

## **Hands on experience, community participation, observation, field visit, multimedia and demonstration are the predictors of environmental awareness: a hierarchical multiple regression analysis**

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**Abstract:** The aim of this study was to determine the relationship among hands on experience, community participation, observation, field visit, multimedia and demonstration for the prediction of environmental awareness among university students. For this study, 50 Assam University students have voluntarily joined as the sample. After a series of activities, the data were collected by environmental awareness scale (EAS) that was four-point Likert scale and has total of 30 items. The hierarchical multiple regression analysis technique was used to find out the relationship among the variables (e.g., hands on experience, community participation, observation, field visit, multimedia, and demonstration), the predictors of the environmental awareness. These variables were mostly independent and responsible for environment awareness, the dependent variable. The findings established from hierarchical regression, students' hands on experience-enhanced environmental awareness, but not community participation or field visit.

**Keywords:** hands on experience; community participation; observation; field visit; multi-media; demonstration; environmental awareness.

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### **1 Introduction**

Environmental education was not a new discipline but a new dimension in the existing curricula cutting across different disciplines. It should, therefore, form an essential component of all programmes and courses of the existing education system (Brenchin

and Kempton, 1994). In content, environmental education should include ecological concept and natural as well as socio-economic aspects of the environment (Aldridge and Fraser, 2000). In our present-day civilisation, we have witnessed environmental problems arising out of overpopulation, depletion of natural resources, food shortages, sprawling cities and the pollution. Solutions to the crisis facing us today can be appreciated and understood only by obtaining a basic background in some of the scientific concepts which are essential for social science teachers and supervisors (Dunlap et al., 1993; Widegren, 1998). Pre-service teachers have also been introduced to strategies for (Ajiboye and Silo, 2006) planning, development, implementation, management and evaluation of secondary school social science curriculum in environmental education (Anderson et al., 2004). However, equipping the teachers with essential concepts of environmental education with the skills and strategies for its design and teaching may not be enough for the successful implementation of environmental education programmes in schools (Bain et al., 1998; Fien and Trainer, 1993; Yılmaz et al., 2007). All educational systems have several constraints that hinder innovations (Angel, 1991). It is necessary to identify and control such constraints. Sometimes, these constraints go beyond the control of the classroom teachers. In such situations, social science supervisors have to play their key roles. They can create conditions in schools, for curriculum and teaching. In fact, it is necessary to provide support for environmental education programmes at different levels. They are school, education system and the community. Within the school the constraints are timetable difficulties, conflict with traditional teaching approaches, lack of resources and lack of cooperation from other staff members and administrators (Barratt et al., 2007). Within the education system, constraints are in the form of overcrowded curriculum, unsupportive examination system and financial difficulties. Social science teachers and supervisors should try to identify the major constraints and to find solutions for these problems (Brok et al., 2006; Dhindsa and Fraser, 2004). To meet these objectives, a number of guiding principles have framed for environmental education curriculum developers. This relates to the design and structure of educational content, educational strategies and learning procedures (Dietz et al., 1998). It is emphasised that environmental education is a continuous lifelong process, follows the problem-solving interdisciplinary approach, inquiry-based learning which adopt a world outlook with due regard to regional differences (Boyer, 1990; Dochy et al., 2005). In acquisition and transfer of learning, practical activities and first-hand experience were to be given due stress (Dewiyanti et al., 2007). Creation of environmental awareness among the students and its success is now is limited news paper, seminar and conferences (Dunlap and Scarce, 1991; Furman, 1998; Gardos and Dodd, 1995). The people who are preparing the strategy, actually they himself not utilises in their daily life (Dunlap, 1989). It needs hands-on experience, community participation, observation, field visit, application of multimedia and demonstration by the policymakers and the clever educationist, students of all levels of the world (Dellar, 1999). So many questions arise in the mind that:

- 1 Are the hands-on experience, community participation, observation, field visit, application of multimedia and demonstration are sufficient for university students to redirect their awareness and actions to create a more sustainable planet (Fien, 2000)?
- 2 What types of novel activities and experiences should provide to the students, then they will learn and they will go into environmental issues in-depth?

- 3 How university students will get knowledge, through hands-on experience, about their immediate environment, interactions within it and the problems therein?
- 4 What are the activities requisite for the student's keen observation, experimentation, survey, recording, analysis and reasoning for conserving the environment through various activities?
- 5 How can the teachers develop the proper environmental awareness and attitude towards the environment and its conservation through community interactions?
- 6 How environmental awareness issues related to environment and development through field visits and demonstrations.

Environmental awareness and Training plays a significant role in encouraging and enhancing people's participation in activities aimed at conservation, protection and management of the environment, essential for achieving sustainable development. Therefore, it is necessary to give priority for the promotion of non-formal environment education and creation of awareness among all sections of the society through diverse activities using traditional and modern multimedia. These activities are seminars, workshops, training programmes, camps, rallies, public meetings, exhibitions, essay/debate/painting/poster competitions, folk dances and songs, street theatre, puppet shows, preparation, and distribution of environmental education resource materials (Kickbusch, 1987; Liere et al., 1981; Shobeiri et al., 2006) etc. Diverse target groups encompassing students, youth, teachers, tribal, farmers, other rural population, professionals and the general public which are the vectors needs environmental awareness (Mansaray and Ajiboye, 1997; Rudel and Roper, 1997).

## **2 Review of related literature**

### *2.1 Hands-on experience*

Direct action taken by individual for gaining of knowledge, called hands-on experience. Environmental education is only possible by individual's active participation in the work. Studies conducted by Gill et al. (1986) found hands-on experience aware the learners about pollution and its causes. Experience made perfect among 2,000 secondary school learners through community work and students realised the value of environmental components (Claudet, 1999; Kempton et al., 1995).

### *2.2 Multi-media*

TV, radio, computer and newspapers aware people towards environment and its related events and found that there existed significant positive relation with peoples' environmental concern (Buerck et al., 2003; Rudel and Roper, 1997). Deforestation reduced in local community after video conference and TV broadcasting. Study conducted by Bandhu and Dyal (1999), and Sinlarat (1993) found entertainment programme regarding environment promotes consciousness among primary students. Similarly, study conducted by Das (2001) found that the impact of TV, radio on environmental awareness is significant and positive. Web-based learning (Chou and Liu,

2005), innovative learning (Chou, 2005), constructivist internet-based learning (Chuang and Tsai, 2005) are appropriate for environmental awareness.

### *2.3 Observation*

Direct observation play a significant role in environmental awareness. The community member realised that pollution control reduces diseases among peoples of the society. Similarly, study conducted by Bandhu and Dayal (1999) found that observation is a formal approach of environmental education for sustainable development of environment. Observation is both informal and non-formal in environmental education (Sonneborn, 1994). Polluted site visit and keen observation and realisation of manmade pollution has significant impact on future environmental awareness (Tietenberg, 1997).

### *2.4 Field visit*

Environmental education directly linked with field visit and it is the mutual concern among community and participants (Dietz et al., 1998). Study conducted by Yilmaz and Öz (2004) found that field visit determines the public awareness towards environmental concerns (Chau et al., 2002). Similarly, waste reduction and recycling, site visit can enhance environmental awareness (Chung and Poon, 1999).

### *2.5 Demonstration*

Experimental work, cause and effect relation, laboratory work can clarify the concept regarding health and environmental problems. Demonstration, regarding environmental issue affects the attitude of people significantly than other technique (Weigel and Weigel, 1978). Study conducted by Yong (1993) found that demonstration is a formal approach of environmental education which directly influences the environmental awareness scores among students but college students have no such strong motivation towards demonstration method regarding environmental issues through computer (Admiraal et al, 1998).

### *2.6 Community participation*

School community participation in village waste management affects directly the environmental awareness among future students and parents (Sonneborn, 1994; Yong, 1993). Study conducted by Dunlap and Scarce (1991) and Sinlarat (1993) found that environmental problems and their protection are the challenging issue for the society. Earth education must be compulsory among the students at all levels (Buttel, 1996). Community participation in social forestry today is the important component of environmental education, which was a supplementary economic support for the local people (Buttel, 1996).

### *2.7 Environmental awareness*

Recently global warming and ozone depletion are the global issues which are manmade (Liere et al., 1981; Stern and Oskamp, 1987). Environmental awareness is a social and ecological need (Brenchin and Kempton, 1994). Study conducted by Tarrant and Cordell

(1997) found that awareness of the people somehow increased after repeated earthquake, Tsunami and draught. Socio economy of people some extent affects environmental awareness (Çabuk and Karacao, 2003). Similarly study conducted by Tuncer et al. (2005) found attitude of young people have strongly positive towards environmental awareness and sustainable development of the world (Çabuk and Karacao, 2003). It was very difficult to predict whether relationship exists among multimedia, observation, demonstration, hands-on experience, field-visit and community participation with environmental awareness or not. That is why the present study was undertaken.

### **3 Objectives of the study**

- 1 To study the effective relationships among multimedia, observation, demonstration with hands-on experience, field visit and community participation for the predictions of environmental awareness among university students.

### **4 Hypothesis**

- 1 There exists significant relationship among multimedia, observation and demonstration with hands-on experience, field visit and community participation for prediction of environmental awareness among university students
- 2 There exists significant relationship among Hands-on experience, field visit and community participation with environmental awareness among university students
- 3 There exists significant relationship among multimedia, observation and demonstration with environmental awareness among university students.
- 4 There exists significant relationship among multimedia, observation, demonstration, hands-on experience, field-visit and community participation with environmental awareness among university students.

### **5 Methodology**

This study was an Experimental study which was statistically analysed by hierarchical multiple regression technique and the research seeking to identify regression of students' awareness towards environment (Aiken and West, 1991; Berry, 1993). The selected independent variables, such as multimedia, observation, demonstration, hands-on experience, field visit and community participation were predicted preferences for environmental awareness. This type of research is useful in studies concerned with prediction for describing relationships.

#### *5.1 Sample*

The study involved 50 students at Assam University in India. There were 50 voluntary participants of different departments were included in the experimental group and no

control group. Students involved in the study were from the department of ecology and environmental sciences, education, life sciences, sociology and social works. Therefore, the sample of this study was purposive.

## 5.2 Tool

### 5.2.1 Environmental awareness scale

The environmental awareness scale (EAS) contains 30 items and having four point responses. EAS has six sub areas like: (Hands on experience, community participation, observation, field visit, multimedia and demonstration). Within 10–15 minutes, the students have responded 30 items. Alpha reliabilities for the scale in the initial pilot sample ranged from .71 to .80. The alpha reliability for the overall instrument, measuring the overall disposition toward EAS, was .75. The instrument was administered to two additional samples totalling 100 university students. The alpha levels in the later samples remained relatively stable (ranging from .60 to .78 on the scales and .69 overall), thus empirically supporting the internal reliability of the instrument and each scale. (Appendix) At the end of the experimental intervention or the activities the EAS was administered upon the whole sample.

## 5.3 Procedure

### *Challenging modes for environmental awareness: a positive paradigm shift in front of world of education*

Environmental education is a challenge in front of world of education, starting from grassroots level to higher levels, that how student, and world existing population will realise and practise the teaching objectives. Teachers, policy makers, and curriculum framers only frame the strategy in the written and modes of speech, but in practical situation nothing happens. Who will implement it, is the recent question? People realised that global warming is the important cause of carbon dioxide accumulation in the atmosphere but even now it is limited in the class discussion, seminar, and conference. The person who frames the strategies first they break the protection sealed by using, doing, activating and polluting materials. So, it is a debate now, how the student realise the practical ecology and environment. In this context, it should not be limited to classroom transaction, but to apply it in the community and local market place also. The following activities were belongs to *challenging modes for environmental awareness programme*.

### 5.3.1 Activity I – hands on experience

The students were assigned to plant inside university campus and they prepared a report within two days. After this hands-on activity students were assigned to research and write an essay on the benefits of trees such as producing oxygen, filtering carbon dioxide, reducing ozone levels in urban areas, as well as providing shelter for animals and shade for people. In addition, students were advised to outline their project and post the benefits of hands on experience, so their peers can understand its purpose.

### 5.3.2 Activity II – community participation

Students were advised to clean the glass, paper products, plastic grocery bags, aluminium, cardboard, tin cans, scrap metal, motor oil, tyres, tube, ink cartridges, household appliances such as refrigerators, computer equipment and other electronic devices, athletic shoes near hostel and staff quarters. The researcher also had given them the idea of recycled content, green paper and use of fertiliser.

### 5.3.3 Activity III – observation

Students were directly observed air and water pollution and its harmfulness to the environment. They visited the local health centre, motor repairing centre, car washing, dog washing, agricultural land, and drains. After that, the students were divided into two groups for discussion and report.

### 5.3.4 Activity IV – field visit

Students were assigned a day visit to nearby brick industries and submitting the report to the researcher. Students realised the positive effects of brick industries like income and employment opportunities, production of building materials but on the other hand, so many negative effects include air pollution, land degradation and water pollution. Brick industry is a source of air pollution in the form of GHGs (mainly carbon dioxide), particulate matter, sulphur oxides, carbon monoxide etc. They found nearby agricultural lands have low production due to refused bricks and ash.

### 5.3.5 Activity V – multi-media

Students were well acquainted with the roles of television, news paper, radio broadcast, and the internet and how they promote environmental awareness. They were assigned to see two films of China and USA related to environmental management and awareness both in urban and rural areas focus on pictures to illustrate environmental problems. After the show, students were requested to give their feedback for the role of multimedia on environmental awareness.

### 5.3.6 Activity VI – demonstration

Students were assigned to encourage the poor and illiterate people of local for the building and use of latrine. The researcher has demonstrated how they will prepare low cost latrine with the help of timber, bamboo, bricks, cement and small stones. It is important that in the entire demonstration that latrine has completed and fully activated for daily use.

## 6 Data analysis and results

H1 There exists significant relationship among multimedia, observation and demonstration with hands-on experience, field visit and community participation for prediction of environmental awareness among university students.

The regression of hands-on experience on the basic model ( $R = .785$ ,  $R^2 = .616$  and adjusted  $R^2 = .591$   $p < .005$ ) revealed significant positive relationship with multimedia ( $\beta = .790$   $p < .005$ ) but not significant with observation ( $\beta = -.041$   $p > .005$ ) and demonstration ( $\beta = -.012$   $p > .005$ ). The F-value (df 3/46, 24.577  $p < .005$ ) was significant. The regression of Field visit on the hierarchical multiple regression model ( $R = .960$ ,  $R^2 = .930$  and adjusted  $R^2 = .925$   $p < .005$ ) found significant positive relationship with observation ( $\beta = .964$   $p < .005$ ) and not significant with multimedia ( $\beta = .008$   $p > .005$ ) and demonstration ( $\beta = .060$   $p > .005$ ). The F-value (df 3/46, 202.766  $p < .005$ ) was significant. However, the regression model of community participation on the model ( $R = .063$ ,  $R^2 = .004$  and adjusted  $R^2 = -.061$   $p > .005$ ) revealed not significant with multimedia ( $\beta = .028$   $p > .005$ ), observation ( $\beta = .053$   $p > .005$ ) and demonstration ( $\beta = .010$   $p > .005$ ). Similarly, the ANOVA of community participation model (df 3/46, .062  $p > .005$ ) was also not significant. Table 1(a) to Table 1(j) contain the information relevant to the hierarchical multiple regression analysis.

**Table 1a** Model summary

<i>R square change</i>	<i>R square F change</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
<b>.785(a)</b>	<b>.616</b>	.591	1.179

Note: (a) Predictors: (constant), demonstration, observation, multimedia

**Table 1b** ANOVA(b)

	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Regression	102.532	3	34.177	24.577	P < .005(a)
Residual	63.968	46	1.391		
Total	166.500	49			

Notes: (a) Predictors: (constant), demonstration, observation, multimedia  
(b) Dependent variable: HoE

**Table 1c** Coefficients (a)

	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
(Constant)	.777	1.686		.461	p > .005
Multimedia	1.048	.124	.790	8.465	P < .005
Observation	-.072	.163	-.041	-.442	p > .005
Demonstration	-.014	.111	-.012	-.130	p > .005

Note: (a) Dependent variable: HoE

**Table 1d** Model summary

<i>R square change</i>	<i>R square F change</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
<b>.964(a)</b>	<b>.930</b>	.925	.618

Note: (a) Predictors: (constant), demonstration, multimedia, observation



**Table 1f** ANOVA(b)

	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Regression	232.443	3	77.481	202.766	P < .005(a)
Residual	17.577	46	.382		
Total	250.020	49			

Notes: (a) Predictors: (constant), demonstration, multimedia, observation  
(b) Dependent Variable: FV

**Table 1g** Coefficients(a)

	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
(Constant)	-1.067	.722		-1.477	p > .005
Multimedia	.013	.065	.008	.195	p > .005
Observation	1.151	.049	.964	23.449	P < .005
Demonstration	.006	.060	.004	.099	p > .005

Note: (a) Dependent variable: FV

**Table 1h** Model summary

<i>R square change</i>	<i>R square F change</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
.063(a)	.004	-.061	1.731

Notes: (a) Predictors: (constant), demonstration, multimedia, observation  
(b) Dependent variable: CP

**Table 1i** ANOVA(b)

	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Regression	.556	3	.185	.062	p > .005 (a)
Residual	137.864	46	2.997		
Total	138.420	49			

Notes: (a) Predictors: (constant), demonstration, multimedia, observation  
(b) Dependent variable: CP

**Table 1j** Coefficients(a)

	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
(Constant)	8.732	2.022		4.318	P < .005
Multimedia	.034	.181	.028	.187	p > .005
Observation	.047	.137	.053	.345	p > .005
Demonstration	.011	.167	.010	.069	p > .005

Note: (a) Dependent variable: CP

H2 There exists significant relationship among Hands-on experience, field visit and community participation with environmental awareness among university students.

Hierarchically, hands-on experience, field visit and community participation regressed the environmental awareness model. The model ( $R = .909$ ,  $R^2 = .827$  and adjusted  $R^2 = .816$   $p < .005$ ) revealed significant positive relationship with hands-on experience ( $\beta = .913$   $p < .005$ ) but not significant with field visit ( $\beta = -.035$   $p > .005$ ) and community participation ( $\beta = -.025$   $p > .005$ ). The f-value ( $df 3/46$ ,  $73.359$   $p < .005$ ) was significant. Table 2(a) to Table 2(c) contain the information relevant to the hierarchical multiple regression analysis.

**Table 2a** Model summary

<i>R square change</i>	<i>R square F change</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
.909(a)	.827	.816	.722

Note: (a) Predictors: (constant), CP, HoE, FV

**Table 2b** ANOVA(b)

	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Regression	114.820	3	38.273	73.359	$P < .005(a)$
Residual	24.000	46	.522		
Total	138.820	49			

Notes: (a) Predictors: (constant), CP, HoE, FV  
(b) Dependent variable: EA

**Table 2c** Coefficients(a)

	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
(Constant)	2.301	.834		2.759	$p > .005$
HoE	.833	.056	.913	14.800	$P < .005$
FV	-.026	.046	-.035	-.569	$p > .005$
CP	-.025	.062	-.025	-.399	$p > .005$

Note: (a) Dependent variable: EA

H3 There exists significant relationship among multimedia, observation and demonstration with environmental awareness among university students.

The regression of environmental awareness on the model ( $R = .672$ ,  $R^2 = .452$  and adjusted  $R^2 = .416$   $p < .005$ ) was significant positive relationship multimedia ( $\beta = .62$   $p < .005$ ) but not significant with observation ( $\beta = -.056$   $p > .005$ ) and demonstration ( $\beta = -.077$   $p > .005$ ). The f-value ( $df 3/46$ ,  $12.629$   $p < .005$ ) was significant. Table 3(a) to Table 3(c) contain the information relevant to the hierarchical multiple regression analysis.

**Table 3a** Model summary

<i>R square change</i>	<i>R square F change</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
.672(a)	.452	.416	1.286

Note: (a) Predictors: (constant), demonstration, multimedia, observation

**Table 3b** ANOVA(b)

	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Regression	62.697	3	20.899	12.629	P < .005(a)
Residual	76.123	46	1.655		
Total	138.820	49			

Note: (a) Predictors: (constant), demonstration, multimedia, observation  
(b) Dependent variable: EA

**Table 3c** Coefficients(a)

	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
(Constant)	3.186	1.503		2.121	p > .005
Multimedia	.814	.135	.672	6.039	P < .005
Observation	-.050	.102	-.056	-.486	p > .005
Demonstration	-.084	.124	-.077	-.680	p > .005

Note: (a) Dependent variable: EA

H4 There exists significant relationship among multimedia, observation, demonstration, hands-on experience, field-visit and community participation with environmental awareness among university students.

The regression model of environmental awareness model ( $R = .914$ ,  $R^2 = .836$  and adjusted  $R^2 = .813$   $p < .005$ ) were found significant positive relationship with hands-on experience ( $\beta = .986$   $p < .005$ ) but not significant with multimedia ( $\beta = -.103$   $p > .005$ ), observation ( $\beta = .120$   $p > .005$ ), demonstration ( $\beta = -.054$   $p > .005$ ), field visit ( $\beta = -.639$   $p > .005$ ) and community participation ( $\beta = -.293$   $p > .005$ ). Their F-value (df 3/46, 36.402  $p < .005$ ) was significant. Table 4(a) to Table 4(c) contain the information relevant to the hierarchical multiple regression analysis.

**Table 4a** Model summary

<i>R square change</i>	<i>R square F change</i>	<i>Adjusted R square</i>	<i>Std. error of the estimate</i>
.914(a)	.836	.813	.729

Note: (a) Predictors: (constant), CP, demonstration, HoE, FV, multimedia, observation

**Table 4b** ANOVA(b)

	<i>Sum of squares</i>	<i>df</i>	<i>Mean square</i>	<i>F</i>	<i>Sig.</i>
Regression	115.986	6	19.331	36.402	P < .005(a)
Residual	22.834	43	.531		
Total	138.820	49			

Notes: (a) Predictors: (constant), CP, demonstration, HoE, FV, multimedia, observation  
(b) Dependent variable: EA

**Table 4c** Coefficients(a)

	<i>Unstandardised coefficients</i>		<i>Standardised coefficients</i>	<i>t</i>	<i>Sig.</i>
	<i>B</i>	<i>Std. error</i>	<i>Beta</i>		
(Constant)	2.821	1.045		2.699	p > .005
Multimedia	-.124	.123	-.103	-1.013	p > .005
Observation	.107	.212	.120	.504	p > .005
Demonstration	-.060	.070	-.054	-.850	p > .005
HoE	.901	.092	.986	9.801	P < .005
FV	-.114	.178	-.152	-.639	p > .005
CP	-.018	.063	-.018	-.293	p > .005

Note: (a) Dependent variable: EA

## 7 Discussion

The theoretical frameworks of multimedia, observation, demonstration, hands-on experience, field-visit and community participation have been recognised as determinants of environmental awareness. A review of the literature suggests that there was less numbers of researches concerning the relationship between the four medium of environmental awareness (Bandhu and Dyal, 1999). The purpose of the current study was explored within one regression model the interrelations between the six methods and environmental awareness. In particular, differing from previous research studies hypothesised that the mediums of environmental awareness would serve as the efforts for awareness. The evidence cited previously indicated that the besides formal approach alternative medium also helpful for environmental awareness (Gill et al., 1986). Furthermore, I also explored whether multimedia, observation, demonstration, hands-on experience, field visit and community participation practise would lead students to aware the environmental crisis. Direct relationship among multimedia, observation and demonstration existed significant relations with hands-on experience, field visit and community participation (Jena, 2011). The evidence established in this study supports, in part, the hypothesis made concern the direct relationships between the  $3 \times 3$  phases (multimedia, observation and demonstration with hands-on experience, field visit and community participation) were the concerned with the thought of environmental awareness. Students who realise the importance of hands on experience have shown their significant positive attitude towards multimedia but not towards observation and demonstration. Field visit has significant positive relation with observation but not multimedia and demonstration. Similarly, the regression analysis also found that community participation does not have any relation for environmental awareness with observation and demonstration.

Environmental awareness depends on the active participation of an individual (Fox, 1991). Lack of necessary and relevant knowledge and motivation towards environment enhances low awareness. The features were shown from the students who have lack of interest in observation and demonstration. Understanding the environmental issues by hands on experience or by field visit directly influences social, individuals' thought, and they became aware on climate change and environmental awareness. In a

similar way, the field visit contributes to the prediction of awareness. Under this phase observation is directly and positively related with field visit and it is not directly related with multimedia. The researcher also realised that multimedia could not predict the impact of field visit while demonstration also not related with demonstration. The environmental awareness, hands on experience, and encourages them to practise in the community. The hands on experience and environmental awareness are much more complex and require in-depth analysis and understanding for its practise (Gill et al., 1986). Students in Assam University who thought observation, field visit, and demonstration are only to know what happen and why the change of climate and environment happen but they realised that environmental awareness could be determined through hands on experience and practise. Observation and demonstration are not directly related with community participation.

### *7.1 Direct relationship of hands on experience, community participation, field visit and environmental awareness*

Hierarchically, hands-on experience, field visit and community participation regressed the environmental awareness model. The findings established from hierarchical regression analyses show that students' hands on experience enhanced awareness (Hirose, 1995), but not by community participation or field visit. This analogous relationship between hands on experience and environmental awareness is similar to previous finding (Gill et al., 1986). Students, who realised, even in the face of obstacles from community participation, are more likely to discourage environmental awareness. From the environmental teaching and learning perspective, most of the ecology and environmental class students viewed only community participation and field visit are not the paramount of successful learning in environmental education but is a way of meaningful engagement. By the same time, the importance of environmental awareness has also been emphasised in other motivational-domain areas of research; for example, self-engagement (Dunlap and Scarce, 1991; Sinlarat, 1993). A negative relationship between field visit and environmental awareness was established in this study. This absence of significance differs from the work of Dietz et al. (1998). Is it possible, perhaps, to argue that there may be other extraneous factors that could also overcome the influence of field visit in students' learning? Methodologically, self-report surveys and/or inventories may not accurately portray students' daily study habits. Likewise, cross-sectional data cannot truly capture the ongoing strategies and study habits that students and researchers use overtime. Students may overtime develop accurate and preferred strategies and habits that they feel comfortable to help them succeed.

### *7.2 Significant positive relationship between multimedia and environmental awareness*

The evidence established, consonant with existing research supports the hypothesis concerning the relationship between multimedia and environmental awareness. The Previous studies have reported, for example (Tietenberg, 1997; Kempton et al., 1995; Liere et al, 1981). The negative effects of multimedia and understanding on environmental awareness but its positive the positive effects on environmental awareness found by Tekçe (1995), Tuncer et al. (2005) and Jena (2011). In this study, both multimedia and environmental awareness are related significantly to students'

understanding. From a theoretical and practical perspective, students who realised environmental issues and its learning have initiative and capability to reflect, articulate, and to generate awareness towards environment.

## **8 Educational implications**

The following activities and procedures are more helpful to increasing awareness among students, teachers and peoples in the existing context.

- 1 The teachers with students in village cleaning programmes, social plantation works.
- 2 Implementation of tree planting/nurseries, water harvesting and eco-clubs projects in the schools (United Nations, 1992).
- 3 Some of the awareness materials made are t-shirts, caps, calendars, and brochures.
- 4 Arranging environmental issues related campaign in different villages and towns (Avery et al., 1992).
- 5 Displaying different film show related to Cause and effect of different environmental issues in front of public (Berman, 1990).
- 6 Distributing books related to existing environmental problems among peoples.
- 7 Special programmes for poor and illiterate, because they only know how to fill their empty stomach, so they have no time to understand these complex environmental issues. These are the advice and interaction for the illiterate poor:
  - a not to hunt the innocent wild animals but to take financial help and loan from government
  - b participations in social forestry and mass plantation programme
  - c understand plant and earth planet.
- 8 Motivating students towards environmental education by parents.

## **9 Conclusions**

The multimedia, observation, demonstration, hands-on experience, field visit and community participation is directly related with environmental awareness. Multimedia positively significantly related with environmental awareness This result was supported by Malkus and Musser (1997), Tietenberg (1997) and Yılmaz and Özer (2001).The importance of the research lies in the examination of the types of methods like multimedia, observation, demonstration, hands-on experience, field visit and community participation and environmental awareness (Schulze, 1996; Malkus and Musser, 1997). Similarly, a statistical examination of multimedia, observation, demonstration as mediators was some extent involved in environmental awareness (Weigel and Weigel, 1978). From a practical perspective, students viewed field visit and observation is directly linked but it has no linked with multimedia and demonstration. From a wider perspective other than environmental awareness the hands on practise leads to the development of individual skills to reflect thinking practise (Weber and Corrado, 1993). It has been

suggested that learners should cultivate reflective thinking practise via hands on experience and encouraging students to adopt a mastery goal orientation on environmental awareness. By the same time university students should encourage to engage more in effort in hands on practise site visit and ultimately environmental awareness can be achieved (Gill et al., 1986). Environmental awareness is a broad concept in the exiting day-to-day life. Nobody is perfectly aware about the climate change and its effect on human lives. Everything is static in theories, speech, debate, seminars, conferences and journals. However, the question arises 'how much the students, the community members, the world educators and the world scientists practise the environmental education in real sense?' This could be understood by the question established on Belgrade Charter (1975). It emphasised on environmental education and awareness. The existing curriculum stressed on the theoretical aspect of climate change and its awareness, but the realisation of awareness is not yet in practise.

In such a scenario, the importance and need for environmental education can hardly be stressed at present. In order to protect and conserve the environment, enabling people to lead quality life, emphasis has been given to environmental education in both formal and non-formal system of education (McColough and Kethoilwe, 2000). In formal system of education, students should acquire appropriate range of awareness, understanding and concepts about the environment so that critical judgment can be achieved (Kennely et al., 2008; Palmer, 1998). Students' environmental awareness is one of the most important indicators for displaying national civilisation. It reflects many aspects of environmental status, such as personal considerations and behaviour, public capacity and the local citizens' attitude towards sustainable society as a whole, etc. Attitude towards the students have been defined as the beliefs and feelings that individual have towards the environment while students' attitude (Tarrant et al., 1997), towards the environment in the research are conceptually defined as their verbal commitment, actual commitment, motivation (Yilmaz and Özer, 2001) and affect concerning nature and environmental issues. In formal system of education, teacher can play an important role in educating their students about environment related issues (Yong, 1993) which is possible only when the teachers themselves have mastery over environmental awareness (Yilmaz and Öz, 2004).

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**Appendix**

<b>Environmental awareness scale (EAS)</b> Name: School/department: Class:
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*I assure you that the data will be collected from you will be kept confidential by the researcher and it will not be used in any other purposes. Please feel free while responding to the items with the researcher.*

Give response by following the hints: Strongly Agree (SA), Agree (A), Disagreed (DA) and Undecided (UD)

		Researcher			
Sl	Items	Responses			
1	I really enjoyed from Hands on experience.	SA	A	UD	SD
2	Working with important persons is worthwhile.	SA	A	UD	SD
3	Direct observation of environmental issue enhances awareness.	SA	A	UD	SD
4	The Field visit regarding environmental issues directly aware people.	SA	A	UD	SD
5	Multimedia directly influences people to understand climate.	SA	A	UD	SD
6	Demonstration of environmental causes and affects aware most among people.	SA	A	UD	SD
7	Community participation in environmental awareness activity is an effective practice	SA	A	UD	SD
8	Experience by hand directly affect cognition	SA	A	UD	SD
9	I observe the reality from the health centre and motor repairing station, what people doing against climate.	SA	A	UD	SD
10	Brick industry visit polluted rural area.	SA	A	UD	SD
11	Newspaper may create environmental awareness among students and people.	SA	A	UD	SD
12	Low cost latrine is effective for health.	SA	A	UD	SD
13	I think poor people realized the importance of latrine for health.	SA	A	UD	SD
14	Planting a tree means planting a life.	SA	A	UD	SD
15	Hands on experience are an active process.	SA	A	UD	SD
16	Every community member should work for environment protection.	SA	A	UD	SD
17	Using of pesticide in the agricultural land pollutes environment.	SA	A	UD	SD
18	Brick industries refuse ash and broken bricks polluted both air and soil.	SA	A	UD	SD
19	The three dimensional picture aware people more	SA	A	UD	SD
20	I aware about environment by hands on experience.	SA	A	UD	SD
21	I work and realized the effectiveness of community activity on environmental awareness.	SA	A	UD	SD
22	I smell and aware the hazard of smoke of automobiles in the road.	SA	A	UD	SD
23	I saw and realized the effect of deforestation in the campus side hill.	SA	A	UD	SD

*Hands on experience*

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24	People and I realized climate, environment and its protection.	SA	A	UD	SD
25	People some extent feel the importance of direct participation of community on environmental ethics.	SA	A	UD	SD
26	I observe the pollutants near the residence of university professionals and workers and aware its effects to the environment.	SA	A	UD	SD
27	Field visit may aware most people towards environment and climate.	SA	A	UD	SD
28	Demonstration in front of students/people aware them for positive health practices of environment.	SA	A	UD	SD
29	Continuous feedback creates awareness among learners.	SA	A	UD	SD
30	Demonstration directly influences environmental awareness.	SA	A	UD	SD

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