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TRANSFORMATIVE LEARNING AS EFFECTIVE DOMAIN OF ENVIRONMENTAL EDUCATION: A STUDY ON WASTE DISPOSAL AMONG 11TH GRADE STUDENTS IN SOME SELECTED SCHOOLS IN NADIA DISTRICT, WEST BENGAL, INDIA

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Abstract
Environmental Education fosters the development of understanding about the environment positive attitude towards the nature, confidence and skills to make positive changes. But the ongoing environmental education curriculum of secondary level has an absence of integration between human and ecological system results 'nature-deficit-disorder'. Predetermined environmental behavior which is acquired through institutionalization process is the major constraint to remove it. To overcome this situation it is necessary to develop social ecological resilience with value-belief-norm aspect in a holistic way and development of significant emotional, transcendent experience with several participatory activities which can produce environmentally sensitive citizenry.

The present paper tries to explore the way of reflective thinking among 11th grade students in some selected schools in Nadia district, West Bengal, India.
After interacting with the students a set of question is administered to obtain their existing knowledge about waste and its disposal system. Then they were exposed to a video film along with some still picture and the same set of questionnaire is re-administered to observe the changes of their behavior. This indicates their reflective thinking with significant emotional and transcendent behavior.

The changes in pro-environmental behavior of the students indicate emergence of transformative learning process which is expected to contribute in the knowledge domain of Environmental Education.

Key Words: Transformative Learning, Waste Disposal, Effective Domain, Environmental Education

Introduction

Environmental education, a lifelong educational process, is responsive to changes in rapidly changing world. While the ultimate aim of environmental education is to develop skill and knowledge needed to identify the quality of life and environment in a multicultural world. But the on going environmental education programs intended to foster healthy development of individual including increased self-awareness, empowerment, positive environmental attitude, commitment to conservation, self confidence and initiative is unable to overcome 'nature-deficit disorder'(Louv, 2006).The lack of integration between ecological system and human system in existing environmental education curriculum along with the institutionalization process has deterred to achieve the desired objectives of social-ecological resilience and sustainability. Pre-determined environmental behavior which the students have already acquired through institutionalization process is the major constraint to remove the 'nature-deficit disorder' and achieve social-ecological resilience. Individual social- ecological resilience which is based on social learning often focuses on participatory activities of the students with significant emotional, transcendent experience acquired from the nature. Reflection of emotional and transcendent experience acquired from nature is often limited towards environmental knowledge and associated behavior. Changes in such pre-determined environmental behavior is the greatest challenge for development of environmentally sensitive citizenry. Following Tbilisi Declaration (1977) the goal of environmental education has undergone several phases of transformation. Against the backdrop of International commitment environmental educational programs and activities are diverse in nature. Many practices and activities especially in general education curriculum are not connected with the purpose articulated in international conference and are inconsistent with them. The inconsistencies in environmental education curriculum are ineffective as potential transformative educational practices.

Transformative learning theory (Mezirow, 2000 and O'Sullivan et.al. 2002) which integrates notion of self reflection and action, is very useful to understand personal growth leading to effective changes in environmental behavior. Transformative learning occurs when a person fails to interpret current experience based on old assumptions. The cognitive system searches for ways to recognize and to discover new constructs. The disconnection between construct and experience allows individual to adapt by transforming himself and learning occurs. Transformative learning involves participation in constructive discourse to use the experience of others to assess reasons justifying these assumptions and making an action decision based on the resulting insight (Mezirow,
2000).

Transformative learning is related to communicative learning i.e. understanding values, concepts and others' point of view. Understanding values, concepts and others' point of view focused on critical self-reflection which led to changes in pro-environmental behavior. The changes in pro-environmental behavior i.e. changes in attitude about waste disposal among 11th grade students in selected schools in Nadia district, West Bengal, India through transformative learning process- looking-gazing-envisioning-responding -thus indicate the effective domain of environmental education.

Review of Literature

After the World Summit in Johannesburg in 2002, the UNO Declared the period 2005 to 2014 as the decade of *Education for Sustainable Development.* To achieve this goal it is necessary to bring changes in people's perception about ecological, economic and social aspects. The challenge therefore, is to integrate the concepts of sustainable development in the educational process. It however necessitates the sensitization and involvement of all people in environmental educational process (http://www.green-dot.org.uk). Based on this knowledge a comprehensive and high impact environmental education programs and communication measures have been introduced to enhance popular awareness for the environment and create the basis for new awareness of responsibilities (http://www.env- it.de). Intentional education means transformation of learners towards well-defined goals while environmental education would mean that learners achieve goals especially dealing with environmental aspects. Such goals can be seen in the usual three categories: cognitive, psychomotor or affective (Schaefer, 1978). Many environmental education programs have recently been introduced in the public schools to help students deal more effectively with the natural and man-made environment. Apart from the effects of the environmental education programs inadequate assessment of the cognitive and affective outcome have deterred the achievements of the instructional procedure. Unfortunately, few instruments (Walls et.al. 2008) distinguish between two types of environmental Education: emancipator environmental education and instrumental environmental education. Schusler and Krasny (2010) report on how emancipator environmental education programs that include opportunities for participatory action to promote positive youth development. Hungerford and Volk (1990) also presented a model of environmentally responsible behavior predictors associated with personal growth, including feelings of environmental sensitivity, empowerment and ownership of nature. This and other evidence suggest an overlap between personal growth and instrumental goals for environmental education (D'Amato and Krasny, 2011).

Mezirow (2000) refers transformative learning as a process by which a person transforms his taken-for-granted frames of reference (meaning perspectives, habits of mind, mind set) to make them more inclusive, discriminating, open, emotionally capable of change and reflective so that they may generate beliefs and opinions that will prove more true or Justified to guide action.

Objectives of the Study

The objectives of the present study are as follows:

1. To find out the existing environmental behavior among 11th grade students in selected schools in Nadia district, West Bengal, India on waste disposal.
2. To find out the change in pro-environmental behavior on waste disposal through transformative learning .

4.0 Materials and Methods

Study Area: The study area includes selected schools in parts of Nadia district, West Bengal, India. In selecting schools different localities and gender is taken into consideration. Four schools are included for the study, among them two schools are from each gender. Regarding locality two schools from rural areas and two schools from urban areas are taken for study. Only 11th grade students of Bengali medium schools from urban and rural areas form the basis of the study.

Methodology: The present study uses descriptive survey method for this purpose which is a present oriented task. To find out the attitude scores of the 11th grade students for both rural and urban areas a psychomotor process is followed. This process is a part of Transformative learning. Fig.4.1 represents a process indicating the different stages of psychomotor process for transformative learning.

Sampling: The present research work is carried out under non-probability sampling technique. For this purpose purposive sampling method is followed for sample selection. The purpose of the present work is to find out the changes in attitude of 11th grade students' towards waste, and its improper disposal. Researcher used random sampling method more specifically, by using random number table for selection of different schools of Nadia district, West Bengal, India. A total number of 201 students consist the sample size for the study.

Fig. 4.1 Stages of Transformative Learning Process

Data collection: For the present study researcher has used standardized questionnaire for data collection. It consists of a series of questions based on environmental education related aspect especially waste and its improper disposal. A total number of 20 positive questions are used. Likert type scale is used for data collection. It is a five point scale. This scale provides a numerical value or weight ranging from 5 to 1 for positive statement. The responses, indicating degree of strength of attitude are:

1. Strongly Agree (SA)
2. Agree (A)
3. Undecided (UN)
4. Disagree (D)
5. Strongly Disagree (SD)

After a brief discussion on waste and its disposal system the questionnaire is distributed among the students for obtaining the existing knowledge on waste disposal. The students are given 45 minutes to complete the task. Once the task is completed the students were exposed to a video film on waste and waste disposal system. They were again allowed to a brief interaction on waste and waste disposal. The same set of questionnaire is re-administered to obtain the change their existing knowledge on waste and waste disposal.

5.0 Results and Discussion

Table 5.1 Summary Table of Collected Data on Total Students

Gender	Before Watching The Video			After Watching The Video		
	N	M	S.D.	N	M	S.D.
Total Boys	93	*83.4*	7.3	93	*91*	5.2
Total Girls	108	*85*	8.2	108	*90.6*	6.53
Total	201			201		

Source: Compiled from primary survey data

Table 5.1 shows the total number of students (N), the mean value (M) and standard deviation SD(σ). From the table (5.1) it is observed that the mean value (M) has increased for both the gender (boys and girls) after exposure to the video while the standard deviation (SD) has decreased for both the cases. The same trend is observed for both rural and urban areas. It could be discerned from the observed value that the exposure of students to video has to some extent changed their taken- for-granted frame of reference towards waste and its disposal systems.

Table 5.2 Summary Table of Correlation (R) of Total Students

Gender	Number of students	Correlation (r)
Total Boys	93	0.5
Total Girls	108	0.7

Source: Compiled from primary survey data

The correlation (r) of obtained scores (Table 5.2) also indicate strong positive correlation (0.70 and 0.50) before and after exposure of students to video for both the gender. Further analysis of obtained scores reveal that strong positive correlation exists in case of urban students compared to rural students regarding waste and its disposal systems. It could be said that the introduction of waste collection by civic authorities has a significant role in the pro-environmental behavior of the urban students.

Fig. 5.1 Attitude Score Before and After Watching the Video of Total Boys

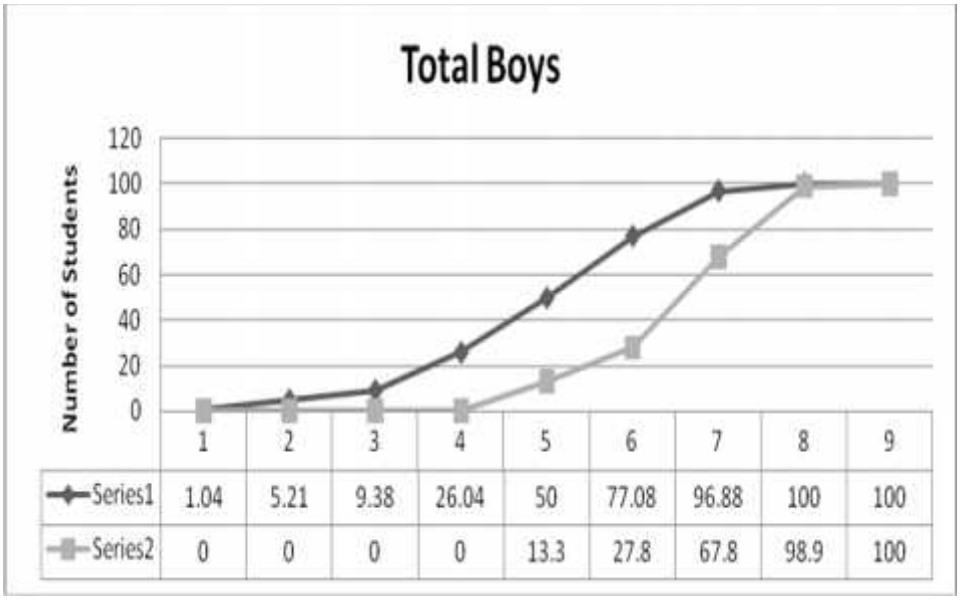

Fig. 5.2 Attitude Score Before and After Watching the Video of Total Girls

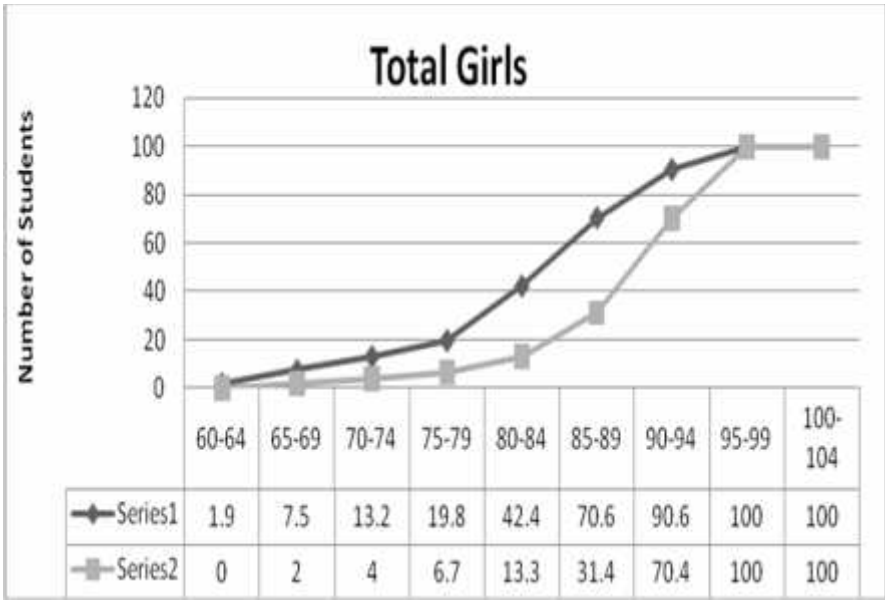

Fig. 5.1 and 5.2 show the ogive curves of attitude scores for both the boys and girls students.

The analysis of curves indicates that the exposure of students to video is very effective and significant as the class interval (90-94) has recorded the highest value (26%). The loop area in the corresponding curves shows the changes in their attitudes towards waste and its disposal systems. The same trend is also observed for both rural and urban students.

Inferential Statistics

Table 5.3: Summary Table of Inferential Statistics of Total Students

Gender	Before watching the video		After watching the video		df	't' value
	Mean	S.D.	Mean	S.D.		
Total Boys(93)	83.4	7.3	91	5.2	(186-2) =184	*t =1.73 t <0.01*
Total Girls(108)	85	8.2	90.7	6.53	(216-2) =214	*t =5.03 t >0.01*

Table 5.3 shows the *t* test value of the total students (both boys and girls) before and after exposure to video on waste and its disposal systems. It is revealed from the table that it is not significant at 0.01 levels for boys while it is significant for girls at 0.01 levels. Further analysis of variance (*t* test) for the treatment group (rural students) is significant at 0.01 levels. The analysis of variance indicates that rural students (both boys and girls) are relatively conscious towards waste and its disposal system. The plausible reason may be that their activities are more nature oriented. The taken-for-granted frames of reference attitude towards waste has allowed them to transform after a short exposure to video in the class room situation. It means that transformative learning process has initiated, however it is just the beginning. The continued exposure to video may help them to achieve proper understanding and change their behavior towards waste and its disposal systems.

Interaction effect of exposure to video

The term environmental consciousness in this paper is defined as the phenomena of thinking about, feeling for, speaking about and acting upon the natural world outside oneself (Sanchez and Lafuente, 2010). This definition for the concept of environmental consciousness is very useful because it addresses the holistic nature of education that strives to help the pupils expand their worldview through their emotions, internal thoughts, external speech and actions (Eisner,2002). The importance of this construction is that it involves a bidirectional effect to and from each of the dimensions. The value- belief-norm aspects aim to create a conceptual framework of environmentally significant behavior. It attempts to discover the casual variables that direct a person towards pro-environmental behaviors and describes four major factors, e.g. attitudinal, contextual, personal capabilities and habit. For the purpose of the study an environmentally conscious person is defined as one which would score higher than average on several of the affective and cognitive aspect of measurement.

Data generated through survey on effective domain on environmental education on waste disposal among the 11^{th} grade students in selective schools indicate that value-belief- norm aspect of environmentally significant behavior is dependent upon personal capabilities and habit. While the gender and locality has any considerable impact in environmentally sensitive behavior. It has been observed from data analysis that pupils are more active when they are exposed to a discussion along with a video show on the adverse effect of accumulation and scattering of waste. The looking-gazing-envisioning-responding aspects lead the students to respond in a better way which has provided a higher attitudinal score irrespective of gender and locality.

The plot of ogive curves (Fig. 5.1 and 5.2) indicate that the calculated values of attitudinal score is concentrated at higher class interval (85-99) while the loop area remains almost the same for both gender and locality. The interaction effect of attitudinal scores for both the gender and locality is statistically at per.

Conclusions

From the above study it can be concluded that girls react more than the boys. Boys have more preliminary knowledge about waste and its disposal systems than girls, but after exposure to video a significant change is observed among the total girls than the total boys.

Significant change in attitudinal score is observed among the rural boys and rural girls before and after exposure to video on waste disposal. Thus, it can be said that both rural boys and rural girls have existing nature oriented attitude which have recorded substantial change after

Exposure to video about waste and its disposal systems. So the reaction is really a very positive indication of transformative learning process.

Urban boys with a positive concept recorded no significant difference between their reaction of before and after exposure to video. But, the urban girls revealed a significant difference of their attitude towards waste and its disposal system before and after exposure to video. The exposure of students to video has initiated transformative learning through the psychomotor process of looking-gazing-envisioning-responding, thus establishing the effective domain of environmental education.

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