P-ISSN 2664-0422	Pakistan Social Sciences Review	April-June 2024, Vol. 8, No. 2
O-ISSN 2664-0430	https://doi.org/10.35484/pssr.2024(8-II)25	[288-297]

Pakistan Social Sciences Review
www.pssr.org.pk

RESEARCH PAPER

Perception of Secondary and Higher Secondary School Students about the Role of Permaculture to sustain the Living System

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ABSTRACT

The most influential concept about environment come to the fore termed as Permaculture which means to use land resources without producing waste. The present exploration based on the purpose to find out the secondary and higher secondary school students' perceptions about the role of permaculture to sustain the living system. It is the quantitative research study along the survey research method comprising the population of secondary and higher secondary private schools of district Lahore. The convenient sampling technique was used to administer the instrument in the targeted sample. Sample size consists of 1304 male and female students of 9th, 10th, 11th and 12th from eight schools. Reliability of the instrument established with Cronbach's alpha 0.885. The findings indicate that the practice of permaculture promotes the eco-literacy among individuals throughout the life and they are able to sustain their lives. It is recommended that permaculture as a subject should be included in curriculum or in our own practices or may be a part of prospective teachers' training to cope the environmental challenges.

KEYWORDS Environment, Permaculture, Sustaining Life

Introduction

Education is a process that shapes and molds young people's knowledge, character and behavior. The culture that each generation intentionally passes on (the people who will be its successors) provided them the skills that are necessary either to stay up with current trends or, ideally, transcend them (G. H. Thompson). In the era of 21st century, the innovative learning styles foster the academic performance of students at secondary and higher secondary level (Dash, 2015). In this aspect the most essential need in the current era is to preserve the environment. As nature and human are two interdependent factors that presents the harmonious relationship to reshape the environmental practices. Now days, the term permaculture has been globally practiced to sustain the life and to mitigate the environmental challenges.

The terminology of permaculture was introduced by Mollison and Holmgren in 1970s. They discovered this word with the meaning of agriculture permanency but their cognitive idea led the foundations for cultural permanency (Bambrey, 2006). As per the NEP's vision (national education policies), schools must attain those strategies that promotes literacy, competences among learners and also facilitate organizational standards in terms of learning experiences (Muhammad, 2016). Several factors play a vital role when it comes to how students view permaculture and influence on their daily life shown in figure 1.

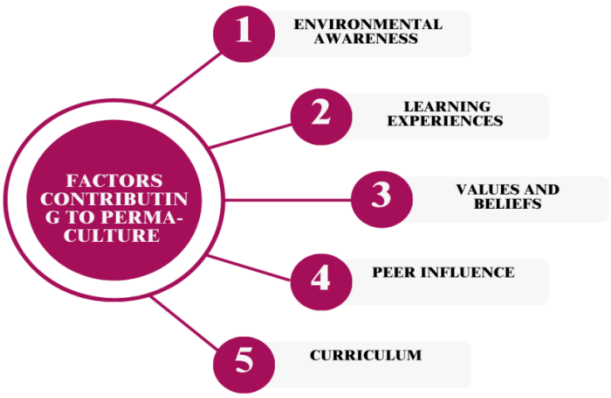

Figure 1 Factors Contributing to Permaculture

Literature Review

The permaculture educational approach is used as a practical tool to fulfill the criteria of ESD (education for sustainable development) initiatives that ensure the quality of education. Three principles are dealt with and taught as part of the basis of fulfilling this goal: earth care, people care and appropriate share within economy and resource use (Dekan, 2021). The knowledge, comprehension and ability of a person to comprehend ecological principles, environmental concepts and sustainable practices are referred to as their ecological literacy. Therefore, ecological literacy is a component of 21st century, it is fundamental that society understand it (Ikhsan et al., 2019).

Permaculture is an umbrella term that means "permanent culture," where culture includes social and ethical norms, continuous learning, and more than just as an agricultural concept (Ferguson & Lovell, 2014). There are two main principles of permaculture includes; a) care for earth and b) care for people (Krebs & Bach, 2018).This permaculture education facilitates the outdoor learning among learners to foster the healthy environment for the well-being of community (Gould & Fuchs, 2023).

Two fundamental themes support the growth and popularity of permaculture: a) the creation of alternative economic and social institutions, along widely dispersed network of trained teachers and b) local or regional organizing centered upon "bioregional" cultures would be developed to practice the permaculture education (Leger, 2017).According to permaculture, natural ecosystem movements are the result of energy building inside the ecosystems, pushing them in the direction of "closed loop" cycles of matter, wherein the ecosystem sustain gradually on the basis of natural resources (Morel et al., 2019).

The movement of permaculture makes meaningful contributions to the transition to sustainability, by supporting an engaged form of ecological literacy (Ferguson & Lovell, 2014). Permaculture is the complete phenomena that renew our ecological concerns and also rebuilt environmental consciousness (Centemeri, 2020). The understanding the dynamic interactions between humans and ecosystems is referred to as eco-literacy (Epstein, 2022).

In order to develop the positive attitude towards natural environment, the concept of sustaining life or eco-literacy, becomes useful and common in practice (Hammarsten et al., 2019).The research illustrate that the learning experiences to explore the nature are very essential for individuals as a part of daily lives. These experiences will contribute to develop numerous learning outcomes and also facilitate the well-being

domains of individuals. In this aspect, an individual intrinsically nurture himself for natural care of earth at least that surrounds them (Adams & Savahl, 2017).

Practice courses are essential to establish an adequate literacy in ecological principles and how they relate to everyday problems (Lewinsohn et al., 2015). To practice the principles of permaculture, there is a need to re-introduce the course of environmental sciences or environmental education at elementary or secondary level as well as such courses gives the opportunity to learners for solving range of issues related to environment. However, restrained ecological practices among students lessen the knowledge related to environment and other ecological footprints (McBride et al., 2013). The ecological experiences enables the participants more conscious to deal environment related issues and gives viable solutions such as climate change, pollution, overexploitation of resources and invasive species (Lewinsohn et al., 2015; Arif & Changxiao, 2022).

Permaculture based courses (PDC) now emerged internationally as per the teaching standards to encourage this learning among adults (Alderslowe et al, 2018; Permaculture Association, 2020; Permaculture Institute, & Permaculture Research Institute of Australia, 2015). For teaching learning practices, educators design alternative materials that promote permaculture studies supporting the curriculum. And also they use preliminary courses for permaculture adults that they work for sustaining their lives. Such initiatives are the simpler version of complete set of PDC providing ethical principles and practices for ecological domain (Ross, 2023). Therefore, this study emphasizes on students' perception about the role of permaculture in enhancing ecological literacy at secondary and higher secondary levels.

Therefore, the main research objective is to explore the "students' perception about the role of permaculture to sustain the living system at secondary and higher secondary school level". Numerous researchers argued that the permaculture activity to stable the environmental practices and to make ecology concerns, the education system lack competencies that facilitate such sustaining behaviors among individuals (Sterling, 2001; Blumstein & Saylan, 2007; Henfrey, 2018).

Hypotheses

H_{01}: There is no significant mean difference between the perceptions of students about the role of permaculture to sustain the living system on the basis of gender.

H_{02}: There is no significant mean difference between the perceptions of students about the role of permaculture to sustain the living system on the basis of different age groups.

H_{03}: There is no significant mean difference between the perceptions of students about the role of permaculture to sustain the living system with reference to current degree**.**

H_{04}: There is no significant mean difference between the perceptions of students about the role of permaculture to sustain the living system with reference to previous degree.

H_{05}: There is no significant mean difference between the perceptions of students about the role of permaculture to sustain the living system on the basis of marks percentage in secondary and higher secondary level.

Materials and Methods

Survey research method under quantitative approach with cross-sectional survey design was employed to conduct the present research study. The data were gathered from a sample to be representative of a greater population at one point in time (Gay, 2012). The survey was applied which involves collecting data to test hypotheses about student's opinions on the role of permaculture to sustain the living system at secondary and higher secondary level, Lahore.

Figure 2 Research Design

Population and Sample

The research population consists of those students who were enrolled in different private secondary and higher secondary schools in District Lahore. This population means all those participants that meet a set of specifications or a specified criterion. The technique for selecting the sample was convenient non-random sampling and used to assess the sample size of the target population.

The selection is based on the availability of participants voluntarily from the pre-existing groups of students at secondary and higher secondary level. The sample of the research study comprised of eight private schools in district Lahore as shown in figure 3. Sample size consists of 1304 male and female students of classes' pre 9th, 9th, pre 10th, 10th, pre 11th, 11th, pre 12th and 12th from these mentioned schools

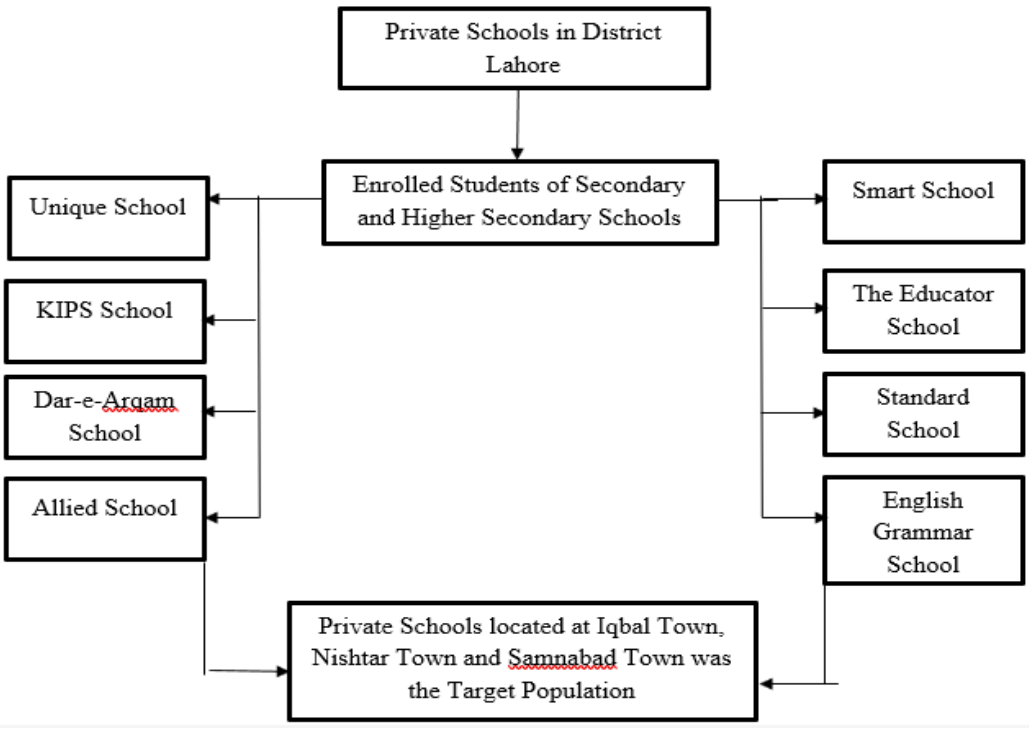

Figure 3 Sample of the Study

Instrumentation

Gissler Questionnaire (2023) was adopted to assess the views of students about the role of permaculture to sustain the living system at secondary and higher secondary students. Experts validated the instrument for further processing. Cronbach's alpha reliability was 0.885 established measures the consistency of the instrument. The statements' scoring organized on five-point Likert Scale. The researcher use Likert scale to quantify responses and assign a numerical value to each response. The researcher uses a scale where 5 represents "Strongly Agree," 4 represents "Agree," 3 represents "Neutral," 2 represents "Disagree," and 1 represents "Strongly Disagree." This numerical representation allows for easy data analysis, such as calculating means, medians, or conducting statistical tests.

Data Collection and Analysis

Data was collected through questionnaire from schools including; Unique School (189 students), Kips Schools (182), Dar-e-Arqam (156), Allied Schools (201), Smart School (183), The Educator School (197), English Grammar School (89). Those students who were enrolled in the secondary and higher secondary schools were the participants of the research study. As table 3 shows the sample of the research study, questionnaire was administered in these schools as per the permission rules offered by the school administration respectfully. Codes were assigned to variables represent the statements for analyze the data and summarization of the results of the research study. Data was analyzed through SPSS version 21.0, to explore the perceptions of students and to measure the objectives of the study. Descriptive and inferential statistical analysis was applied to analyze the research data.

Results and Discussion

Table 1

Independent sample t-test, H_{01}: There is no significant mean difference between the perceptions of students about the role of permaculture to sustain the living system on the basis of gender.

Sr.No	Factor	Variable	N	Mean	Df	t value	Sig.
1	Students' perception about the role of permaculture to sustain living system on the basis of gende	Male	561	14.3078	1302	0.133	0.874
		Female	743	14.3405			

Table indicates that t-test value (0.133) at the level of $p \leq 0.05$ is not statistically significant. So, there is no difference exists on the basis of gender perceptions about the role of permaculture to sustain the living system and the null hypothesis is accepted with significant value of 0.874.

Table 2
One-Way ANOVA

Comparison of groups	Sum of square	Df	Mean Square	F ratio	Sig.
Between group	124.931	3	41.644		
Within groups	21369.093	1300		2.533	0.056
Total	21494.024	1303	16.438		

Table indicates that significance value (2.533) proves that the null hypothesis is not rejected as the probability level kept at $p \leq 0.05$. It is inferred that there is no difference exists significantly on the basis of students' age group about the role of permaculture to sustain the living system.

Table 3
One-Way ANOVA H_{03}

Comparison of groups	Sum of square	Df	Mean Square	F ratio	Sig.
Between group	139.642	3	46.547		
Within groups	21354.382	1300		2.834	0.037
Total	21494.024	1303	16.426		

Table indicates that significance value (0.037) is significant at the level of $p \leq 0.05$, the null hypothesis that there is no significant mean difference between the perception of students' current degree secondary and higher secondary schools about the role of permaculture to sustain living system is not accepted. It depicts that there is a significant mean difference occur between the perception of students' current degree secondary and higher secondary schools about the role of permaculture to sustain living system.

Table 3(a)
Post Hoc Test, H_{03}

Level of degree	Sig.
8^{th} vs 11^{th}, 12^{th}	0.14
10^{th} vs 8^{th}	0.09

Table illustrate that the mean difference values are significant at the level of $p \leq 0.05$ so, there is mean difference of 8^{th} with 11^{th} and 12^{th} and 10^{th} with 8^{th} about role of permaculture to sustain living system.

Table 4
One-Way ANOVA, H_{04}

Comparison of groups	Sum of square	Df	Mean Square	F ratio	Sig.
Between group	131.514	3	43.838		
Within groups	21362.509	1300		2.668	0.046
Total	21494.024	1303	16.433		

Table indicates that significance value (0.046) is significant at the level of $p \leq 0.05$, our null hypothesis "There is no significant mean difference between the perception of previous degree secondary and higher secondary school students about the role of permaculture to sustain living system" is rejected. It illustrate that there is a significant mean difference exists between the students' perception on the basis of previous degree in secondary and higher secondary school level about the role of permaculture to sustain living system.

Table 4(a)
Post Hoc Test, H_{04}

Level of degree	Sig
9^{th} vs 11^{th}	0.011
12^{th} vs 9^{th}	0.014

Table illustrate that the value of mean difference is significant at the value of $p \leq 0.05$ so there is a significant mean difference of 9^{th} and 11^{th} students and 12^{th} students with 9^{th} students about role of permaculture to sustain living system.

Table 5
One-Way ANOVA, H_{05}

Comparison of groups	Sum of square	Df	Mean Square	F ratio	Sig.
Between group	14.953	3	4.864		
Within groups	21479.431	1300		0.294	0.829
Total	21494.024	1303	16.523		

Table indicates that sig-value (0.829) at $p \leq 0.05$ level is not significant and the null hypothesis that there is no significant mean difference between the perception of students' marks percentage secondary and higher secondary school students about the role of permaculture to sustain living system is not rejected. It is depicts that there is no significant mean difference occur between the students' perception on the basis of marks percentage at secondary and higher secondary school level about the role of permaculture to sustain living system.

Discussion

The results showed that permaculture study significant to eco-tones, or natural edges, are greatly advantageous to perma-culturists in terms of productivity. Education about permaculture is frequently neglected area in formal education. According to this study, ecological-literacy can be used to improve an essential area of the Pakistani curriculum.

Results revealed that by promoting psychological behaviors related to learning ecology that aims to be transformative by applying permaculture concepts, eco based thinking, ecological literacy, and scientific concepts. The main agenda of permaculture studies is not only just learning but to indulge this activity in real life situations that significantly enhances the environmental care (Centemeri, 2020).

There are two ways on which science courses are designed that encourage global practice thinking and makes local initiatives (Gould & Fuchs, 2023). There is a transformed timeline in which a worldwide issues related to environment is presented, followed by an examination of how nature eliminate or resolve these issues. To assist students understand how objects are connected to one another and to themselves, the second involves pedagogies that place an emphasis on interconnection (Hockin-Grant & Yasue, 2017).

By emphasizing relevant engagement, certain science learning activities can be utilized to catch students' attention and scaffold their learning in three domains i.e. cognitive, emotional, and psychomotor domain. There was inadequate data on changes perception in students' conduct for the environment (Ikhsan et al., 2019), but as per the current findings, the majority of students demonstrated improvements in thinking for sustaining life system and also builds their attitude showing the care for the environment. Therefore, the present study gives significant baseline for future studies to explore and investigate every aspect of permaculture practices.

Conclusion

The study was conducted to explore the views of students about the role of permaculture to sustain the living system using survey approach. On the basis of gender, students were not possess different perceptions about the permaculture role but they greatly influenced by different age groups and overall academics. Thus, it was concluded that permaculture had an impact on students' living system that they balance their environment accordingly.

Recommendations

On the basis of the present research study, following some recommendation was drawn,

1. Permaculture as a course subject should be incorporated in the textbooks. So that students must aware about how to protect the natural environment.
2. Awareness sessions should be conducted at secondary and higher secondary level that promote the literacy among students to sustain their lives.
3. Schools must integrate permaculture base activities where students practice environment friendly projects.

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