Pakistan Journal of Social Sciences (PJSS)
Vol. 43, No. 2 (2023), pp. 257-270

An Agent of Change: Education for Sustainable Development (ESD) Carried Through Situated Learning Model

Bazgha Saleem Khan
Ph.D. Scholar, Department of STEM Education,
Lahore College for Women University, Lahore, Pakistan
Email: bazghamoinqazi.phd@gmail.com

Afifa Khanam
Associate Professor, STEM Education Department,
Lahore College for Women University, Lahore, Pakistan
Email:dr.khanam.wattoo@gmail.com

Muhammad Saqib
Instructor Education, Faculty of Education,
Virtual University of Pakistan
Email: muhammadsaqib@vu.edu.pk

Qurat-ul-Ain Arjmand
Ph.D. Scholar, Department of Educational Research and Assessment,
University of Okara, Okara, Pakistan.
Email: quratularjmand786@gmail.com

Abstract:

This study has provided an application of the Situated Learning Model (SLM), which has proved to be an agent for change toward Education for Sustainable Development (ESD), a strategy used in a university course, i.e., General Science. Correctly speaking, it has described the development and evaluation of a Situated Learning Model (SLM) implementation in the subject of General Science during the Fall semester, B.Ed. (Elementary Education), session 2022-2026, taught at a renowned Public Sector University, Lahore (Pakistan). Fifty-seven students have participated in the present research study voluntarily. Pretest and posttest experimental research methodologies were employed to assess the appropriateness of the SLM as an ESD technique, which resulted appreciating proportion of knowledge about SDGs among students. Furthermore, the participation of students in SLM has made them aware of community benefits that how to maintain enviro-commune friendliness. This research has shown that SLM teaching methodology is becoming a more important tool for tangible and non-tangible competencies and awareness of the environment. Since conceptual knowledge is non-tangible and later becomes tangible in the form of disposal/solution of an emergent, unseen need to be worked out in real life and the EDS regime.

Keywords: Tangible, Non-tangible, Artifacts, SLM, Sustainability, STEM, Enviro-commune.

I. Introduction

Date of Acceptance and Available Online: 30 June, 2023

Climate change has an important role in human geography and concerning issues with it. Emerging issues have badly affected humanity and have become accelerated social reality. In recent decades, this social reality has adversely threatened different ecosystems, generating successive effects which have badly polluted environmental quality. The main factors involved in this devastation are the rapid depletion of resources and the extreme energy consumption. The current economic system demands situational learning and pragmatic solutions among the economy, individuals, and environment (Khan, 2023). Such practices hinder progress toward sustainability and cause irreversible problems within our environment. However, sustainable development is a concept of combating environmental changes, the devastation of resources, and jammed economic development followed by destroying active ecosystems.

Massive deterioration of the environment has always been a grave concern of this planet. Almost every corner of this planet is undergoing a challenging situation. United Nations (UN) has generated the Agenda 2030, which has suggested 17 Sustainable Development Goals (SDGs). The sole purpose of this Agenda 2030 is the sustenance of development goals. Thus, the educational significance has encompassed sustenance and betterment of the environment, which has, ultimately, ensured the relevance of the subjects of STEM (Science et al.).

Teaching has connected learners to getting enriched experiences, the way to know one's environment, which has provided community services to ensure sustainable development. Seventeen (17) Sustainable Development having 169 goals were indicated, which have an eagle's eye on the economic, social, educational, law and justice, and environmental positions of countries.

Each government expects to assume its responsibility by considering the deficiencies with well-stated policies and, afterward, monitoring/measuring the smooth execution of Agenda 2030. This research article is going to address some of these Agendas among the most related SDGs, i.e.,

- SDG No.4. Ensuring equitable and inclusive quality education that promotes lifetime learning prospects for all,
- SDG No.11. Making resilient, inclusive, safe, and geographically sustainable development, human and physical arrangements.
- SDG No.16. Promoting inclusive ecosystems for sustainable development, peaceful, that shall be available, accessible, and justice for all for building accountable, effective, inclusive institutions across all levels.

A. Background, Situated Learning and Experiential Practices

The basic tool for sustainable development is awareness to common people from the early year's education. Jickling and Wals (2023) have pointed out the grave challenge for teachers who needs to find a diverse way of teaching their learners. Suppose we look at methodologies and strategies that have connected interests with motivation among learners who have been aspiring for meaningful learning. In this sense, Situated Learning Model (SLM) is an important strategy to resolve the issues when it annexes with the experiential process of learning, which is regarded as a service for communal benefits. Direct or indirect involvement of students in their community services has been provided

through neighborhood/municipalities, which acts as a platform of their own educational choice. Interpersonal and social incentives have increased the probability of positive reciprocity, mindfulness, and pragmatism.

According to Bazgha (2023), the conceptual framework of the Situated Learning model uses many definitions and methodologies that can be considered pedagogical techniques. This method helps students better understand academic excellence for the benefit of society through skills and knowledge. The multidimensionality and interdisciplinary nature of the Situation Learning Model made this concept more complex. Thus, an educational mindset promotes determination, awareness, diligence, social and moral engagement, and blended learning for the benefit of the community. In recent years, several situational learning strategies have been developed and implemented, which allow educators to expand their knowledge to the wider field of experiential learning of the educational platform. Important transitional steps of practices related to training organization, i.e., from SLM to design, are implemented. This ensures a balance between formative and summative learning from community co-teaching activities.

Many other educational incentives raise learners' awareness about environmental disruptions. In this way, commitment, awareness, mindfulness, actions, and gestures presented by the learners have led to real-life participation. It has recognized the relationship between processes, i.e., the Situated Learning Model and Experiential Learning. Adaptation is an initiative that is the most commonly used tool in academia for writing a bibliography, which helps in differentiating between Situated Learning activities and experiential practices (role plays, fieldwork, demos, volunteering, etc.). Educational practices are of four types, conceptually clarified by following these steps. Each step has turned experiential demands into SL demands (Solffitri et al., 2013).

Figure 1: Situated Learning Model (SLM) quadrants displayed four types of learning experiences & extent of learning for community services.

B. Situated Learning Model Implication in the Study of Science

In the past years, many students have been interested in science at the university level. On the other hand, significantly less interest has been recorded for other disciplines. Due to insufficient interest in any other discipline, it is easy to understand that complex phenomenon is not associated with a single factor. However, there is the involvement of diverse factors whereby social consideration of science and, likewise, it is teaching. It has caused difficulties while providing proven knowledge, and therefore, it has ensured proper scientific literacy to all citizens, which enabled them to participate in every scientific regime. World. This responsibility lies on the shoulder of an education system that may regularize any such situation by helping and advocating faculties that have engaged students within their learning ecosystem.

The NSES (National Science Education Standards) has emphasized that all students deserve active participation in public discourse, whereby important issues related to General Science and Technology need to be addressed. Many Situated Learning Models have also been projected, designed, and implemented in recent years. Resultantly, ensuring balance between curricular and academic learning and activities, it is mandatory to have community services. Since this very need is a new type of intelligence, responsible citizens emerge from the universities with philanthropic profiles, which are mainly based on individualistic dependence. Such emergence demands a balance between community-based services and practical academia.

Usually, Situated Learning Model develops sound connections with the long-term sustainability of knowledge and skills that provides a platform to others concerning orienting theatrical commands and theoretical approaches aligned with talent, brevity, and creativity. This kind of social commitment requires impersonating knowledge, a series of practices, excessive skills, and a sustainable curriculum at every level of education.

C. University Level: SLM

As we know that learning has become a big challenge for university teachers when motivation is absent. It not only creates a huge mess for university learners but also hampers the goal-directed behavior of the students. If this goal is achieved correctly, it is proven that the right teaching methodology is implemented. How does this very plan work? What teaching method will be adopted wherein contents and methodology can be combined with practicality to develop skill and training, which is highly needed for a futuristic professional career? However, motivation can be improved by aligning theoretical content with practical, real-life situations. The purpose is to involve individuals, and their participation is ought for retaining knowledge (Bertucci, 2023).

According to Saleem (2022), interest-based assignments value the assigned task, making students more involved cognitively. Hence, the methodology of situated learning has a full contribution towards converting theoretical content into practical execution. However, this connection is established between professional reality & curriculum; therefore, using SLM has shown their students are satisfied while experiencing and valuing its multipurpose advantages like skill development, professional soundness, and training sessions (Venn, 2017).

Upon saying this, it has been pointed out that SLM characteristics and its impact on students' practical approach have invited the community's attention. The academic community is growing and bringing theatrical content close to the realities while generating new avenues for fresh post-grad students and society, broadening their professional competencies and cognitive horizons (Bibi, 2012).

D. The problem with the Statement

Let us look at my problem with the Statement, which is about applying SLM, a teaching method, interventive and later adopted for quantitative evaluation of ESD knowledge. The problem with the Statement is *"an agent of change; Education for Sustainable Development (ESD) carried through Situated Learning Model*," wherein the Situated Learning Model (SLM) is an agent for change toward Education for Sustainable Development (ESD), a strategy used in a university course, i.e., General Science. Knowledge of sustainable education is about accomplishing SDGs with full participation in SL projects. The adopted SLM teaching strategy particularly focuses on different developmental activities.

E. Research Hypothesis

Likewise, the hypotheses of the present study are as under:

H^1: Participation through Situated Learning Model permits plausible uses of this method toward Sustainable Education among students.

H^2: Knowledge about SDGs increases when students participate while using Situated Learning Model.

II. Research Method

A. Research Sample

This article has described evaluation and development of a Situated Learning Model (SLM), and its implementation in the subject of General Science during the Fall semester, B.Ed. (Elementary Education), session 2022-2026, taught at a renowned Public Sector University, Lahore (Pakistan). Fifty-seven students have participated in the educational research voluntarily, with an average age range of 19-30 (mean value 20.21 years, whereby high proportion is of women than men. All of the 57 students who participated in the research study were voluntary. Pretest and posttest experimental research methodologies were employed for assessing the appropriateness of the SLM, ESD strategy, which resulted appreciating proportion of knowledge regarding SDGs.

Keeping a view of the above background of the participants, more students had science backgrounds than social sciences. The value of Table Work 1 has provided complete information on the demographics of all participant's research sample.

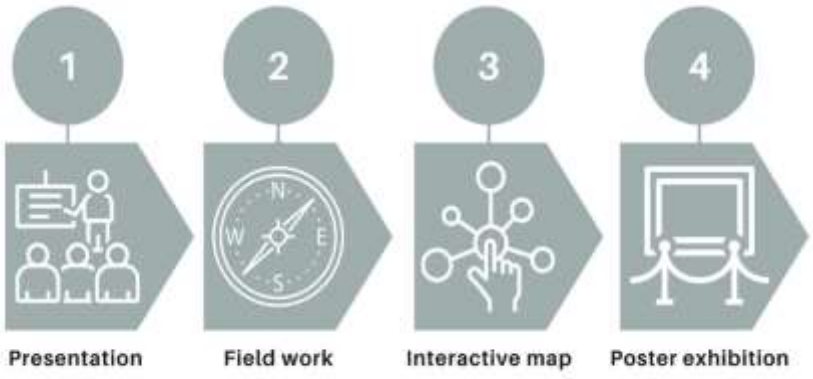
Table 1: Demographical detail about preservice teachers of subject science who are participants of a given research article

N	Gender %		Age %			Educational Background %		
	Male Participant	Female Participant	19 to 21	22 to 25	>25	Social Sciences	Science	Technology
57	30.4	69.57	90.00	7.00	3.00	40.32	55.34	4.34

B. Research Intervention: SLM Activities

SLM was introduced and executed in teaching the subject of General Science, a compulsory subject for B.Ed. (Elementary Education), Public Sector University, Lahore, Pakistan. This subject of General Science has provided pre-service science teachers for sustainable and productive concepts about human and material resources in a conducive environment. Such concepts were applied during training and teaching strategies to elementary-level students. The presented article has described the uses, implications, and evaluation of the Situated Learning Model in the form of Educational Sustainable Development. A study was conducted on preservice teachers of the subject of science who were enrolled in an Elementary program. During this case, the Situated Learning Model teaching was developed during part of this subject of General Science.

Thus, the SLM lasted four months, in which various activities such as presentations, fieldwork, interactive maps, and poster exhibitions were designed and implemented following the time and acquired knowledge of the learners. Thus, the SLM activities were carried out in different forms, as shown in the following sequence Figure 2.



Phases of the SLM followed these steps:

Phase No.I: How to present activities through using SLM;
Phase No.II: Fieldwork in historical town related to Sustainable Development Goals (SDGs);
Phase No.III: All gathered information will help students to build their service-learning goals;
Phase No.IV: Finally, the discussion and results will be presented.

Phase I: At the beginning, SLM and its fundamental differences were explained with other teaching practices following a general timeline of the SDGs. Detailed activity and its demonstration were conveyed to the whole group of subjects. Additionally, students were requested to participate as a group of learners and were introduced to real-life activities, which developed after that. It also involved feedback from the group of participants of individual activity, which was recorded as reflections.

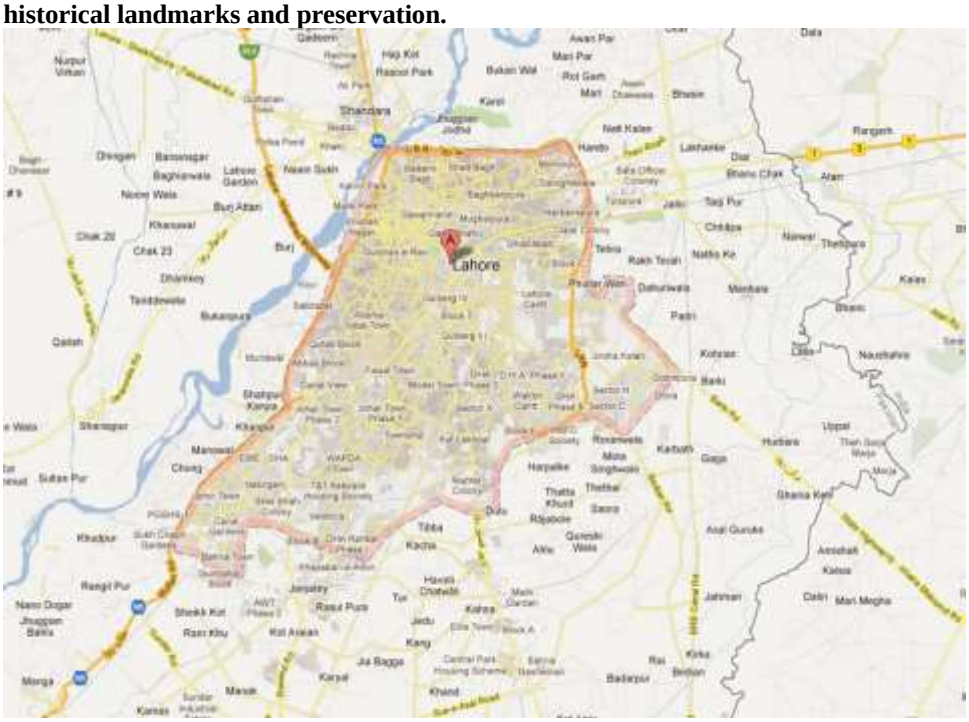
Phase II: While experiencing an inquiry-based task, reflections were acquired from the learners who visited the nearby communities of the city, where they got to learn about its

ecology, important landmarks, and prevalent situations in the context of the SDGs. Interactive activities were carried out through students who worked in heterogeneous groups. Once every group has identified diversification and problems in the city, they are asked how to execute small community-related projects. These projects got addressed through Situated Learning in primary education, and in this way, learners have learned additional information for futuristic teachings (Bruner, 2022).

Phase III: If we got to look into the reflection of our working group, old city of Lahore, an interactive map which was formulated in assistance with Walled City Consortium and the Town Hall (Figure 3), which was later circulated to raise mindfulness, awareness & valuing home district, to stop possible threatening actions.

With such interactive activities, students aimed to continue at work in an intact group, each had made series of logos, features, theaters, videos, etc. Later, uploaded and shared with social media groups like Facebook Messenger, WhatsApp Messenger, google Meet, etc. This has helped each group to present their videos through these apps, whereby small projects were taken to evaluate knowledge of SDG, which SLM acquired. Additionally, an interactive map was also assembled and distributed via social networking.

Figure 3: Interactive map of Lahore. Its location has an interactive video of students participating in an SLM fieldwork which has explained the relevance of this city's historical landmarks and preservation.



Phase Four: At last, students were judged by different panelists, who disseminated information regarding costs involved in maintaining the city of Lahore and its problems. This caused vandalism of this city due to the poor management system.

These panels were placed throughout the university so they might come close to opportunities and necessities related to community-based projects and their sustenance.

C. Research Instrument

In order to collect data from group learners, a questionnaire was used as a research instrument. The instrument was designed while keeping abreast of knowledge and interest in the teaching methodology of a working group of learners to collect their self-assessments. During the implementation of this instrument, it was carefully noticed that it must be based on Situated Learning Model, along with the learner's knowledge and perception regarding SDGs & following implementation. The instrument was categorized into three subsets. The first subset collected demographical information of participants; the second one was supposed to assess knowledge of active teaching methods and, later, their implementation.

The segregation of this section was like eleven items altogether which followed 5-Point Likert Scale ranging ledger was Strongly disagree; disagree; do not know; agree; & strongly agree. In comparison, part Three of the instrument has proposed the knowledge and perception of the students regarding SDGs & their functions. The segregation of this section was also like ten items altogether, which followed 5-Point Likert Scale ranging ledger: Strongly disagree; disagree; do not know; agree; & strongly agree. The intervention was exposed before the start and end of activities during class time; the purpose was to maximize learners' participation.

This participation was voluntary, and consent was acquired before the onset of the activity. Because of the above consent, ensuring the anonymity of participants was the first thing; therefore, no clue was that no personal information was taken from them. Lastly, a panel of experts on the relevant subject validated the instrument before submission. Likewise, reliability was calculated by taking the means from the Cronbach alpha test. The under-mentioned Table Work 2; had summarized items which was used for 2nd & 3rd sections.

Table 2: Instrument was used for the collection of data from participants for Knowledge of Methodology (KM) and Knowledge for SDG (KSDG) in this research.

Knowledge about methodology		KSDG Items Questionnaire	
KM-1	I knew well about Situated Learning Model and its method.	SDG-1	How much familiarity do you retain with the SDGs concept?
KM-2	I knew how to design any such educational model with interactive methods.	SDG-2	Have you possessed a strong interest in learning SDGs?
KM-3	I have sufficient teaching aids and their operation.	SDG-3	Do you know the literal meaning of SDGs?
KM-4	I always get motivation through diverse tasks, which I used to carry out in teaching-learning training at university.	SDG-4	Do you recognize SDG's importance and necessity for our earth's preservation?
KM-5	I always perform such interactive activities which are beneficial for the community.	SDG-5	Do you understand environment-related confusion which may damage the heritage within our community?

KM-6	I am confident in presenting my skills publicly.	SDG-6	Are you equally responsible for earthly disruptions around us?
KM-7	I have great respect for my city Lahore.	SDG-7	Do you participate in activities (e.g., lectures, debates, seminars, demonstrations & awareness campaigns) regarding sustenance and preservation of heritage?
KM-8	I am aware of the historical and cultural knowledge of my city.	SDG-8	Do you believe that caring earth and its environment secures culture & heritage at very low-cost maintenance from public administrations?
KM-9	Through academic training, I have learned much about the heritage and history of my city.	SDG-9	Do you take like Lahore's cultural and environmental heritage?
KM-10	I have an anticipation for better learning and teaching ecosystem.	SDG-10	Do you have a prompt care factor for your cultural footing?
KM-11	I fully contribute my respect & care toward my native city.	SDG-11	Do you contribute your sincere efforts & attachment to the betterment of my vicinity?

D. Statical Procedure and Data Analysis

A descriptive study in which a sample of participants was characterized and described as a population. Sample homogeneity was ensured before proceeding to the next step. the collected research material (Shapiro Wilk) was divided based on which it was decided whether the sample fits a normal distribution or not. It was concluded that the data were normally distributed. Parametric tests were used to assess the reliability of each instrument. Cronbach's alpha was used to calculate the reliability of the instrument, which obtained values of 0.779 and 0.833 for the second and third parts of the instrument. This instrument was considered as reliable. For assessing the impact of given instructions, designed Situated Learning Model with different variables was implemented. By applying t-test, results were found significant, and effect size (Cohen's d) was recorded.

III. Research Results

A. Knowledge of SLM & Interactive Methods

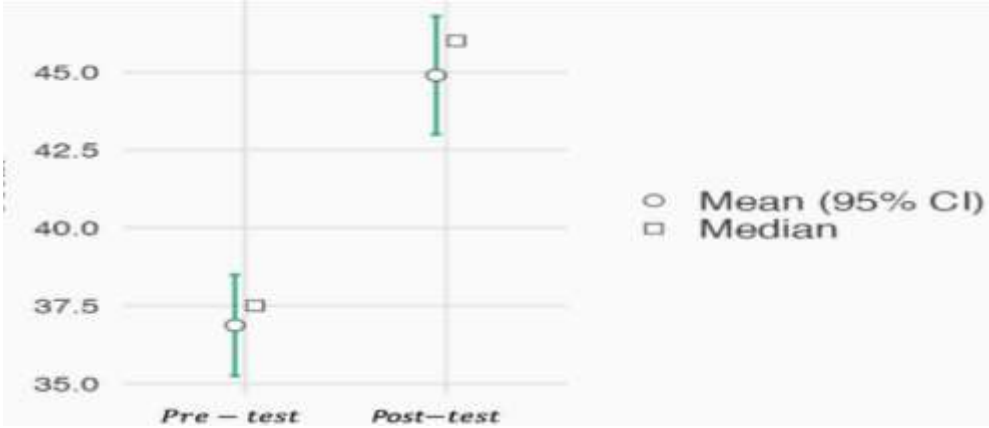
In earlier research analysis of the SLM, the degree of knowledge among participants is revealed while using interactive teaching methods, in general, and for SLM. The internal reliability of the instrument was found consistent on KM Scale all over global score. It was recorded as summative scores from the second part of the instrument.

All individual items from this section were (KMTotal $= \sum_{i=1}^{i=11}$ KMi). Figure 4 has represented total scores i.e., before intervention and after intervention of scores of the students. SLM has increased after implementation, the mean value of KM, total KM & total was 44.8 (std. dev = 5.98). In contrast, value of mean KM, Total before completing the SLM implementation was 37.0 (std dev = 5.59).

Learners has shown t-test that difference between both values were significant, i.e., $t(82) = 6.34$, $p < 0.001$, $d = 1.35$), which has suggested we implement SLM, students

have shown a genuine difference in gaining knowledge through interactive learning methods and SLM. Effect Size has also denoted (d =1.35), which was very high.

Figure 4: Score for the MK among participant who took part before pre-test & after post-test, SLM implementation



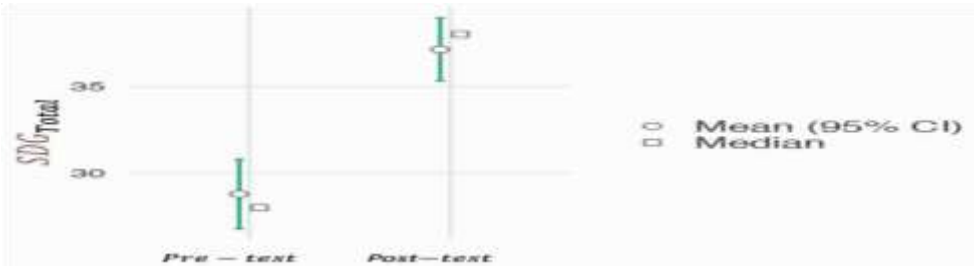
B. Knowledge of SDGs

From another perspective, it is worth noticing, as shown in Figure.5, where the degree of familiarization with the SDGs of participants is reflected. It has summarized results from participants assessed regarding their knowledge of SDGs. As is keenly observed in the figure. 5; where the participants from all sorts of such cases reveal the extent of their knowledge. It tells about whether participants have the know-how of SDGs, which is increased after exposure to SLM. Summative scores of all participants on individual items of the scale were calculated as,

(SDG Total $= \sum_{i=1}^{i=10}$ SDGi).

In light of these results, the SDG's mean table value was 28.90, acquired after exposure to SLM interactive activities, wherein the standard deviation was recorded as 6.96. since the mean value of SDG in respect of the total before exposing SLM was recorded as 37.10 along with standard deviation, i.e., 5.71. t-test has shown the difference between both t-values, which were recorded as significant $t(82)=5.94$ & $p<0.001$ and $d=1.31$ that has recommended the beneficial application of the SLM which has made genuine difference about SDGs knowledge along with high Size Effect i.e., d =1.31 which was denoted very high.

Figure 5: Total scores for the knowledge SDG knowledge among participants who took part before pre-test & after post-test, SLM implementation.



IV. Discussion Part of a Research Article

Due to the continuous massive deterioration, environmental changes have caused adverse effects on our earth's climate, people's attitudes, and the society they live in. It needs to be addressed on SOS basis from all perspectives. Education is an agent of sustainable change in this inevitable & global era of technology, which sidelines all emerging myths and problems. It has been observed that community-based learning has a more focused and targeted impact all over the world.

International organizations and programs, like USAID, UNESCO & UNEP, have indicated purposive intervention and interaction at all educational platforms. Consequently, the ESD has to be set up to enable citizens to participate in every university educational program. This will foster the core values and attitudes and be more sustainable and fairer for every sect of society for all and sundry (Water, 2019).

Thus, teaching methods such as SLM have their value, connecting students with society while taking care of community-based services such as water and sanitation, supervisory services, health centers, shuttle service to nearby grocery markets, mosque duties, etc. Resultantly, Situated Learning has proved as best tool for sustainability, which is a type of intrinsic motivation through which contributors, students, learners, novice teacher, and community members participate in an interactive, active, sharp, life-styled, real, and in-depth ecosystem. Their actions speak louder towards sustainable development as Situated Learning practices are increasingly being important for every educational platform.

The results obtained in the present research study and its results have proven that implementing SLM has a significant impact. However, most research variables have detailed SLM knowledge and interactive methods. Notwithstanding, the effect was significant; the size of the effect was large, too, i.e., d =1.31. Thus, this SLM intervention and followed participation of participants in individual tasks has proved that it is an appropriate strategy for preservice teachers to teach the subject of science. The purpose was engaging students effectively through continuous learning. Similarly, results have suggested that active learning methods can enhance learning through community-based activities, theatrical skills, attitudinal farming, and mind-mapping skills through outsourcing fieldwork.

Student-teacher connectivity with their community has proven the most demanding, motivating, and effective. The current scenario presented by Castro et al. (2022) is that different Situated Learning perspectives have aimed at improvising students' skills since refinement to get a sustainable society. The research study has concluded that if level of intervention is high then the degree of satisfaction would also be high among all participants. On the contrary, demotivating students without interventive teaching has resulted in a high degree of failure.

The situated Learning Model is a relevant teaching tool for participation in diverse interactive activities, enlightening student motivation. The impact of the Situated Learning Model is highly significant in social development and transformation. SLM allows learners to learn how to act for dire needs; previous results have reported that university students have reflected increased knowledge and care for their communal works.

Despite the administrations' best attempts to advance the SDGs, which are listed in the 2030 Agenda, reality has demonstrated that people' active participation enables them to be aware of the requirements of their community. By delivering information and actualizing sustainable competences to fulfil the goals of the SDGs, ESD has grown to be an indispensable part of global sustainable development. As a result, after participating in SL, the participants' interest for acquiring knowledge concerning the SDGs expanded significantly, in line with the results of the research study which stood out statistically significant, with a very high Effect Size (d = 1.31).

V. Conclusion

It has been concluded that the objective of this study was to incorporate sustainable education standards in an educational institution's science course by means of an SLM collaborative community project. This research seeks to examine participants' knowledge of establishing innovative activities for teaching Educational Sustainable Development, such as community-based real-life learning, once it had been implemented (Anyagh, 2023).

$H^{1:}$ Hypothesized that participation through Situated Learning Model permits plausible uses of this method toward Sustainable Education among students.

$H^{2:}$ Hypothesized that knowledge about SDGs increases when students participate while using Situated Learning Model. The Situated Learning Model was implemented for pre-service science teachers enrolled in the Bachelor in Education (Hons.) program of a public sector university affiliated with the University of Indiana, USA (Flowers, 2023).

VI. Recommendation

The SLM interactive projects have been developed having the objective of strengthening teachers' comprehension and awareness about the SDGs as aspiring educators and putting them to practice in their own communities. Additionally, the ESD platform necessitates the use of novel learning techniques. There are four steps to its application; the first was a presentation to the participants, the second was fieldwork regarding the SDGs for the participants and their historical city, Lahore, and the third involved the students gathering all the evidence to establish their Situated Learning Model. The final debate and outcomes were presented in phase 4, which was the

conclusive phase. Before and after the deployment of the Situated Learning Model, pre- and posttest technique was extensively employed.

According to Almala (2020), students' participation in community-based initiatives was conceived and implemented with SLM in mind in order to achieve significant ESD scores. First and foremost, students now have a substantially greater understanding of creative teaching techniques that can be used with ESD. It has been demonstrated that students' involvement in the planning and execution of the SL project increases their knowledge of the suggested methodology and learning motivation. As a result, the SL approach used to address ESD is a highly useful tool in the context of a university, and particularly for trainee teachers, as it not only allows participants to profit from the methodology as participating students but also helps them develop their teaching skills.

A major limitation of this research study was that the characteristics of the sample precluded comparison of results with methods other than SLM (no control group was used). Furthermore, the sample size and subsequent additional information limited these results, allowing us to demonstrate the potential of SLM as an educational strategy in the context of EDS (Voughus, 2021).

References

Abu, R., & Flowers, J. (2023). The Effects of Educational Sustainable Development on Achievement, Retention and Attitudes of Home Economics Students in North Carolina. *Journal of Vocational and Technical Education, 13(2)*, 16–22.

Almala, A. H. (2020). *A Constructivist Conceptual Framework for a Quality e-Learning Environment. Distance Learning*, 2(5), 9-12.

Anyagh, I. P. (2022). *Effect of Formula Approach on Students' Achievement and Retention in ESD. Unpublished Master's Thesis*. Benue State University.

Artiyup, D., voughus, L,M., (2021). *Introduction to Sustainable Development at Westmount research in education, Belmont, CA: Clarksmith Educational Learning.*

Bibi, A. (2012). *The comparative effectiveness of ESD with the help of textbooks and group work activities. (Doctoral dissertation).* Retrieved from http://eprints.hec.gov.pk/cgi/search/advanced

Bazgha, S. K. (2023). *Effectiveness of Situated Learning Strategies on Nigerian junior secondary students' academic achievement in Basic Science. British Journal of Education, Society & Behavioral Science*, 2(3), 307-325. doi: 10.9734/bjesbs/2012/1628

Bertucci, A., (2023). *The impact of the size of the Situated Learning Model on achievement, social support, and self-esteem. The Journal of General Psychology, 137(3),*256272. M. G., & Brooks, J. G. (1999). The Courage to be Constructivist. Educational Sustainable Development, 57(3), 18-24.

Bruner, J. (2022). *Toward a theory of instruction, Cambridge, MA: Harvard University Press. Central Printing Press.*

Venn, J. J. (2019). *Assessment in inclusive settings. Assessing students with special needs for ESD (2nd edition).* New Jersey: Prentice Hall Inc.

Water, V. (2019). Effect of Educational Learning on Sustainability and Attitudinal Rating Scale. *Journal of Educational Research,* 95, 220-229.

Zakaria, E., Solffitri, T., Daud, Y., Abidin, Z. (2013). *Effect of Educational Sustainable Development on secondary school students mathematics achievement*. Creative Education, 4(2), 98–100. Retrieved from: http://www.scir.org/journal/ce; http://dx.doi.org/10.4236/ce.213.42014. May 10th2014