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Educational System of J&K in the light of Evolutionary Multimedia Technology: A Case Study

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Abstract: Purpose: *The study attempts to suggest improvement in the education system as well as the quality of education in higher education (Colleges) departments of J&K in order to bridge the gap between the traditional and new learning technologies so that the state can be at par with the developed and developing nations. Multimedia Technology is being considered as a necessary, useful and adaptable tool for this purpose.*

Design/Methodology/Approach: *In order to meet the objectives of the paper simple survey method is used for this purpose. To collect data for the expected Usage of multimedia technologies within higher educational System of J&K for teaching purpose, some short interviews were conducted and a simple structured questionnaire was prepared.*

Limitations: *The area of coverage for studying the college curricula is restricted to only Natural science departments in higher education departments of J&K. Teachers in natural science department were selected on the basis of criteria like: Experience, resource availability, usage of resources. Acceptance of the study is also limited to Higher education only.*

Findings: *The respondents are willing to adapt multimedia technology in teaching & learning process but they do not have access to the multimedia resources on campus. With multimedia technology, the communication of the information can be done in a more effective manner. It was also found that the mostly used multimedia facilities were being used for research and publication activities rather than for teaching their students.*

Suggestions: *The Higher education authority must aim to ensure availability, accessibility, and reliability of multimedia facilities in its higher education system. Therefore necessary Steps should be taken for the Integrating and the use of new multimedia technology in higher education departments (college) in a meaningful way is the need of an hour.*

Keywords: *Multimedia, Evolutionary technologies, Higher education, ICT, Faculties,*

I. INTRODUCTION

The world of education is currently undergoing a massive transformation as a result of the digital revolution. This transformation is similar to the transition from Apprenticeship to universal schooling that occurred in the 19th century as a result of the industrial revolution.

Due to the rapid expansiveness of Multimedia technology and its wide array of uses, the incorporation of Multimedia technology in learning has become a viable and inexpensive option. As a result, it is becoming increasingly clear that traditional textbooks will be replaced by e-books.

(Harris Interactive, 2009) reports that almost three-quarters of Americans (73%) believe that investing in innovation and advanced technology sciences in education is the key to the country's long-term success.

The use of multimedia has also been effective in increasing productivity and retention rates, where research has shown that people only retain 10% what they read, 20% of what they see and 30% of what they hear. But they remember 50% of what they see and hear, and as much as 90% of what they see, hear, and do simultaneously (Lindstrom 1994).



Multimedia is any combination of text, graphics, art, sound, animation, and video with links and tools that let the teacher/learner navigate, interact, and communicate with the computer. When you allow the user (the viewer) to control what and when these elements are delivered, it is interactive multimedia. When you provide a structure of linked elements through which the learner can navigate, interactive multimedia becomes hypermedia. If done properly, interactive multimedia excels in leaving lasting impressions in the teaching/learning process. Retention rates increase by 25% to 50% by incorporating multimedia technology. The communication of information can be done in a much more effective manner and it can be an effective instructional medium for delivering information.

Multimedia technology can add clarity through multiple views and can provide depth through additional information channels and resources. Multimedia access to knowledge is one of the possibilities of information and communication technology that has tremendous impact on learning. The instructional media have emerged in a variety of resources, and equipment, which can be used to supplement or complement the teacher's efforts in ensuring effective learning by students. Educators are in constant search for more efficient and effective ways to advance student learning.

As we strive to make sense of unimaginably large volumes of data, visualization has become increasingly important. Multimedia offers exciting possibilities for meeting the demands & needs of 21st century learners. The use of multimedia instruction can significantly enhance students learning if properly designed and implemented. It has been revealed that conventional means of technology can no longer help in meeting the needs of our teaching & learning process and as a result conventional media is being replaced by Evolutionary multimedia technology. The environment in this technology can be controlled by learner.

II. IMPORTANCE OF MULTIMEDIA TECHNOLOGY

Multimedia is fast emerging as a basic skill that will be as important to life as reading in the twenty-first century. In fact, multimedia is changing the nature of reading itself. Instead of limiting you to the linear presentation of text as printed in books, multimedia makes reading dynamic by giving words an important new dimension with sound, pictures, music, and video. Multimedia will help in spreading the information to millions of learners (teachers/Students) who have not yet used the computer. Multimedia educational computing is one of the fastest growing markets in the world today.

Fueling this growth are advances in technology and price wars that have dramatically lowered the cost of multimedia computers. The growing number of internet users has created a larger market for multimedia. The new tools are enabling educators to become developers. Noting how multimedia is used to enable individuals to create course material, that once required teams of specialists, individuals can now produce multimedia desktop video productions. Commercial and educational available generic courseware to support commercial products is emerging. For these reasons, it is important to share information about what goes into the development of multimedia, and the appropriate use of multimedia, so that educators can make wise choices in selecting instructional applications.

The advent of multimedia and multimedia technologies has changed the way educators teach and students learn. With multimedia technology, the communication of the information can be done in a more effective manner.

III. LITERATURE REVIEW

Multimedia is the use of at least two of these elements: sound (audio), and text, still graphics, and motion graphics (visual) (Tannenbaum, 1998). It is “the combination of various digital media types, such as text, images, sound, and video, into an integrated multisensory interactive application or presentation to convey a message or information to an audience (Mao Neo and Ken T. K. Neo 2001 ;Agnew, Keller man and Meyer, 1996).

The electronic information technologies are being transformed from expensive, exotic gadgets into standard classroom equipment, their extraordinary multimedia capabilities are rapidly becoming a routine part of many learning environments (Slawson, 1993). Thus Multimedia is the field concerned with the computer controlled integration of text, graphics, drawings, still and moving images (Video), animation, audio, and any other media where every type of information can be represented, stored, transmitted and processed digitally (Patti Shank 2005).

The College student of today is accustomed to receiving information on a in a variety of formats on daily basis. This can really present a challenge to educators wishing to engage students in the classroom while still providing required content in order to enhance learning outcomes. (Gregory Krippel,A. James McKee, Janette Moody ,2007) . Therefore the traditional text based approach to learning is being superseded by an approach which combines text, audio and color video in a much more exciting way. Good presentations can be created when they are based on cognitive objectives that focus on the learning of topics at different levels of comprehension. (Barker & Tucker, (1999) Sweller, J (1988)) .

However (Neo and Neo, 2000; (Lindstrom 1994).) believes that the power of multimedia lies in the fact that it is multi-sensory, stimulating the many senses of the audience. It is also interactive, enabling the end users of the application to control the content and flow of information. This has introduced important changes in the educational system and impact the way we communicate information to the learners, and as a vehicle for flexible delivery, multimedia has much more to offer. It allows large quantities of Information to be made available for the use of individual learners at times and places of their Choice.

Nowadays, multimedia generally indicates a rich sensory interface between humans and computers or computer-like devices. Our brains are wired to process visual input very differently from text, audio, and sound. Recent technological advances through functional Magnetic Resonance Imaging scans confirm a dual coding system through which visuals and text/auditory input are processed in separate channels, presenting the potential for simultaneous augmentation of learning. (Marois, R. & Ivanoff, J. (2005)). Still others notably (Ellis,2004; Bagui, 1998; Daniels, 1994) considered the theory of multi-channel communication as addition reinforcement , and when information is presented by more than one channel, it will result in greater retention and improved learning .

The evolution of multimedia has made it very possible for learners to become more involved in their work. With multimedia technologies, they can create multimedia applications as part of their project requirements. This would make them active participant in their own learning process, instead of just being passive learners of the educational content. It is important to say that the use of multimedia technology has great significance in colleges, universities and research institutions in the Western countries. In these countries, the technology is being seen as a key player to development in all ramifications and essential component of education. The bottom line is that students using well-designed combinations of visuals and text learn more than students who only use text.

IV. MULTIMEDIA IN EDUCATION

Multimedia is changing the way we communicate with each other. The way we send and receive messages is more effectively done and better comprehended. The inclusion of media elements reinforces the message and the delivery, which leads to a better learning rate. Multimedia, is "woven combinations of text, graphic, art, sound, animation, and video elements. When you allow an end user the viewer of a multimedia project to control what and when the elements are delivered, it is

interactive multimedia". The power of multimedia lies in the fact that it is multi-sensory, stimulating the many senses of the audience, which consequently leads to better attention and retention rates.

At the heart of any digital multimedia development is interactivity with which the audience is involved in the communication process and in the navigation of the content. Therefore, interactivity and interactive features in a multimedia application facilitate interaction between the computer and the user. A key feature in interactivity is that "it empowers the end-users of the application by letting them control the content and flow of information" (Vaughan, 1998).

Multimedia technology has introduced important changes in our educational System and impact the way we communicate information to the learners. The evolution of multimedia technology has made it very possible for learners to become involved in their work. With multimedia technologies, they can create multimedia applications as part of their project requirements. This would make them active participants in their own learning process, instead of just being passive learners of the educational content. With multimedia projects, students can make use of the knowledge presented to them by the teacher, and represent them in a more meaningful way, using different media elements. These media Elements can be converted into digital form and modified and customized for the final project. By incorporating digital media elements into the lecture can be extremely informative, a lecture that integrates pictures or video images can help an individual learn and retain information much more effectively. The students are able to learn better since they use multiple sensory modalities, which would make them more motivated to pay more attention to the information presented and better retain the information.

Another advantage of creating multimedia projects in the classroom environment is that when students create multimedia projects, they tend to do this in a group environment. By working in a group situation, the students will have to tap into their group skills and use a variety of activities to accomplish the projects overall objectives. Therefore, using multimedia in the teaching and learning environment enables students to become critical thinkers, problem-solvers, more apt to seek information, and more motivated in their learning processes.

Multimedia is slowly gaining ground as a way for students to represent the knowledge that they acquire in class and to construct their own interpretation of the information acquired (Neo and Neo, 2000). It also fosters collaborative and cooperative learning between and among students, thus better preparing them with a skill set for real-life work situations.

Multimedia will provoke radical changes in the teaching process, particularly as the smart students discover they can go beyond the limits of traditional teaching methods. Indeed, in some instances, teachers may become guides and mentors along a learning path instead of the primary providers of information and understanding. The students, instead of teachers, become the core of the teaching and learning process.

Benefits of Multimedia Technology in Learning

Well-designed multimedia helps learners build more accurate and effective mental models than they do from text alone. (Patti Shank 2005) Shephard synthesized studies showing potential benefits of Well-designed multimedia, including:

1. Alternative perspectives
2. Active participation
3. Accelerated learning
4. Retention and application of knowledge
5. Problem-solving and decision-making skills
6. System understanding
7. Higher-order thinking

8. Autonomy and focus
9. Control over pacing and sequencing of information
10. Access to support information

V. STATEMENT OF THE PROBLEM

One of the significant trends in higher education is the overwhelming growth of educational data (information overload). This problem points out the potential danger of getting lost in data. It is crucial to have the right information available at the right time. Therefore, it is important to identify methods and models, which can extract reliable and comprehensive knowledge.

Teo and Wong, 2000; Tan, 2000 , suggest that there is an urgent need to improve the quality of education to bridge the gap between developing nations, and multimedia instruction is considered as a necessary tool for this purpose. However, the presence of multimedia alone will not stimulate significant changes in a school. Teachers are important ingredient in the implementation of multimedia instruction in education. Without the involvement of teachers, most students may not take advantage of all the available potential benefits of multimedia on their own. Teachers need to actively participate in the use of multimedia facilities. They have to be trained in the use of multimedia and in its integration in the classroom activities to enhance Thinking and creativity among students. They must also learn to facilitate and encourage students by making them responsible for their own learning. Many of the current graduates were found to be lacking in creativity, communications skills, analytical and critical thinking and problem solving skills.

The Higher educational system of J&K also need to be revived and the quality of education should be improved as well. In this study, an attempt is therefore made by examining issues which hindered the use of evolutionary multimedia technology for teaching in the Natural Science (Physics, Chemistry, and Biology) faculties of Higher education Departments of J&K.

VI. OBJECTIVES OF THE STUDY

Some of the basic & specific objectives of this study are to:

1. To identify whether teachers are using multimedia resources, if available, in faculty of natural science for Teaching purpose or not.
2. To check the distribution of the faculties of natural science involving in the study.
3. To identify the factors, if there is any, this hindered / limits the use of multimedia Technology by the College lecturers in faculties of Natural Science.
4. To check the availability of instructional multimedia in the Faculties of Natural Science for teaching and learning.
5. To check by investigating the adequacy of multimedia technology facilities for teaching and learning in departments of Natural Science faculties.
6. To determine the frequency and pattern of use of multimedia technology by lecturers in these selected faculties for teaching and learning.

VII. RESEARCH QUESTIONS

The study is structured to provide answers to the following research questions:

1. What are the available instructional multimedia resources for teaching and learning in the Natural Science departments?
2. Are teachers mentally prepared, to use evolutionary multimedia technology in their curricula?
3. What is the pattern and frequency of use of the multimedia technology for teaching and learning by the lecturers of the Natural Science?
4. How adequate are the multimedia facilities for teaching and learning in these faculties?
5. What factors limit the use of multimedia by lecturers of the Natural Science?

VIII. METHODOLOGY

The present study was conducted in Some (5) government colleges of J&K , situated in Srinagar district of J&K .The data obtained were compiled and tabulated using simple numbers and percentages scheme & later analyses of the data were done both qualitatively and quantitatively. This study has employed a research methodology by doing survey. The instruments used for this study were short interviews and a simple structured questionnaire. The instruments which were designed to extract information on the availability and use of multimedia for teaching and learning among lecturers in the Natural Science faculties of some colleges, was validated by 4 scholars . The subjects used in determining these properties were also drawn from these colleges. The instruments were divided into three sections. 1) To sought out information related to demographic data of the respondents. 2) To prepare structured questions directed to the study.3) to conduct short interview sessions and personal observation of respondents were also carried out. The population for this study was lecturers in the Faculty of Natural science whose count is seventy respectively for the year 2103/2014 academic session. However, the simple random sampling technique was used in arriving at a workable sample size. Hundred (100) questionnaires were distributed but only forty eight (70) were returned, giving a response rate of 70%. The data generated were analyzed using respondents frequency and percentages.

IX. RESULT

Table 1: Respondent Teachers Gender.

Gender	Respondents	Percentage
Male	49	70.00 %
Female	21	30.00 %
Total	70	100.00 %

Table 1, Shows that the majority of the respondents were male Teachers 70% (49/70), while as 30% (21/70) were female teachers

Table 2: Teaching Experience of Respondents (Male/Female) in general .

Experience	Respondents(M/F)	Percentage
above 16 Yr's	14 (11/3)	20.00 %
10-15 years	14 (10/4)	20.00 %
5-10 years	28 (18/10)	40.00 %
1-5 years	14 (10/4)	20.00 %
Total	70	100.00 %

Table 2 Statistics clearly suggest that only 14 (20.00%) of the respondents had above 16 yrs of teaching experience whereas 14 (20.00%) had between 10 – 15 years. 28(40.00%) of the respondents had teaching experience between 5-10 years, while 14 (20.00%) of the respondents had spent 1-5 years as teachers in imparting knowledge to students.

Table 3: Availability of Multimedia Resources

Availability	Respondents(M/F)	Percentage
Yes	14 (14/4)	20.00 %
No	56 (35/17)	80.00 %
Total	70	100.00 %

It is clear from Table 3 above that 56 (80.00%) of the respondents revealed that multimedia resources were not available in faculties of natural science for their use in teaching and learning while the remaining 14(20.00%) of the respondents indicated that multimedia resources were available. This indicated that even though there are resources but not enough to cater the demand.

Table 4: Accessibility of Multimedia Resources

Availability	Respondents(M/F)	Percentage
Yes	21 (14/7)	30.00 %
No	49 (35/14)	70.00 %
Total	70	100.00 %

Table 4 showed the accessibility of multimedia resources. 14 (20.00%) of the respondents had access to multimedia resources on campus while 49 (70%) of the respondents, a larger percentage had no access to these resources. This implies that much is required to facilitate easy access to multimedia resources.

Table 5: Adequacy of Multimedia Technology

Adequacy	Respondents (M/F)	Percentage (%)
Adequate	14 (10/4)	20.00%
Inadequate	35 (25/10)	50.00%
Extremely inadequate	21 (14/7)	30.00%
Total	70	100.00%

Table 5 above highlighted the fact that only 14 (20.00%) of the respondents viewed multimedia technology being adequate; 35 (50.00%) of the respondents viewed the multimedia technology as inadequate for (teaching, learning, research and presentations); 21 (30.00%) ranked them as being Extremely inadequate indicated to their needs for teaching and learning while. It could be inferred that the multimedia facilities in these faculties are adequate as low as only 14 (20.00%) of the respondents viewed the collection or facilities as being adequate.

Table 6: Type of Multimedia Resources being used.

Type Usage	Respondents (M/F)	Very Often	Often	Rarely	Never	Percentage
Computer	35 (23/12)	15	10	10	35 (50%)	50.00%
Internet facilities	42 (28/14)	22	12	10	28(60%)	60.00%
Projector	21 (16/5)	9	7	5	49(70%)	30.00%
Graphics	21 (12/9)	10	7	4	49(70%)	30.00%
CD-ROMs	35 (6/8)	15	10	10	35 (50%)	50.00%

Table 6 above reveals that 35(50%) teachers mostly use computer & 42(60%) internet facilities. This is followed by projector 21 (30.00%); Graphics 21 (30.00%); then CD – ROMs 35 (50.00%); while earlier means of multimedia technology are not used at all (e.g. Television, radio excluded from table).

Interview sessions held with these respondents as to what they used these resources for and where they used them revealed that majority 56 (80.00%) of the respondents used the multimedia resources for their research and publication activities, paper presentations & forming lecture notes used in teaching which suggests that these multimedia resources are not used actually in classroom for teaching. Major reasons for not using these facilities in teaching their students were adduced to lack of infrastructural facilities, lack of ICT training skills and time to spend on the technology. Majority (34) of them said that they made used of these materials at their homes and while the remaining (22) signified that they made use of these facilities on the campus and cybercafés outside the campus.

Table 7: Factors limiting the use of Multimedia Facilities

Factor	Respondents (M/F)		PERCENTAGE
High cost of technology	56	(38/18)	80.00%
Lack of understanding of the value or possible benefits of multimedia facilities	63	(45/18)	90.00%
Lack of infrastructures	70	(49/21)	100.00%
Inadequate Capital on the part of the individual	56	(38/18)	80.00%
Lack of training	56	(38/18)	80.00%
Software inadequacy	35	(24/11)	50.00%
Lack of time to spend on technology	63	(45/18)	90.00%
Too hard to use	21	(14/7)	30.00%
Not user-friendly	14	(7/7)	20.00%

Table 7 above, shows the order of importance of the constraint factors: lack of supportive infrastructures (100.00%); lack of time to spend on technology (90.00%); Possible benefits of multimedia facilities (90.00%) ; lack of training (80.00%) , and inadequate capital/funds on the part of the individual lecturers (80.00%) & high cost of technology (80.00%) appear to be the major constraint factors affecting lecturers to use multimedia and ICT in these their respective faculties. Whereas, multimedia in terms of Software inadequacy ,being too hard to use, not user friendly and are found to be of less importance having 50.00%, 30.00% and 20.00% respectively.

X. SUMMARY OF FINDINGS

1. New technologies can create learning opportunities that challenge traditional learning in colleges.
2. It was evident that there is an ever widening gap between Multimedia Technology and teachers in J&K.
3. It was also found that the mostly used multimedia facilities were being used for research and publication activities rather than for teaching their students.
4. Majority of the respondents do not have access to the multimedia resources on campus probably this might be responsible for use of these materials at their homes and cybercafés.
5. The multimedia collection in these faculties is being viewed by respondents as being extremely inadequate.
6. 21 (30.00%) of the respondents had access to the multimedia resources available on the campus while the remaining 49 (70.00%) do not have access.
7. It was also found that majority of the respondents did not make use of the multimedia resources in practical teaching but rather in forming lecture notes for teaching their students, paper presentations activities
8. The study further revealed that the Internet and its facilities as well as the Computer and CD-ROMs were the mostly used of the multimedia resources while the television and transparencies were the least being used.
9. Lack of supportive infrastructures; lack of time to spend on technology, inadequate and or lack of training, inadequate fund on the part of individual lecturers and high cost of technology were the major constraint factor limiting the use of multimedia for real – life experience in teaching their students.

XI. RECOMMENDATIONS

In view of the above findings, the researchers would like to recommend certain things which are:

1. It is right time that educators and policy makers of higher education department of J&K should start to rethink what constitutes effective and good practice in multimedia technologies, both for the teacher and the learner as education is a lifelong enterprise
2. The Higher education department of J&K Govt. must encourage & should take necessary steps to see information & communication technology (ICT) integration effort in ICSC as an embracing project towards the development in education.
3. New multimedia technologies create learning opportunities that challenge traditional learning in colleges. The higher education department as well colleges must aim to grab these opportunities.
4. Monitoring of teaching and learning should be done to ensure that pupils develop higher-level thinking skills through exploiting the full potential of Multimedia Technology.
5. Technology leaders need to work together with educators, not as missionaries, but as collaborators in creating new opportunities to learn.
6. Govt. should also releasing adequate funds to invest in massive Internet connectivity, as well as should support it by allocating special funds for and installation of ICT infrastructures i.e. (MM S/w & H/w .)
7. The College management can solicit for internal and as well as external funds. They can also take support from international organizations, individuals & philanthropists in case Higher education department is not forthcoming.
8. Besides Higher Education, Government can also help in this project by reducing the tariffs or subsidizing Important ICT facilities so that lecturers and others can afford the purchase of these ICT facilities and accessories if the price will come down.

XII. CONCLUSION

Teachers must need to understand how learning multimedia technologies work and how they change the basic interactions of teachers and learners. Teachers need to push for a more expansive view of education reform. The College must aim to ensure accessibility, availability and reliability of ICT facilities such that every lecture room and staff offices have computers linked to Internet and has appropriate equipment for accessing a range of electronic resources. Steps should be taken to Integrating the use of technology into curriculum in a meaningful way is one of the many problems facing lecturers today. College must ensure that training should be given to lecturers and other staff members in on integration of technology in instruction. College lecturers should be exposed to series of training and development skills in the use of these high technology facilities. Adequate, experienced and competent technical staff (ICT) must be made available if any problem arises. Funds which are disbursed from all the means should be utilized toward sustainability of ICT integration and application efforts.

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