Mapping the Sustainability Consciousness of Students

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Abstract

Education plays a critical role in empowering individuals to make choices which contribute to sustainable development. The research focus in this area has shifted from environmental consciousness to a broader concept of sustainability consciousness encompassing the multiple dimensions of sustainable development. Sustainability consciousness (SC) as a construct is represented by categories of knowingness, attitude and behaviour in the three dimensions of sustainable development (SD) namely 'environment', 'social' and 'economic' dimensions. This study is undertaken to find out the sustainability consciousness of students (17–18 years) and analyse the relationship between various constructs and sub-constructs based on the 'three-order theorised model of sustainability consciousness constructs. The sample constitutes 330 students who recently passed out of various schools across India. The mapping was undertaken using an empirically validated and test designed tool 'Sustainability Consciousness Questionnaire' (SCQ). The findings reveal that students have high level of sustainability knowingness (in all the three dimensions, but mostly in the environmental dimension) and low level of sustainability behaviour (lowest in the environmental dimension). Correlation analysis between the constructs of SC indicates positive interaction between sustainability knowingness and sustainability attitude. Sustainability behaviour is positively associated with sustainability attitude except in the areas of environment and economy indicating that environmental knowingness has not translated into attitude and further into behaviour. The study has implications for curricular and pedagogical initiatives to promote sustainability consciousness in students.

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Introduction

Sustainable development as a concept and process is not just an academic term but a compelling necessity for the survival of humanity and the planet. The 'climate change' accelerated by human activities is now seen as a wake-up call for us either to take action in terms of sustainability or perish. The Brundtland report (1987) defines sustainable development as '… a development that meets the needs of the present generation without compromising the needs of future generations…' (WCED 1987). The concept of sustainable development (SD) is represented by three interconnected and overlapping dimensions which are referred to as three pillars of sustainable development, namely, 'economy', 'environment' and 'society'. This model referred to as three rings of SD, is endorsed by all the international agencies and became a benchmark for all the SD initiatives across the world including education. According to UNESCO framework, these three dimensions need to be explicitly stated and explained in terms of our knowledge (knowingness), attitude and behaviour. In 2015, the UN General Assembly adopted Agenda 2030 for sustainable development with an aim to redirect humanity towards a sustainable path for the future. Forging ahead on the path of SD will not only require a change in our thinking but also in our actions.

In this context, education plays a critical role in promoting the culture of SD by 'empowering individuals to make choices and actions for environmental integrity, economic viability, and a just society'. (UNESCO, 2015). Education for sustainable development (ESD) is lifelong learning concept and the UN report on SD reiterates the role of educational institutions. 'All educational institutions from early school to tertiary education should consider it their responsibility to deal intensely with the matters of SD and to foster the development of sustainability competencies.' (UNESCO, 2017). ESD has been recognised as a key enabler for SD since 1992 United Nations Conference on Environment and Development (UNCED) and the UN decade for ESD (2004–2015) is now being followed up by Global Action Programme (GAP) to further scale up. ESD is not just about teaching SD related content or revamping curriculum but also to mainstream sustainability with all the aspects of curriculum, organisational culture and community relationships in the educational institutions. In order to bring any changes in the organisational culture, curriculum and pedagogy, it is important to know the students' understanding and perceptions about sustainability related issues. Research has focused on students' understanding of environmental issues at various levels in terms of awareness, attitudes and environmental consciousness, etc. (Sanchez and Lafuente, 2010; Sharma and Bansal, 2013). As we shift

from 'environmental consciousness' to 'sustainable consciousness', there is a need to focus on this aspect at various levels of education. This study focuses on mapping the sustainability consciousness (SC) of students who have just finished the formal schooling (17–18 years) and analyses the relationship between various constructs and dimensions of sustainability.

Theoretical Background

Sustainability consciousness (SC) is a relatively new term. In this context, sustainability consciousness refers to 'the experiences or awareness of sustainability phenomenon which include experiences, perceptions that are commonly associated with us such as beliefs, feelings and actions.' (Gericke, et al., 2019). They have, for the first time, operationalised this word 'Sustainability Consciousness' (SC) as a construct represented by the categories of knowingness, attitude and behaviour in the environmental, economic and social dimensions of sustainable development on the basis of UNESCO framework (see Fig. 1). In this theoretical framework, the 'Knowingness (K) refers to what people acknowledge as the necessary features of Sustainable Development (SD), Attitude (A) refers to the attitudes towards the issues in SD, and Behaviour (B) indicates what people do in relation to the SD issues under consideration.' (Gericke, et al., 2019). The authors have evolved a theorised three-order model of sustainability consciousness constructs (see Fig. 2) and developed an empirically validated instrument 'Sustainability Consciousness Questionnaire, (SCQ). In this model, the three psychological constructs of sustainability consciousness–knowingness (K), attitudes (A)— behaviour (B)— are related to and three dimensions of sustainable development—environment, economy and social resulting—into nine sub constructs (K-ENV, K-S, K-E, A-ENV, A-S, A-E, B-ENV, B-S, B-E) as illustrated in Fig. 2.

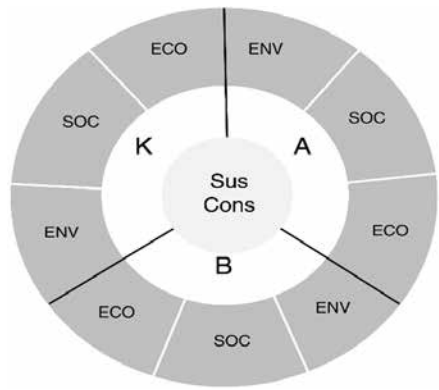

Figure 1: Conceptual representation of sustainability consciousness (Source: Gericke, et al., 2019)

The Sustainability Consciousness Questionnaire (SCQ)' developed and validated on the basis of this model, contains items representing the three constructs and nine sub-constructs and cover the entire spectrum of 15 sub-themes of SD proposed by UNESCO (2015). The study is based on this framework of SC and mapping was done using this SCQ which is discussed in detail in methodology section.

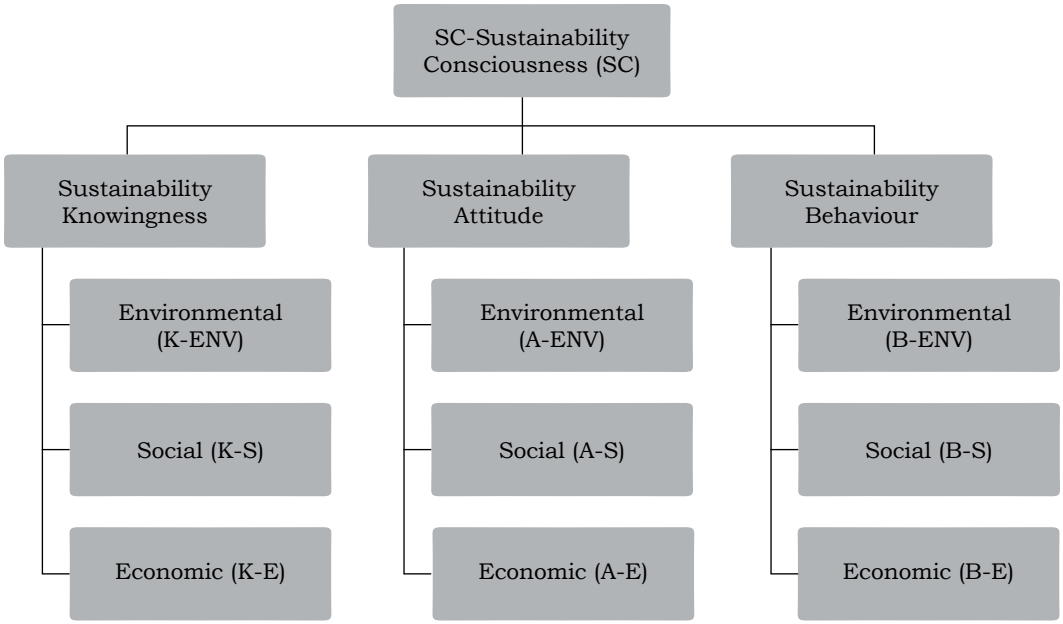

Figure 2: Theorised three orders model of sustainability consciousness constructs

Research Focus

In present times, the environmental issues need to be understood in a complex manner and need multiple perspectives to resolve. Research in the area of sustainability and sustainability consciousness is only a decade old. The studies focused on developing a scale to measure the educational competencies to live together sustainably (Biasutti and Surian, 2012), attitude towards SD based on three-pillar model of SD (Biasutti and Frate, 2017), knowledge, attitude and behaviour with regard to SD (Michalos, et al., 2012), and sustainability consciousness (Gericke, and et al., 2018). The review of literature indicates that not much work has been done in the area of sustainability consciousness and the author has not come across any study done in the Indian context either at school level or undergraduate level. Thus, establishing the validity of this SCQ in the Indian context and mapping the SC of students can serve two-fold benefits. One is that mapping would help the academicians and educators to know the SC of the students with whom they are dealing. This will help to evolve pedagogical and institutional initiatives. It will cater the process of policymaking and curriculum designing for many trans-disciplinary and interdisciplinary initiatives in school and higher education to meet the 21st century skills. The second benefit of this mapping would

help to understand how the formal schooling has prepared young adults towards issues related to SD and henceforth, can help to suggest for school education curricular reforms. Keeping this two fold benefit in mind, this study is undertaken to map the SC amongst students who have just finished 12 years of formal schooling. The study is based broadly in the following research questions:

(i) To map the sustainability consciousness (SC) of students.

(ii) To analyse the relationships between various constructs and sub-constructs of sustainability consciousness.

(iii) To examine the relationship between the academic streams (sciences, humanities and commerce) and the various constructs of SC.

Materials and Methods

Tool: The Sustainability Consciousness Questionnaire (SCQ)

The instrument used in this study for analysing SC of students is SCQ (long version) which is a test designed and empirically validated tool with 638 students (age 18–19) by Gericke, et al., in 2017–18. Due permission is taken from the authors to use the tool. The SCQ items are formulated on the basis of 15 sub-themes of SD as formulated by UNESCO (2015). The SCQ (long version) consists of 50 'Likert-scale type' items to measure knowingness, attitude, and behaviour with regard to sustainable development in all the three dimensions, i.e., environmental, social and economic aspects. The SCQ has three sections: Sustainability knowingness, attitude and behaviour and the number of items within each section are denoted in Table 1. Thus, the SCQ is structured in three sections and further structured into nine sub-sections representing items to all nine sub-constructs, i.e., K-Env, K-S, K-E, A-Env, A-S, A-E, B-Env, B-S and B-E. The items are randomly arranged within each section and the Likert scale uses scale ranging from (1) Strongly disagree to (5) Strongly agree.

Sample

The sample consists of 330 students who have just passed out of school and enrolled in an institution of higher education in Delhi studying various courses. Though the sample belongs to one particular institution (convenient sampling), it represents regional and cultural diversity of India as the students from various states of India (almost all regions of India) take admission in this institution. The limitation of the sample is that it only comprises female students as it is a women's institution and high achievers. However, this study is first of the series of studies undertaken, its scope in terms of gender and other variables can be expanded in other papers. As the students come from various academic streams of their school education, the study explores the relation between their academic stream at school level and SC.

Table 1
Number of Items in Various Constructs and Dimensions of SD

	Knowingness	Attitudes	Behaviour	Total
Environmental	6	4	7	17
Economic	5	4	4	13
Social	8	6	6	20
Total	19	14	17	50

The quantitative analysis was done using parametric statistical tests and SPSS software. Descriptive statistics were used to compare the mean scores within each construct and sub-construct. Tests to compare groups (t-test) and correlation analysis (Pearson correlation) were performed using SPSS software. The reliability of the tool is established by calculating Cronbach's alpha and its value came to be 0.795. Since it is more than 0.7, the tool is found to be reliable in the Indian context.

Results and Discussion

1. Analysis of Sustainability Consciousness of Students

Descriptive statistical analysis of SCQ items revealed that students had higher scores in items related to sustainability knowingness (knowledge domain) followed by sustainability attitude and least scores in items related to sustainability behaviour (Table 2).

The dimension in which students scored highest within the three analysed areas (knowingness, attitude and behaviour) is economical dimension (Mean of 4.05) closely followed by social dimension. The dimension in which students' SC is lowest is environmental dimension. However, within sustainability knowingness, environment dimension is the highest whereas in sustainability attitude and behaviour, the environment dimension of SC of students is least (see Fig. 3). Overall, the sustainability behaviour scores in all dimensions in the SCQ is least indicating that knowingness has not translated effectively into behaviour.

Table 2
Mean scores of constructs and sub-constructs of SC

Domain	Dimension/ Sub-construct	Mean	SD
Sustainability Knowingness	Environmental	4.32	0.58
	Social	4.23	0.50
	Economic	4.08	0.41
		4.21	
Sustainability attitude	Environmental	3.27	0.52
	Social	4.43	0.44
	Economic	4.44	0.48
		4.05	

Sustainability behaviour	Environmental	3.61	0.51
	Social	3.96	0.46
	Economic	3.64	0.64
		3.73	

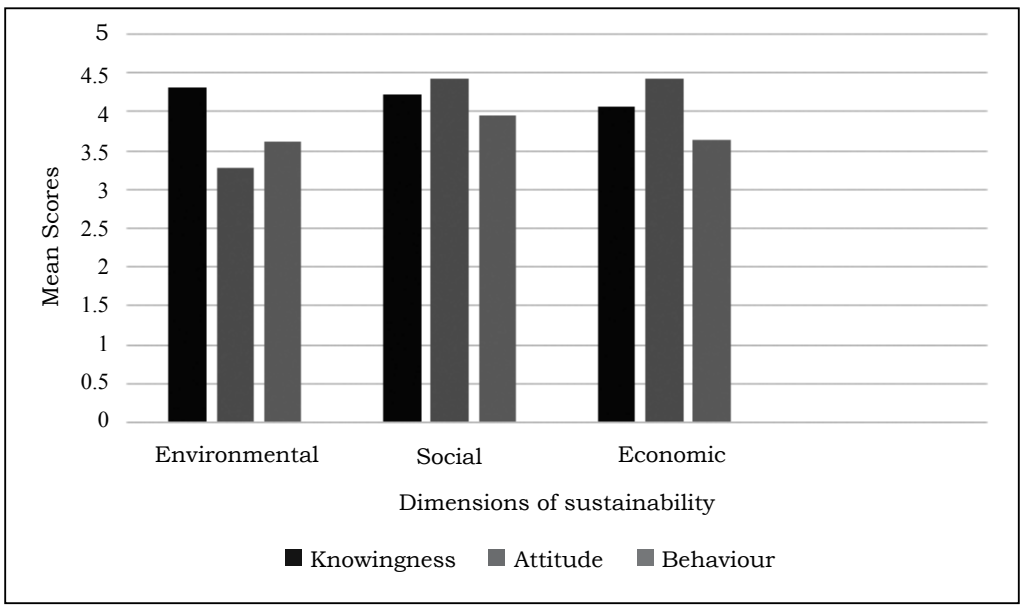

Figure. 3: Mean scores of knowingness, attitude and behaviour in the three dimensions of SD

Sustainability Knowingness

The three dimensions (sub-constructs) of sustainability knowingness, i.e., environmental, economic and social dimensions, were analysed item wises. Table 1 corresponds to the number of items related to the environmental dimension of knowingness. Majority of students agreed that reducing water consumption (72%) and wastes (81%) is necessary for sustainable development (SD). 93 per cent expressed that preserving nature and natural species is necessary for SD and 77 per cent felt that people need to be educated about natural disasters. Few items (Table 1) were asked in the economic dimension of sustainability knowingness. Analysis of responses revealed that above 70 per cent agree that economic development is necessary for SD but only 67 per cent agreed with the view that SD requires people's understanding of the working of economy whereas 25 per cent were of neutral opinion in this aspect. Majority of students (73%) agreed that companies should treat their employees in a fair way to achieve SD. The analysis of social dimension of sustainability knowingness revealed that majority

(above 80%) agreed with the view that improving people's health and life is necessary for SD. Majority of students agreed that peaceful resolution of conflicts (84%) and participation in democratic process like elections (70%) is necessary for SD. 25 per cent of students could not associate between SD with democratic processes. A good number of students are of the view that reinforcing girls' rights (82%) and respecting human rights (87%) and access to education (89%) are necessary for SD. 84 per cent of students agreed that respect for other cultures is necessary for SD, whereas 15 per cent in this regard were neutral.

Sustainability attitude

Environmental, social and economic dimensions of sustainability attitude was analysed through 14 items. An overwhelming majority of students agreed that more strict laws are needed to protect environment (95%), and it is important to do something with the problem of climate change (98%). Regarding economic dimension, majority of students (90%) agreed that companies have a responsibility to reduce the use of packaging and disposable articles and people who pollute should pay for the damage (95%). 70 per cent of students are of the opinion that companies in rich countries should give their employees in poor nations the same conditions whereas 26 per cent neither agreed nor disagreed. Regarding social dimension of sustainability attitude, 95 per cent of students agreed that everyone needs to be educated to live sustainably and 81 per cent students are of the view that people in the present generation need to take care of future. Majority of students (83%) agreed with the view that government should give financial aid to people for shifting to green vehicles. However, only 63 per cent felt that government should make decisions on the basis of SD and 25 per cent of students neither agreed nor disagreed with this view. An overwhelming percentage of students (97%) agreed that men and women need to give same education and employment opportunities and 93 per cent agreed on the importance of voting in elections and express views.

Sustainability behaviour

The items probing the environmental, social and economic dimensions of sustainability behaviour were analysed and this part gives an insight of students' behaviour in certain situations. Seven items were asked on the environmental dimension of sustainability behaviour (see Table 1) which refer to their behaviour in a personal context. Though majority of students (74%) stated that they choose to cycle or walk whenever possible, 19 per cent were neutral. Regarding wasting water and recycling things only 57 per cent stated that they do not waste water and 59 per cent stated recycling things. Only 56 per cent said that they would pick up rubbish from public places and 30 per cent neither agreed nor disagreed. Only 66 per cent said that they separate food from other wastes and 15 per cent do not follow this practice whereas 91

per cent said that they do things to reduce waste. Regarding economic dimension, 72 per cent expressed that they do things to help poor. Regarding purchase behaviour, only 42 per cent said that they purchase second hand goods and 35 per cent said that they do not prefer it. Only 51 per cent agreed with the view that they prefer not to buy goods companies with a poor reputation for treating their employees. Few items were asked regarding social behaviour. An overwhelming 90 per cent of students are of view that they treat others respectfully while using internet or mobile communications like messages and chats. Surprisingly only 32 per cent agreed that they do things which are not good for their health. A large number of students (67%) are keen on working with committees and support an aid or environmental organisation (62%) and treat people with respect irrespective of the cultural background (98.5%).

The overall analysis shows that there are certain gaps between knowingness and behaviour and the sustainability knowingness has not effectively translated into sustainability behaviour.

2. Associations between Constructs of Sustainability Consciousness

In order to find out the associations between various constructs and sub–constructs, correlation analysis was done by calculating Pearson's correlation coefficients which are depicted in Table 3.

Table 3

Correlations between constructs and sub-constructs of SC

		KE_M	KS_M	KEN_M	AE_M	AS_M	AEN_M	BE_M	BS_M	BEN_M
KE_M	Pearson Corr.	1	.727**	.462**	.560**	.364**	.152	.414**	.300**	.255**
	Sig. (2-tailed)		.000	.000	.000	.000	.057	.000	.000	.001
KS_M	Pearson Corr.	.727**	1	.451**	.522**	.434**	.067	.331**	.291**	.091
	Sig. (2-tailed)	.000		.000	.000	.000	.405	.000	.000	.265
KEN_M	Pearson Corr.	.462**	.451**	1	.423**	.416**	–.092	.290**	.340**	.298**
	Sig. (2-tailed)	.000	.000		.000	.000	.247	.000	.000	.000
AE_M	Pearson Corr.	.560**	.522**	.423**	1	.560**	.070	.355**	.380**	.197*
	Sig. (2-tailed)	.000	.000	.000		.000	.388	.000	.000	.016
AS_M	Pearson Corr.	.364**	.434**	.416**	.560**	1	–.034	.369**	.361**	.220**
	Sig. (2-tailed)	.000	.000	.000	.000		.664	.000	.000	.006
AEN_M	Pearson Corr.	.152	.067	–.092	.070	–.034	1	.008	.067	.001
	Sig. (2-tailed)	.057	.405	.247	.388	.664		.922	.411	.988
BE_M	Pearson Corr.	.414**	.331**	.290**	.355**	.369**	.008	1	.492**	.506**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.922		.000	.000
BS_M	Pearson Corr.	.300**	.291**	.340**	.380**	.361**	.067	.492**	1	.366**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.411	.000		.000
BEN_M	Pearson Corr.	.255**	.091	.298**	.197*	.220**	.001	.506**	.366**	1
	Sig. (2-tailed)	.001	.265	.000	.016	.006	.988	.000	.000	

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Correlation analysis revealed that sustainability knowingness and sustainability attitude are positively associated except in the environment dimension indicating that environmental knowingness has not translated into environmental attitude. Regarding sustainability behaviour, results reveal positive association with sustainability knowingness in all the three dimensions. Sustainability behaviour is positively associated with sustainability attitude in all the dimensions but it is not significant in the aspects of environmental and economic behaviour, indicating that attitude has not translated enough into behaviour in the environment and economy dimension. Within the sub-constructs, the analysis of data reveals that there is a substantial correlation between environmental, economic and social dimensions of sustainability knowingness. There is negative association between social and environmental attitude, though not significant. There is no significant interaction between environmental attitude and economic attitude beyond positive interaction between them. Similarly, association between environmental attitudes is not significant with social behaviour except positive correlation between them.

3. Relation Between Sustainability Consciousness and Academic Stream

In order to know the differences in the sustainability consciousness of students from various academic streams in their senior secondary stage, i.e., sciences, humanities and commerce, data was subjected to t-test analysis in SPSS.

Table 4
Mean Scores of Sub-constructs across the Three Academic Streams at School Level

	Stream					
	Commerce		***Humanities***		***Science***	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
KE_M	4.13	0.56	4.04	0.55	4.14	.67
KS_M	4.24	0.52	4.20	0.51	4.26	.51
KEN_M	3.81	0.48	3.80	0.42	3.92	.32
AE_M	4.63*	0.44	4.40*	0.49	4.35*	.47
AS_M	4.55	0.35	4.46	0.44	4.34	.50
AEN_M	3.32	0.52	3.23	0.47	3.35	.63
BE_M	3.64	0.63	3.62	0.68	3.71	.57
BS_M	4.12	0.45	4.10	0.46	4.17	.47
BEN_M	3.61	0.46	3.53*	0.53	3.78*	.46

* Results are based on two-sided tests assuming equal variances with significance level 0.05

On the basis of two-sided tests assuming equal variance with significance 0.05, it is found that there is no significant difference in the responses of students from humanities, commerce and science streams except in the area of environmental behaviour between science and humanities groups. Environmental dimension in sustainability behaviour is more in students with science background than humanities students and SC in economic dimension in sustainability attitude is more in commerce students than rest of the students.

Conclusions and Implications

The sustainability consciousness of school leaving students (17–18 years) was mapped in this study with the purpose to analyse the sustainability consciousness in terms of knowingness, attitude and behaviour. For this, SCQ tool developed by Gericke, et al. (2019) was used with due permission. This is one of the most extensively used as well as the first tool developed to measure SCQ and was empirically validated with the sample of 16–17 years' age group students in Sweden. Since then, researchers in other countries like Taiwan, Turkey, etc., have used this tool to analyse SC of students across various age groups. The author has not come across any study done using this tool in the Indian context. Hence this study also helped in empirical validation of the tool in the Indian context. The SC of the young students who had finished formal schooling was analysed in different domains (environmental, social and economic) of sustainability knowingness, attitude and behaviour, which are also referred as constructs and sub-constructs of sustainability consciousness. The results reveal that students hold high levels of sustainability knowingness (in all the three dimensions, but most in environmental dimension). Students reported a low level of sustainability behaviour (lowest in the environmental dimension), which is contrary to the results of sustainability knowingness as the environment dimension was highest in knowingness. This indicates that sustainability knowingness is not effectively translated into behaviour. The sustainability knowingness of students may be reported as high due to the influence of textbooks and other curricular knowledge sources but not translated into personal contexts. This has strong implications for schooling and ESD initiatives at institutional level. This implicates that school curriculum needs to focus more on the experiential aspects and provide more opportunities for student-led environmental activities like projects, case studies, community interface, etc. There is no significant difference in the responses of students from humanities, sciences and commerce academic stream except in the area of environmental behaviour.

Correlation analysis between the constructs of SC indicates positive interaction between sustainability knowingness and sustainability attitude. Sustainability behaviour is positively associated with sustainability attitude except in the areas of environment and economy indicating that environmental knowingness has not translated into attitude and further into behaviour.

It is very challenging to change behaviour regarding SD (Guler and Afacan 2013) and in order to modify these complex and contextual behavioural aspects, it is important to address and change beliefs related to sustainability (Ferreira, et al., 2009; Wals, 2011; Kinoshita, et al., 2019). To teach sustainability effectively, and improve SQ, we need holistic and pluralistic approaches (Pauw, et al., 2015). Some effective strategies for improving SQ and orienting students for SD are project-based inquiry learning (Kalsoom and Khanam, 2017; Tsai, 2018; Wals, 2011; Kinoshita, et al., 2019), green experimental approach (Mageswary, et al., 2012), university-school partnerships (Kruger, et al., 2009) and service-learning approach at both senior school and university level (Hernandez-Barco, et al., 2020; Lasen, et al. 2015) as these involve students in direct experiences with complex problems related to sustainability. The school curriculum needs to integrate sustainability issues across all the subjects in an interdisciplinary approach.NEP 2020 is aligned with the ESD framework and Agenda 2030 as the vision of the policy states to promote the development of knowledge, skills, values and dispositions to support human rights, SD and global values. The policy recommends holistic and multidisciplinary educational environment and include areas such as climate change, waste management, organic and sustainable living, global citizenship education, etc., to sensitise students for SD. Engaging students in the SD issues and establishing a culture of sustainability in institutions is the key for transformation. Mapping the SC of students help not only in curricular reforms but also in planning for various institutional initiatives and creating organisational culture to promote sustainability as way of living.

Scope for Future Research

The impact of gender on sustainability consciousness is not explored in this study. The relationship between gender and SC can be examined in future studies. Similarly longitudinal and cross-sectional studies can be undertaken to understand how SC develops or changes with age and other experiences. In-depth content analysis and evaluation of curriculum in various subjects can be undertaken to examine the relationship between SC and curriculum. The impact of interventional strategies in the institutions can be analysed by measuring the change in SC

in certain aspects by using this tool or modifying this tool as per the requirement. Sustainability consciousness initiatives in schools and higher education institutions can be undertaken after mapping the students and identifying the gaps. Knowing the SC of students through this kind of mapping also helps to plan macro and micro level interventions at various stages of education.

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