

**E-LEARNING CONTENT DEVELOPMENT: AN EXPERIMENTAL
LONGITUDINAL STUDY ON MEASURING THE EFFECTIVENESS OF
STUDENTS' LEARNING EFFICIENCY**

UGC CARE
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ABSTRACT

Technological innovations lead to lot of changes in all the fields, and education is not an exception. e-Learning is adopted across the globe due to Technological innovations, advancements and development. In educational institutions, slowly e-Learning concept is being taught for some select courses. After carefully going through the review of literature and in-depth discussion with experts, a study on online course content and to self-develop a course material for a select subjects is needed. Therefore, it is decided to develop e-content in English and then translate the same to TAMIL for a course in Engineering programme. This content was developed further and uploaded on web and android compatible so that the control group has to go through and learn in all possible ways. The purpose of conducting this study is to break the language barrier among the students, especially those who have studied their higher secondary education in Tamil medium. By providing content in Tamil language, interest in reading the subjects will be developed, and confidence will be created among students wherein they can treat themselves at par with English medium students in understanding the content and concepts. A total of 283 samples have been identified in two educationally backward district, and longitudinal study was conducted. Result shows that there is a significant improvement while using Tamil translated video module compared to pre-test value. This study will be highly useful for the students who have studied their higher secondary in Tamil medium, if it is implemented properly by the government.

Keywords: *e-learning, Longitudinal experiment, student learning, attitude, performance.*

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Introduction

According to All India Survey on Higher Education (AISHE) there are 864 Universities, 40026 colleges and 11669 stand-alone institutions. 59.34% of colleges are located in rural areas as per 2017 Census and Tamilnadu has the maximum (17) dual mode universities. McKinsey reported that "Only quarter of engineers in India is actually employable" (ET online, Jun 04,2018). NASSCOM Says only 25% Graduates were employable and invites for possible solution. In India 80% of engineers were unemployable (The Hindu business line, New Delhi, January 19,2018). The learning capability is not similar to all the students across the geography. It varies among the individual students and also students from different socio-economic and cultural background. In rural colleges, most of the students are from economically backward community and majority of them are first generation graduates. So, the understanding capacity, and their education level (mental ability) may not be at par with city / urban students. They normally observe and receive any subject in their native language; however, the processing period is too high many times. This can be mainly witnessed among the students in Engineering College located in rural area.

Because of difficulty in coping up with the new subjects in Engineering, the dropout rate is increasing considerable every year. Raghuraman (2018) stated that due to various reasons including the inability of students to cope with the engineering syllabus has resulted in high dropouts in engineering colleges in the year 2017 - 2018. Students studying in the second and third years are mainly quitting the courses while some colleges are having about 15% dropouts in the current academic year (Raghuraman, 2018).

In addition to that, skill development is almost important for the students where they are lagging. There is a saying that "Education is more important but skill is most important!!" It is true. The young generation needs to be skilled in order to get employment. It is very much important to get skills and then only we can think of a bright future of a country. Nowadays we usually face this problem that a person is knowledgeable but not skilled enough to do a particular job. Education should be skill based rather than knowledge based. In a class, all the students may not be excellent in their studies alone, but may have other projects in which the weaker students can come up. In our society it is not only knowledge that matters but if you have the skill to do something you can guarantee work (Sombir, 2014).

Another important point to be highlighted is social inclusion. Students must be educated to think that they are socially inclusive in the society. A socially inclusive is defined as one where all people feel valued, their differences are respected, and their basic needs are met so they can live in

dignity (Cappo, 2002). However, this aspect is missing among most of the students in rural colleges. Most situations, their feelings are not accepted by the society, peers and even within local community.

Besides, lack of self-confidence is observed high in rural college students. Maheswari and Maheswari (2016) found in a study that more than half of the students studying in engineering colleges have low self confidence level.

On observing various studies, it is found that the learning in foreign language is one of the reasons for dropouts, lack of self-confidence, socially exclusive, etc. In College level all the subjects are taught in English language except the language subjects. Since, the students are from rural background, it is challenging for them to cope up with the subjects in understanding the concepts besides understanding the languages the teachers speak. Hence, it is found that there exists a gap between understanding capabilities and teaching, learning language. If teaching language is easily understood by the students, then their knowledge will increase, which leads to the development of skill in respective subjects.

Review of Literature

For the purpose of comparing and contrasting e-learning and traditional classroom-based learning in the context of English learning, Hu et al. (2005) conducted a longitudinal quasi field experiment. Additionally, they looked at how the usage of e-learning as compared to traditional classroom-based learning affected efficacy and outcome improvements. Overall, their data demonstrates that learning efficacy linked with e-learning is much greater than that seen in the traditional classroom (measured both objectively and subjectively). Subjects who use e-learning are also happier with the course materials than their peers who use traditional classroom settings. Although the strength of personalised learning support in e-learning looks to be greater than in traditional classroom settings, the statistical difference is not statistically significant.

In a study done by Klement and Dostal (2014), the authors offer university students' perceptions of e-learning as one of the most modern types of instruction within the context of their undergraduate studies. The course is presented, along with a few of the survey research findings. The survey was conducted from 2008 to 2012 with the primary goal of learning what the students preferred and thought about the format, structure, and specific e-learning tools or components. As a result, the current study adds to the conversation on the advantages and disadvantages of using

entirely electronic learning in the context of undergraduate and lifelong learning, based on the application of contemporary information and communication technologies.

According to Wang et al. (2021), Covid-19's effects have led colleges to postpone classes that have started to rely heavily on online instruction. To research the relationship between college students' e-learning self-efficacy, monitoring, willpower, attitude, motivational approach, and e-learning effectiveness in the context of online learning during the Covid-19 outbreak. Results from their study give higher education institutions and students the knowledge they need to improve students' use of the e-learning system and make better use of online technology for learning and teaching. These findings have significant ramifications for the effectiveness of online learning.

Research Problem

Use of internet among students in penetrating at a very high speed and it has to be channelized for a right cause. Online education modifies the components of teaching and learning especially in higher education. Several studies done are on issues relating to online courses, but specifically on learning through local language and conducting experimental study with control group are scarce. It is argued that online learners face language barrier and it is a one-way delivery tool. Slow learners are also to be motivated to learn by self and thus special focus need to be provided to them for their learning attitude. Even though online courses are highly encouraged, online courses on local language will be more result oriented and will add value to the existing body of knowledge.

Research Objective

To measure the effectiveness of the e-content developed through experimental study

Research Methodology

Longitudinal Experimental Study was adopted in this project to assess the learning attitude of the students. Population for this study is students who have studied Higher Secondary in Tamil Medium and joined in Engineering Colleges located in backward districts with low Literacy level. According to Government of India Census 2011, five districts in Tamilnadu are found to be backward districts in terms of literacy level. They are Dharmapuri, Ariyalur, Krishnagiri, Villupuram and Erode districts. For the present study, students studying in Engineering colleges of Ariyalur and Krishnagiri district are selected as the population. With the help of an expert

committee, the subject considered for the present study is “Environmental Engineering and Science” where the students studying in engineering colleges have this course in their curriculum irrespective of specialization.

The sample selected for the present research is second years students who have studied higher secondary in Tamil medium, studying in engineering colleges and failed in “Environmental Engineering and Science” course in their first year are the samples for this study. Before commencement of the study, pre-test was conducted to know the present position of the students in learning and understanding of engineering subject especially “Environmental Engineering and Science”. This subject has five units, and each unit is divided into 4 modules which comes to 20 modules. A video was prepared professionally by experts for each module which lasts for 10 minutes including presenter’s introduction, explanation about the topic of presentation along with animations, pictures, facts and figures. After showing video to the students, ten questions relating to the subject were asked and the students responded to those questions. Similarly, data collection was performed four times after completing the experiment. Finally, researcher thanked the students, staffs and principals of respective colleges.

Analysis and Interpretation

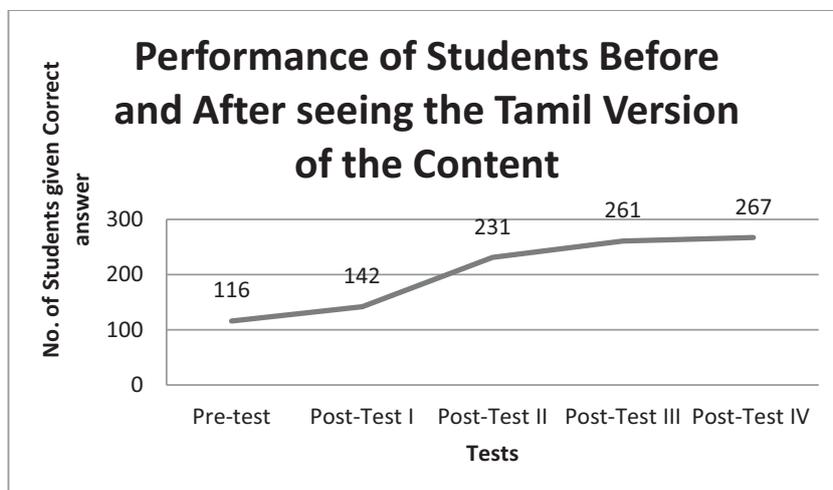
After collecting the data from 283 students from various colleges across the two districts, the data was subject to analysis to find out the number of correct answers given by the students.

Table 1: Frequency and Percentage of Number of Students given Correct answer in each Round

Total Number of Students participated in the study	No. of Students given correct answer in each round				
	Pre-Test	Post-test I	Post-test II	Post-test III	Post-test IV
283	89 (31.1%)	142 (50.1%)	231 (81.6%)	261 (92.2%)	267(94.3%)

It is noted from table-1 that, out of 283 respondents, only 31.1 percent of the students have given correct answers to the questions raised before conducting the study. However, after showing the video to the students, 50.1 percent of the students have given correct answer after a week time, 74.2 percent of the students have given correct answers after two-week time, 92.2 percent of the

students have given correct answers after three-week time, and 267 (94.3%) students have given correct answers after four-week time.



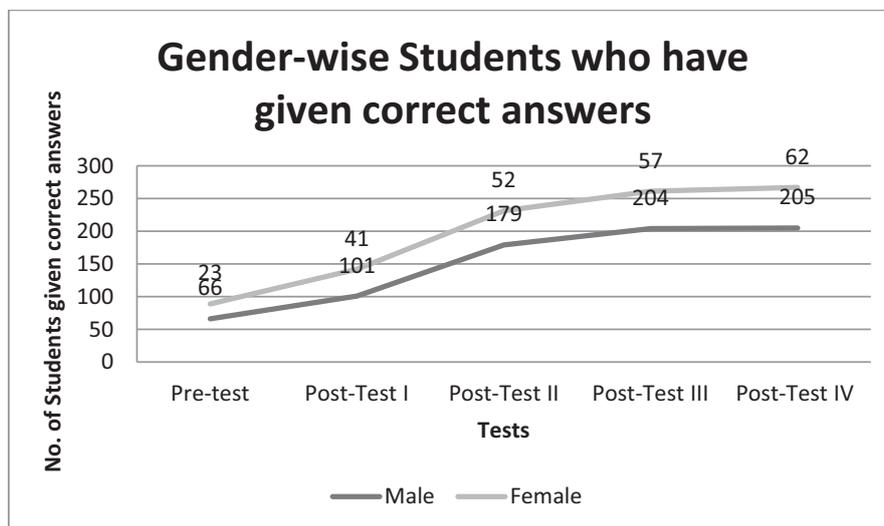
Following graph shows the performance of the students before and after seeing the Tamil version of the content. It is interesting to note from the following graph that the performance of students increases before and after showing the Tamil Version of the content. Also, it is noted that there is a significant increase in understanding level from post-test I to post-test II, and post-test II to post-test III. However, the difference between post-test III and post-test IV is minimum, which means that the students' understanding level increases slightly as the number of post-test increases. Also, the difference between two consecutive post-test decreases as the number of post-test increases.

Table 2: Frequency and Percentage distribution of no. of students given correct answers during Longitudinal Study based on their gender

Gender	Longitudinal Study Results					Total
	Pre-test	Post-test I	Post-test II	Post-test III	Post-test IV	
Male	66 (74.2%)	101 (71.1%)	179 (77.5%)	204 (78.2%)	205 (76.8%)	217 (76.7%)
Female	23 (25.8%)	41 (28.9%)	52 (22.5%)	57 (21.8%)	62 (23.2%)	66 (23.3%)
Total	89 (100%)	142 (100%)	231 (100%)	261 (100%)	267 (100%)	283 (100%)

Gender-wise frequency and percentage distribution of number of students who have given correct answers for the questions raised during longitudinal study is given in the above table. Result shows that in pre-test 74.2 percent male have given correct answers while 25.8 percent female have

given correct answers. Regarding post-test I, 71.1 percent of male students have given correct answers, while 28.9 percent of the female students have given correct answers during post-test I. Similarly, the percentages of students who have given correct answers during the remaining longitudinal study are given in table-2, along with the percentage for each value.



Above figure also depicts the difference between male and female students who have given correct answers for the questions raised before and after completion the experiment. In the beginning, i.e., during pre-test the difference between male and female students is less. Whereas, as the number of post-test increases the difference or gap between male and female also increases, which means that female have comparatively higher pickup rate than male students.

Major Findings

Findings obtained from the present study is given hereunder. It is found from the study that there is a significant improvement while using Tamil translated video module compared to pre-test value. Further it is identified that the post test scores are in increasing trend which means that the number of students who give correct answers for the questions increases as the number of post-test increases. That is, the percentage of students who have given correct answers increases considerably from post-test I to post-test IV, which shows that as the number of times students exposed to a video, the possibility of recall and remembrance is more. Hence, if the frequency of exposing to video module increases, then the understanding level of the students will also increase. Regarding gender-wise study, female students have given correct answers quickly compared to male students,

which means that the grasping power of female students is high compared to male students. Result shows that during pre-test the difference between male and female students is less, and as the number of post-test increases the difference or gap between male and female also increases, which means that female have comparatively higher pickup rate than male students

Suggestions and Conclusion

The present study gives lot of suggestions for the Tamilnadu State Council for Higher Education. Since, there is a significant improvement in using Tamil translated version of Video module compared to pre-test score, it is suggested to the government, to offer or provide Tamil version of modules in each course. It should also upload all the modules in the government website and should insists the students to download the needed materials for their reference. As the content in the video is in both English and Tamil, it is easy for the students to understand and learn quickly without any difficulties. It is also suggested to the government that it should give a circular to all the colleges and universities authorities to keep modules of such courses and instruct their students to regularly listen to this video. This will undoubtedly improve the understanding power of the students and their level of self-confidence, as they visit library and will keep this as a habit. To conclude, e-content developed in this study certainly helpful to the students' learning efficiency and improves their performance during their examination. Further study could be performed in future by considering different courses of study and provide the e-Content in the library or through online in the form of an app for the benefits of the students.

Note: The present study is being conducted as part of the Project received from Tamilnadu State council for Higher Education (TANSCHE), and the authors thank the authorities of TANSCHE for granting permission to do this project in this novel area.

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References

1. *All India Survey on Higher Education (2016-17), Published by Ministry of Human Resource Development, Department of Higher Education, Government of India, New Delhi, 2017.*

2. *Cappo D (2002), Social inclusion initiative. Social inclusion, participation and empowerment. Address to Australian Council of Social Services National Congress 28-29 November, 2002, Hobart*
<https://doi.org/10.3389/fpsyg.2021.573590>.
3. *Hu, Paul J., John Milton, Wendy Hui, Will Ma, Theodore H.K. Clark, and Kar Yan Tam (2005). Examining e-Learning effectiveness, outcomes and learning style: A Longitudinal field experiment. Conference Paper:*
<https://www.researchgate.net/publication/221229289>, 1023 – 1036.
4. *Klement, Milan and Jiri Dostal (2014). Students and e-learning: a longitudinal research study into university students' opinion on e-learning. Procedia – Social and Behavioural Sciences, 128, 175-180.*
5. *Maheswari R, and K. Maheswari (2016). A Study on Self-Esteem among College Students". IOSR Journal of Humanities and Social Science. 21 (10). pp 08-10.*
6. *Padmini I (2012). Education Vs Employability - the Need to Bridge the Skills Gap among Engineering and Management Graduates in Andhra Pradesh. International Journal of Management & Business Studies., Vol.2, Issue 3, July - Sept., pp 90-94.*
7. *Raghuraman (2018) Tamil Nadu: Engg colleges witness high dropouts this year, The Deccan Chronicle, Jul. 12.*
8. *Sombir Sheoran (2014). Importance of Skill Based Education, October 8.*
<https://www.linkedin.com/in/sombirsheoran/detail/recent-activity/posts/>
9. *Wang, Cai-Yu, Yuan-Yuan Zhang and Shih-Chih Chen (2021). The empirical study of college students' e-learning effectiveness and its antecedents toward the Covid-19 epidemic environment. Educational Psychology, 12.*