# 342. Constructive Framework for Effective Science Communication

***Shekhar Salunke[1], Rajesh Moholkar[2], Madhura Sagare[3], Shubhangi Gavande[4] & Kamladevi Awate[5]***
[1, 2] Members; NGO, Centre For Environment Solapur, M. S.
[3] Jain Gurukul College of Science, Solapur, M. S.
[4] Sangameshwar College, & Member; NGO, Centre For Environment
[5] District Institute of Education & Training, Solapur. M.S. (Principal Investigator)
Centre for Environment; 29-A, Nrsinha Nagar, Opp. Water Tank, Dist; Solapur 413 004 Maharashtra
spr_salunke@bsnl.in

**Abstract.** It is fundamental that feed-back be given to any communication and the effectiveness be analyzed. Important perception of science communication is that the information is exchanged in order to share the information. Based on effective science communication, present investigation focuses on the research on instructional effectiveness of science teaching apart from traditional methods. Great amount of learning materials through multimedia instructional system can be reused by many individuals, providing that there exists an effective way of finding and disseminating this material. A new concept, a unit of learning materials in a multimedia format, has been developed to ensure that learning materials are thought provoking and reusable replacing the reportedly unacceptable traditional method of teaching in the subjects of science.

The research addresses likelihood and effectiveness of developing learning materials for science education into an adaptive learning system. The research is a systematic approach towards learning facilitation with enhanced enthusiasm, an attempt to establish an agreed method of formal and informal environmental education as well. The investigation analyzes comparison of the students' perceptions towards difficulty levels experienced during the traditional method of education. We have extended multimedia based learning tool as learning objects to teach students with an individual adaptive learning experience. We have evaluated the tool confirming its effectiveness and acceptability for students learning. The innovative approach is found to strengthen effective exchanges between the pupils and teachers providing leadership and practical know how to the concept of sustainable development. It also corroborates voluntary participation, seldom seen in traditional methods of teaching-learning system. Statistically analyzed data indicates that the innovatively designed multimedia system of instruction is reportedly acceptable, inviting voluntary participation of the pupils, palatable and deepens understanding the concepts to a greater depth, and facilitates distance education and in-service teacher training objectives. The multimedia-learning, a new approach to education has proved to invite voluntary participation.

**Keywords:** Adaptive learning system, effective communication, learning facilitation.

## Introduction

An integrated process for environmental education through multimedia instructional system has not been incorporated yet in the educational scenario yet across the country. Although environmental education has been introduced into many curricula, this is only a beginning step. The incorporation of instructional system is hopefully to play a crucial role in deepening the understanding of the environmental education among the pupils and is required to set ourselves on fruitful sustainable paths. Most instructors want to make the classroom a place where students are encouraged to test ideas, make connections among subjects and content areas, explore problems and issues, work cooperatively, and become lifelong learners. They believe that students must be intellectually engaged and actively involved in their learning, and that traditional instruction is likely failing to provide this engagement. Tremendous efforts have been made by educators to help students learn. Peer group and collaborative learning have been introduced into classrooms. Collaborative learning promotes communication of ideas and understanding of concepts. In view of implementation and investigating the efficacy of the method of collaborative learning "Multimedia instructional system" was developed for environmental education to study its efficacy in the teaching learning process, an innovative education process for sustainable community development and it has been experienced with reinventing the concepts of education and development.

The approach has observed to have broad implications in the education process. The main objective of this study was to examine the practicability of multimedia instructional system for an education process, which is expected to contribute to easing the educational process that in turn contributes to a sustainable community development as exemplified by the research output. The participatory research data has been used to extend theoretical perspectives

on applications of multimedia instructional system and environmental education and to reinforce new directions of research on education and sustainable communities. The research focuses on designing instructional systems, its efficacy in processes in learning and instruction, delivery systems and evaluation of instruction in the context of Environmental Education.

## Methods of study/design of study

The standard systems view of instructional design is depicted as under:

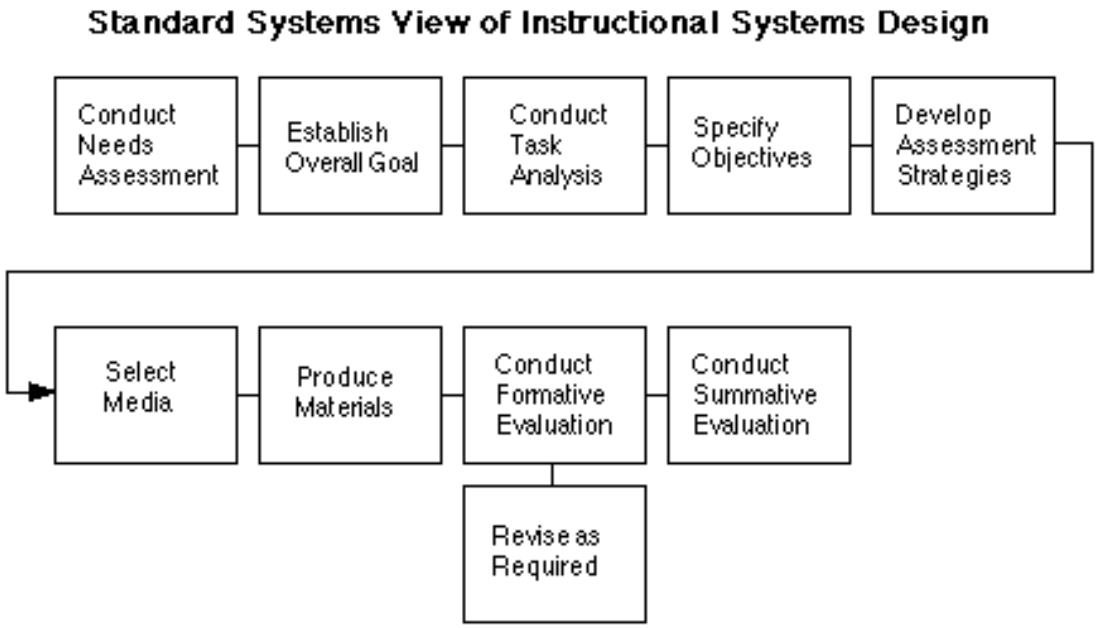


***Fig 1. Standard Systems view of instructional Systems Design***

**Table 1. Gender attitude or performance towards investigative parameters**

| INVESTIGATIVE PARAMETERS | GENDER ATTITUDE OR PERFORMANCE AVERAGE | | |
|---|---|---|---|
| | % MALES | % FEMALES | |
| Performance Grade | 68 (B) | | 74 (B) |
| Inclination towards traditional Black-Board methodology | 76 | 80 | 71<br>78 |
| Inclination towards Technology integrated classroom environment | 91 | 89 | |
| Inclination towards combination of Technology integrated classroom environment with traditional methodologies | 83 | 92 | 90<br>88 |

n Males = 83, n Females = 79

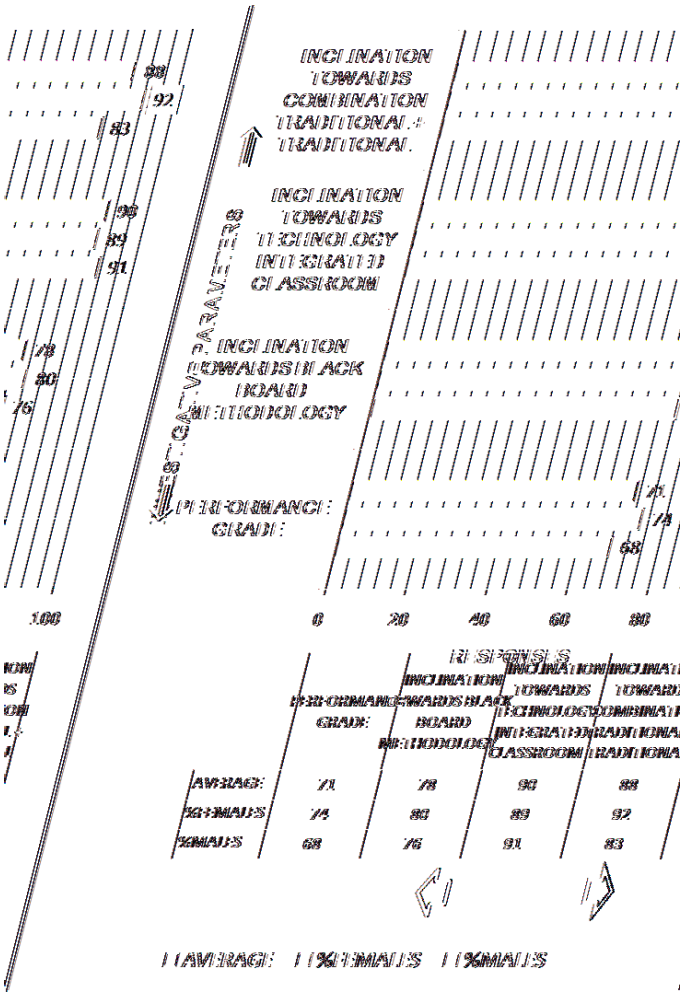


***Figure 1; Graphical illustration of Gender attitude or performance towards investigative parameters***

The design of the study includes a sequencial flow chart of the system involved as; Conduct needs assessment, establish overall goal, conduct task analysis, specify objectives, develop assessment strategies, select media, produce materials, conduct formative evaluation, conduct summative evaluation, revise as or if required. The design further had an investigatory intention ;-

1. To analyze the conventional approach of teaching Environmental Education.
2. To plan multimedia instructional system for Environmental Education.
3. To design and construct multimedia instructional system for Environmental Education.
4. To test the effectiveness of constructed multimedia instructional system.
5. To compare the effectiveness of constructed multimedia instructional system with the conventional system of instruction.
6. To validate multimedia instructional system in terms of their effectiveness over conventional system of instruction.
7. To equip the pupil teachers and teacher-educators with reliable system to overcome the difficulties in theory course of Environmental Education instruction.

The above investigation was performed under traditional classroom environmental settings that investigated the relationships between student performance in introductory method of curriculum delivery, various educational characteristics, learning preferences, and the potential effectiveness of technology as a medium of instruction to complement face to face teaching. The survey consisted of the student consent form along with the three levels of instrumentation which were developed to collect quantitative and qualitative data for this study. It could be administered quickly in the large introductory class.

## Results and Discussions

The investigations resulted in elevating pupils interests in curricular studies a sign of development of a positive attitude towards science is one of the most important goals of the curriculum as also observed by Koballa and Crawley, Laforgia, (1988). Activity-based joyful learning approach as an emerging trend in the field of teaching methodology/ strategy, is important for our school education as reported by Panda & Basantia 2004). Lewin and Potter (1947) reported that children get answers to questions by finding out their own routes to discovery.

Investigations proved effective to reduce the dimensionality of the learning items of the learning perception survey to more basic variables based on the responses received from the participants. Based on the nature of the statement items and Bloom's Taxonomy of the cognitive domains, these six factors were named individually as Learning By Rote (Factor I), Learning By Relating (Factor II), Learning by Comprehension (Factor III), Learning Through Formula Derivations (Factor IV), Learning Through Effort (Factor V), and Learning Through Practice (Factor VI). Further, the results of the evaluation of the students' performance were based upon their semester long grades on exams and homework assignments. Overall, 68 percent of male and 74 percent of female participants received a final grade of B or higher (Table 1). No significant performance differences were found between male and female students
(Fig. 1). This study found that participants performed better by trying to understand the learning material and relate problems to real world situations. Participants who relied on rote learning did not perform well. It was reported that computer-supported and interactive learning environments better serve the diversity of students. Results from the qualitative method at this study showed that a majority of students were on the whole positively inclined to having the pedagogy with the integration of educational technology, such as PowerPoint presentation, visualization, simulation, and found it helpful in learning. The results were also positive about advantages gained from the use of Black Board and interactive communications such as asynchronous discussion. About 90% of students in the technology-integrated classrooms reported being benefited by the learning environment while 78% of students in the traditional classroom setting indicated their preference in having the technology-integrated curriculum. Further, the student performance in the technology-integrated classrooms indicated that 90 percent of the technology-inclined participants compared to 78 percent of the black board methodology (Table 1).

The student performance technology inclined participants as compared to the traditional lecture-format classroom showed progress and were satisfied with the current technology integrated classroom instruction format. In this study, however, no significant gender difference was found between students who favored the integration of the technology in the introductory design and students who favored to learn under the traditional instructional format.

Investigations endorse a constructive framework for science communication, communicating abstract aspects more efficiently proving the attempt to have the ability to turn information into useful knowledge. It has found to stress skill development nurturing the development of good habits of mind, having applications beyond passing a test. Learning through technology integrated plans and teaching materials need to include a relevant context for new information to lead to broader understandings. During traditional teaching methodology it is often hard for students to understand the connections between activities within a particular subject. This confusion is heightened when students struggle to understand the connections between different subjects within traditional classroom environment and can be overcome with the integration of technology with pedagogy. "Habits of mind" should be an important goal, or outcome, in education. These habits can produce a world view that incorporates different disciplines or subjects. They can be thought of as the "ground rules" for a particular discipline, and include, but are not limited to, verification and respect for data in science. The attempt endorses successful implementation of inquiry learning indicative of active learner involvement leading to important outcomes in the classroom. Observations indicate that participants made active observations, collected, analyzed, and synthesized information, and drew conclusions developing useful problem-solving skills. These skills can be applied to future "need to know" situations that participants shall encounter both in the educational sector and at work. Another benefit that such framework offers is the development of habits of mind that can last a lifetime and guide learning and creative thinking.

## Recommendations for future research

Collaborative learning, real world application, interaction with instructors, and using technology as tools were perceived by students as helping them learn the complex concepts. Based upon the results of this study, several recommendations for further research can be generated. The exploration of the confounding effects related to learning perceptions, integration of technology in aiding the student comprehension, and the performance needs to be done to fully understand the features that enhance students learning best and which instructional formats are more potent than others.

## Acknowledgment

We gratefully acknowledge the long term co-operation by the Principal, Mr. G.N. Chitte, Sangameshwar College, Solapur, for availing liberty and extended facility of the library resources for this particular research work. Last but not least I extend my gratitude to the technical laboratory staff of Department of Physics, Sangameshwar College, Solapur, for their vital role during the investigation period.

## References

1. Book; Data Analysis; ES-315, Research for distance education, Indira Gandhi National Open University, New Delhi, 2008.
2. Koballa, T. R. and Crawley, F. E. (1985) "The influence of attitude on science teaching and learning. School Science and Mathematics. 85(3) 222-232."
3. Lewin, Driver, R. (1989). "The construction of scientific knowledge in school classrooms. In Millar.R.(Ed.).Doing Science ;Images of Science in Science Education.London: Falmer Press Lewes.
4. Panda,B.N. & Basanta, T.K. (2004). Activity-based Joyful learning Approach, A Strategy for the Achievement of Interdisciplinary Competencies. Journal of Indian Education, Vol. XXX, pp 76-88.
5. Tools for research; ES-315; Research for distance education, Indira Gandhi National Open University, New Delhi, 2008.