Effectiveness of Multimedia Instructional Package (MMIP) on Interest in Greening Initiatives and Environmental Accountability among Secondary School Students

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Abstract:

Man is a product of the nature (School of Naturalism) who depends fully on the nature for his entire livelihood in which environment is very closely related to day to day life. Globalization, Urbanization and Industrialization had destroyed the nature and natural resources to a greater extent. Nowadays we don't live in the environment which is stable but much rather becoming unrecognizable and diminishing before our eyes only because of extensive cutting down of trees, pollution, unscientific waste of disposal, population explosion and many interrelated allied problems. Addressing all these issues and crisis, investigator felt that the education alone can be the long term strategy and solution to combat such problems. Among various strategies to educate a man media could be the place a dominant role in sensitizing the mankind to greater extent. Hence, researcher decided to sensitize the secondary student's through Multimedia Instructional Package (MMIP) by developing and validating two tools namely, Greening Initiatives inventory and Environmental Accountability Scale and started with the intervention at Jawahar Navodaya Vidhyalay(Residential Institution) at Pondicherry for about 30 days and drawn the following findings. There is a significant difference between the pre-test and the post-test scores of the experimental group and Control group on Greening Initiatives and Environmental Accountability. There is a significant difference between the Post Experimental and the post Control group on Greening Initiatives and Environmental Accountability. Exist significant Gender difference where girls possess higher than that of boys on both Greening Initiatives and Environmental Accountability. Significant difference in locality between rural and urban students. Significant difference between Joint and Nuclear family on Greening Initiatives and Environmental Accountability.

Keywords: *Multimedia Instructional Package, Greening Initiatives, Environmental Accountability Secondary Students*

I. BACKGROUND

Development has been so rapid that nature has not had time to adapt to these changes and to human requirement and greed. The last century has seen an unmanageable increase in population rate leads Pollution, Energy crisis, excessive use of ground water, placing a tremendous burden and pressure on natural resources. To combat such problems, United Nations and the World Commission on Environment and Development, Ministry of Forest and Environment, Centre for Environmental Education (CEE) formulating ideas/strategies for environmental protection and sustainable development. Education alone can sensitize these current burning issue and address on these challenges. Environmental Education (EE) placed at the center of efforts to achieve sustainable development. The ultimate purpose of the environment education is to help individuals develop conscious behaviors towards environment in order build a long term eco friendly habits & Judicial use of Natural Resources in day to day life. The number of studies on environment education is increasing rapidly. Education became powerful medium to modify behaviour. Education alone can sensitize these current burning issue and address on these challenges. Environmental Education heavily depends on direct experiences of natural phenomenon outside the classroom; many environmental educators have begun to use multimedia in the form of computers in environment education. Application of Media/Computers in environmental education has the prospect of extending the realm of computer mediated education to learning situations outside of traditional educational settings. The potential of environmental literacy as a vehicle to realize the educational agenda of sustainable development. Disinger and Roth (1992:165) Environmental Literacy is a prerequisite to maintaining and improving the quality of the environment and life. The development and fostering of environmental literacy need, therefore, to be a key objective in any general education programme (Roth, 1992)

Greening Initiatives at Schools: Global Perspectives

The term Greening is mostly used in corporate sectors in order to lessening the energy resources, pollution, water crisis, resource management and marketing, exchange of goods etc. Greening is popular word/term in western countries for the purpose of building schools, offices and classrooms with natural lighting, ventilation and use of solar energy resources for all household electronic devices. Verchot Manon, Luma Kenny(2014) "How to bring green

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into classroom" :The students are engaged in calculating Carbon Footprint, Conducting Energy Audition in classroom, go to school greenly including biking, walking, use of public transportation/ to the school can all help reduce carbon emission(Cancel a car, walking, starts a zero waste in classroom policy- recycling, set up recycling bins) For Teachers, students and Parents) evaluate how much waste created per day, encourage them to reuse bottles, container and sachets instead of disposable ones, good competitions with classroom to see who can reduce their waste output, most is great way to create healthy competition and less waste. The students are said to be future leaders & have to play great role by developing eco-friendly practices and sensitize in knowing the natural resources and judicial use of natural resources and a sense of awareness on energy crisis and create an ample of opportunity for them to explore alternative energy resources. Hence, Supervisor and researcher decided to bring these two terms into Educational/Institutional level, so that the concept of Greening and Accountability would become Environmental Educational terms in shaping & moulding the behaviour & sensitise the student's community to be eco-friendly in their day to day life activities like a) Grow a School Garden and just take a nature walk. b) Compost Outdoors or Indoor: Zero waste can be with composting making connection between Food, waste, the nature of work and c) Connecting Parent Teacher Association (PTA) & connects all the activities.

Role of Environmental Education in Greening Initiatives

Environmental Education is a process aimed at improving the quality of life by empowering people with the tools they need to solve and prevent environmental problems. Environmental education can help people gain the knowledge, skills, motivation, values, and without destroying the commitment they'll need to manage the earth's resources sustainable and to take responsibility for maintaining environmental quality (Judy a. Braus David wood-1993). It is found in the conceptual analysis of Greening Initiatives believed that the kind of eco-friendly practices adopted by an individual in the day today life at school, home and even in the other social environment and the Environmental Accountability reflects the individual accountability in using the available resources in a judicial manner in terms of allocation, distribution and forecasting the resources of all kinds with special focus on Non-renewable resources which will have very short period of existence and sensitize themselves in order to use more and more renewable resources as these resources can replenish on a regular interval. Fion Perekin, Chartic shackleton & Infrid Schudel(2007) established greening initiatives worldwide focusing on tree planting & most effort targeted institutions, schools and community which aims at assessing the respondent's knowledge on the importance of trees and trees planting by means of questionnaire. Janet E. Dyment, Alan Reid (2005) Breaking New Ground? Reflections on Greening School Grounds as Sites of Ecological, Pedagogical and Social Transformation. The centre of these ideas is to socially transformative potential of Green school grounds by reflecting on our own experiences from green School grounds initiatives in Canada and England.

Today, on the edge of an emerging "green" economy, we need to raise two essential questions about the relationship between business and education. First, are the evolving qualities of industry and commerce significantly different from what they were a century or two ago, when they shaped schools in the image of the assembly line factory? Second, is it even proper for schools to serve the goals of business above all other considerations, or is it time to envision a new mission for education? For those who understand the meaning of "green" business, these two questions are closely related. The new ways of doing business mean that the bottom line includes human, social and ecological concerns and not merely a single minded focus on corporate profit or efficiency. If green business aims to make a more holistic contribution to human welfare than material wealth alone, then the kind of schooling more broadly, the kind of learning that would be aligned with such a mission should look substantially different from schooling driven by the factory model. The industrial economy required the training of workers who would efficiently perform their assigned tasks; in the green economy, individuals are not considered in such a robotic image, but are generally treated as whole human beings capable of creativity, imagination, and a lifelong search for meaning. An education designed to train people for their narrow roles in the workplace is vastly different from an education whose purpose is to enable individuals to become all they are capable of being. What are some of the characteristics of this human-centered, "Green" Education or Ecological literacy a holistic learning environment has meaningful connections to the world of nature. The principles of ecology and sustainability are implicit in the structure and content of a holistic education, if not explicitly addressed; there is a deliberate cultivation of what David Orr has called "ecological literacy." The physical design of holistic schools and classrooms brings nature indoors, or invites students into the surrounding ecosystem. In these spaces, beauty is as important a concern as functionality. We would commonly find gardens, field trips, or other opportunities for contact with the nature in the curriculum even in an urban setting.

Role Education in Making Green Society

Education brings together values, skills and knowledge to help women and men learn to constructively address change, complexity and uncertainty, while encouraging them to work together to create new opportunities; to assure a successful transition to a "green economy" and "green society". Students are said to be future leaders of the society and they need to be trained in the environmental management issues and encourage them to follow eco-friendly practices in their day today life. Hence it is education is the only ways and means to strengthen these abilities from school itself by means of curricular and co-curricular activities. Teachers are held responsible for the same and make them expose in possible ways and means to the environmental issues and problems.

II. ENVIRONMENTAL ACCOUNTABILITY

The Environmental Accountability variable has operated in mostly at the corporate sector (Bhattacharyya, A. (2011),

'Attitudes towards environmental accountability in an emerging economy setting evidence from India. As it is related to accounting for the environmental management and maintenance of natural resources. However, recently few studies are conducted in the academic arena in reflecting the environmental accountability as the sole responsibility of the students community use the available resources sensibly and contribute for the social accountability; Hence, Environmental Accountability and Social Accountability are considered as the two sides of the same coin. Hence, there is an urgent need that this variable must treat as an important variable in Environmental Education as it reflecting in terms of responsibility in the hands of the individual to use the available resources in a judicial manner as it is considered as an significant in the modern world. Institutions are the first home of the future leaders and there by sensitizing them by a means of academic ambience in exposing them to the real world of pollution, climate change and energy crisis.

Based on the above background researcher clearly identified the research gap existed in the variables that has been operated in the present research.

- The concept of Green building, green school designs are very much popular in USA as it Cost effective and in India, this sort of academic movement has yet to start.
- Greening Initiatives used corporate/business sectors like Marketing & distribution. But not in Educational settings.
- Greening Initiatives and Environmental Accountability words and eco-friendly practices are very common and mostly used in corporate sectors like Green Marketing, Green Business, etc. not in education arena.

Research Questions

The present research aims at evaluating and analyzing the Effectiveness of Multimedia Instructional Package (MMIP) on changing Greening Initiatives in the form of eco-friendly practices and pro-active behavioural pattern and positive attitude (A sense of strong feeling) Environmental Accountability.

III- METHODOLOGY

Objectives

1. To Develop Multimedia Instructional Package for students studying in secondary schools.
2. To construct and validate the Greening Initiatives Inventory (GII) for Secondary School Students.
3. To construct and validate the Environmental Accountability Scale (EAS) for Secondary School Students.
4. To study the effectiveness of Multimedia Instructional Package on Interest in Greening Initiatives and Environmental Accountability among Secondary School Students.
5. To find out the significant difference in the effective use of MMIP on Greening Initiatives and Environmental Accountability among Secondary School students when they are classified according to Gender, Locality and Type of family.

Hypotheses

1. MMIP is more effective than the conventional method of teaching on Greening Initiatives among Secondary Students.
2. MMIP is more effective than the conventional method of teaching on Environmental Accountability among Secondary Students.
3. There is no significant difference between Boys and Girls of Secondary Students in their interest in Greening Initiatives when they are taught through MMIP.
4. There is no significant difference between Boys and Girls of Secondary Students in their Environmental Accountability when they are taught through MMIP.
5. There is no significant difference between Rural and Urban secondary students in their interest on Greening Initiatives when they taught through MMIP.
6. There is no significant difference between Rural and Urban secondary students in their Environmental Accountability when they taught through MMIP.
7. There is no significant difference between Joint and Nuclear family of secondary students in their interest in Greening Initiatives.
8. There is no significant difference between Joint and Nuclear family of secondary students in their Environmental Accountability.

Variables of The Study

1. Independent Variable

Multimedia Instructional Package(MMIP): The instructional package developed based on the content of 8th standard Environmental Education of NCERT text book in which small video stories, documentaries, clippings, short films, animated visuals developed based on abstractness of world known burning & challenging concepts on Environmental issues,

2. Dependent Variables

- **Interest on Greening Initiatives:** Sensible steps to engage the students on eco-friendly practices in school life, public places, at home and to develop a positive step towards installing sustainability in the minds of secondary students.
- **Environmental Accountability:** Is the degree of responsibility and positive attitude towards the use of natural environment and strong feeling, the sense of judicial use of environmental resources & issues pertinent to Environment, Economic issues of the resources.

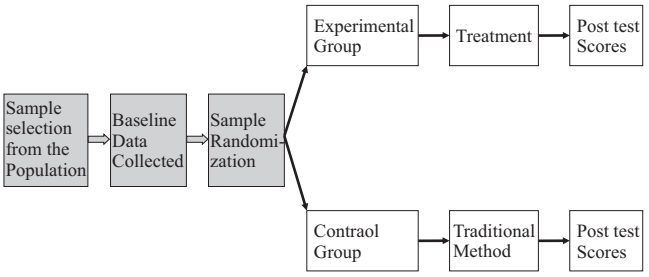
Research design

The present study is experimental in nature. Pre-test post-test Equivalent group experimental design was followed in the present study. In this design pre-tests was administered before the experimental and control group treatment and post-tests at the end of the treatment period. Gain scores are compared and subjected to a test of significance difference between the means. This design was found to be most appropriate after review of related literature in experimental designs.

Diagrammatic representation of the Pre-test Post-test equivalent groups design

RESEARCH DESIGN

Pre-test Post-test Equlvalent Group Design - Phases



The Experimental group was subjected to treatment using the Multimedia Instructional Package (MMIP). The students were taught in the selected topics in Environmental Education. 8th standard CBSC Text book of Environmental Science/Education. Multimedia Instructional Package was developed with a special focus on two dependent variables which are as follows.

1. Greening Initiative Inventory(GII) and
2. Environmental Accountability Scale (EAS)

Tools Used In The Study

- Greening Initiatives Inventory (GII) Constructed & validated by the Supervisor and Researcher.
- Environmental Accountability Scale (EAS) Constructed & validated by the Supervisor and Researcher.

IV- ANALYSIS AND INTEPRETATION

H1: Multimedia Instructional Package (MMIP) is more effective on interest in Greening Initiatives among Secondary Students.

Table 1: Difference between Pre-test and Post-test scores of the experimental group on Greening Initiatives

Group	Mean	N	SD	SEM	t	df	Sig	d
Pre-test	140.94	35	24.62	4.162	7.054	34	0.000**	1.19
Post-test	162.89	35	20.63					

** Sig at .01 level

From the above, it can be observed that there is a significant difference between the pre-test and the post-test scores of the experimental group on greening initiatives (t=7.054; sig >.01). The mean of the group before the intervention was 140.94 and after the intervention it was found to be 162.89.This increase in the mean clearly indicates that the MMIP was effective in enhancing the greening initiative. The effect size of 1.19 (Cohen's d-1983) clearly indicates that MMIP has been highly effective in bringing desired change in the expected direction.

H2: Multi Media Instructional Package is more effective in teaching on Environmental Accountability among Secondary Students.

Table2: Mean difference between Pre Experiment and Post Experiment Group on Environmental Accountability.

Group	Mean	N	t	df	Sig	d
Pre- Experiment	145.46	35	3.256	34	0.003	0.55
Post- Experiment	155.14	35				

** Sig at 0.01 level

From the above table it can be inferred that the gain mean scores of post experimental group is better/ higher than pre experimental group for environmental accountability and t statistics is significant at 1 %. Hence, it can be inferred that the intervention/treatment is so effective and it has significantly contributed towards improving the environmental accountability. The effect size (Cohen's d) is 0.55

H3: Boys and Girls of Secondary Students differ significantly in their interest in Greening Initiatives when they are taught through MMIP.

Table 3: Gender Difference in Greening Initiatives

Dependent Variables	Gender	N	Mean	S.D	t	df	Sig. (2-tailed)
Pre Experiment on Greening Initiatives	Boys	17	136.65	10.148	0.171	29	0.866
	Girls	18	145.00	17.334			
Post Experiment on Greening Initiatives	Boys	17	151.71	14.224	1.366	29	0.182
	Girls	18	173.44	20.451			

From table, it can infer that the gender difference between Boys and Girls on Greening initiatives in pre and post scores on experimental groups. From the t value, it is very clear that there is an influence of gender on the obtained scores. Therefore it can be concluded that there is a significant difference between boys and girls on greening initiatives. Hence, the intervention has been successful across gender.

H4: Boys and Girls of Secondary Students differ significantly in their Environmental Accountability when they are taught through MMIP.

Table 4: Gender Difference in Environmental Accountability

Dependent Variables	Gender	N	Mean	S.D	t	df	Sign.
Pre Experiment on Environmental Accountability	Boys	17	139.00	19.251	0.250	29	0.804
	Girls	18	151.56	16.321			
Post Experiment on Environmental Accountability	Boys	17	147.94	16.005	0.004	29	0.997
	Girls	18	161.94	12.080			

From above table, there is a gender difference among Boys and Girls on Environmental Accountability in pre and post scores on experimental groups. From the t value and its significance is very clear that there is no influence of gender

on any of the scores neither pre and post test. Therefore it can be concluded that there is a significant difference between Boys and Girls in environmental accountability on experimental group.

H5: Urban and Rural secondary students differ significantly in their interest on Greening Initiatives when they taught through MMIP.

Table5 : Locality wise difference in Greening Initiatives

Dependent Variable	Locality	N	Mean	S.D	t	df	Sig. (2-tailed)
Pre Experiment Greening Initiatives	Urban	23	136.91	10.148	2.393	33	.023
	Rural	12	148.67	19.094			
Post Experiment Greening Initiatives	Urban	23	158.52	19.439	1.787	33	.083
	Rural	12	171.25	21.080			

From the above table it can be inferred that there is a difference on residence/locality (Rural and Urban) on pre and post experimental at 1 % level. It can be concluded there is a influence of residence on the scores in Greening Initiatives.

H6: Urban and Rural secondary students differ significantly in their Environmental Accountability when they taught through MMIP.

Table 6: Locality wise Difference in Greening Initiative

Dependent Variable	Locality	N	Mean	S.D	t	df	Sig. (2-tailed)
Pre Experiment on Environmental Accountability	Urban	23	141.43	16.194	1.825	33	.077
	Rural	12	153.17	21.280			
Post Experiment on Environmental Accountability	Urban	23	151.48	16.272	2.005	33	.053
	Rural	12	162.17	11.937			

From the above table it can be inferred that there is a difference on residence/locality (Rural and Urban) on pre and post experimental at 1 % level. It can be concluded there is a influence of residence on the scores in Environmental Accountability.

H7: Joint and Nuclear family of secondary students differ significantly in their interest in Greening Initiatives.

Table 7: Family wise Difference in Greening Initiative

Dependent Variable	Family type	N	Mean	S.D	t	df	Sig. (2-tailed)
Pre Experiment on Greening Initiatives	Joint	17	140.47	14.629	.182	33	.857
	Nuclear	18	141.39	15.212	.182	32.98	.857
Post Experiment on Greening Initiatives	Joint	17	164.53	22.630	.453	33	.654
	Nuclear	18	161.33	19.091	.450	31.39	.656

Influence of family type on pre post and delayed scores are in the above table. From the results it can concluded that there is no difference in Joint and Nuclear family at 1 % in pre, post and delayed scores in green initiative and environmental accountability therefore it can be opined that there is no influence of type of family.

H8: Joint and Nuclear family of secondary students differ significantly in their Environmental Accountability.

Table8: Family wise difference in Environmental Accountability

Dependent Variable	Family type	N	Mean	S.D	t	df	Sig. (2-tailed)
Pre Experiment Environmental Accountability	Joint	17	140.18	13.597	1.669	33	.105
	Nuclear	18	150.44	21.633	1.691	28.83	.102
Post Experiment Environmental Accountability	Joint	17	152.94	17.009	.806	33	.426
	Nuclear	18	157.22	14.359	.802	31.39	.428

From the results it can concluded that there is a difference in Joint and Nuclear family at 1 % in pre and post scores in environmental accountability therefore it can be opined that there is a influence of Family type on any of the scores on environmental accountability.

IV. MAJOR FINDINGS OF THE STUDY

- Multimedia Instructional Package is more effective than the conventional method in enhancing the Achievement of students who taught through Multimedia Instructional Package (MMIP) found superior that of students taught through conventional method of teaching.
- There is a significant difference between the pre-test and the post-test scores of the experimental group on Greening Initiatives.
- There is a significant difference between the pre-test and the post-test scores of the experimental group on Environmental Accountability.
- There is a significant difference between the Post Experimental and the post Control group on Greening Initiatives.
- There is a significant difference between the Post control and the post scores of the experimental group on Environmental Accountability.
- There is a significant difference between the Immediate Post test scores and the delayed post test scores of the experimental group on Environmental Accountability.
- There is a significant difference between the Post Experiment and delayed post test among Boys and Girls at 0.05 level and insignificant at 0.01 level on Greening Initiatives.
- There is a significant difference between the rural (N=12) & urban (N=23) students, in which rural students possess high when compared to that of counterpart. But if the significance can be diluted to 5 % we can see a pattern where rural students are more inclined to Greening Initiatives and Environmental Accountability in all Pre, Post and Post delayed scores.
- There is no significant difference between Joint and Nuclear family at 1 % in Pre, Post and delayed Post test scores in Greening Initiatives and Environmental Accountability.
- There is clear evidence that the intervention executed by the researcher has been successful as there is not just improvement but also retention in Greening Initiatives among secondary students.

V. EDUCATIONAL IMPLICATIONS

The following are the educational implications are drawn from the findings and results

- There is a significant difference between Pre-test and Post-test Scores. It is evident from the present research study obtained mean scores has improved on a larger extent. Hence, Media and Multimedia and its resources can clarify the most of the abstract concept.
- Teachers must be trained in developing the Multi-media Instructional Package (MMIP) in all the subjects like teaching Science, Mathematics, Social Science and Language so that many abstract concepts can be made it easy to learn.
- Teachers should be encouraged to use E-Learning resources/Open Learning Resources (OER) which are free, open can be accessed at any point of time.
- Teachers must be trained in developing the Multi-media Instructional Package in most of the subjects like teaching Science, Mathematics, Social Science and Language-Many abstract concepts can be made it easy to learn.
- Sensory Experiences would always capture/brings the attention of the student community-Media alone can replace these expectations.
- Abstract concepts can be very well explained with the help of image/visuals, Sound, Vedio/Films/ Virtual videos must be prepared at the early schools and other levels too.
- Schools must be empowered with Adequate Media/ e-content materials so that Teacher's/Students can make use of the resources.
- Content and Pedagogy synchronization must be spirit of any learning based on Scientific Process in relation to Environmental Education and allied discipline.
- Networking with National Agencies like UGC, NUEPA, NCERT, CEC, INFLIBNET so that online resources would be accessed freely with no boundaries.

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