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SUSTAINABLE DEVELOPMENT AND EDUCATION – KNOWLEDGE ASSESSMENT AND ATTITUDES OF BACHELOR STUDENTS

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ABSTRACT

Purpose: *The purpose of this paper is to investigate Bachelors University students' level of education on sustainable development and ascertain whether there exists a discrepancy of level of education on the basis of gender. The aim is to study the possibility of any relationship between the education of sustainable development among students and their attitude/behavior towards environment*

Design/methodology/approach: *For the evaluation of student's knowledge and behavior, an online survey was used for the data collection. The survey had 329 respondents. This survey data was used to ascertain the level of Education of Sustainable Development (ESD) by using t-test, independent sample t-test and tests like multinomial regression was used for measuring the relationship between their education and behavior.*

Findings: *The study revealed that students possessed a high level of understanding and knowledge towards sustainable development. The results suggest that there was no particular difference exists on ESD on the basis of gender. Finding on the actions/behavior were also discussed and reported further in paper.*

Practical implications/limitations: *The paper should assist other students and/or professors in assessing the level of education of bachelor students towards sustainable development. It highlights the need for the younger generation to make a change their attitude towards environment and shift into an action taking mindset. This paper also had limitations such as only bachelor students were considered and no more higher education students were considered for this study. The variables for measuring the difference between education could be increased and should have used more reasonable and practical variables.*

Originality value: *There is a significant lack of research papers exploring extensive analysis of measuring knowledge of ESD among students across India and the effectiveness of their action. This study explored and analyzed the level of education students possess and its correlation with their action towards sustainable development. Taking into consideration that these students are the future of our country and are pursuing higher education, it is crucial to measure their education level and identify areas where changes are needed on taking actions towards SD.*

Keywords: *Sustainable Development, Education for Sustainable Development (ESD), College Students, Behavior towards sustainable development, Behavioral analysis, Higher Education Institutions.*

1. INTRODUCTION

With the United Nations Sustainable Development Goals in place, the need for sustainable practices has gained prominence globally in recent years, prompting educational institutions to play a pivotal role in fostering environmental awareness and responsibility among its students. Universities, as centres of learning and innovation, have a unique opportunity to shape the attitudes and knowledge of future leaders regarding sustainability. This research paper aims to evaluate university students' sustainable knowledge and attitudes, examining how their educational experiences influence their understanding and commitment to sustainable practices.

Sustainable development is "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (Brundtland., 1987)

Sustainable development has been a recognized concept for several decades. The first time this concept received its major recognition was in 1972 at the UN Conference on the human environment held in Stockholm. Despite its basic meaning, the question remains is that how many people actually know what sustainable development is and how it can be effectively achieved? According to (Mensah, Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review, 2019) even after years of widespread recognition, the notion of sustainable development remains indistinct as many people continue to question its meaning, history and significance, specifically in development theory and practice.

Sustainability encompasses a broad spectrum of issues, including environmental protection, social equity, and economic viability. As the repercussions of climate change and resource depletion become increasingly evident, it is essential to understand how well-equipped society is to navigate these challenges. Youth and students are the ones facing and making the future therefore they must have access to quality education. University and high schools play a very major role in imparting education to the students. Despite, the major role that they play, there is still a lack of necessary steps in providing ESD to students resulting in a lack of awareness among students and younger generations about the environmental crises and the steps they should take to resolve it.

This evaluation will not only assess the level of sustainable knowledge among students but also explore the underlying attitudes that drive their behaviours and decision-making processes. We know that education is one of the powerful means for development and there is little to no argument how education is a great means to achieve a sustainable future. This is why it is necessary to invest in good ESD for a better future.

Quality education on the environment despite its major positive impact also has other benefits like new innovations and better alternative ways and uses to protect and preserve the environment and achieve its SDG goals. In that pathway, UNESCO recently launched the program for ESD by 2030 which solidifies our belief that quality education not only raises

awareness and knowledge about but enhances freedom in innovation and new ways to achieve sustainable development.

Universities and higher education institutions have now realised the need for this and even started focusing on environmental education to students which has benefitted greatly in ESD. These studies shape the attitude of students and mould it into what is known as required actions and attitudes towards the environment. The university is responsible for instilling such attitudes and behaviour in the students. Students' engagement with the university and its various programs and initiatives regarding environment protection and sustainability has many aspects and its consequences can have a huge impact on both - the lives of the students and the environment in question.

In the line of behavioural analysis, the question remains, how the education impact the student's life decisions, actions, behaviours, attitudes, habits and innovations towards the environment? To achieve this, there needs to be more study and research done on students to measure how and what impacts ESD affects students' decisions.

This study analyses the quantitative data collected through surveys and qualitative insights garnered from interviews and focus groups and conducts empirical tests. By engaging with students from diverse academic backgrounds, the research seeks to identify knowledge gaps and aims to contribute to the development of more effective sustainability curricula and initiatives within higher education, promoting a culture of sustainability that extends beyond the university settings.

This study is organised into following section to address the research questions: Section 2 provides a detailed literature review of existing literature on education of sustainable development and similar studies. Section 3 describes the research methodology used during data collection process- the techniques and tools used to analyse the survey responses. The results are displayed in section 4, which are followed by in-depth analysis and portrayal of the results and comparison with the existing literature in similar study. In the last section of this study, the research is concluded along with potential further research scope in this area. Limitations of this study are also addressed.

2. SYSTEMATIC LITERATURE REVIEW

Envision a scenario where people possess awareness of the consequences of their damaging and negligent actions on the environment, a scenario where individuals possess the basic understanding of sustainable development and are more aware and conscious of their actions, a society that respects nature's boundaries. This would be such an ideal scenario, wouldn't it?

Unfortunately continuing to our current track, will take a lot of time to achieve a world within earth's carrying capacity. According to (Giddens, 2009) at the present rate of natural degradation, it is controversial whether the objective of balancing social, economic and environmental trinity is achievable, and whether human parity and opulence along with population growth can be realizable. This requires a dire need for an improvement in the

thinking process and mindset of people. Thus, there is a necessity for steps to be taken in compliance with the grand scheme of things to change the education paradigm at every existing level. (Cortese, 2003)

Research and education on sustainable development accede better and more comprehensible understanding of the right practices leading to fundamental support to the advancement of sustainable development (Guerra, 2021), Therefore, there is a pressing need to integrate education and sustainable development, a need even acknowledged by UNESCO. ESD remains a somewhat contested phrase which, given the difficulty in establishing a clear definition, has the potential to compromise the inclusive, process-orientated concept it needs to convey.

UNESCO defines education for sustainable development as:

"*Education for Sustainable Development means including key sustainable development issues into teaching and learning; for example, climate change, disaster risk reduction, biodiversity, poverty reduction, and sustainable consumption. It also requires participatory teaching and learning methods that motivate and empower learners to change their behavior and take action for sustainable development. Education for Sustainable Development consequently promotes competencies like critical thinking, imagining future scenarios and making decisions in a collaborative way* ((Jelle Boeve-de Pauw, 2015))

It proves that ESD plays a crucial role in advancement of achieving SDG goals (Safarli, 2024)**,** The dire need of education on sustainable development is evident by countless and tireless efforts made by nongovernmental organizations (NGOs) and new policies by government to incorporate environment education in school to transform the traditional flawed education system (Cortese, 2003)**,** It is therefore extremely important to imparts its education to very levels in society.

2.1. ESD in higher education

Education, including higher education, is viewed as fundamental for progress in SD (Minghui Yang, 2022), As deep learning is considered to be 'particularly crucial in the case of sustainability education' Intensive knowledge about environment education is very crucial in sustainable education (Warburton, 2003). According to De Silva (Dakshina G. De Silva and Rachel A. J. Pownall, 2014), environment and sustainable practices is highly dependent on higher education, Another research asserted that indicators developed in the field of citizenship education, conservation education and particularly EE are used to derive existing tools and methodologies for measuring and assessing ESD initiatives ((Reid, 2006); (Wals, 2009); (Charter, 2011)). Higher education emerges as a crucial way to youth empowerment, owning to the students being the future and providing them with beneficial programs will equip them with necessary life skills, and if these students are taught properly, they can greatly contribute to economic growth and achieving sustainable development. (Ukpabio,

2015). HEIs prove to be suitable and optimal ground for sustainable development (Elliott Mokski, 2022).

HEIs and Universities has emerged as major institution for shaping societies by creating dynamic leaders, policymakers, entrepreneurs, etc. Furthermore, due to the large number of population being students and studying in universities and modern teaching standards and environmental awareness subjects in coursework, it makes a direct as well as indirect positive impact on improvement of environmental issues (Abubakar, 2008), Hence HEIs can take the load and responsibility to further promote students to leadership role towards SD (Nicolaides, 2006).University also plays a major role in raising awareness and projects a strong emphasis on imparting education on environmental education and sustainable development. (Péter Bagoly-Simó, 2017), According to (Thomas, 2004), The universities have an obligation towards society to give environmental literacy and is not fulfilling, It is acknowledged more research work and education measures are necessary

2.2. India and Sustainable Development

In the context of India, there is an emerging high focus on sustainable development and its further measures to overcome it and this is evident in higher education institutions, driven by the high demand of society (Chhokar, 2010)

There has been very little to no attention paid to analyse and examine the effects of different factors habits and knowledge of students to ESD. (Baker, 2001)

Besides, one of the major concerns is to analyse how ESD is effective for students to make an impact. According to (Sterling, 2009) “Sustainability is not just another issue to be added to an overcrowded curriculum, but a gateway to a different view of curriculum, of pedagogy, of organizational change, of policy and particularly of ethos” This meant that ESD different from other educational subjects, is not topic to be taught to students in a normal textbook way, but to go further beyond the traditional teaching methods to create a bigger impact on students behaviour and actions.

According to (Uitto, 2013) the impacts of ESD is not researched properly and this led us to disregard the “impact involves real-world changes in ecological sustainability, policies, and people’s well-being”. This is a big research gap and in our research paper, we are going to focus on the current education impact on behaviour and action towards real world by university students. Sinakou made several statements about action- orientation. Sinakou argued that action- orientation includes taking action on real- sustainability issues. He stated that it also involves students’ leadership which requires active participation of students in making decisions about their learning. (Sinakou, 2019)

2.3. Research question

In addressing the above research gap following questions arose:

Ques 1) Do students have enough existing knowledge of Sustainable development?

Ques 2) Is there any difference in the level of education based on gender?

Ques 3) Does better education leads to better action and change in behaviour of students towards environment in day- to- day life?

2.4. Research Hypothesis

S. No	Null Hypothesis (H_0)	Alternate Hypothesis (H_1)
1	There is no existing substantial knowledge of Sustainable Development (SD) in college students	There exists substantial knowledge of Sustainable Development (SD) in college students.
2	There is no difference in the level of ESD based on gender	There is difference between male and female on the basis of knowledge regarding SD
3	Higher education does not leads to a positive change in habits of students towards the environment	Higher education leads to a positive change in habits of students towards the environment

3. METHODOLOGY

The methodology used for this study is descriptive in nature, as data was obtained using a survey administered at a single point in time. The research was undertaken at the University of Delhi. A randomly selected sample of 350 individual across different colleges were collected and surveyed. Data was collected by distributing e- survey questionnaires that was developed for this study, to the students across all domains. The purpose of the survey was to explore students' attitudes and perceptions towards sustainability. The survey approach allowed for an analysis of habits and actions of students regarding sustainability.

The purpose of the questionnaire was to establish relationship between students' actions and attitude toward the environment and their perceptions of ESD. Questions in the survey consisted of both closed and open questions; both quantitative and qualitative questions were collected. Items related to students' knowledge of sustainable development used a five-point Likert scale for 1-5 (1= "strongly disagree" to 5= "strongly agree"). Actions of students related to sustainability is collected in a checklist format where students were asked to choose "Yes" or "No" that are later converted to 1 for "Yes" and 0 for "No". The majority of the questionnaire items were chosen from the work of and the other items were developed by the researchers.

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The researchers performed various descriptive analysis including means, standard deviations and percentages. Additionally, statistical tests such as analysis of variance and the t-test were also applied to assess the statistical significance of several independent variables. Gender data of students was also collected to study the relationship between gender and sustainability- related actions. This was executed by studying mean and performing t-test on

obtained data. The relationship between education and action was analysed using multinomial logistic regression, due to the presence of multiple independent variables, ranging from 1-5 and binomial dependent variable (0 and 1). One sample t-test was employed to examine the presence of existing knowledge of sustainable development in students. To test the hypothesis authors assessed the responses from a questionnaire directed at undergraduate students.

The research utilized several statistical analyses to investigate various components of sustainable development (SD) awareness within the student population. The comprehension of ESD was first analyzed using one sample statistics to generate a mean score, derived from the students' answers provided to the questionnaire, and compared to a reference value. In this analysis, four ESD-related questions were evaluated to establish if the student's mean score was significantly different from an expected value. These results provided clarity into whether the students awareness fell above, below or aligned with the predicted level of knowledge relating to ESD.

To investigate possible sex differences in ESD awareness, an independent samples t-test was conducted to compare the mean scores of male students and female students to test whether any differences can be statistically significant. The analysis assumed normality of the data, with equal variances between the groups, although corrections (like Welch's t-test) can be done if the variances are not equal. A significant p-value (i.e., usually < 0.05) concluded whether sex does play an aspect in ESD awareness, while a non-significant result would suggest there is no significant difference between male and female students.

Finally, the study examined how students' understandings of sustainable development impacted their behaviour through the use of logistic regression. The dependent variable (students' behavior) was binary, thus a binary logistic regression model was appropriate. Six statements about knowledge were treated as independent variables. A likelihood ratio test was performed to determine whether the inclusion of knowledge significantly improved the ability to explain student behaviour. By examining the regression coefficients, the knowledge factors affecting students' ESD-related behaviours were ranked, indicating more or less influence about students' awareness into action. Overall, the statistical analyses provided a complete picture of ESD awareness awareness, gender differences in ESD awareness, and knowledge/behaviour relationships.

Additional questions are also mentioned in the questionnaire to understand students' knowledge and perceptions regarding SD. These questions were not analysed numerically and no statistical operations were performed on this data however the questions can be studied to understand perceptions and inclination of students in the subject of sustainability.

4. RESULTS

The results were divided into three domains: knowledge testing, difference of knowledge on the basis of gender and linkage of ESD with attitude/Behavior of students.

Descriptive statistics

4.1. Existing Knowledge of sustainable development in students.

Null hypothesis: There is no existing substantial knowledge of SD in college students

Alternate hypothesis: There exist a substantial knowledge of SD in college students.

In this section authors tested the above stated null hypothesis.

Students were asked about their present knowledge of sustainability around a series of questions to test their knowledge of sustainability. Answers were graded on the basis of 5-point Likert scale (1 to 5) with 1 being "strongly disagree" and 5 being "strongly agree". Authors performed the analysis on the data obtained using 5 questions asked to the students. Test value is taken as 3 to accept or reject the null hypothesis.

Table 1: One-Sample Statistics

	N	*Mean*	*Std. Deviation*
Reducing water consumption is necessary for sustainable development.	*336*	*1.56*	*.679*
To achieve sustainable development, all the people in the world must have access to good education.	*336*	*3.02*	*1.025*
Sustainable development requires that companies act responsibly towards their employees, customers and suppliers.	*336*	*3.02*	*.935*
I think that everyone ought to be given the opportunity to acquire the k0wledge, values and skills that are necessary to live sustainably.	*336*	*3.12*	*.965*

Table 1 here shows the questions asked and their results from one sample t test, The first question was "Reducing water consumption is necessary for sustainable development." (n=336) With its options being "yes", "maybe", "No". Its mean was 1.56 which is greater than 1 so indicating that students believe it to be a right measure of sustainable development. Rest of the questions had 0 to 4 rating as discussed in the above paragraph. The other 3 questions in which all of the questions' answer had mean above 3 so satisfying the one sample t test,

The students also responded on the question "The shift to sustainability requires critical thinking about the role of the institution in its social and ecological systems. Circle which of the following your institution (through individual, group or departmental efforts) attempts to teach its students." (n = 315) With the highest response being:

How the campus functions in the ecosystem (e.g. its sources of food, water, energy, as well as the endpoint of waste and garbage) (n = 174) suggesting how institute teaches about sustainability from their day to day lives to students and that being 56% of the responses,

4.2. Difference between ESD in between gender

Null hypothesis: There is no difference on the level of ESD on the basis of gender Alternate Hypothesis: There is difference between male and female on the basis of knowledge regarding SD.

Below table represent the proportion of responses on the Likert scale (1 to 5) on the basis of gender.

Table 2: Number of students

Ratings	*Male*	*Female*
5 = Always	*143*	*72*
4 = Often	*227*	*102*
3 = Sometimes	*256*	*163*
2 = Rarely	*184*	*83*
1 = Never	*73*	*32*

1. I always separate food waste before putting out the rubbish when I have the chance.
2. I often purchase second-hand goods over the internet or in a shop.
3. I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.
4. I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or wasting materials).

These are the research question asked to collect data on action regarding ESD of students across colleges. Students were asked to score on a scale of 1 to 5. A score 1 represent never i.e., most negative feedback; a score of 5 represent always i.e., most positive feedback.

Authors has performed independent samples t-test. Male has been assigned “0” while female is assigned “1”. Table 1 shows the group statistics of several questions. Although the size of female population is low compared to male sample was relatively representative. Mean difference of Sustainable development knowledge in male and female is not significant and the figures are similar in all four questions. Standard deviation is also uniform across all questions ranging from 0.90 to 0.172 in females and 1.059 to 1.114 in males.

Table 3: Group Statistics

Particulars	*Gender*	*N*	*Mean*	*Std. Deviation*	*Std. Error Mean*
I always separate food waste before putting out the rubbish when I have the chance.	*1*	*88*	*3.51*	*1.072*	*0.114*
	0	*191*	*3.25*	*1.081*	*0.079*
I often purchase second-hand goods over the internet or in a shop.	*1*	*88*	*2.32*	*1.040*	*0.111*
	0	*191*	*2.55*	*1.173*	*0.085*
I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.	*1*	*88*	*3.40*	*1.028*	*0.110*
	0	*191*	*3.32*	*1.114*	*0.081*
I have changed my personal lifestyle in order to	*1*	*88*	*3.66*	*0.900*	*0.096*

reduce waste (e.g., throwing away less food or wasting materials).	*0*	*191*	*3.62*	*1.059*	*0.077*

Table 4: Independent Samples Test

		Levene's Test for Equality of Variances		***t-test for Equality of Means***			
		F	***Sig.***	***t***	***df***	***Sig. (2-tailed)***	***Std. Error Difference***
I always separate food waste before putting out the rubbish when I have the chance.	*Equal variances assumed*	*.184*	*.668*	*1.850*	*275*	*.065*	*.139*
	Equal variances not assumed			*1.855*	*171.167*	*.065*	*.139*
I often purchase second-hand goods over the internet or in a shop.	*Equal variances assumed*	*3.261*	*.072*	*-1.555*	*276*	*.121*	*.147*
	Equal variances not assumed			*-1.627*	*186.215*	*.105*	*.140*
I avoid buying goods from companies with a bad reputation for looking after their employees and the environment.	*Equal variances assumed*	*1.698*	*.194*	*.552*	*276*	*.581*	*.141*
	Equal variances not assumed			*.569*	*179.375*	*.570*	*.137*
I have changed my personal lifestyle in order to reduce waste (e.g., throwing away less food or 0t wasting materials).	*Equal variances assumed*	*4.685*	*.031*	*.285*	*276*	*.776*	*.131*
	Equal variances not assumed			*.303*	*193.805*	*.762*	*.123*

An independent samples t-test was used to explore possible differences in Education for Sustainable Development (ESD) awareness by gender across the four questionnaire items. Results indicated that: First Question: t(275) = 1.850, p = 0.668 (with equal variances assumed) The p-value of 0.668 does not reach significance (p > 0.05), indicating insufficient evidence to reject the null hypothesis that there are no gender differences. Second Question: t(276) = -1.55, p = 0.72 (with equal variances assumed) Again, the p-value is not significant, while it is relatively high, indicating no statistically meaningful difference. Third Question: t(276) = 0.552, p = 0.194 (with equal variances assumed) Once again, the results do not achieve statistical significance at conventional levels. Fourth Question: t(276) = 0.285, p = 0.31 (with equal variances assumed) The p-value is somewhat lower than on the other questions, but the mean difference of 0.37 is of little to no substantive significance, indicating no meaningful differences by gender.

The uniformly elevated p-values (all > 0.05) across items indicate that any differences in male and female means that can be observed cannot reliably be distinguished from 0.The statistical power of the test (the opportunity to detect true effects) appears to be sufficient

given the sample sizes (df ≈ 275), further implying that the null findings reflected a true null hypothesis as opposed to an artifact of data insufficient to detect an effect. Furthermore, the effect sizes (mean differences), are trivial in a practical sense and continues to bolster the conclusion of no substantive gender-based difference in ESD.

Although the mean difference in all cases is not very significant, we still have to deduce P-value to draw inferences from the test results. As the significance value in 3 cases are more than 0.05, it can be concluded that there's no statistically significant difference between the groups being compared. This means the observed differences could be due to chance. This renders not enough evidence to reject the null hypothesis, thus we can infer that there is no difference on the level of ESD on the basis of gender. Similar results were also shown in Daniel Olsson study regarding the effectiveness of education for sustainable development, Olsson found that effectiveness of education for SD in Girls and boys follows the same trajectory regardless of gender. (Daniel Olsson, 2022)

4.3. Relationship between ESD and students action/behaviour

Null Hypothesis: There is no relation between education of sustainable development and actions towards SD.

Alternate Hypothesis: There exists a relation between between education and sustainable development actions/behaviour

This hypothesis is performed to find whether there exists a relationship between knowledge and actions regarding sustainable development in college students. Authors have chosen one independent variable and multiple independent variables. Multinomial Logistic regression has been performed to analyse the results.

Table 5

S. No	Questions
1	I have changed my personal lifestyle in order to reduce waste (eg: throwing away less food or wasting materials)
2	Improving people's chances for a long and healthy life contributes to sustainable development
3	Reducing water consumption is necessary for sustainable development
4	To achieve sustainable development, all the people in the world must have access to good education
5	Sustainable development requires that companies act responsibly towards their employees, customers and suppliers
6	I think that everyone ought to be given the opportunity to acquire the knowledge, values and skills that are necessary to live sustainably
7	I don't think about how my actions may damage the natural environment

These are the research question asked to collect data on action regarding ESD of students across DU. Students were asked to score on a scale of 1 to 5. A score 1 represent never i.e., most negative feedback; a score of 5 represent always i.e., most positive feedback.

Table 6: Model Fitting Information

Model	*Model Fitting Criteria*	*Likelihood Ratio Tests*		
	-2 Log Likelihood	*Chi-Square*	*df*	*Sig.*
Intercept Only	*370.849*			
Final	*341.298*	*29.551*	*28*	*.385*

Table 6 shows the results of the goodness-of-fit test indicate that the model's expected distribution did not significantly differ from the observed data (0.385 > 0.05). As a result, we do not reject the null hypothesis that the model adequately fits the data, which indicates that the difference between the observed and the expected values is likely due to random variation rather than systematic model misspecification. In econometric terms, the relatively high p-value indicates that the current model specification is sufficiently capturing the underlying structure of the data without any statistically significant evidence of poor fit.

The goodness-of-fit test examines how closely the observed data aligns with the theoretical distribution provided by the model, and our findings indicate that there is an admissible distance separating the two pieces of information from a statistical standpoint. Even though we do not claim that our model perfectly fits data, the results suggest that the model does indeed provide a reasonably close approximation of the observed data distribution through conventional significance levels. These outcomes are especially important for testing the structural assumptions behind the model and the suitability of the model for examining the relationships between outcomes and predictors in our study of Education for Sustainable Development.

Table 7: Likelihood Ratio Tests

Effect	*Model Fitting Criteria*	*Likelihood Ratio Tests*		
	-2 Log Likelihood of Reduced Model	*Chi-Square*	*df*	*Sig.*
Intercept	*341.298*[a]	*.000*	*0*	.
Improving people's chances for a long and healthy life contributes to sustainable development.	*349.360*	*8.063*	*10*	*.623*
Reducing water consumption is necessary for sustainable development.	*343.785*	*2.487*	*2*	*.288*
To achieve sustainable development, all the people in the world must have access to good education.	*344.882*	*3.584*	*4*	*.465*
Sustainable development requires that	*344.665*	*3.367*	*4*	*.498*

companies act responsibly towards their employees, customers and suppliers.				
I think that everyone ought to be given the opportunity to acquire the k0wledge, values and skills that are necessary to live sustainably.	*344.616*	*3.318*	*4*	*.506*
I don't think about how my actions may damage the natural environment.	*350.886*	*9.588*	*4*	*.048*

Table 7 includes the outcomes of the likelihood ratio tests examining whether removing a predictor caused a significant deterioration in Model 1 model fit. The likelihood ratio test compares the -2 log-likelihood between a final model (including all predictors) and a reduced model (one effect is omitted). The chi-square statistic represents the difference between the final and reduced models and is interpreted as a significant difference indicating the removed predictor had substantial meaning to the model fit. Ultimately, the test results of this study would suggest omitting the effect caused no significant deterioration in the model fit, as difference in the model fit represented by the chi-square statistic is not meaningful. Thus, the null hypothesis of zero parameters for the effects are not rejectable: "the effect of ESD education on actual sustainability behaviour demonstrates no relationship." In essence, the analysis reveals insufficient statistical evidence to suggest that students' knowledge of ESD matters to their actual sustainability behaviour.

Comparison with the Current Literature: Nonetheless, these findings are at odds with the previous scholarship on the matter. (Daniel Olsson, 2022) for example, investigated the effectiveness of ESD and described a positive association between students' knowledge of sustainable development and self-reported sustainable behaviours in the context of internationalization. His study supports the assertion that ESD increases both awareness and action. (Meyer, 2015) has similarly found evidence for a potential positive association again with ESD education and pro-environmental behaviour, thus reinforcing the impression that increased knowledge can lead to more sustainable behaviours.

Discussion of the Discrepancies: While the logistic regression analysis conducted with the present study does not show a statistically significant relationship, the differences in findings from Olsson and Meyer suggest that differences in methods, sampling characteristics, and/or constructions for measures could impact results. Further research should be conducted to examine the discrepancies in findings and discover if contextual factors (curriculum structure, culture, or mode of assessment) might impact the association of ESD education and behavioural outcomes.

5. CONCLUSION

This study aimed to study the existing knowledge of sustainable development among the college students. It also aimed to find out if there is any difference in the knowledge and actions between gender. At the last it tested if there exists any positive relationship between the level of education and the corresponding level of action.

The data for this study was collected through an online survey and using extensive questions to gather enough data for hypothesis testing of 3 research questions. 330 students responded to the survey. The answers suggested and by testing their education on sustainable development, it clearly showed that students studying in higher educations showed high level of knowledge towards the concept of sustainable development. It proved that in India, education curriculum focused on teaching students and youth the concepts of sustainable development.

The studies also suggested that there is no difference in the presence of ESD in between different gender. As shown in the results, the significance values were all higher than 0.05 hence deriving the results insignificant and leading us failing to reject the null hypothesis i.e., there is no difference on the level of ESD based on gender.

The last hypothesis, i.e. checking if ESD as any positive effect on actions towards sustainable development in students was done through multinomial regression. The results of the study showed that the results were insignificant leading us to fail to reject the null hypothesis. This tells us that even though the youth and college students are aware of the implications of sustainable development, there is still not much positive effect towards the environment. (Kopnina & Meijers, 2014) After reflecting upon the objectives of ESD that it has to overcome the challenges presented by theory and practice of ESD, such as cross- cultural applicability, efficient methods of teaching and evaluating different ESD programs. This implores the government and higher institutions to implore the youth and motivate them to continuously take positive actions and make a change in their behaviors. There is a high need right now for undergraduate students, the future of our generation to take positive actions towards sustainable development.

College and higher education plays a great role in teaching students about change towards SD from their daily practices and environment. Hence here students also gave their responses on how college plays a major role in attempting to teach its students:

Table 8

Particulars	***Number of responses***
How the campus functions in the ecosystem (e.g. its sources of food, water, energy, as well as the endpoint of waste and garbage)	*172(54.6%)*
A sense of place: the natural features, biota, history and culture of the region	*140(44.4%)*
The institution's contribution to a sustainable economy and sustainable local communities	*164 (52.1%)*
How the institution views and treats its employees (such as staff and faculty involvement in decision-making, their status and benefits)	*130 (41.3%)*
The basic values and core assumptions that shape the content and methods of the academic disciplines	*118 (37.5%)*

There is a shortage of research papers done to measure the level of education of sustainable development in college students and how their level of education affects their level of

education towards their actions. Therefore, this paper provides a clear study on existing level of ESD in students pursuing higher institutions, their difference on the basis of gender and finally it proves that even though there is enough ESD in students in college, there is still a lack of positive actions and there is a long way to go to get students to adopt daily positive practices in their habits towards the environment. This compels the government and premium education institutions to motivate the youth to take a change taking behavior towards sustainable development. As (Monroe, 2007) suggested that in future research ESD has to develop a new niche to promote high quality and effective ESD programmes.

However, this research paper also had certain limitations as it did not take other important variable n measuring the level of educations in students such as their level of education, CGPA, their course, etc. As it is important to note that any omitted variable or factor that is correlated with education and education attainment will lead to biasness towards the results in a standard regression framework (Meyer, 2015), Taking these measures would have improved out data more and make our research paper better. There is also future scope in this paper to check how different education backgrounds and different education level such as under graduation and post graduation could have an effect on their actions towards environment. The findings of current study need further research to make it better and more measurable to measure students' perception, education and actions towards sustainable development in India.

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