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THE PREDICTIVE MODEL FOR ENVIRONMENT RELATED BEHAVIOUR REGARDING LOCUS OF CONTROL AND ECOLOGICAL VALUE



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Abstract: There are various internal and external factors which influence environment related behavior. The present study only sought to measure the effect of locus of control, utilisation and preservation as ecological values. The construct of environment related behaviour has been researched extensively across diverse social situations. But there is hardly any empirical study on environment related behaviour in the context of students with visual impairment. Cross-sectional empirical study was based on survey type research design. The sample (N=240), comprising students studying in grade IX to XII, was drawn from special and general educational institutes in West Bengal. Sampling decisions are made for the explicit purpose of obtaining the richest possible source of information to answer the research questions. The Bengali adaptation of locus of control scale (Julian Rotter, 1966), ecological value (Wiseman and Bogner, 1999) and environment related behaviour scale (constructed and standardized by the researcher) were used to collect relevant information. Except utilisation all the independent (preservation and locus of control) variables considered in the present study were the successful predictors of the environment related behaviour of the total students with visual impairment.

Key words: Environment related behaviour, Type of visual impaired, Types of educational institution, Gender, Inclusion and Students with Visual Impairment.

INTRODUCTION:

The development of environment related behaviour or environmental activism is strongly related to philosophical factors and essential psychological factors rather than mere accumulation knowledge. This has been proved time and again by previous researches. But researches in this respect on students with visual impairment are far from adequate indicating a research gap necessitating further research on this aspect as no empirical work was found relating value, locus of control and environment related behaviour. In environmental educational research the initial emphasis was on environmental knowledge, and awareness to develop environment related behaviour. Later on the researcher found out that awareness per se is not adequate to precipitate environment related behaviour. Rather the psychological and philosophical factors like affect, value system, motivation including locus of control, personality traits play important role in this regard along with external factors like infrastructure, social cultural, political factors and economic situation (Kollmuss and Agyeman, 2002). In environment related researches, the initial trend was dominant social paradigm indicating anthropocentric approach. Now the researcher are more inclined to paradigm shift from DSP (Dominant Social Paradigm, which is essentially anthropocentric) to NEP (New Environmental Paradigm, basically ecocentric approach), indicating the crucial role of affective factors like relevant values and psychological variables as motivation. In this context the ecological value and locus of control are worth studying in relation to environment related behaviour. This change in outlook emphasizes more on humanistic values and human being's control over his own action vis-à-vis environmental protection.

The literature survey has helped to identify the relevant variables in the context of environment related behaviour which is dependent variable and ought to be developed among the students. It is further argued that environmental knowledge and awareness are necessary but not sufficient conditions for precipitating such behaviours. The studies have focused the role of psychological factors like ecological values, locus of control and motivation in this respect. The literature survey has revealed that the studies of these factors vis-a-vis environment related behaviour has started in other countries but their number in our country is very small. The environment related behaviour is often situation specific and as such these types of studies should be undertaken in different contexts. Ecological value and its relation with environmental behaviour have been investigated in other country but no such research was found in our country. Similarly studies integrating locus of control with environment related behaviour have been found to be very few and far between. Obviously there is a huge gap in environmental education research in this area which is needed to be investigated.

However hardly any empirical study is available to show the role of locus of control in developing the environmental awareness and environment related behaviour amongst the students with visual impairment. Moreover such types of research are also scarce in the context of students with normal vision. The survey of literature also failed to locate any study on environmental education with students with physical impairment including students with visual impairment. This is an uncharted area of research which should be studied in right earnest to give a fillip to the policy of inclusion. Researches in this respect on students with visual impairment are far from adequate indicating a research gap and lack of empirical work especially studies related to value, behaviour and locus of control. However, a few empirical researches conducted by the authors showed activity method of teaching environmental education improved the pro environmental behaviour of students with visual impairment (Sengupta, Banerjee and Maji, 2009). Regarding of environmental awareness and behaviour gender difference was observed among the school students with visual impairment (Sengupta, Banerjee and Maji, 2008, 2010, 2012). Another empirical study revealed that academic achievement impacted on ecological value of the students with visual impairment (Mukherjee and Maji, 2011). So it is expected that this study will not only clarify the relation among relevant variables but also develop new perspective on visual deprivation and environmentalism.

OPERATIONAL DEFINITION OF USED IMPORTANT TERMS Locus of Control

Locus of control is a personality construct referring to an individual's perception of the locus of control of events as determined internally by his/her own behavior versus fate, luck or eternal circumstances (Grantz, 1999). According to Rotter's theory (1966), Locus of control refers to the extent to which individuals believe that they can control events that affect them. Expectancies are the result of reinforcements, which act to either increase or decrease the expectancy that a particular behavior will lead to further reinforcements. LOC as a concept has been found to explain the prediction of behaviour. Locus of control can again be of two types-

Internal locus of control— Individual believes that his/her behaviour is guided by his/her personal decisions and efforts. External locus of control - Individual believes that his/her behaviour is guided by fate, luck, or other external circumstances

Internal People are those who determine their own life outcomes by being active and effective agents of change while external people belief that their life outcomes are the results of luck, chance, fate, or powerful others, beyond their control.

Ecological Value

Values indicate the worth, usefulness or importance of a thing, object or an issue. Value is personal view and opinion which are held in high esteem by and individual. Thompson and Burton (1994) mentioned about ecocentric

values and anthropocentric values in the context of environmentalism. Previously it was postulated that and individual is either anthropocentric or ecocentric in his approach to environment. Ecological values are environmental views of a person who thinks strongly about it. Bogner and Wiseman (1999) proposed two dimensions of environmental perception namely utilisation and preservation. Subsequently it was designated as Model of Ecological Value (Wiseman and Bogner, 2003). The Model of Ecological value is a different approach to environmental perception. However, Bogner and Wiseman (1999) postulated that biocentricism or preservation and anthropocentricism or utilization is two separate views and they are not necessarily related. Preservation is the biocentric dimension of perception, which is concerned with conservation, and protection of environment. Utilisation on the other hand is anthropocentric dimension with the objective of utilising natural resources (Wiseman and Bogner, 2003).

Environment related behaviour

The environment related behaviour has been extensively studied as it is the ultimate objective of environmental education. One short coming of the study of environment related behaviour is that although a broad range of different behaviours have been included but the situational factors were often ruled out. The situational factors are sometimes beyond the control of the individual for which despite the existence of behaviour intention, the actual behaviour may not take occur. The problem is that the planned behaviour theory focuses on the role of individual, neglecting wider social issues (Bamberg & Moser, 2007). Peoples' behaviours are preceded by behaviour intention and other normative factors. Environment related behaviour as the sort of behaviour that consciously seeks to minimize the negative impact of one's actions on the natural and built world. It is observable and reported behaviour of the individuals, either done or willingness to do in future, regarding the protection of the environment for examples civic responsibility, personal life style change, individual civic action and cooperative civic action.

METHODOLOGY

This study is a cross-sectional empirical study based on descriptive survey research design. This is a corelational research design in which case the researcher seeks to understand the relationship between dependent and independent variables.

Sample

The population of the present study comprises the students (N=240) with visual impairment studying in classes IX to XII (age range 14-25 years) in schools situated in urban and semi-urban areas of West Bengal and affiliated to West Bengal Board of Secondary Education and West Bengal Council Higher Secondary Education. The population also includes special educational institutes (segregation of the students with special needs) and the general educational institutes (inclusion of the students with special needs). The sample was drawn from total number of 62 schools (both

special and general educational institution) from various districts. This study will make use of purposive sampling. This simply means that participants are selected because of some defining characteristic that makes them the holders of the data needed for the study. Sampling decisions are therefore made for the explicit purpose of obtaining the richest possible source of information to answer the research questions.

Instruments

i) Locus of Control Scale (LOCS)

The Bengali adaptation of locus of control scale (Julian Rotter, 1966) was standardised by the investigator. The original scale had 29 items. The adapted version included 18 ones eliminating the rest which were not suitable for the sample group. Each item has two alternatives, one related to external locus of control and the other to internal control. The participant has to choose one of the alternatives. Scoring was done by granting 1 for item indicating internal locus of control and 0 for the item indicating external locus of control. The high scores (8-15) indicate internal locus of control and low scores (1-7) depict external locus of control. The tool was standardized on a separate sample group (N=60). The reliability of the test was determined by Cronbach alpha (0.69). The item validity was tested by Tetrachoric correlations were also calculated and the values varied from 0.3-0.7.

ii) Ecological Values Scale (EVS)

The study of ecological value scale began with the concept of environmental worldview. The ecological value scale (20 items) constructed by Wiseman and Bogner (1999) was translated into Bengali and two items were modified in such a way so as to suit the purpose of the present research. The tool was standardized on a separate sample group (N=60). The reliability of the test (Likert type 5-point) was determined by Cronbach alpha (0.64). The item validity was tested by Tetrachoric correlations and the values varied from 0.2-0.8.

iii) Environment Related Behaviour scale (ERBS)

By environment related behaviour it is meant the observable and reported behaviour of the individuals, either done or willingness to do in future, regarding the protection of the environment. The factors included were behaviour related to civic responsibility, personal change, individual civic action and cooperative civic action etc. The researcher developed the Likert type (5-point) scale (25 items) having a reliability (KR-21) value of 0.82. The item validity was tested by Tetrachoric correlation and the values varied from 0.2-0.7.

PROCEDURE

The researchers first contacted teachers, head of the institution, NGO and hostel authority (where students with visual impairment are living). With the help of head of the institution, the researcher contacted students with visual impairment to get permission from them. After the permission was secured the students with visual impairment were interviewed. Before starting the interviews, head of the

institution were informed about the objectives of the study and assured their identity will be kept confidential. The students were also similarly assured that the interview will remain confidential. Only interested students with visual impairment were asked to take part in the study. For quantitative approach, in the first phase of the research, three research questionnaires were developed, adapted and standardised. The standardised tools are then applied for actual research. As the questionnaires were not in Braille form, the researchers read out the items to the students and tape recorded their responses. Approximately a range of thirty minute to one hour was required to interview each student. For this reason students met the researcher after or before the school hours and sometimes at their hostel. The researcher tried to maintain the objectivity as far as possible.

Data were analysed by using SPSS v.17. The most useful approach to the prediction of dependent variable from a set of independent variables is step-wise multiple regressions. One specific advantage of the application of step-wise multiple regression analysis is the possibility of valuating the relative contribution of the set of independent variables. This would provide a picture of nature and extent to which independent variables were involved in predicting the dependent variable (Basantia, 2000). The multiple regression equation used here was as follows-

$$Y = a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_1 X_n$$

Where Y denotes the outcome variable and may be predicted from a linear combination of the scores on different independent variables $(X_1, X_2, X_3, \ldots, X_n)$ multiplied with their beta coefficient $(\beta_1, \beta_2, \beta_3, \ldots, \beta_n)$ and intercept or constant (a) of the regression line.

RESULT AND DISCUSSION

In the present investigation, the researcher applied step-wise multiple regression procedure on few variables to predict. In this analysis, environment related behaviour of the students with visual impairment was treated as the dependent or outcome variable and the scores on locus of control, preservation and utilisation were independent or predictor variables. Step-wise multiple regression analysis was carried out to find out the maximum possible variance in environment related behaviour of students with visual impairment that could be explained with the help of each of the independent variables (Basantia, 2000). Results of the step-wise multiple regression was been presented in Table-1, Table-2, Table-3 and Table-4.

Table -1: Descriptive Analysis in Relation to Regression Analysis for Students with Visual Impairment (N=240)

	Mean	Std. Deviation	N
ERB	92.42	13.754	240
LOC	8.02	3.21	240
U	27.02	6.448	240
P	38.42	5.293	240

Model	R	R Square	Adjusted R Square	F	Sig.	Durbin-Watson
1	.509 ^a	0.259	0.256	83.077	$.000^{a}$	1.615
2	.590 ^b	0.348	0.343	63.322	.000 ^b	1.015

- a. Predictors: (Constant), P
- b. Predictors: (Constant), P, LOC
- c. Dependent Variable: ERB

Table -3: Step-wise Multiple Regression of Environment Related Behaviour with the Predictor Variables for Students with Visual Impairment (N=240)

			Unstand	dardize	Standardized					Collinearity	
			Coeffi	cients	Coefficients			Correlation		Statistics	
	Predictor			Std.				Zero-			
Mode	l Variables	Constant	В	Error	Beta	t	Sig	order	Partial	Tolerance	VIF
	1 P	41.635	1.322	0.14	0.509	9.115	0.00	0.509	0.509	1	1
	2 P	43.887	0.969	0.15	0.373	6.479	0.00	0.509	0.388	0.83	1.20
	LOC		1.408	0.24	0.329	5.706	0.00	0.483	0.348	0.83	1.20

Table -4: Step-wise Multiple Regression of Environment Related Behaviour with the Excluded Variable for Students with Visual Impairment

						Collinearity Statistics
Model		Beta In	t	Sig.	Partial Correlation	Tolerance
1	LOC	.329a	5.706	0.000	0.348	0.83
	U	.166ª	2.983	0.003	0.19	0.968
2	U	.081b	1.455	0.147	0.094	0.878

- a. Predictors in the Model: (Constant), P
- b. Predictors in the Model: (Constant), P, LOCc. Dependent Variable: ERB

(i)Model-1 (Predictor: Preservation)

From the Table-2, and Table-3, it was seen that the first variable entered in the step-wise multiple regression analysis was preservation. The multiple correlation (R) obtained was about 0.509. The value indicated that the strength of the relationship between the two variables was about 50.9%. The F-value for the first model was highly significant [F (1/238) = 83.077, P<0.01]. This result showed that the first model significantly improved the ability to predict the outcome variable (ERB).

The coefficient of multiple R square was 0.259. This showed that 25.9% of the variance on environment related behaviour of students with visual impairment was accounted by the preservation scores. Moreover, the adjusted R square was 0.256 and difference between R square and adjusted R square was 0.259- 0.256= 0.003. This shrinkage means that it would account for approximately 0.3% less variance in the outcome, if the model was to be derived from the population rather than a sample.

The standard error of estimate for the model was 0.145. The t-value of the model was highly significant (9.115, P<0.01), which revealed that the Beta value (1.322) differed significantly from zero. In other words, the predictor was making a significant contribution to the model. The intercept value that it would be considered in the equation, at the end of the first step, with which prediction of the environment related behaviour would be possible, was 41.635.

(ii) Model-2 (Predictor: Preservation and Locus of control)

The 2nd and last variable entered in the final step of regression analysis was locus of control score. From Table-2, it was found that the multiple R obtained was about 0.590, which revealed that the strength of the relationship between the predictor variables and environment related behaviour was about 59%. It would also be observed from the table that the F-ratio was highly significant [(2/237) = 63.322, P<0.01]for this model. The coefficient of multiple R square 0.348, which indicate that 34.8% of the variance on environment related behaviour could be explained with the help of preservation and locus of control. The calculation of adjustment R square gave some idea how well the model could generalize over population. The difference between R square and adjusted R square for the final model was about 0.5% (0.348-0.343= 0.005). This shrinkage means that it would account for approximately 0.5% less variance in the outcome, if the model was to be derived from the population rather than a sample.

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From Table-3, it could be seen that the intercept of the model was 43.887 and Beta value were 0.969 for preservation and 1.408 for locus of control, which standard error of 0.15 and 0.247 respectively. To determine whether or not the Beta value differed from zero, t-tests were conducted. For the model, the t-value for the preservation (t=6.479, P<0.01) and the locus of control (t=5.706, P<00.1) were all significant predictors of environment related behaviour. But from Table-4, it was seen that the utilization (t=1.455, P=0.147, which was greater than 0.05) did not successfully predict the outcome variable (ERB).

(iii) Beta Value Analysis

The calculations of Beta value were important because they would explain the relationship between environment related behaviour and each predictor. Positive Beta value represented the positive relationship between predictor and the outcome and negative value represented negative relationship. For the present analysis of Model- 2, all the two predictors had positive Beta values (Table-3). Thus when the predictor variable was increased, the environment related behaviour would also increase. Apart from these, Beta values expressed the degrees of each predictor effect on the outcome when the effects of all other predictors were held constant.

Preservation Status (B=0.969): This value indicated that when preservation increased by one unit, environment related behaviour would increase by 0.996 unit. This interpretation was true only when the effect of locus of control and utilisation were held constant.

Locus of Control Status (B=1.408): This value indicated that when locus of control increased by one unit, environment related behaviour would increase by 1.408 unit. This interpretation was true only when the effect of preservation and utilisation were held constant.

(iv) Standardized Beta Value Analysis

The standardized version of the Beta values was in many ways, easier to interpret because they would tell the degree of change in outcome variable (ERB) as a result of change in one standard deviation of the predictor variables. Preservation Status (Standardized B=0.373): This value indicated that with the increase of preservation by one standard deviation (5.293), the environment related behaviour of students with visual impairment would increase additional 0.373 standard deviation. The S.D. for environment related behaviour was 13.754 and this constitute a change of 5.13 (0.373 x 13.754) in their environment related behaviour. This interpretation was true only if the effects of locus of control and utilisation were held constant.

Locus of control Status (Standardized B=0.329): This value indicated that with the increase of locus of control by one standard deviation (3.21), the environment related behaviour of students with visual impairment would increase additional 0.329 standard deviation. The S.D. for environment related behaviour was 13.754 and this constitute a change of 4.53 (0.329 x13.754) in their environment related behaviour. This interpretation was true only if the effects of preservation and utilisation were held constant.

(V) Checking Assumptions for Multiple Regression Analysis

To draw conclusions about the population, based on a regression analysis of the present sample, following assumptions were made:

Assumption of Independent error: To check the assumption of independent error Durbin-Watson statistics was calculated which informed about whether the assumption of independent error was tenable. As a conservative rule, the value less than 1 or greater than 3 definitely raise alarm bells (Field, 2000). From Table- 3, the Durbin-Watson value was 1.615, which was so close to 2 that the assumption had almost certainly been met.

Assessing the Assumption of No Multicollinearity: When the predictor variables are highly correlated with each other, it is technically known as multicollinearity. The regression model failed to predict successfully if multicollinearity is high. The SPSS provided the VIF (Variance Inflation Factor) and tolerance statistics. The VIF indicated whether a predictor had a strong linear relationship with the other predictor. In this respect Bowerman and O' Connell (1990), suggested that if the average VIF was substantially greater than 1, then multicollinearity might bias the regression model. The tolerance statistic was related to VIF, which was its reciprocal a potential problem. From Table- 3, it was evident that the tolerance statistics were all above 0.2 and the average VIF was very close to 1 and this confirmed that the collinearity was not a problem for this model.

CONCLUSION

In the present investigation step-wise multiple regression analysis was made to predict the environment related behaviour (ERB) of the students with visual impairment with the help of their locus of control (LOC), preservation (P) and utilisation (U). The findings revealed that except utilisation (U) all the independent variables were able to predict successfully the environment related

behaviour of the total students with visual impairment. Regression analysis findings also revealed that 25.9 % of variance on environment related behaviour (ERB) of the students with visual impairment was accounted by preservation (P) scores and 34.8 % of variance by preservation (P) and locus of control (LOC) scores. The equations are -

ERB = 41.635 + 1.322 (P).....1

 $ERB = 43.887 + 0.969 (P) + 1.408 (LOC) \dots 2$

The study had pointed out the role of locus of control and ecological value in developing environment related behaviour. It implies that the teachers help the students to become more internally controlled. They should endeavour to inculcate the value of preservation regarding environment by means of various educational activities. Since environmental education is a multidisciplinary subject, all the teachers from the different disciplines should be encouraged to bring up environment related issues while teaching their subject by following the method of correlation. As the students are unable to see the nature and its degradation so the teachers have the added responsibility of interpreting these issues orally to them. It implies that locus of control and ecological value help to develop environment related behaviour. So in classroom situation, the teachers should learn the psychological techniques of making students more internally controlled.

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