

Effectiveness of E-content in Enhancing the Academic Performance of Student Teachers of Biological Sciences: An Empirical Approach

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Abstract: The development and application of Information and Communication Technology in the new era has greatly influenced teaching and learning in education. The issue of information and communication technology in teaching apparently facilitates both the effort of the teacher as well as the learner. In the present era of knowledge explosion, adopting modern tools for teaching is one of the predominant needs of the hour. Knowledge packaging in electronic form or e-content is a powerful technique for teaching all subjects. ICT have become handy in class room teaching and has the potential to engage the students throughout the period and make learning easy, effective and potentially beneficial through visual aids, animations and simulations. They will be able to see the different stages and functions of the learning object which they cannot normally see through naked eyes. The repeatability or the reusability of technology based learning system meets the needs of all the differently able students so that they are able to understand the concepts in a better way. Therefore the technology-based teaching and learning has become essential. The term 'e-content' refers to that form of knowledge or content which is packed in an electronic form. It includes text, audio, video, animations, images etc. In order to carry out the present study an achievement test in biological science was conducted so as to validate the developed e-content and to assess the effectiveness of e-content. While analyzing the results of the study the investigator found that the performance of the prospective teachers in the achievement test is better and it became proven that e-content is highly effective. While administering the e-content to the student teachers, which is a self-instructional learning strategy, it is found that e-content promotes active participation in the teaching and learning and encourages vigilance among the prospective teachers. The study also found that learning through e-content differs significantly than learning through the traditional lecture method and learning through e-content is found to be more beneficial and effective as compared to the conventional method of learning. Thus, learning through e-content enables the student teachers for continuous updating of knowledge, enhances their Information technology skills and paves the way for time management in the teaching-learning process.

Keywords: Achievement test, E-learning, E-content, ICTs, Instructional technology.

1. INTRODUCTION

The quality of education is an important measure of productivity and prosperity of the Nation. Social, political and economic changes and reforms are possible only through education. Today the information arenas witness an excellent plethora of technological advances, which has to great extent been responsible for immeasurable enhancement as human knowledge. Technology has also provided the means of managing knowledge through the strengthened capabilities of collecting, strengthened capabilities of collecting, storing, processing, packaging and transmitting information.

The age of Virtual University system has brought about a revolution in computer technology, specifically the Internet, offers increased possibilities for higher education. With computer technology, the education comes to the student; students are freed from time and space constraints of the traditional classroom. The fusion of information science and technology has tremendously augments storage capacities, accelerated access for updating the processing facilities, refined search strategies and expended access to distant databases network.

E-learning is a technology which supports teaching and learning via a computer web technology. It bridges the gap between a teacher and a student in different geographical locations. Advancement in Internet and multimedia technology is the basic enabler for e-content and administration. Software applications built for planning, delivering and managing learning events has become a crucial need for the corporate training departments of large organizations. Our creative and technical abilities allow us to package the most complex material into a comprehensive and an interactive e-learning application. We work with sophisticated technologies and produce e-learning applications for a variety of situations and deployment methods. The enhanced functionality offers support to existing students and faculty including admissions, events and academics resources.

The pressure to expand and democratize educational opportunities have increased enormously, fuelled in part by the population expansion and in part by the need to prepare people for jobs in ever more complex and interdependent societies. Planners are seeking strategies that will not only make education available to greater numbers of people but also an education that will not demand the level of investment and administrative structure customarily associated with the traditional system of education. Understandably the search is on for alternatives to these traditional forms of education so that the benefits of education can be extended beyond the four walls of the schools to embrace a wider spectrum of people, old and young, rural and urban.

Today our students have changed radically and drastically in their abilities and potentialities so as to understand use the powerful force of ICTs proficiently. Today's students are no longer the people of our educational system who were designed to be taught and learn in the present times classroom. The advent of digital gadgets changed the thinking pattern of the students and they process the information differently. These new students of today designated as "*Digital Natives*". Our students of today are all "*native speakers*" of the digital language of computers, video games and the Internet. Those of us who were born into the digital world but have, at some later point of lives, become fascinated by and adopted many or most aspects of the new technology are "*Digital Immigrants*" (Prensky, 2011). The biggest problems facing education in the present scenario is that our Digital Immigrant instructors, who speak an outdated language (that of the pre-digital age), are struggling to teach a population that speaks an entirely new language. So the teachers and teacher educators of today should adopt strategies which could satisfy the digital natives in the teaching learning process. But the teacher education system which produces the teachers of today lack behind the actual situation. This had been addresses as integration of Information and Communication Technology (ICT) in teacher education and some initiatives have taken as introducing a paper, doing some session work in the teacher education curriculum. Definitely, it is not just enough for the digital natives. By analyzing the effectiveness and introducing the e-content in the teaching and learning process, it can surely ignite the young minds in the abstract ideas of learning content especially in basic sciences like Biological sciences. It could also support the individualized self learning as well. Integration of ICT in teacher education can be strengthened as per the global trend by the way of infusing e-content development in teacher education with high weightage.

E-content and its Effectiveness

E-content means content in the electronic form. It is a combination of text, audio, video, images, animation with visual effects. Any digitized content that can facilitate the learning process and/or learning outcome can be termed as e-content. The acquisition of these contents takes place via four different channels: purchase of materials, use of freely available content on the Internet, self production of material, exchange of existing material in network with other institutions of Higher Education (AG eLearning, 2007). According to Selinger (2014), "*e-content should be seen as a tool to improve the understanding, engagement and motivation of learners; to provide a safe environment for them to experiment and explore their conjectures; and to test their understanding using novel assessment methodologies based on trial and improvement; simulations and manipulation of models*". E-content can also be utilized as reusable learning objects.

National Mission on Education Through ICT and Relevance of E-content

For India to emerge as a knowledge super power of the world in the shortest possible time it is imperative to convert our demographic advantage into knowledge powerhouse by nurturing and honing our working population into knowledge or knowledge enabled working population (Mission Document). Human Resource Development would certainly be the key for it to happen the conventional approach must also be aided and supported by the technological interventions through ICT so as to make available the knowledge resources to each and every learner as per his/her convenience and just in time. It is obvious that emphasis on ICT is a crying need as it acts as a multiplier for capacity building efforts of educational institutions without compromising the quality. This requirement stems from the shortcomings of the current educational delivery model and the explosive nature of the knowledge. Schools, colleges and universities have not been able to keep up with the requirements for educating the Indian masses at the rate, level and quality that is expected from

an Indian citizen in the coming knowledge era. To bridge this gap, new models of content creation, content delivery, learning, management and planning mechanisms for creating cooperative and self-learning environment have to be developed.

The efforts of Ministry of Human Resource Development (MHRD) would be geared towards creating open house forum for knowledge. The effort would involve content packaging, evaluating and store them in an open web portal. The endeavor of the mission is to work continuously for enriching the repository of e-contents of the Nation. For the purpose it encourages the academicians, scholars and institutions to contribute to the world of knowledge in Cyber space by creating e-content. The mission also is to evolve a mechanism to rate the quality of the e-content generated before admitting it to the National repository. As a custodian of the National repository of e-content, the Mission shall undertake an exercise for indexing the available e-content, for its easier retrieval and access by the learners. Thus, in the present era of knowledge explosion, adopting modern tools for teaching is one of the predominant needs of the hour. Instructional packaging in electronic form or e-content is a powerful technique for teaching all subjects. ICT have now become handy in classroom teaching which has the potential to engage the students throughout the period and make learning easy and effective through, visual aids, animations and simulations.

Infusing E-content in Teacher Education and Teacher Education Programmes

Our ambition of India becoming a knowledge super power by effectively utilizing her abundant human resource faces the weakness such as a) Lack of timely and easy availability of knowledge resources to all, b) Mismatch between demand and supply of knowledge and skills; c) The growing digital divide and a very low percentage of digital literacy; d) The lack of a strong contingent of motivated teachers; e) Inefficient functioning of the knowledge delivery mechanism (Mission Document). For education to reap the full benefits of ICTs in learning, it is essential that pre-service and in-service teachers have the basic ICT skills and competencies. The teacher education must provide leadership in determining how the new technologies can best be used in the context of the culture, needs, and economic conditions within their country (UNESCO, 2002). Most of the universities in India didn't give much importance to e-content development and its infusion into the teacher education curriculum and teacher education programmes.

Significance of the Study

New innovations are coming to the fields of education in terms of technology which promise to change the process of teaching and learning. Training of competent teachers is very important in these new and modern technologies of teaching and learning because they directly or indirectly influence the quality and the quantity of educational services. Without adequately trained teachers cadre the institution cannot aim to expand the educational facilities.

E-content

The term '*e-content*' refers to that form of knowledge or content which is packed in an electronic form. It includes text, audio, video, animations, images etc. An innovative application of computer in the teaching and learning process is e-content. E-content is the advancement of technology to design, deliver select, administer and extend learning.

Objectives of the Study

The present study has the following objectives which are:

1. To prepare e-content for particular topic in the teaching of biological science education at B.Ed level;
2. To find out whether there is any significant difference in achievement means score between control group and experimental group in learning teaching of biological science education by the B.Ed., student teachers.

2. METHODOLOGY OF THE STUDY

The investigator followed the experimental method for the present study. The collected data was put to analysis through use of appropriate statistical analysis techniques such as: Mean, t-test, standard deviation.

Sample

The present study is concerned with prospective student teachers of two colleges of education which are Aligarh College of Teacher Education, Aligarh and Gyan Mahavidhyalya College of Teacher Education, Aligarh. Hence the college selected could be considered as a representative college. Eighteen students have been selected for experimental group and another eighteen students for the control group by using purposive sampling method.

Hypotheses of the Study

The hypotheses formulated for the present study are as following:

1. There is no significant difference in the Post-test achievement mean scores between control group and experimental group.
2. There is no significant difference in the achievement mean scores between the Pre-test and Post-test of experimental groups who learnt through e-content.

3. DATA ANALYSIS AND INTERPRETATION

Null Hypothesis Ho 1: There is no significant difference in the Post-test achievement mean scores between control group and experimental group.

Table 1: Comparison of Post-test achievement mean scores of experimental and control groups

S.No.	Group Compared	N	Mean	S.D.	't' value	df	Level of Significance
1.	Control Group	18	8.72	1.127	9.22	34	Significant
2.	Experimental Group	18	13.33	1.910			

From the above table 1, it is seen that the t-value of 9.22 is greater than the critical value of 2.704 corresponding to the 0.01 level of significance. This implies that the control group and experimental group differ significantly in their achievement in the post-test. Hence, the null hypothesis is not accepted and it stands rejected.

Null Hypothesis Ho 2: There is no significant difference in the achievement mean scores between the Pre-test and Post-test of experimental groups who learnt through e-content.

Table 2: Difference between the Pre-test and Post-test achievement mean scores due to treatment of the experimental groups

S.No.	Experimental Group	N	Mean	S.D.	't' value	df	Level of Significance
1.	Pre-test	18	10.72	1.364	8.040	34	Significant
2.	Post-test	18	13.33	1.910			

From the above table 2, it is seen that the calculated t-value of 8.040 is greater than the critical value of 2.704 corresponding to the 0.01 level of significance. This shows that the experimental group is highly significant in their achievement in the post-test. Hence, the null hypothesis is accepted.

Major findings of the study

The major findings of the study which have come to the forefront after the data analysis are as following:

1. An achievement test was conducted so as to assess the effectiveness of the e-content. While analyzing the result it was found that the performance of the students in the achievement test is better and it became clear that the e-content is highly effective.
2. The student teachers of experimental group who were taught through e-content achieved more in the subject of biological science units than the control group student teachers.
3. It was found that learning through e-content and learning through traditional lecture method are not similar and the achievement of the prospective teachers in the classroom achievement test in biological science differ significantly when they were taught through both of these methods.

Educational Implications of the Study

The educational implications for the present study are as following:

1. New instructional techniques of assisting student through computers are to be explored by the teachers and researchers continuously.
2. Teachers of higher secondary schools can be given orientation as how to develop e-content.
3. The use of e-content is found to be valid in enhancing the achievement; it will diminish wastage and stagnation in school.

4. CONCLUSION

Education systems around the world as well as in India must respond to the changing needs of students and their teachers, just as business has reacted to its changing needs in implementing employee training (Kulsum, 2008). Technological innovations are increasing the demand for altering the mode of transaction in the teaching and learning process and that in turn develop a significant impact on technology use expectations. It is very much imperative that emerging technology of e-content development needs to be adopted in the present day teacher education curriculum of all the universities as well as teaching and learning should be facilitated through the e-content. It has now come to the forefront of the technological development and technological revolution that many universities in India such as University of Kashmir, University of Kurukshetra as well as M.S University of Baroda's Faculty of Education are now keenly working on developing e-content on all its teacher education curriculum and teacher education syllabus, both at Undergraduate level as well as at Post-graduate level.

With the realization of the National Mission on Education through ICT, the teacher education regulatory body NCTE can insist the demand of the hour is to develop and maintain e-content in all of its recognized institutions. Especially basic science teachers should develop such skills of developing e-content so as to develop a curiosity over the basic science concepts and to enhance the individualized self-learning experience of teachers. All of these are possible only, when e-content development is infused in the teacher education curriculum and in-service training for the basic science and especially biological science teachers of today.

Based on the proceeding findings of the present study, the conclusions that were drawn are very encouraging and motivating for the prospective teachers. The level of performance of teacher trainees who learnt through e-content were greater than the other part and hence it was evident that e-content is also an effective approach to teach Biological Science Education (BSE). The rise of e-learning and an electronic content is a new paradigm for education and training in the knowledge-driven society, empowered by technological advancements which give the modern instructional technology. The development of educational content in tune with the changing times has become a major responsibility of the modern teacher who has to face a new learner in a new environment. More over the level of motivation, learning style and anxiety towards computer improves the efficiency and efficacy of the prospective teachers and hence the e-content approach is having great scope in the instructional design of the student teachers. So we need to equip our teachers to knob these digital natives by the way of adopting e-content development and latest developments in ICT in the teacher education curriculum.

REFERENCES

- [1] AG eLearning (2007). *Bericht der AG eLearning an die Curriculumkommission der fakultat fur Betriebswirtschaft*. Retrieved November 17, 2006, from http://www.uibk.ac.at/elearning/aktuelles/051221_agelearning_bericht_kurz_public.pdf
- [2] Amutha, S. & Ramganes. E-content—An Inevitable Supplement for a Teacher Educator. Paper presented at the *International Conference on Quality Enhancement in Distance Education for Lifelong Learning* 26-27, March, 2011.
- [3] Jeya Shanmuga Rja, J. E-content Development on Teaching method of Zoology at B.Ed Level., Paper presented at the *International Conference on Quality Enhancement in Distance Education for Lifelong Learning* 26-27, March, 2011.
- [4] Kalam, A. (2008). Distinguished Lecture at the IIIT, Hyderabad. Retrieved August 8, 2011` from <http://www.abdulkalam.com>.

- [5] Kulsum, Umme (2008). Role of Educational Technology in Teacher Education. *Information and Communication Technology in Teacher Education* (2nd Edition). Agra: H.P. Bhargava Book House Publishers.
- [6] Mission Document. *National Mission on Education through Information and Communication Technology*. Retrieved April 15, 2014, from http://mhrd.gov.in/sites/upload_files/mhrd/files/MissionDocument.pdf
- [7] Prensky, M (2011). Digital Natives, Digital Immigrants. *On the Horizon* 9(5), 201-207.
- [8] Selinger, M. (2014). Cultural and pedagogical implications of a global e-learning programme. *Cambridge Journal of Education*, 34 (2), 213-229.
- [9] Suma, S. (2007). Development and Validation of e-content on the uses of the simple present tense in English at higher secondary level. M.Phil Thesis submitted to Bharathidasan University.
- [10] UNESCO. (2002). *Information and Communication Technologies in Teacher Education*. Division of Higher Education. UNESCO. Retrieved April 17, 2014 from unesdoc.unesco.org/image/0012/001295/129533e.pdf