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Validation of e-content in learning environmental pollution among prospective teachers

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Abstract
Today the entire world is moving speedily towards digitization and we have to learn new things using new technologies. The evolution of computers especially the internet has affected all spheres of our life. Ten to fifteen years back we used to spend our time in the library for information in books, magazines and journals. Now a day we search for the information in the web sites. Access to information has become very easy because of information sharing on World Wide Web (www). Quality of teaching and students' learning are determined by the teachers who teach them. Well trained teachers with required knowledge, skills and commitment can develop scientific and critical thinking, promote tolerance, and develop cultural and social values in them. Innovative technologies will make it possible to achieve these by providing new ways to teachers. But these new technologies are placing more demands on teachers to learn how to use them in their teaching and learning processes. This great transformation is posing challenges to teachers and teacher educators in using technologies in creative and productive ways. Today nothing in life can be conceived without technology aids imparting education is just not possible without the modern technology like online, virtual learning, e-learning, and collaborative learning. Hence the investigator has taken an attempt to conduct a study on validation Of E-Content in Learning Environmental Pollution among prospective teachers.

Keywords: e-content, environmental pollution, computer proficiency, education technology

Introduction
Education has benefited from the inclusion of technology and computers by making it easier for students to keep up while helping teachers by improving the way lessons can be planned and taught. Students who use computers learn to use word processors for work, and subsequently they learn computer jargon and strengthen grammatical skills. Students can also look up lessons on websites or through email rather than lugging heavy textbooks with them every day. Students who use computers have been shown to attend school more steadily and perform better than students who do not use computers. Along with getting higher grades on exams, students also stated they felt more involved with their lessons and work if they used a computer. Using computers gets students to become more focused on their work at home, in collaborative projects with other students and on their own. Computers play a vital role in the modern business world, and many of even the most basic jobs involve technology and computers. Teaching students how to use computers helps them prepare for any number of possible careers, and classes based on computer education can get even more specific. Computers make the learning process a lot more simple and efficient, giving students access to tools and methods of communication unavailable offline. For example, students can check their grades or lesson plans online, and also communicate directly with their teachers via email or educational platforms such as Blackboard. Students can also send work to their teachers from home or anywhere else, letting them finish work outside the constraints of school hours and teaching them about procrastination and personal responsibility.
Electronic content (e-content) which is also known as digital content refers to the content or information delivered over network based electronic devices or that is made available using computer network such as internet. E-content is becoming popular because of it's flexibility of time, place and pace of learning. E-content includes all kinds of content created and delivered through various electronic media. E-content is available in many subjects and almost all levels of education. It can be used by wide variety learners with diverse needs, different backgrounds, and previous experience and skill levels. It can be shared and transmitted easily and promptly among unlimited number of users around the world. Teachers, students and others get benefited by the use of well designed and developed e-content. It is advantageous to the educational organizations to make their program accessible to their teachers and students on campus, home and other community learning or resource centers.

Scope of the Study
The scope of the study is syllables prescribed Environmental Education at B.Ed level by the Tamilnadu Teacher Education University. This study is primarily focused on the effectiveness of teaching environmental pollution through e-content approach to the B.Ed students. Keeping this view in mind, the researcher has developed a suitable e-content on environmental pollution in environmental education at the B.Ed level. The investigation is restricted to only 30 B.Ed students of the Department of Education, Tamil University, which is situated in a rural area of Thanjavur district fifteen of them, constitute the experimental group where the rest formed the control group. This is an experimental study restricted to measures the effectiveness of e-content approach over the

conventional method in promoting the achievement B.Ed students in learning Environmental education.

Need For the Study

The present study has its importance because today we are in grey revolution. The advancement in science and technology has changed the face of education. The role of teacher is also changed. Yesterday teacher is only one source of information. But today teacher becomes one of the sources of information. The invention of internet and worldwide web opened the source of information for all. The paradigm shift in the field of education triggered by grey revolution is matched by real life teaching learning situations. The whole game of education becomes learner centric and learning centric. To be in the paradigm shift that the world of education witnessed any teacher of any level of education must adapt their relationship with learners, switching from soloist with learners, switching from soloist to accompanist and shifting the emphasis from dispensing information to helping learners seek organized and manage knowledge guiding them rather than molding them. One of the main tasks of education in a modern society is to keep pace with this advance in knowledge. Thus new technology and strategies are essential to satisfactorily solve the new problems in the field of education for enhancing the teaching and learning process.

Title of the Study

Validation E-Content in Learning Environmental Pollution Among prospective Teachers.

Operational Definition of the Key Terms Used

Effectiveness: According to Oxford Dictionary (1987) "Effectiveness is being able to bring about the result intended" As far as this study is concerned effectiveness refers to impressive result in the learning of environmental pollution by B.Ed graduate based on content. Effectiveness refers to the degree of realization of educational objectives. It also refers to the degree of realization of higher level attainment.

E-content: E-content are electronic form of tested materials which are digitalized for anytime, anywhere and for anybody's use to be hosted in the web site.

Environmental Education: Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1978).

Computer proficient

Computer proficient means having all the basics, upgraded and up to date knowledge of computer. The ability to use a computer for work and recreation with reasonable facility could be considered computer proficient in a social context, but in an educational situation it would mean that you understood what a computer was and did, were able to program, at least some, and had a working knowledge of peripherals

Objectives of the Study

The following are the objectives of the study

1. To develop e-content on Environmental pollution in environmental education at the B.Ed level.
2. To find out the significant difference if any, in the level of achievement in Environmental Education with reference to the variable Computer proficiency between control and experimental groups at the post-test level

Hypotheses of the Study

The following are hypotheses framed for the present study:

1. There is no significant difference in achievement mean scores between the experimental and control groups at the pre-test.
2. There is no significant difference in achievement mean scores between the control group and experimental group at the post-test.
3. There is no significant difference between high computer proficiency and low computer proficiency students in post-test achievement mean scores of control group.
4. There is no significant difference between high computer proficiency and low computer proficiency students in the post-test achievement mean scores of experimental group

Background of the Study

In the present study, the investigator decided to develop the e-Content in HTML format based on the instructional objectives. In this state the topic divided into sub topics and to present each sub module the investigator decided to collect appropriate images, animations, and videos. For the navigation among the sub topics and other facts in each page of the e-Content, the investigator has predetermined the links. For the attractiveness of the pages of the e-Content, the investigator selected the animation, font size, font type, and heading color accordingly. Since the e-Content video, as the first step of the video shooting, the investigator prepared a storyboard, which is the working document for the investigator in the development of video in the e-Content. The storyboard gives a general outline of the material that the investigator intended to produce in video format. The investigator used three column formats for story board writing. In this format the first column contains content part, second column contains proposed visuals, and the third column contains effects. The approved storyboard transformed into a more detailed, step-by-step script. The investigator prepared this in two columns, labeled respectively 'audio' and 'visual' where both parts of the message were carefully planned and sketched out. The audio part of the script was the prototype for what would be said and what sound effect would be recorded. The 'Visual' part of the script shows every shot that will be used in the final production. Using the Psychological principle of learning theories and Gagne's nine events instruction,

Sample for the Study

The present investigation was carried out in the Department of education, Tamil university, Thanjavur, 30 B.Ed students are selected. One group of 15 students forms an experimental group and the groups of other 15 students form a control group.

The illustration below shows the total number of sample taken for the present study.

Table 1

S. No	Group	Number of students	Total
I	Experimental group	15	15
II	Control group	15	15

Description of the Sample

The present study is concerned only with B. Ed students in Department of education Tamil university, Thanjavur. Hence the college selected could be considered as a representative college. Fifteen students have been selected for experimental group and another fifteen students for control group by using simple random sampling method. The control group was taught through conventional method while the experimental group was taught through e-content.

Construction of the Tools

To evaluate the effectiveness of e-Contents used in this study and to compare the achievement of B.Ed students taught by e-Content, an achievement test was constructed. The test was constructed covering the environmental education at the B.Ed level consisting of 20 objective type questions in unit i.e. environmental pollution.

Questions of objective type nature were framed the questions was framed so as to suit the level of B.Ed students. Utmost care was taken to avoid ambiguity and ambivalence. The test items were selected on the basis of item analysis. The final form of achievement test consists of the aforesaid different types of objective type questions. All the questions include in the final form of achievement test have been taken from the content supplied to students. The final form of achievement test is given in appendix.

Considering the expert's experience and the difficulty level of the students understanding, the topic 'Environmental pollution' was selected.

Validation of the Tools

The e-Content material on Environmental pollution was screened to a group which consisted of

1. Faculty members in the field of biological science/ educational technology.
2. Experts in the field of Educational Technology. Their rating about the validity of the e-Content learning material was ascertained.

The high score of the sample of B.Ed students who were exposed to the e-Content learning material was found to be satisfactory.

Reliability of the Tools

The term 'Reliability' means the consistency with which a set of test scores measures what they do measure. Reliability is a necessary condition for validity.

There are several methods to estimate the reliability of a test. Some of the commonly used methods are;

1. Test – Retest method
2. Split – Half reliability.
3. Alternative parallel form reliability.
4. Kudar – Richardson Estimates.

In the present study, the split – half method is used to estimate the reliability of the test. The split half method is considered to be one of the best methods for measuring reliability because all the data from computing reliability are obtained by one testing, so that the variations likely to be brought about by difference between the two testing situations are eliminated.

The test was administered on a random sample of 30 B.Ed students consisting of 15 experimental groups and 15 control group. In this method the test was divided into two equivalent halves by pooling these scores on odd and even numbered items and the correlation found for this test by using the Karl-Pearson co-efficient of correlation formula.

Validity of the Tools

A research tool is said to be valid only when it measures what it purports to measures. Any achievement test should possess validity. Validity indicates how adequately the content of the test sampling that domain above which inferences are to be made. It is particularly very important for achievement test. A logical examination of instructional objectives and the contents to be taught was taught by a panel of experts. The panel consisted of one faculty member in the field of Education, One from Biological Science from the Department of Education, Tamil University, Thanjavur. The agreement of views of the ten experts was taken as the index of validity of the content of achievement test.

The e-Contents were also viewed by panel of experts in the relevant field. The above panel was employed for this purpose also. The agreement of the views of the panel of experts was taken as the index of validity of the e-Contents.

Pilot Study

After the expert's consultation, the researcher may still have only a vague idea of what are the crucial elements of her problem. In that case a pilot study, which is a preliminary study conducted on a linked scale before the original studies, is carried out.

Before formulating any hypothesis, pilot study is undertaken. The researcher should select the small sample from the actual group to be studied. The pilot study enables the researcher to overcome various variables in the research and on the basis of this information the researcher formulate the research schedule. For the present study, five students were selected for the pilot study. The content validity is established through the pilot study and also achievement tests.

Achievement Test

Achievement tests attempt to measure what are the main concepts that the individual has learned in the present level of performance and it is helpful to determining individual or group status in academic learning. Achievement tests have been useful to predict the improvement for further research. For research purpose the achievement test are useful to find out the students level of attainment about the subject Environmental Education.

Administration of the Pre-Test

Both the control and experimental groups were administered a pre-test must before the treatment. The pre-test consisted of set 20 questions each carrying one mark to test the previous

knowledge of the students.
The pupils were seated conveniently and a strict invigilation was done to avoid consultation. All of them finished the test within 20 minutes. The pretest was scored objectively.

Administration of the Post-Test
Immediately after the treatment was over, the researcher should take special care not to have any conversation between them. They were given the post-test. The post-test consisted of set 20 questions each carrying one mark to test the previous knowledge of the students.
The pupils were seated conveniently and a strict invigilation was done to avoid consultation. All of them finished the test within 20 minutes. The post-test was scored objectively. The post-test question paper is given in appendix. The scoring key is given in the appendix. The post-test was conducted to the both the groups and the scores were analyzed. The scoring key is given in appendix.

Data collection
All the end of the experimental period, a post test was conducted for both control group and experimental group. The response given by the two groups formed the important data required for the analysis. The achievement scores of the two groups in pretest and post-test are given in Appendix.

Scoring Procedure
The achievement test consisted of 20 objective type questions. The total score of the test is 20. For each correct answer, the score is one and for each wrong answer the score is Zero. The answer key to the achievement test is given in appendix.

Data Analysis
The analysis of data and interpretation are presented in the form of tables.

Analysis of Pre-test Mean Scores of Control Group and Experimental Group
Mean and standard Deviation of pretest scores of control group and Experimental group and the calculated t value are presented in the table.

Table 2: Mean and Standard Deviation of Pre-test Scores of Control and Experimental Group and the Calculated t- Value

S. No	Group	Size	Mean	S.D	t-value
1	Control	15	9.33	2.41	
2	Experimental	15	10.6	2.76	1.19(NS)

NS –denotes Not Significant
Calculated value of 't' =1.19
Critical value of 't'=2.05

The calculated t-value is1.19. It is less than the critical value 2.05at 5% level of significance. It implies that the difference between the mean scores under consideration is not significant. Therefore the null hypothesis is accepted.
It is inferred that the achievement mean scores of the students of the control group and experimental group do not differ significantly at pre-test level. It proves that both the control and experimental groups are matched before the treatment in terms of their knowledge and understanding on the environment education concepts

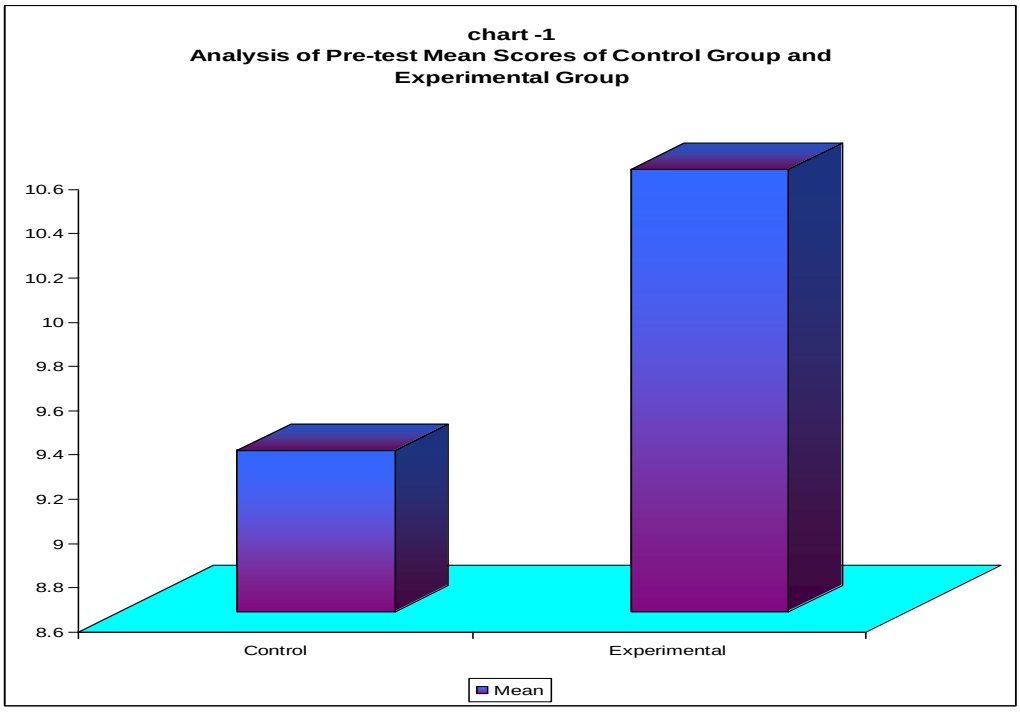

Fig 1

Analysis of Post-test Mean Scores of high and low computer proficiency students in the Control Group
Mean and standard deviation of post test scores of control group high and low computer proficiency students in the Control group and the calculated t-value are presented in table 4.3.5

Table 3: Mean and Standard Deviation of Post-test Scores of high and low computer proficiency in Control group and the calculated t-Value.

S. No	Computer proficiency	Size	Mean	S.D	t-value
1	Computer proficiency Low	9	10.6	1.69	27.1*
2	Computer proficiency High	6	13.1	1.86	

* –denotes Significant
Calculated value of 't' =27.1
Critical value of 't' =3.01

The Calculated t-value is 27.1. It is higher than the Critical value 3.01 at 1% level of significance. It implies that the difference between the mean scores under consideration is statistically significant. Therefore the null hypothesis is rejected.

It is inferred that the achievement mean scores of high and low computer proficiency students in the Control group differs significantly at the post-test level. It proves that highest mean scores of the students with high computer proficiency achieved better than their counter part in learning environmental pollution concepts.

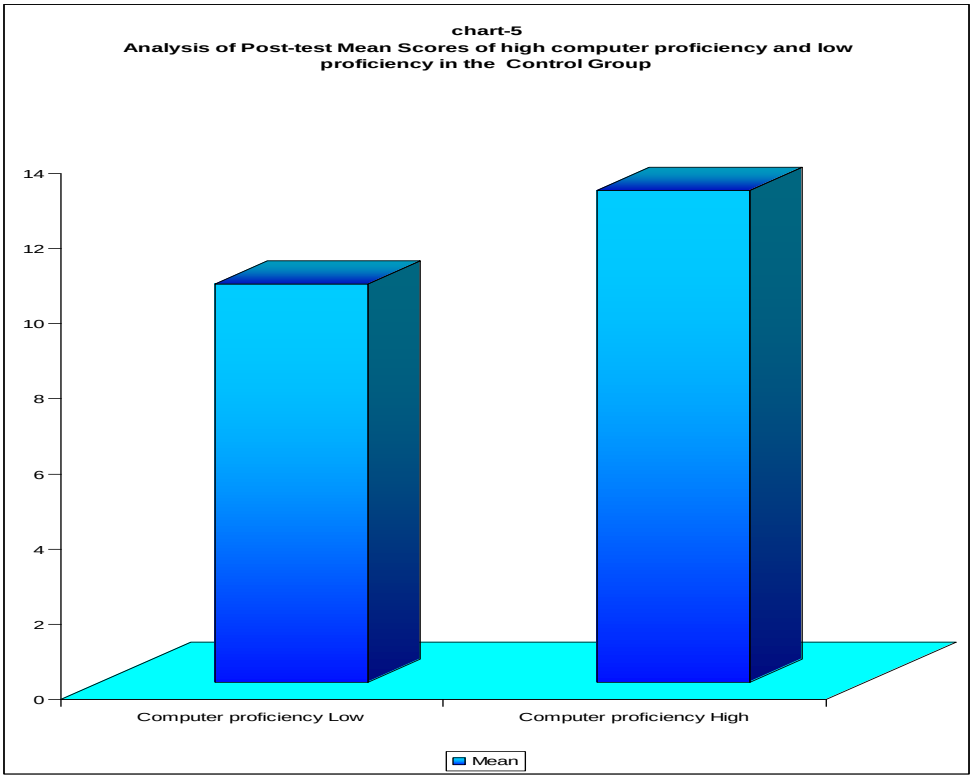

Fig 2

Analysis of Post-test Mean Scores of high and low computer proficiency in the Experimental group.

Mean and Standard Deviation of the post test scores of high and low computer proficiency in the Experimental group and the calculated t- value.

Table 4: Mean and Standard Deviation of the Post-test Scores of the high and low computer proficiency in the Experimental Group and the calculated t- Value.

S. No	Computer proficiency	Size	Mean	S.D	t-value
1	Computer proficiency Low	9	17.4	1.42	0.43(NS)
2	Computer proficiency High	6	17.1	1.25	

NS –denotes Not Significant
Calculated value of 't' =0.43
Critical value of 't =2.16

The calculated t-value is 0.43. It is less than the Critical value2.16 at 5% level of significance. It implies that the difference between the mean scores under consideration is not statistically significant. Therefore the null hypothesis is accepted.

It is inferred that the achievement mean scores of Low and High proficiency in the Experimental group do not differ significantly at the post-test level. It proves that a both Low and High proficiency students in the Experimental group are equally gained their achievement in learning environmental pollution concepts.

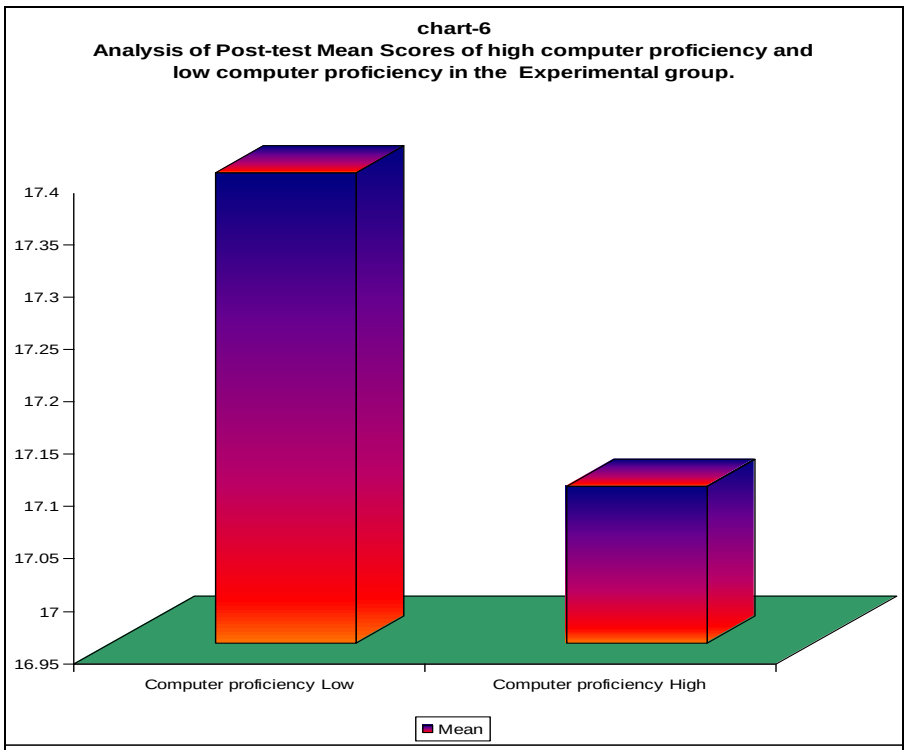

Fig 3

Major Findings and Conclusions

The major findings which have emerged from the study are as follows:

- No significant difference existed between control group and experimental group students at pre-test.
- Computer proficiency has not influenced the post-test performance of students of both control and experimental groups taught through e-content in learning environmental pollution.

Educational Implication of the Study

- New instructional techniques of assisting student through computer are to be explored by the teachers and researchers continuously.
- New patterns of Computer – Assisted Instruction and its uses can lead to a wholly new organizational and administrative system for improving the effectiveness of the total educational enterprise.
- E-content material is more effective in teaching environmental education to B.Ed students when it is very effective, then it has to be equally effective to either levels also.
- Auto-instructional materials like e-content material can be developed by the teachers and lecturers as a set of activities integral to the syllabus, textbooks and curriculum complexes.

Recommendations of the Present Study

- Chalk and Talk method of teaching biological science should be minimized and newer instructional technologies using e-content material can be introduced at a greater extent.
- The e-content material for teaching biological science is found to be effective and so the same approach can be given for the teaching the subjects like Language, English, Chemistry, Physics, Mathematics and social science.
- E-content materials can be used to enhance both the theoretical knowledge and the practical knowledge.
- E-content material is found to be more effective in teaching science subjects since experiments, dissections, phenomena etc can be presented effectively through e-content materials.
- Teachers and lecturers should be trained to produce e-content materials at various levels. In-service training and orientation courses can be provided.

Conclusion

The rise of e-content and an electronic content (e-content material) is a new paradigm for education and training in the knowledge society, empowered by technological advancements which gives the modern instructional technology a pew lock. The development of educational content in time with the changing times has become a major responsibility of the modern teacher who has to face a new learner in a new environment. The role of qualitative e-content material assumes critical necessity and value to boost and spread modern instructional technology. However, the development e-content material is not an easy task. If calls forth the coming together of both the educationists and the technologists. Simply, the development of an e-content is not enough. We should keep an eye on the various stages of the e-content development to ensure whether the developed content is valid and suits to the needs of the learner. Effectiveness of e-content material is meant not only for the current generation but also for the posterity.

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