JESE 3 (1) (2023)

Journal of Environmental and Science Educatior

http://journal.unnes.ac.id/sju/index.php/jese

Students' Perception on Teaching and Learning of Green Skills for Sustainable Future

Jayashree Mahapatra[1*] and R. Ravichandran[1]
Department of Humanities Science Education and Research,
PSS Central Institute of Vocational Education, Shyamla Hills, Bhopal- 462002, India

DOI: https://doi.org/10.15294/jese.v3i1.61084

Article Info

Received 10 November 2022
Accepted 12 January 2023
Published 29 April 2023

Keywords:
Green Skills,
Employability Skills,
Vocational Courses,
Teaching of Green Skills

*Corresponding author:
Jayashree Mahapatra
PSS Central Institute of Vocational Education
E-mail: jayashree.voced@gmail.com

Abstract

In India, green skills have been incorporated into school vocational curricula by Pandit Sunderlal Sharma Central Institute of Vocational Education, Bhopal. This study examined the perception of students of senior secondary government schools on teaching and learning of green skills in Indore, Madhya Pradesh. The senior secondary government schools where vocational courses under the National Skills Qualifications Framework have been introduced were selected for the study. Data was obtained from a sample of 80 students of class XII who had chosen vocational courses at the secondary level from four selected senior secondary government schools using a self-developed Likert type questionnaire. Mean and standard deviation of the responses were calculated to analyse the data. Students being the only respondents Friedman Test was calculated to find out the pattern of the distribution of the data. The results revealed that the distribution is the same for teaching and learning of green skills. However, there were varied responses with low mean and high standard deviation from students about their knowledge of the concept of green skills, even though the majority of students followed green practices which were being taught to them in vocational courses.

p-ISSN 2797-0175
e-ISSN 2775-2518

INTRODUCTION

Environmental sustainability was made a key tenet of India's development strategy in the 12th Five-Year Plan (2012–17). The Skill Council for Green Jobs (SCGJ) was founded by the Government of India on October 1st, 2015, as part of the National Skill Development Mission, supported by the Ministry of New and Renewable Energy (MNRE) and Confederation of Indian Industry (CII). This is a significant advancement for green jobs by the Government of India. The Ministry of Skill Development and Entrepreneurship (MSDE) is also in charge of coordinating all national skills development initiatives, addressing gaps in the supply and demand for skilled labour, creating a framework for vocational and technical training, skill upskilling, developing new skills, and innovative thinking for both existing and future job opportunities (Kumar et al, 2018).

India has a sizable portion of traditionally trained labour such as blacksmiths, carpenters, potters etc. that is already aligned with the green skill domain; the remaining contemporary technical labour needs to undergo transformations at the skill and thought process levels. This will contribute to the development of a greener economy. In this context, Kumar et. al. (2010) stated that 'The "green jobs or occupation" existed from the time-immemorial in India, however, the phenomenon has attracted attention of academia and policy makers after the recent initiatives of United Nations Environment Program (UNEP) and International Labour Organization (ILO) for the publication of the report on "Green jobs: Towards decent work in a sustainable, low-carbon world"'(p.iii).

Kumar et. al., (2010) in their report mentioned that by utilising high efficiency methods to consume less energy, materials, and water, green occupations contribute to the preservation of ecosystems. Additionally, it aids in the economy's decarbonisation and the reduction of all waste and pollution for sustainable development. A rural resident engaged in sustainable farming, a plumber setting up water-recycling systems, or an energy auditor's mechanism all contribute to the necessary transformation for a greening of the economy.

The world's carbon footprint has altered as a result of some developing nations, including India, experiencing extraordinary development rates. These nations will need to make a fundamental change in establishing new skills and certifications that will offer enormous potential for the creation of green jobs in this context, keeping in mind the significance of sustainable development. Green employment has a lot of potential in India because of its vast human capital potential.

The vision of the National Education Policy 2020 is to develop knowledge, skills, values, and dispositions in learners that support responsible commitment to human rights, sustainable development and living, and global well-being, thereby reflecting a truly global citizen. The policy acknowledges teachers and faculty as the heart of the learning process. This calls for active engagement of the teachers to develop in the learners the knowledge, skills and attitude towards green skills and sustainable development. Today's educators must take on a motivating role, examine the effects of the learning process, and provide fresh approaches to assist students develop the abilities they need to contribute towards green economy.

This places more responsibility on vocational educators to prepare students for the growing green jobs. By utilising high efficiency methods to consume less energy, materials, and water, green occupations contribute to the preservation of the ecosystem. Additionally, it helps to create energy-efficient structures, reduce all types of waste and pollution for sustainable growth, or help a farmer or plumber construct a green economy.

Employability skills are defined as "skills required not only to gain employment, but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions". These abilities can aid people in adjusting to change. The fundamental abilities that each employee needs to apply and adapt to the job are known as employability skills. Every employee needs to have these abilities in order to be more competitive and successful in raising productivity and profitability.

Green skills are defined as the technical skills, knowledge, value and attitude needed on green jobs to support a sustainable economy, social, and environmental through activities such as industry, business, and community (Strietska-Ilina et al., 2011). CEDEFOP (2012) defines green skills as "the knowledge, abilities, values, and attitudes needed to live in, develop and support a sustainable and resource-efficient

society." Thus, green skills are included in employability skills. The term "green skills" refers to a set of knowledge (cognitive dimension), abilities (psychomotor dimension), and attitudes and values (affective dimension) that employees need to support sustainable growth in the social, economic, and environmental spheres.

Knowledge of environmental preservation can be seen as a component of green skills from a cognitive perspective. Green abilities, from a psychomotor standpoint, refer to the capacity to, for example, cut greenhouse gas emissions or minimize energy use. Green skills can also refer to affective elements, such as a person's commitment to protect the environment. The advancement of the green economy, information, and communication technologies necessitates a level of competence that is able to foresee changes and advances in a timely manner, which contributes to the rising needs for green job skills.

Traditional academic teaching strategies, such lecture-driven delivery, have not effectively prepared students with the necessary skills to move from the classroom to real-world problem solving (Steinemann, 2003; Seatter & Ceulemans, 2017). Additionally, TVET pedagogy has been criticized for failing to provide students with green skills since it has implicitly responded to industrial objectives while overlooking unintended environmental and social effects (Anderson, 2009; Arenas & Londono, 2013; Bedi & Germein, 2016). Generic skills can be shaped through teaching and learning designed by lecturers using diverse teaching methods, which may result in strengthening various aspects of generic skills (Rosini Abu and Fitrisehara Kazilan, 2008; Hamid et.al.,2019). Moreover, giving a full lecture or demonstrating the skills is not proven to be methods of developing the skills among students (Zaki Kamsah, 2004, Hamid et.al., 2019).

In order to help students, build generic green skills, a more innovative methodology that offers interactive, experiential, transformative learning as well as real-world problem-solving possibilities should be used by the vocational teachers. The environmental consciousness of the students must be increased, and vocational teachers must teach and train students in developing green skills. As UNESCO-UNEVOC (2012) pointed out that students should be the main emphasis of training, and green development should also not just be a theoretical topic. Students must experience personally what it means to work sustainably. They need to understand that they are accountable to both themselves and others. They must regard themselves to be a part of the social and environmental systems that they will have to take into account in the future, in addition to the school community and their place of employment.

This is due to the fact that, in contrast to green skill, which imparts both, the curriculum is often focused on the development of hard skills and soft skills in the areas of knowledge, abilities, and attitudes. Thus, both extracurricular and curricular activities can be used to improve green skills.

METHOD

The present study was conducted to examine the perception of students on teaching and learning of green skills in vocational subjects at senior secondary level. The study is descriptive in nature and survey method was used for data collection related to the objectives of the study.

Population

The population of the study constituted of the senior secondary government schools in which vocational education has been introduced under National Skill Qualifications Framework (NSQF) and the students who opted for vocational subjects at the senior secondary level in Madhya Pradesh. The list of the senior secondary government schools was obtained from Directorate of Public Instruction, Bhopal.

Sample

Random sampling technique was adopted for this study. The sample of the study constituted of four senior secondary government schools in which vocational education has been introduced under National Skill Qualifications Framework (NSQF) and from the selected four senior secondary government schools, 80 students of class XII, in total, who opted for vocational subjects from both the job roles, were randomly selected for the present study. Due to time constraint and limitations of the study, Indore was selected as the location of the study.

Instruments

The questionnaire was developed after an intensive literature review in line with the specific objectives of this study. It consisted of two main sections, "A" and "B". Section A consisted of 10 statements solicited information

on the teaching of green skills while section B consisted of 10 statements on learning of green skills by the school students. The statements were framed from the chapter on Green Skills under Employability Skills that students are taught in schools. It will show whether teachers restricted pupils to learning only the theory or exposed them to the application of green skills in everyday life. Open-ended questions that were directly extracted from the textbook were not included in the questionnaire to avoid the effects of rote learning or any other unfair practices.

The questionnaire was based on 5-point Likert scale (1= Strongly Disagree; 2= Disagree; 3= Neutral; 4= Agree; 5= Strongly Agree) so that the students find it easy and take less time to respond. Pilot study of the questionnaire showed that students could comprehend the statements given and desired responses could be obtained so the prepared questionnaire was finalised for the study.

Reliability and Validity

Experts in the field of vocational education and training validated the questionnaire by making revisions to the statements regarding the relevancy of teaching and learning green skills. The 20 statements related to teaching and learning of green skills were improved upon using expert recommendations in the final version. 40 students from a government school in Bhopal who were not involved in the study were given the instrument as part of a pilot test to determine its reliability. The data collected were then analyzed using Cronbach's alpha to achieve a reliability coefficient of 0.78. The responses to the questionnaire were analyzed using SPSS version 20 in order to test Cronbach's alpha during reliability analysis.

Data analysis

Data was collected using a questionnaire developed by the researcher based on the research objectives, related literature and suggestions from the experts in the field of vocational education. The data was collected using Google Forms due to the prevalent COVID situation.

In determining the research results, suitable techniques and statistical tools were used for data analysis. Data acquired by this study was analysed using descriptive statistics such as mean and standard deviation, with the help of IBM-SPSS version 20.

RESULT AND DISCUSSION

Findings from the analysis of quantitative data gathered from the present study has been presented below.

Students' perception on teaching of Green Skills

The analysis of the data indicated that majority of the students (75%) strongly agreed with the statement 'Throwing garbage freely can affect environment' which indicates that students are aware of cleanliness around them as this was being taught by the vocational teachers. While 73.8% students strongly agreed with the statement 'Fresh water is an important natural resource'. However, least percentage of students (48.8%) strongly agreed with the statements 'School teacher conducted various green practice related activities' and 'Teacher keeps windows open during class to make use of natural light". It can be inferred that in some schools' green skills were being taught theoretically and students were not exposed to experiential learning. Difference in perception among the students could be attributed to availability of resources, school and classroom environment.

Mean scores and standard deviation were used to rank the statements which has been presented below.

Table 1 depicts that the statement 'Fresh water is an important natural resource' has the highest mean score of 4.55 and 'Teacher keeps windows open during class to make use of natural light' has the lowest mean score of 4.00. Results suggested that, there was not much differences in the perception of the students towards teaching of green skills. It can be interpreted that vocational teachers are teaching the content of the Green Skills to the students but when it comes to the infrastructure of the school, in the classroom some of them are unable to follow green practices. This makes it harder for students to learn through observation because they also pick up knowledge from what their teachers do informally.

Table 1. Mean scores and standard deviation (S.D.) of students' perception on teaching of green skills

Sl. No.	Statements	Mean	S.D.	Rank
1	Green practices are followed in the vocational labs	4.15	1.18	VIII
2	School teacher conducted various green practice related activities	4.10	1.09	IX
3	Teacher keeps windows open during class to make use of natural light	4.00	1.19	X
4	Reuse and Recycled products can be used in school projects	4.16	1.04	VII
5	Encourage friends and family members on green practices	4.41	.96	V
6	Turn off lights when not in use	4.32	1.11	VI
7	Unplug electronic appliances when not in use	4.45	1.00	IV
8	Fresh water is an important natural resource	4.55	.82	I
9	Throwing garbage freely can affect environment	4.51	1.00	II
10	We must plant more trees to save environment	4.46	1.01	III
	Total	**4.31**	.70	

Students' learning of Green Skills

Based on the analysis of the students' responses it was found that majority of students (80%) strongly agreed with the statement 'Room hygiene should be maintained daily'.

Table 2. Mean scores and standard deviation (S.D.) of students' learning of green skills

Sl. No.	Statements	Mean	S.D.	Rank
1	Green practices are a part of sustainability	4.15	1.18	IX
2	Waste management, energy conservation and water management are part of green practices	4.20	1.10	VII
3	Rain water harvesting system should be used	4.34	1.01	V
4	Environmental pollution leads to health hazards	4.45	.94	II
5	Room hygiene should be maintained daily	4.65	.79	I
6	Use energy efficient lighting at home and work place	4.16	1.07	VIII
7	Always carry bags while going for shopping	4.42	1.01	III
8	Use bucket and mug for bath instead of shower	4.36	1.13	IV
9	Waste should be segregated before disposing	4.23	1.21	VI
10	Kitchen waste can be used to make compost	4.36	1.05	IV
	Total	**4.33**	.77	

However, least number of students (61.3%) strongly agreed with the statement 'Rain water harvesting system should be used'. It can be

inferred that students are yet to learn about rain water harvesting as a mode of water conservation. Teachers need to focus more on teaching of innovative ways of sustainability. Difference in perception among the respondents could be attributed to different teaching styles of vocational teachers, learning types of students and school environment. Mean scores and standard deviation were used to rank the statements on students' learning of green skills which has been presented below.

Table 2 depicts that the statement 'Room hygiene should be maintained daily' has the highest mean score of 4.65 and 'Green practices are a part of sustainability' has the lowest mean score of 4.15. Compared to what is mentioned in the textbooks of the vocational subjects, it can be assumed that students have understood the concept of green skills. Instead of the underlying principle, what students remember from their teachers are the examples discussed in the classroom while teaching the topic.

Further, to test for the presence of pattern in the data, Friedman test was employed as same respondents, the students, marked the teaching and learning of green skills. The responses provided by the students might as well be random without any pattern and simply comparing them based on mean rank can be erroneous. So, mean ranks can be compared only after making sure that there is a pattern in the ratings provided by the students. Mean value for each statement was used to rank the statements related to the perceived teaching and learning of green skills in schools. The test statistic has been mentioned below in Table 3.

The analysis revealed that the distributions of teaching and learning of green skills are same. The total mean score of teaching of green skills is 4.31 (S.D.= .07) and the total mean score of learning of green skills is 4.33 (S.D. = 0.77) which do not have much difference. According to the findings, the students were learning what they were being taught in class regarding green skills.

The study's findings showed that most students had a positive opinion toward the teaching and learning of green skills in classrooms. According to the study's findings, green skills were effectively taught and learned in the selected schools. Students were learning the content that was being taught to them in the classroom. The study empirically confirms that statements related to acquisition of green skills by students such as 'Fresh water is an important natural resource', 'Throwing garbage freely can affect environment', 'We must plant more trees to save environment', 'Unplug electronic appliances when not in use', 'Room hygiene should be maintained daily', 'Environmental pollution leads to health hazards will motivate the students to act towards sustainable future'.

Table 3. Test tatistic of Friedman Test

Hypothesis Test Summary			
Null Hypothesis	**Test**	**Significance**	**Decision**
The distributions of Teaching and Learning are the same.	Related-Samples Friedman's Two-Way Analysis of Variance by Ranks	.431	Retain the null hypothesis
Asymptotic significances are displayed. The significance level is .05.			

According to the study, working with qualified trainers makes teaching and learning about green skills more meaningful. Jahonga, Ngore and Muramba (2015) for instance, cite the fact that one of the biggest obstacles to green technology is a lack of expertise and the necessary skills by the vocational teachers, and that the TVET programmes available do not incorporate green technology. Kamis et al. (2017) for instance, explored the incorporation of green competencies in technical and vocational education as a means of promoting sustainability.

The introduction of green skills in the vocational curricula is a much-needed step for ensuring sustainable future. Through the potential of competent people, the economy becomes more productive and competitive. The key indicator of an economy's development process is the composition of its labour force and the expansion of possibilities. The development

of training modules on green skills that correspond to the identified skill sets in order to provide training that is specific and appropriate for the purpose of vertical and horizontal mobility should be incorporated in the process of designing the curricula at the secondary and higher secondary level. India has a great possibility to create a lot of jobs by selecting the appropriate regions where green jobs are more appropriate because green jobs are a new and specialized field. Students studying about green skills in schools can further enhance their knowledge at tertiary education level and can contribute towards greening of industries.

CONCLUSION

There is a need to incorporate environmental and sustainability-related courses into the curricula for general and vocational training and education from the foundation phase to the tertiary levels. A successful transition will be facilitated by the availability of sufficient talent, particularly for innovation, research, and development for a greener economy. In order to meet the demands of the labour market, the adoption of green growth policies in support of green employment and the greening of current vocations is likely to call for new skills. Additionally, there is a need to redesign the curriculum to include employability skills that are core to it, allowing students to openly relate their learning activities to the competences they wish to achieve for the green jobs.

Therefore, the purpose and goals of the schools should be in line with those of demands of the various industrial sectors. Additional research could be more targeted by identifying the unique green skills required in various sectors, such as automotive, beauty and wellness, waste management, rural and urban development, tourism, and engineering. In order to develop and rebuild their curriculum in accordance with industrial needs, the schools may find the findings of this study to be of great use. Students having knowledge and positive attitude towards green skills can simultaneously inspire and support them in becoming green entrepreneurs who would help to create a more sustainable future.

ACKNOWLEDGMENT

We whole-heartedly acknowledge all the respondents for spending their valuable time on filling our questionnaire. This study was funded by PAC programme of NCERT during 2021-22. Data collection was undertaken by Ms. Shabina Hasan, JPF.

REFERENCES

Anderson, D. (2009). Productivism and ecologism: Changing discourses in VET. In J.Fien, R. Maclean, & M. Park (Eds.), *Work, Learning and Sustainable Development: Opportunities and Challenges*.(pp. 35-57). Springer.

Arenas, A., & Londono, F. (2013). Connecting vocational and technical education with sustainability. In Stevenson, R., Brody, M., Dillon, J. & Wals, A. (Eds.), *International Handbook of Research on Environmental Education* (pp. 163-170). Routledge.

Bashir, Z., Umar, S., Bashir, S., Kuchey, Z. F., & Bhat, M. (2022). A study of environmental awareness, attitude and participation among secondary school students of district Kulgam, J&K., India. *International Journal of Multidisciplinary Educational Research*, *11*(1(4)), 80-89.

Bedi, G., & Germein, S. (2016). Simply good teaching: Supporting transformation and change through education for sustainability. *Australian Journal of Environmental Education*, *32*(1), 124-133.

CEDEFOP. (2012). *Green skills and environmental awareness in vocational education and training: Synthesis Report*. Publications Office of the European Union.

Danielraja, R. (2019). A Study of Environmental Awareness of Students at Higher Secondary Level. *Shanlax International Journal of Education*, *7*(3), 6-10.

Hamid, M. Z. A., Hassan, Z., Nordin, M. S., Kamin, Y., Atan, N. A. Suhairom, N. (2019). Generic Green Skills in Teaching and Learning: Meaning and Implementation. *Universal Journal of Educational Research,* *7*(12A), 121-126.

Handayani, M. N., Ali, M., Wahyudin, D., & Mukhidin, M. (2020). Student's green skills

in agricultural vocational school. IOP Conference Series *Materials Science and Engineering. 830*(4):042083.

Jahonga, W. M., Ngore, P. R., & Muramba, V. W. (2015). Transforming and greening TVET for sustainable development in western Kenya. *European Journal of Research and Reflection in Management Sciences*, 3(2), 63-71.

Kamis, A., Rus, R. C., Rahim, M. B., Yunus, F. A. N., Zakaria, N., & Affandi, H. M., (2017). Exploring Green Skills: A Study on the Implementation of Green Skills Among Secondary School Students. *International Journal of Academic Research in Business and Social Sciences*, *7*(12). 327-345.

Kamis, A., Alwi, A., Limuna, B., Ismail, Hj., Zakaria, N., Yunus, F., & Yunus, N. (2017). Integration of Green Skills in Sustainable Development in Technical and Vocational Education. *International Journal of Engineering Research and Applications*, *7*. 2248-962208.

Kumar, V., Mandal, K., Kumar, N., & Banerjee, T. (2010). *Skills for Green Jobs in India*. International Labour Organisation.

Kumar, V., Kumar, N., Mandal, K., & Choudhary, A. (2018). *Skills for Green Jobs in India*. International Labour Organisation.

Ministry of Human Resource Development. (2020, July 29). *National Education Policy*. Government of India.

Ramli, S., Rasul, M. S., & Affandi, H. M. (2018). Sustainable Development: Needs of Green Skills in the Fourth Industrial Revolution (4IR). *International Journal of Academic Research in Business and Social Sciences*, *8*(9), 1082–1095.

Seatter, C. S., & Ceulemans, K. (2017). Teaching sustainability in higher education: Pedagogical styles that make a difference. *Canadian Journal of Higher Education*, *47*(2), 47-70.

Sharma, K. (2015). *Towards a green school on education for sustainable development for elementary schools*. National Council of Educational Research and Training.

Sharma, K. (2016). *A Study of Good Practices on Greening of the Schools*. National Council of Educational Research and Training.

Steinemann, A. (2003). Implementing sustainable development through problem-based learning: Pedagogy and practice. *Journal of Professional Issues in Engineering Education and Practice*, 129(4), 216-224.

Strietska-Ilina, O., Hofmann. C., Haro, M D., & Jeon, S. (2011). *Skills for Green Jobs: A global view: Synthesis report based on 21 country studies*. International Labour Office.

Thirupathy, S., & Mustapha, R. (2020). Development of Secondary School Students' Green Skills for Sustainable Development. *International Journal of Academic Research in Business and Social Sciences, 10*(3), 160–173.

United Nations Educational, Scientific and Cultural Organisation. (2012). *Greening TVET for Sustainable Development*. UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training.

Yapin, H., Suhadi, N., & Esa, A. (2017). Implementation of Green Skills through the co-curriculum activities among students Technical and Vocational Education Training (TVET) towards development of Green Industry. *Elixir Social Science*, *107*, 47295- 47297.

Vemula, M., & Devendar, B. (2021). A Study on the Environmental Awareness of Secondary Grade Students. *Natural Volatiles & Essential Oils, 8*(6), 3327-3352.