International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

Role of Computers viz-a-viz Teaching of Physics—An Analysis

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Abstract: ***Physics is considered to be mother of all modern sciences, especially Information Technology. Physics is the study of interaction of matter and energy, and the mathematical description of the process. It has been observed across the world that students have often deep misunderstanding about the subject of Physics. They have negligible knowledge and ideas about how Physical Science works. The teaching fraternity also finds it difficult to make the concepts of Physics clear to the students. In order to acquaint teachers with the pedagogical approach of Physics and to nourish the students to be the will full takers of the subject, Computers play an outstanding role by way of using different types of facilities to the users. Computers have also played an important role in all most all walks of life and have turned the world in to a global village. The contents which definitely seem to be very difficult to comprehend have made it easy by way of using multimedia, animation, modeling, decision making and simulations. Computers have played unparallel role in achieving better advancement in material Science, Healthcare, Administration, Social Science, Agriculture, Employment, Research, Weather forecasting, e-marketing, Economics, and above all Teaching Learning process. In order to give fillip and encourage our teachers in all and students in particular, Computer is being used as most important teaching tool to achieve the desired goals well in time. The paper attempts to high light the significance of Computers in understanding the complexities of Physics as a Science and its analysis.***

Keywords: Modern sciences, Information Technology, Global village, Computer utility.

1. Introduction

Researchers believe that physics education have determined that innovative pedagogical strategies that make use of inquiry and collaborative techniques can be very successful [1].

Physics as a subject

The assessments for this research have been done after going through a cross-section of learners by taking their pre and post tests. These detailed and in depth exercises of teaching will definitely encourage students to go for any type of learning which enables them to take the corrective measures for reinforcement to achieve the target. In order to examine the students' individual ideas and changes in the ideas,we can go for analysis of their skill and beliefs. In case of science subjects, we always take cognizance of laboratory work carried out by the students, which always seems to be in small groups[2].

In order to infuse or inculcate the spirit of learning complex areas or topics, especially like physics, we may provide with computer system and other allied teaching aids, whatever necessary to make system of learning more comfortable. We not only watch how ideas evolve among students, but also see role played by the computer in mediating group discussion and sense-making[3].

The research carried out while using computer in teaching learning process has proved to be very significant and fruitful. It has been proved by researchers that learning by using multimedia and simulations provide more concrete ideas among students. In order to answer the questions of learning fundamentals of physics as per the tradition, it has worried the researchers that nothing concrete is visible, which has proved to be the failure on the part of students performance.It has come to the knowledge of the think tankers of the international level that the analysis of the students drawn from less practical knowledge is worst performers. The performance of the students has been of great concern for the communities to address their ignorance in taking the subject of physics[4].

However, the impact of the ignorance of the subject takers not only have proved fatal for individuals and educational organizations who are concerned about their own jobs and shares but its impact has certainly shocked the government agencies who know that economic excellence has been the outcome of utilization or incorporation of the technology. Moreover, it has been observed by the researchers[5], that there has been decline in job opportunities to the physics students which in turn have made the students ignorant for opting the physics subject which otherwise happen to be the backbone of different industries. After analyzing and getting feedback from different quarters, it reveals that the subject curriculum has lost its relevance and needs to be relooked interms of its futuristic approach and utility.

The subject has been overpowered by mathematics and students find it very complex and tough to comprehend. Since last few decades the work on research of physics and its relevance in the field has proved that learning of physics makes the basis of technology, which is imperative for future generation to go through and use it whenever it finds its applications. As regards the Interactive Engagement(IE) is a brand name for technology methods that help to fillip conceptual understanding through interactive engagement of student in head-on(always) and hands-on(usually) activities that yield quick feedback through discussions with peers and or instructors[6].

The key point in IE is the acceptance of the principle of constructivist account of learning which traces back to the work of Swiss psychologist Jean Piaget in the first half of the 20th Century. A final principle, originated in the work of

the Russian Psychologist Lev Vygotsky, states that, for most individuals, learning is the most effectively carried out via social interactions [7].

Utility of computers in teaching physics

Researchers are proactive in this field in order to find more and more areas where they find the utility of computers to get the solutions of difficult problems done and develop the sense of responsibility among the teachers to teach the subject to get more and more students involved in the area of physics. Since the phase of education and technology have revolutionized all most all areas.In order to use computers, software designers have to come up with softwares which suit the learners besides the teaching faculty with advancement of technology, many things which one would not even imagine to get done are being done in less time and with comfort and accuracy[8]. The main objectives of using the computers to make the subject easy to understand and have futuristic approach are:

- The due consideration to bring curriculum which is the need of the day
- To enhance teaching learning process
- To develop confidence among learners, arrange student teacher discussions
- Bridge the gap between stack holders like students, researchers, economists, teachers, administrator and parents.

Thus in order to have different types of softwares for promoting the students' interest to learn the subject of physics and use the same for their career advancement scheme, we have to take time bound and accurate steps to address the aforementioned objectives.

2. Data Analysis

Information and Communication Technology (ICT) has opened new possibilities for increasing the effectiveness of teaching and learning process[9], [10]. One of the most promising is the animation-base learning. It is a process of dynamic representation that makes change to the learner[11]. It has been observed that student fraternity is mostly inclined and motivated to have more and more visual data, which creates interest in the minds of learners.

Impacts on teaching learning by using the following methods:

a) Using Videos:

The impact of video on teaching learning process has been outstanding, especially in learning of subject like physics which has been always a concern to learners. The real world problems have been made easy and maximum has been drawn in terms of transaction and skill [12]. The pictorial representation of the data has helped to analyse and take necessary advantages of learning.

b) Using Animation:

The animation is a dynamic representation that can be used to make change in complex processes explicit to the learners. Multimedia software is based on the concept of hypermedia, and presents information in a structured, usually graphical way. Interactive controls help students to get their desired goals, not necessarily in a sequence as big amount of information available as text, animations, images, video-clips, simulations[11].

c) Using Simulations:

Computer simulations or computer model is a computer program that attempts to simulate an abstract model of a particular system. Computer simulations built on, and are a useful adjunct to purely mathematical models in science, technology and entertainment. Microworld are based on computer programs, developed by experts which are used to implement simulations. Such type of programs definitely encourage the student fraternity to explore after making certain useful changes and collecting the results[3].Simulations are programs of small models that express to the graphical view of it.

d) Using Modelling:

The modelling is basically software environment. In order to make students self confident, modelling tools help them to evaluate their potential. The students are allowed to apply their brain and describe concepts of models developed to boost their practical knowledge. This knowledge helps them to shape their future after engaging themselves in hands-on practice and provides the opportunity to discuss with each other[6].

e) Using Internet:

Since Internet has made world global village, it is obvious; we find each and every type of content on web, especially people who are affiliated with research. Both teacher as well as the student can avail the opportunity of the content, because every person tries to upload his innovative work to web and get feedback about his work done. The students nowadays get vast amounts of real-world data on which they can ponder after words [8].

As per the review and comparative analysis of computers in physics, education is the prime concern of the world and has priority in every developed or under developing country. The content available on internet can be helpful to both fraternities in enhancing their knowledge by watching videos, animated movies, models, simulations etc. In modern world, classrooms and even homes are connected to the internet for providing opportunity to teach or learn prior to go to their classes, to have in hand information about the topic to be delivered or learned in case of teacher and learner respectively[13].

This research is based on the collection of data, after ascertaining and evaluating different groups of students as well as the teaching faculty from rural and urban areas, about the subject of physics being learned and taught respectively. Since the state of Jammu & Kashmir is educationally backward state and does not find even implementation of ICT properly, this speaks about the complexities of the transaction and learning of such a twisted subject of physics. Different types of projects launched by the Government of India, like SSA, RMAS, RUSSA etc, wherein main cantors of these projects was the implementation of ICT based teaching learning by way of using smart classrooms. Some of the schools were identified as model schools on pilot basis with the infrastructure of smart classrooms, but the outcome of the projects was not

successful to that extent which was expected to;due to heavy curtailment of electricity in the state and non-availability of renewable energy. The rural area schools does not have even electric connectivity, which has definitely hindered in the implementation of the ICT based projects at different levels of the institutions[14].

3. Conclusion

To achieve the objectives of this paper, need arise to have infrastructure and availability of such type of softwares which will help in knowledge acquisition to both students and teachers. It is an admitted fact that content interms of animation, video, simulation, text, graphics, pictorials etc. definitely help the target group in making progress in their areas of concern whether it is difficult to comprehend or easy. It is important to enhance the pedagogical concepts of teachers and viz-viz the understanding power of students by providing good environment in classrooms and helping them in solving and making the content more pleasant and attractive by the help of using Information and Communication Technology(ICT). The main objective of this research paper is to emphasize teaching learning especially the subject like physics which has given tough time to both teachers and learners to comprehend.

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