DEVELOPING AWARENESS AND ATTITUDE TOWARDS SUSTAINABILITY THROUGH AN ACTIVITY-BASED INTERVENTION

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ABSTRACT

The present study intended to examine the impact of an activity-based intervention on the attitude and awareness of adolescents towards sustainability and its dimensions using a quasi-experimental research design. A cluster sample of 99 participants, experimental and control groups comprising of 50 and 49 school students, was selected for the present study. The investigators constructed and standardized an activity-based module for conducting the intervention, awareness test and attitude scale for sustainability. The module was used to teach the treatment group regarding concepts related to sustainability. However, the lecture method was used to teach the control group. Both groups were taught for a duration of four weeks. The results of the analysis of covariance revealed a positive and significant impact of the activity-based module for sustainable development on the awareness and attitude of school students towards sustainability and its dimensions. Implications of these results are discussed with regard to curricular and pedagogical concerns at the school level in India.

KEYWORDS

Activity-based module, attitude, awareness, economic, environmental, intervention, social, sustainability

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Highlights

- *The results revealed a significant impact of the activity-based intervention for sustainable development on the attitude and awareness of school students towards environmental sustainability.*
- *The results of the study revealed that the activity-based module for sustainable development has a significant and positive effect on attitude and awareness of school students towards economic sustainability.*
- *Further, the activity-based intervention for sustainable development led to an increase in favourableness and enhanced levels of attitude and awareness of sustainability, and its three dimensions among school students.*

INTRODUCTION

Whereas the 21st century has been an era of rapid industrialization, and technological advancements, its corollaries in the form of population explosion, poverty, deforestation, illiteracy, urbanization, etc. have resulted in the sustainability crisis assuming staggering proportions. A mass culture of consumerism is being promoted by capitalism at the global level, which in turn is depleting natural and human resources. The earth's carrying capacity is adversely affected due to the depletion of life-supporting resources. Thus, affluence and consumption-prone lifestyle will ultimately make the life of the future generation unsustainable (Chaudhari, 2013). Every day, two million tonnes of waste is poured into the water, while one litre of wastewater pollutes eight litres of fresh water (Gobar Times, 2003). There are several such wake-up calls about the harm that humans are inflicting upon the environment, but awareness about these remains wanting.

Adolescence is a crucial phase as from here the learners will enter the stage of adulthood. A review of previous researches revealed that adolescents tend to take less interest in the issues and concerns related to the environment, and a dearth

of studies on the consciousness of school students regarding sustainable development in the economic and social context was observed (Olsson and Gericke, 2016).

As the sustainable development concept evolved, the role of education as the main instrument became pertinent. First of all, education for sustainable development (ESD) got recognition and description in Chapter 36 under Agenda 21 for the promotion of education, awareness and training points to the duty of both formal as well as non-formal education system for developing appropriate attitudes in the population at large so as to enable them to actively participate in activities and matters concerning sustainable development (UNESCO, 1992). To make education effective, it should deal with biotic and abiotic components of the environment, including various facets of human development. These concepts should be integrated across all disciplines by using a variety of means of communication with the help of formal and non-formal methods. United Nations World Summit on Sustainable Development (WSSD) produced a resolution 57/254 at Johannesburg, South Africa in 2002 and declared the decade of 2005–2014 as a Decade of Education for Sustainable Development (DESD). UNESCO was assigned to be the main agency for promoting and integrating practices, values and principles of sustainability across different educational levels.

During the latter half of 1980s, education for sustainable development (ESD) emerged as a triad of three domains, namely social, economic and environmental sustainability. These three pillars together form the core of sustainable development. The basic premise is that economic systems, habitats and people coexist and are interrelated irrespective of the context. This interdependence can be ignored for a specific period of time, ultimately human race will be reminded of its dire consequences by means of a crisis or an unforeseen situation (Strange and Bayley, 2008). There is a dearth of such studies in India that embrace all three pillars of sustainability. The focus of earlier studies on sustainability is restricted to its one dimension i.e. environment, alone. Social, cultural and economic dynamics of sustainable development are generally ignored. The synchronization of these three pillars is the central concern of this new paradigm of sustainable development. It is a well-established fact that the targets of sustainable development cannot be achieved without considering all three components viz. environmental, social and economic factors in an integrated manner (Burgan and Sansom, 2006; George, 2007). Glavič (2020) suggested that the content of education for sustainable development should be holistic, focusing on all aspects of human experience, including social, emotional, physical as well as intellectual and should emphasize on a balanced relationship between man and the environment. The present study takes into consideration these tripartite aspects, as the remediation of social inequalities and environmental debasement is not possible without adhering to a sound economic edifice.

The related literature review indicated that most of the researches focussed on the environmental aspect of sustainable development. It was further observed that the awareness of students regarding sustainability and the related concerns was much less as compared to their awareness regarding environment-related concerns. In most of the researchers the concept of ESD was misrepresented as environmental education. Significant knowledge gaps concerning the social and economic dimensions were pointed out in a number of studies (Incekara and Tuna, 2011; Nicolaou and Conlon, 2012; Kilinc and Aydin, 2013; Walshe, 2017; Michael et al., 2020). However, experiential learning, instruction packages and intervention programmes were found to be effective in making the school students' attitude more favourable towards the economic, environmental and social aspects of ESD (Segalàs, Ferrer-Balas and Mulder, 2008; Sonwane, 2010; Kilinc and Aydin, 2013; Kalathaki, 2017) as well as enhancing their level of awareness towards education for sustainable development and its dimensions (Harjai, 2008; Uzunboylu, Cavus and Ercag, 2009; Walshe, 2017; Sarma, 2017). In a recent study, the use of educational aids was recommended for achieving the objectives of sustainable development (Krishna et al., 2022).

While reviewing the studies related to sustainability, it was seen that much research has not been done in the area of activity-based intervention for teaching the various aspects of sustainable development. Most of the studies remain descriptive in essence, relying on traditional modes of instruction. The activity-based learning package in ESD was developed for this study so as to rekindle inquisitiveness, stir the acquisition process, bringing effectiveness in teaching-learning process by replacing the monotonous classroom teaching with vigorous instruction, thereby raising awareness and knowledge of students about sustainable choices. Hence, to find out how far an activity-based learning package for education for ESD is effective in developing the awareness and attitude of school students in terms of environment, social and economic sustainability, the present study becomes imperative.

Experiential learning, instruction packages and intervention programmes have been found to be effective in enhancing the students' attitudes as well as their awareness levels towards education for sustainable development (Burek and Bonwic, 2010; Walshe, 2017; Sims and Falkenberg, 2013; Walshe, 2017; Kalathaki, 2017). Walshe (2016) argued that an interdisciplinary approach to ESD encourages students to engage more critically and affectively with the concept of sustainable development. It has also been suggested that innovative pedagogies and integrated approaches must be adopted for developing sustainable attitudes (Wamsler, 2020). In a recent study considering the developmental concerns, it was emphasized that ESD must be strengthened through all types of education channels i.e. informal, formal as well as non-formal channels in view of global development (Yuan et al., 2022). Hence, a need was felt to develop attitude and awareness of adolescents regarding sustainability in terms of its social, economic and environmental dimensions. So, it was thought worthwhile to construct and standardize an activity-based module for sustainable development to test its effectiveness on the attitude and awareness of school students regarding sustainability.

OBJECTIVES OF THE STUDY

- To study the impact of an activity-based module on the attitude of adolescents towards environmental, social and economic sustainability.
- To study the impact of an activity-based module on the awareness of adolescents towards environmental, economic and social sustainability.

METHOD AND PROCEDURE

The present research was conducted using a quasi-experimental research design in two phases: (1) Module and tool development (2) conduct of the experiment.

Module and Tool Development

An activity-based learning module for sustainable development along with an attitude scale and awareness test of sustainability was developed for the school students for the present study as described hereunder:

Activity-based Learning Package for Sustainable Development

The researchers prepared and standardised an activity-based learning package for sustainable development, including the thrust areas and activities based on environmental, economic and social sustainability. The development of the learning package involved selection and specification of the content (environmental sustainability, social sustainability and economic sustainability) based on the class 9th social science textbook prescribed by Punjab School Education Board and modules for sustainable development, formulation of instructional objectives in terms of Bloom's Taxonomy, followed by the development of activities for the learning package. The validity of this activity-based module was established through content validation. The content validity of the module was determined by matching the behavioural outcomes of the learners with the conditions specified in the instructional objectives of the activities covered in the package. Further, experts, educationalists and subject teachers with credentials and expertise in the Social Sciences and sustainability orientation from different fields were also consulted for standardization of activity-based module for sustainable development through content validation.

Attitude towards Sustainability Scale

The attitude towards Sustainability Scale was developed by the investigators. The development of the scale involved the selection and specification of the content (environmental, social and economic sustainability) for the preliminary draft, preparation of the preliminary draft consisting of 123 items, followed by item analysis and preparation of final draft of attitude towards sustainability scale containing 38 items pertaining to its three dimensions, namely, social, economic and environmental sustainability. These were selected based on a field tryout of 100 ninth-grade students (Mean age = 15.25 years). This scale has Likert type items to be responded on a five-point continuum. The scale was found to have satisfactory reliability and validity. The test-retest reliability was calculated and found out to be 0.97, with internal consistency reliability using Spearman and Brown Formula, Guttman Split-half Coefficient, and Cronbach's Alpha found out to be 0.95, 0.95 and 0.94, respectively.

Awareness Test for Sustainability

The test for awareness of sustainability was also constructed and standardized by the investigators, which involved the selection and specification of the content (environmental, social and economic sustainability) for the preliminary draft, formulation and classification of instructional objectives on the basis of Bloom's Taxonomy, preparation of the preliminary draft consisting of 103 items, followed by item analysis to determine the difficulty and discrimination index of the questions on the test, and preparation of the final draft of awareness test containing 56 items pertaining to the three dimensions viz. social, economic and environmental sustainability based on a field tryout on 102 ninth grade school students (Mean age = 15.56 years). Each question was followed by four options, out of which only one was correct, while the other three were distracters. The respondent was awarded one mark if he/she selected the correct option and a score of zero was awarded for every incorrect response. The test was found to have satisfactory reliability and validity. The reliability of the Education for Sustainable Development Awareness Test was calculated by Kuder-Richardson Reliability Coefficient, which came out to be 0.87.

Conduct of the Experiment

The population for this study was ninth-grade students from government schools located in Patiala District of Punjab. A cluster sample of 99 school students (mean age = 15.85) studying in 9th grade of Govt. Senior Secondary School, Bahadurgarh from Patiala district was selected to conduct the study. The 9th class had four sections (Sections A, B, C, and D). As the nature of the present study was quasi-experimental, all four intact classes were matched based on intelligence and academic achievement in terms of marks obtained in 8th grade. Two sections that did not differ significantly on the above-mentioned criteria were selected and further matched on the basis of pre-test scores and socio-economic status, followed by a random procedure for selecting the experimental and control groups. These groups comprised of 50 students (28 boys and 22 girls) and 49 students (27 boys, and 22 girls) respectively. There were three phases in this study:

Pre-experimental Testing

This was the initial stage of the experiment. Prior to the commencement of experimentation, the necessary permission was sought from the District Education Officer and the school authorities where the experimentation was to be conducted. In this phase, pre-testing was done on the variables namely awareness and attitude towards sustainability. Before administering pre-tests, the investigator held an informal session with the students of both groups. The doubts of the students regarding the tests were cleared. The tests were administered to respondents who were assured that the information they gave would be confidential and meant only for research purposes.

After the pre-testing was complete, the response sheets were collected from the students and were scored with the help of pre-determined scoring keys to be used for further analysis.

Experiment/Treatment

The sessions were carried out among school students in 9th grade of Govt. Senior Secondary School, Bahadurgarh in Patiala district of Punjab. The activity-based learning package for Sustainable Development was executed in fifty working days for one period of thirty-five minutes for each working day. The sessions were carried out with the school students within the school premises. For the experimental group, the sessions were participative and activity-based. The main techniques for imparting education for sustainable development were small group activities, role-playing, story-telling, group discussions, brainstorming, hands on experiments, and audio-visual presentations, etc. Similar content was taught simultaneously to the control group through the traditional method of teaching. The students in the control group were given awareness regarding sustainable development. However, they were not given any exposure to the activities.

Post-experimental Testing

Post-experimental testing was done with both the groups immediately after the completion of the administration of the activity-based learning package for sustainable development. The investigators administered the attitude scale and awareness test for sustainability during the post-testing.

RESULTS & DISCUSSION

The present study intended to find out the impact of an activity-based module on the attitude and awareness of school students towards sustainability and its different dimensions. The data analysis was done using the technique of analysis of covariance to investigate the impact of treatment on the awareness and attitude of school students towards different dimensions of sustainability.

Effect of Activity-based Module on Attitude of Adolescents towards Sustainability

The mean scores and SDs of the attitude of school students towards sustainability and its dimensions at different stages are shown in table 1.

Variable	Stage	Experiment Group			Control Group		
		N	Mean	SD	*N*	Mean	SD
Attitude towards Environmental Sustainability	Pre-test	50	50.92	6.98	49	50.53	5.82
	Post-test	50	62.90	6.97	49	57.65	6.73
Attitude towards Social Sustainability	Pre-test	50	50.06	8.37	49	52.55	7.70
	Post-test	50	65.64	5.97	49	60.65	6.88
Attitude towards Economic Sustainability	Pre-test	50	26.96	4.77	49	26.04	4.92
	Post-test	50	33.92	3.83	49	31.29	4.82
Attitude towards Sustainability	Pre-test	50	127.94	15.65	49	129.12	14.83
	Post-test	50	162.46	13.81	49	149.59	14.97

Table 1: Means and SDs of Attitude of School students towards Sustainability and its dimensions in Experiment and Control Groups

In order to see whether the activity-based learning package in education for sustainable development had any significant effect on the attitude of school students towards sustainability and its dimensions, ANCOVA was applied on mean attitude scores of school students towards sustainability and its dimensions, keeping pre-test attitude towards sustainability scores as a covariate. The results of the analysis of covariance for the impact of the activity-based intervention on the attitude of school students towards sustainability and its dimensions are shown in table 2.

Variable	Source of Variation	*SS*	*df*	*MS*	*F*-value
Attitude towards Environmental Sustainability	Among Means	618.46	1	618.46	20.08**
	Within Groups	2956.60	96	30.80	
	Total	3575.06	97		
Attitude towards Social Sustainability	Among Means	940.13	1	940.13	37.04**
	Within Groups	2436.88	96	25.38	
	Total	3377.01	97		
Attitude towards Economic Sustainability	Among Means	137.96	1	137.96	8.04**
	Within Groups	1648.04	96	17.17	
	Total	1786.00	97		
Attitude towards Sustainability	Among Means	4645.74	1	4645.74	51.77**
	Within Groups	8614.20	96	89.73	
	Total	13259.94	97		

*** p ≤ 0.01*

Table 2: Summary of Analysis of Covariance on Attitude towards Sustainability and its dimensions of School students for Two Groups: Experimental vs Control

Table 2 shows that the *F*-values for the impact of the activity-based intervention on adjusted mean attitude scores towards environmental, social, economic and overall sustainability came out to be significant (F = 20.02, 37.04, 8.04, 51.77; $p \leq 0.01$). This implies that there is a significant impact of the activity-based intervention in developing positive attitude towards economic, social and environmental dimensions as well as overall attitude towards sustainability among school students. The activity-based intervention significantly improved the attitude towards sustainability and its dimensions among school students in the experimental group compared to their control group counterparts.

A post-hoc analysis was carried out to study the significance of mean differences in adjusted mean attitude towards economic, social, environmental and overall sustainability scores. Table 3 reveals the results of post-hoc analysis.

Variable	Group	*N*	Pre-test Mean (M_x)	Post-test Mean (M_y)	Adjusted Mean ($M_{y.x}$)	*t*-value
Attitude towards Environmental Sustainability	Experimental	50	50.92	62.90	62.78	4.50**
	Control	49	50.53	57.65	57.78	
	General Means		50.73	60.30	60.28	
Attitude towards Social Sustainability	Experimental	50	50.06	65.64	66.18	6.02**
	Control	49	52.55	60.65	60.10	
	General Means		51.29	63.17	63.14	
Attitude towards Economic Sustainability	Experimental	50	26.96	33.92	33.78	2.83**
	Control	49	26.04	31.29	31.43	
	General Means		26.51	32.62	32.61	
Attitude towards Sustainability	Experimental	50	127.94	162.46	162.87	7.23**
	Control	49	129.12	149.59	149.17	
	General Means		128.53	156.09	156.02	

*** p ≤ 0.01*

Table 3: Adjusted Mean Scores of Attitude towards Sustainability and its dimensions Experimental and Control Groups of School students

As per Table 3, the calculated *t*-values for checking the significance of mean differences in adjusted mean attitude towards environmental, social, economic and overall sustainability scores between the control and experimental group came out to be significant (t = 4.50, 6.02, 2.83, 7.23; $p \leq 0.01$). This indicates the more favourable attitude of school students towards the environmental, social, economic and overall sustainability of the experimental group than their control group counterparts. Thereby meaning that the treatment given to the experimental group has a significant and positive effect on the attitude of adolescents towards sustainability and its dimensions.

Effect of Activity-based Module on Awareness of Adolescents towards Sustainability

The means and SDs of school students' awareness of sustainability and its dimensions at different stages of the intervention are given in table 4.

Variable	Stage	Experiment Group			Control Group		
		N	Mean	*SD*	*N*	Mean	*SD*
Awareness of Environmental Sustainability	Pre-test	50	9.46	2.70	49	9.45	2.96
	Post-test	50	20.62	1.95	49	17.08	2.73
Awareness of Social Sustainability	Pre-test	50	5.80	1.85	49	5.55	2.14
	Post-test	50	13.16	1.28	49	10.67	2.14
Awareness of Economic Sustainability	Pre-test	50	6.76	2.10	49	6.45	2.31
	Post-test	50	13.20	1.80	49	11.94	1.96
Overall Awareness of Sustainability	Pre-test	50	22.02	4.79	49	21.45	5.52
	Post-test	50	46.98	3.32	49	39.69	5.37

Table 4: Means and SDs of Awareness of School students towards different dimensions of Sustainability at different stages

In order to test whether the activity-based learning package in education for sustainable development had any significant effect on awareness of sustainability and its dimensions among school students, ANCOVA was applied on awareness scores of sustainability and its dimensions among school students, keeping pre-test awareness scores as a covariate. Table 5 shows the summary of the analysis of covariance for the effect of treatment on awareness of sustainability and its different dimensions among experimental and control groups of school students.

Variable	Source of Variation	*SS*	*df*	*MS*	*F*-value
Awareness of Environmental Sustainability	Among Means	309.03	1	309.03	72.66**
	Within Groups	408.32	96	4.25	
	Total	717.35	97		
Awareness of Social Sustainability	Among Means	142.71	1	142.71	52.50**
	Within Groups	260.97	96	2.72	
	Total	403.68	97		
Awareness of Economic Sustainability	Among Means	34.64	1	34.64	10.55**
	Within Groups	315.36	96	3.29	
	Total	350.00	97		
Overall Awareness of Sustainability	Among Means	1184.76	1	1184.76	124.32**
	Within Groups	915.25	96	9.53	
	Total	2100.01	97		

*** p ≤ 0.01*

Table 5: Summary of Analysis of Covariance for the Impact of Activity-based Intervention on Awareness of School students regarding Sustainability and its dimensions

Table 5 shows that the *F*-values, testing the significance of the impact of the activity-based intervention for sustainable development on mean awareness scores of environmental, social, economic and overall sustainability of school students came out to be significant (F = 72.66, 52.50, 10.55, 124.32; $p \leq 0.01$). This indicates that an activity-based package for sustainable development has a significant impact on the awareness of school students towards sustainability and its dimensions. The activity-based intervention resulted into a significant improvement in the awareness of school students in the experimental group regarding sustainability and its dimensions as compared to their control group counterparts.

The adjusted mean awareness scores of school students towards environmental, social, economic and overall sustainability and the *t*-values for checking the significance of mean differences in adjusted mean scores of awareness of environmental, social, economic and overall sustainability, post-hoc analysis was used. The results of post-hoc analysis are presented in table 6.

Variable	Group	*N*	Pre-test Mean (M_x)	Post-test Mean (M_y)	Adjusted Mean ($M_{y.x}$)	*t*-value
Awareness of Environmental Sustainability	Experimental	50	9.46	20.62	20.62	8.63**
	Control	49	9.45	17.08	17.08	
	General Means		9.45	18.87	18.85	
Awareness of Social Sustainability	Experimental	50	5.80	13.16	13.12	7.27**
	Control	49	5.55	10.67	10.72	
	General Means		5.68	11.93	11.92	
Awareness of Economic Sustainability	Experimental	50	6.76	13.20	13.16	3.28**
	Control	49	6.45	11.94	11.98	
	General Means		6.61	12.58	12.57	
Overall Awareness of Sustainability	Experimental	50	22.02	46.98	46.79	11.15**
	Control	49	21.45	39.69	39.88	
	General Means		21.74	43.37	43.34	

*** p ≤ 0.01*

Table 6: Adjusted Mean Awareness Scores of School students regarding Environmental, Social and Economic Sustainability

As per table 6, the *t*-values for the significance of mean differences in adjusted mean awareness scores of environmental, social, economic and overall sustainability between treatment and control groups are significant (t = 8.63, 7.27, 3.28, 11.15; $p \leq 0.01$). This indicates the significantly higher level of environmental, social and economic sustainability awareness scores for the treatment group than their control counterparts. It shows the significantly positive impact of the activity-based intervention for sustainable development on awareness regarding sustainability and its dimensions among school students.

The results of the present study highlighted that it is important to engage students by means of a variety of student-centered activities. The students must be given ample opportunities to engage with the subject-matter, thereby developing their own understanding and constructing their own knowledge in an educational context for getting mastery over the content. These results are being supported by a number of researches. For example, Uzunboylu, Cavus and Ercag (2009) found a mobile-based multimedia program to be effective in enhancing participants' awareness regarding environmental concerns. In another study, Walshe (2016) observed that integrating poetry in a geography lesson helps develop the appreciation of economic and social sustainability among Geography students. However, the significant focus of the students was on the environmental dimension of sustainability. Also, Sarma (2017) found a significant effect of active strategies for environmental education for sustainable development on the knowledge,

attitude and skills of school students regarding environment compared to the control group. Paul and Mehera (2016) in a study on the households of Burdwan district in West Bengal observed a significant and positive impact of education on sustainable development. Also, Olsson, Gericke and Chang Rundgren (2016) recommended that teachers should design the sustainability education as per the age and level of students. Further, due attention should be given to striking a balance of various sustainability dimensions. In another study, Nousheen et al. (2020) stressed upon integration of education for sustainable development in teacher education in Pakistan as it has the potential to develop a favourable attitude of prospective teachers towards sustainable development. Similarly, Badea et al. (2020) observed that integrating sustainable development content along with the involvement of teaching staff involvement emerged as important strategies for developing sustainable behavior among Romanian Economics and Business students. In a recent study, Birdman, Wiek and Lang (2022) found that individual activities, relationships and their interactions to be the formative and mutually influential elements for developing sustainability competence in a graduate sustainability program. Also, Olsson, Gericke and Boeve-de Pauw (2022) concluded that ESD has an effect on the action competence of students for sustainability. In a similar vein, Corazza, Cottafava and Torchia (2022) observed that a transformative training activity for business students helps them choose a career in the field of sustainability. These results emphasize that study of sustainability-related disciplines influences the long-term career orientation of students in sustainability-oriented areas. Hence, it may be concluded that the results of the present study have both theoretical as well as empirical support from the earlier research and these results are worthwhile to explain the development of sustainability perspective among school students.

IMPLICATIONS

Following are the implications of these results:

1. The results revealed a significant impact of the activity-based package for sustainable development on the attitude and awareness of school students towards environmental sustainability. Therefore, students should be oriented towards pro-environmental attitudes by reinforcing the environmental aspects such as living in harmony with biodiversity, consuming and conserving resources responsibly, having a sustainable lifestyle, purchasing only what we need, participation in non-threatening environmental activities, etc.
2. The results of the study revealed that the activity-based learning package for sustainable development has a significant and positive effect on the attitude and awareness of school students towards economic sustainability. In this context, it has been rightly remarked that there is a dire need to raise awareness and reorient attitudes towards preferential consumption of those that have been made locally and under the least environment threatening conditions, encouraging fair commercial practices, thereby reducing the adverse impact of commercialization on the environment (Estrada-Vidal and Tójar-Hurtado, 2017).
3. Further, the activity-based package for sustainable development led to an increase in favourableness and enhanced levels of attitude and awareness of sustainability, and its three dimensions among school students. Therefore, teachers should incorporate activity-based teaching strategies in their everyday classroom teaching transaction and approach education for sustainable development content holistically. Hence, rather than teaching through conventional methods, the lessons should be taught with the help of activities involving small group activities, role-playing, story-telling, group discussions, brainstorming, hands on experiments, and presentation of video tutorials.
4. Learning is life-long process and learning of concepts through activity-based learning package for sustainable development provides a solid edifice for concept formation in students. The concepts learnt through experiential learning are ever-lasting and bound to leave impressions on the students' minds forever. Therefore, experiential learning must be given due importance in teaching-learning transactions.
5. Activity-based intervention for sustainable development was found to have a significant and positive effect on the attitude and awareness of school students towards sustainability. Therefore, through experiential teaching, teachers must emphasize the social responsibilities and roles that the students have to play as members of society by participating in democratic activities, respecting other cultures and believing in gender equity through means of non-environmental threatening approaches.
6. The results also suggest that innovative pedagogies must be adopted in schools in order to facilitate and develop uniformities regarding the attitude and awareness of various issues and concerns related to sustainable development (Patra and Panda, 2017). It is further recommended that sustainable environment programmes must be designed to ensure the involvement of students and the community at large. Environmental activists should try to generate mass awareness with the help of various environmental programmes.
7. Courses on sustainable development must be integrated into the pre-service teacher education curriculum (Aydın and Keles, 2021). Teachers' professional development initiatives can develop ESD teaching over time. Hence, the teachers must be supported during the process of transformation of their teaching towards education for sustainable development, to develop students' competencies to enable them to contribute to sustainable development (Olsson, Gericke and Boeve-de Pauw, 2022).
8. Educational institutions must have a clear vision for achieving the sustainable development goals through curricular and pedagogical approaches (Moganadas et al., 2020). It has been rightly pointed out that the ESD curricula and courses should be designed per human society's needs (Glavič, 2020). It is recommended that the issues and concerns regarding sustainability should be incorporated into the curriculum of different educational programs to enhance students' consciousness and knowledge regarding these pertinent issues (Msengi et al., 2019).

9. Finally, curricular adjustment is needed across all levels (Novieastari et al., 2022). Further, concepts related to sustainable development should be integrated into the curricula of all institutions, and special emphasis must be given to the training and empowerment of the public and stakeholders in a rigorous manner.

In a nutshell, it may be concluded that it is the need of the hour to integrate ESD across all disciplines and levels of education. Moreover, the impetus must be given to the continuous professional development of teachers so that ESD policy may be implemented in letter and spirit. Also, adopting ESD management practices will help support and promote ESD globally (Laurie et al., 2016). Sustainability based curricula and organizational culture must be developed in educational institutions, which may prove to be the key driver for bringing about desirable mindset transformation. The sustainability principles must be the core agenda of institutional strategy (Žalėnienė and Pereira, 2021). It is a well-known fact that the road to sustainability is paved by education since education plays a pivotal role (Kioupi and Voulvoulis, 2019). It is high time we must invest into it, else we would not be able to achieve the sustainable development goals by 2030.

LIMITATIONS

Following were the limitations of the present research:

1. The present study was quasi-experimental. A similar study may be undertaken using true experimental designs to validate the results of the present study more rigorously at different stages of education, i.e., from school to university level.
2. The qualitative and experimental approaches may be combined to replicate the same study to fill the existing lacunae in the theory and practice of sustainability and its tripartite aspects.
3. The social science textbooks of PSEB may be analyzed with regard to content coverage regarding sustainable development by carrying out its content analysis. Further, comparisons may be drawn between PSEB social science textbooks and those published by NCERT.
4. Descriptive studies may be conducted to assess students' attitude and awareness of sustainable development at different stages of education.

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