



Aesthetic Perspective of Virtual Science Laboratory – A New Mantra for Educating the Post Millennials

Dr. Basundhara

St. Anne's Convent School Chandigarh

Email: basundharabasundhara@gmail.com

Abstract: Physical, spiritual, cultural and aesthetic aspects of a learner are the aspects of true quality education, embraced with core intellectual development. The main objective of education, therefore, should be eternal. The constant development of technology seems to have created an intense need for technology in every aspect of life. Modern technology is considered an irreplaceable component of education. Effective integration of information technology into pedagogy represents the true spirit of education in this new digital age. ICT enhanced pedagogy in school education captivates modern, techno-savvy students even though the subject content remains traditional. Utilizing virtual science laboratories for science pedagogy has almost become a trend now. But aesthetics should still remain an integral part of quality education. Both aesthetics and education are multidimensional in nature. A true education ought to have an aesthetic pedagogy. In this paper, the aspect of effectively incorporating an aesthetic value into a virtual science laboratory is discussed.

Keywords: Post Millennials, Science Pedagogy, Aesthetics, Quality Education

Quality Education: Eternal Goal of Education

The goal of education is eternal. It has been discussed, defined, and analyzed by scholars and educators for many centuries now. Physical wellbeing, emotional augmentation, cultural enrichment, spiritual enhancement, and aesthetics of a learner are aspects of true quality education, embraced with core intellectual development. The goal of education for humans, therefore, should not deflect from the ancient to the present era of artificial intelligence. Since every other aspect of the human race is continuously changing, the objectives and methods transform continuously with time, but the aim ought to be constant. It should be a matter of great concern if the concurrent modification of education ignores any of the various peripheral yet important components of the overall aim. The colossal growth of technology and the rapid expansion of knowledge should not overshadow the importance of the development of physical wellbeing, emotional augmentation, cultural enrichment, spiritual enhancement, and aesthetics of a learner. Learning would then not only be incomplete but the overall human characteristics of the learner would gradually degenerate, creating a huge threat to the human race's being extinct. It is thus very important to identify generation-specific characteristics to enhance and complement the capabilities of learners. It is also essential to supplement any deficiency that is formed due to those same characteristics. Presently, education deals with mainly two generations: the generation Y and the generation Z.

Today's digital generation is lovingly called generation Y or the millennial's (Laskaris, 2017). Born between the early 1980's and around 2000, the learner's utilized technologies differently than generation X—their predecessors. Technology is closely embedded in their lives. This generation is not only techno-savvy; they have forced the previous generation to adapt to the new technologies,



preparing a background for the next generation, the post-millennial generation. Generation Z is also called the Linkster Generation because it is the first generation to be linked into technology from before their birth. They grew up with social media, smart phones, and apps. (Blair, 2018).

The scope of the transition of cultural, aesthetic, and emotional traits from one human generation to the next has become narrow because face-to-face communication has been greatly replaced by communication technology. Nature has been the soul inspiration of creativity, emotional, physical, and cultural virtues for centuries. Every area of human civilization has been inspired by observing nature. The natural world teaches humans to save themselves from various natural disasters. It prepared humans to survive in changing global environments. Each and every insignificant technology is a mimic of nature's engineering, but in recent eras, a devastating change is prominent. The new generation of human beings is unable to follow nature because they gather most of their experience from technology, further robbing them of the aesthetics embedded in nature. The constant development of technology seems to have created an intense need for technology in every aspect of life. Modern technology is considered an irreplaceable component of education. Effective integration of information technology into pedagogy should represent the true spirit of education in this new digital age. The virtual laboratory experience captivates modern, techno-savvy students even though the subject content remains traditional.

In this present context, where nature and the natural environment are replaced by information technology and virtual reality, aesthetics ought to be an integral part of quality education.

Scientific skills and Aesthetics

An experience of decoding the scientific facts behind beauty in nature is captivating. Scientific knowledge actually enhances aesthetics. (Feynman, 1988). A flower is appreciated by everybody because of its apparent exquisiteness but when a science scholar appreciates it he or she might observe more than the superficial beauty of the flower. Understanding of the aesthetics of the cells arrangement is imagined and noted which enhance the aesthetics. Subsequently it may be stated that scientific skills enhance the aesthetic sense. From a learner's point of view Art and science seems to be apart from each other without similarity between the subjects, but philosophers, scientists and mathematicians relate aesthetics and science through metaphysics and theories. The dictionary meaning of Aesthetics is "a branch of philosophy that explores the nature of art, beauty, and taste, with the creation and appreciation of beauty". (Merriam Webster) Epistemologically, it is defined as the study of subjective and sensory-emotional values. (wikipedia) Aesthetic value of a person helps to appreciate beauty in the surrounding. (BIRKHOFF,1933) Aesthetics enhances positivity and develop spiritual wellbeing.

Scientific skills like observation, evaluation, analyzing, synthesizing has direct link with development of a better aesthetic sense because both science and aesthetics is defined by this parameter. One of the main objectives of science is observing the nature and natural phenomena to understand them and being able to utilize them in human life. Aesthetics too involves part of that observation and evaluation. Creativity and innovation both are also parameters utilized in explaining scientific skill, but according to general perception a creative person has better aesthetic sense.

In the frontier of research, applied science is used in every possible field of human civilization. Appreciating innovation is appreciating the nature in true sense because discoveries of science are actually finding the laws of nature and implementing them according to one's specific need.

For example, Science learning involves searching the cause and effect of atomic and molecular level interactions to explain macroscopic observable changes. In other wards science utilizes logic to



reach towards the perfection apparent in beauty of nature.

Observing changes and explaining the process in terms of cause and effect relationship and hence being able to predict the effects in theoretical terms is one core characteristic of science.

Post - millennial learners due to the modern lifestyle are deprived from the scope to observe nature. The learners are somewhat disconnected from the real world of the remaining generations. To ensure the overall development of a learner one needs to be sure that spiritual development is existent.

Experimentation and Aesthetics

The zest in science pedagogy is providing learners the scope to be able to appreciate nature and the natural phenomenon. A serious concern of science pedagogy should be avoiding the fault that brings about a dilution to the importance of science and nature by emphasizing on the Theoretical content, learners should not be burdened with explanations and unrealized facts irrelevant to their life. In pedagogical context characteristics of science should be reflected in its pedagogy and curriculum in all levels of the education. Post Millennial learners are independent and used to experimenting with technology from the beginning, they easily get involved in learning through activity. Aesthetic sense will be developed along with Science if experiment and activity based curriculum is developed. A successful pedagogy will do justice for both the subject and the learner. A true enrichment of scientific knowledge will improve learner's aesthetes. There is huge scope to improve the experimental experience in underground science through virtual laboratory. It is a fact that for post milliner's Virtual laboratory is comfort zone, so will it enhance the learner's aesthetics?

From Learning to “doing science”

The “doing science” involve observations and carry out experiments utilize instruments and learning from the process. A traditional standardized laboratory session simultaneously aims towards multiple goals.

- Learning to operate instruments
- To develop skill to carry out experiments
- Cognizing the process
- Associating experiment with theoretical background

Even in the formative stage of traditional practical science, specific apparatus and reagents are supposed to be utilized that have explicit methods for handling. In higher stages of experimentation, more complicated apparatus, instruments and reagents are recommended. But school science laboratories seem primitive compared to what is available in modern science laboratories. The traditional practical approach cannot depict the vast resource available in nature for a learner to experiment with. A beginner's struggle to handle the orthodox instruments is not of much use in real modern laboratory nor does it actually represent the complicate nature of real environment.

Virtual Science Laboratory: A Friend of Post Millennials

Use of Computer simulation to teach abstract concepts of science is well recognized in various parts of world. It is also established that use of computer simulation in science experiments is safer than handling equipment in traditional science laboratory. (Eilks& Byers,2009).

An important attribute of computer technology is creating simulations of real phenomena. Simulation is a model or imitation. Imitating a real situation for understanding the components is a practical solution for circumstances when the real situation is not easy to observe. Computer simulation is a simulation run on computer to provide an experience or reproduce behavior of a system. A simulation of real phenomena is created through programming.



Computer simulation helps to understand processes that are otherwise difficult to be created. Many a time it is preferred in skill development tasks because it is cheaper and provides a safer experience than the real. (Sweller, Merrienboer, & Paas, 1998) It is especially useful when the consequence of the real situation is unavoidable but the situation is worth observing.

The interaction between the subatomic particles, their shape, energy and stabilization are abstract ideas. Abstract concepts of theoretical science are difficult to understand. Students may develop miss concepts. Interaction between atoms or molecules may dispatch better meaning to young generation if served through contemporary technology utilizing computer simulation to construct three-dimensional models and explaining the subatomic phenomena.

India is a country full of diversity. The government has a major responsibility to reduce the unwanted differences between its entities. Application of technology in mass education might be remedial. As per the recommendation of the National Policy on Education 1986, (India, 1986) “Modern communication technologies have the potential to bypass several stages and sequences in the process of development encountered in earlier decades. Both constrains of time and distance at once become manageable. In order to avoid structural dualism, modern educational technology must reach out to the most distant areas and the most deprived sections of beneficiaries simultaneously with the areas of comparative affluence and ready availability.

Educational technology will be employed in the spread of useful information, the training and retraining of teaching to improve quality, sharpen awareness of art and culture, inculcate abiding values, etc., both in the formal and non- formal sectors. Maximum use will be made of the available infrastructure. In villages without electricity batteries or solar packs will be used to run the program.”

Central Institute of Educational Technology (CIET), a constituent unit of NCERT, was established in the year 1984 merging Centre for Educational Technology and Department of Teaching Aids. Aim of CTET is to promote utilization of educational technologies viz. radio, TV, films, Satellite communications and cyber media. Its task is to undertake activities to widen educational opportunities promote equity and improve quality of educational processes at school level. It monitors studies to use ICTs by the School Students to integrate information and communication technologies (ICTs) in Secondary schools, develops and transmits (i.e. EDUSAT) video support materials on curricular areas, production and digitalization of Audio/Radio programs, and design scripts for Educational Audio-Video program in Curricular and Co-Curricular Area.

Technology is receiving the fair share of attraction from the government of India. “The vision of Digital India program is to transform India into a digitally empowered society and knowledge economy.”(Ministry of Electronics & Information Technology, 2016)The policies of Indian government make it obvious to realize that to be able to be in the global platform India has to utilize the latest of the technologies.

Incorporating virtual laboratory successfully with science learning experience is a challenge for the educators today. One should keep in mind that technology is developing in a tremendous speed. Technology is merging with human life in every possible area. Government and policy makers encourage classrooms to be converted into smart classes. So virtual laboratory should be integrated part of science education. Integration of computer simulation in education is considered to be more effective and efficient for students’ achievement. The virtual laboratory will not only be more effective in knowledge enhancement; it has the capacity to attract the learner’s attention improving the learning experience. To a great extent, computer simulation technology has the scope to blend with traditional science pedagogy. Scientific literacy will grow with the use of virtual laboratory because learners that fail to retain their concentration in traditional class room teaching will be intensely attentive towards the virtual scientific environments.



Cherishing the world view

One foremost value that one gathers from sound scientific knowledge is intellectual enjoyment from working on the concepts of science. The joy of knowing and creating has been the force behind human innovation from beginning of the civilization. To be able to be keeping the spirit of learning alive, learners should learn to enjoy what they learn. The universal eager learner is revealed when learning through virtual science laboratory, because it does not stop the learner to tryout once more. Providing virtual platform to Post-Millennial generation will definitely enhance human innovation and creativity maintaining the overall positive progress.

Another value that is integral part of science education is of world view. The value is a result of scientific effort. Being able to realize that imagination of nature is far greater than imagination of man. This realization is extremely relevant for contemporary learner generation. Understanding and accepting the nature and realizing its eternal status in human life and civilization drives us to achieving the value of peace and coexistence.

Conclusion

To contribute to building a peaceful and better world young generation needs to be enlightened. The true value of life and the world peace shall be through the method they better understand and accept. Though the aim of education is eternal method of education ought to keep changing with changing characteristics of the learners. After considering various aspects, it is perceptible that science education may influence aesthetic? Exploring the scope to enhance aesthetic sense of students while learning science Virtual Science Laboratory is recommended. It may be concluded that use of virtual science laboratory for science education will encourage aesthetic development which in terms will encourage a sound spiritual existence that respect natural worlds and Benefit of the Congruence of virtual science Laboratory with wet Science Laboratory: Science moves from the lab and the classroom to the computer, as working in a virtual science laboratory and viewing simulations provide additional ways of learning science.

Bayan College



References

- Ausubel, D. P., Novak, J. D., & Hanesian, H. (1978). *Educational Psychology: A Cognitive View*. Holt, Rinehart and Winston.
- BIRKHOFF.(1933).Retrieved2018,fromAESTHETICMEASURE:
- http://www.skidmore.edu/~flip/Site/Lab/Entries/2008/10/24_Aesthetics_files/Birkhoff%20Aesthetic%20Measure.pdf
- Blair, O. (2018). *Independent*. Retrieved 2018, from independent: <http://www.independent.co.uk/life-style/millennials-generation-z-linksters-what-next-generation-x-baby-boomers-internet-social-media-a7677001.html>
- Eilks,I.,& Byers,B.(2009).*Innovative Methods of Teaching and Learning Chemistry in Higher Education*.
- Cambridge: The Royal Society of Chemistry.
- Feynman, R. P. (1988). "What do you care what other people think?'. united states: Bantam Books. India, G. o. (1986).*The National Policy on Education (NPE)*.
- Laskaris, J. (2017). *efront*. Retrieved 2018, from <https://www.efrontlearning.com/blog/2016/03/5-strategies-to-engage-the-millennials.html>
- *MerriamWebster*.(n.d.).Retrieved2018,from<https://www.merriam-webster.com/dictionary/aesthetic>
- Miller, G. (1956). The magical number seven, plus or minus: Some Limits on our capacity for processing information. *PsychologicalReview*,63, 81-97.
- Ministry of Electronics & Information Technology. (2016). <http://digitalindia.gov.in/>. Retrieved from Ministry of Electronics &Information Technology.
- Pickering, M.(1980).Are Lab courses awaste of time? *The chronicle of higher Secondary Education*, 19,80.
- Sweller J., & C. (1991). Cognitive Load theory and format of instruction. *Cognition and Instruction* , 292-332.
- Sweller, J., Merrienboer, J. J., & Paas, F. (1998). Cognitive Archiecture and Instructional Design. *Educational Psychology Review*, 10(3),251-296.
- *wikipedia*.(n.d.).Retrievedfrom<https://en.wikipedia.org/wiki/Aesthetics>

Bayan College