Analyzing the Need for Augmenting Online Study Material for Engineering Students in the Era of Educational Technology (ET)

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Abstract

The Online Educational Services Industry is one of the worldwide booming education sectors. By 2023 the Information and Communication Technology (ICT) services in education market will record a CAGR of over 4%, which has been a forecast by Technavio's analysts. Almost in all developing countries their governments have started to keep good budget for ICT. Education as a Service (Eaas) is equally becoming popular like other cloud service models such as Service as a service (Saas), Platform as a service (Paas) and Infrastructure as a service (Iaas). The current population of India is 1.36 billion (approx.), based on the United Nations estimates 2023, in that more than fifty percentage are 'below 25' age group. Rapid rise in educational technology in India is due to the rise between the 5 and 24 age group population. Number of universities in India had reached to 1043, with 42343 colleges, where approx 40 million students are enrolled for higher education as per data till 2020. This is approx 30% of the gross enrolment for higher education. Shortly from now, India would be having the largest working population. The major objectives of the study is to apprehend the need for augmenting study material for engineering students in the world of Educational technology. And also to identify the factors influencing the need for supplementary material for engineering students.

Keywords: *Education technology, network, learning, E- learners, Eaas, Saas, Iaas, Paas*

Introduction

Education Technology (EdTech) market is expected to touch $1.96 billion by 2021 with nearly 9.6 million users14.Many educational start-ups have started their part of contribution to the country by launching education products from kindergarten to class 12. India is the second largest market for e- learning after U.S.A. Today around 3,500 Indian start- ups are catering to the education space, by creating contents in various formats and languages for students. This is to consume at their own convenience, as there are a number of studies has suggested proven methodologies; to achieve alternate learning experience.

Table 1- Top 10 e-Learning companies in India

S.NO	Name of the company
1	Byju's
2	Dexler Education

3	Educomp Solutions
4	IGNOU
5	NIIT
6	Edukart
7	Simplilearn
8	Zeus Learning
9	Meritnation
10	Excelsoft

There is a usage of online materials for educational purpose; however usage of those in higher education segment is very less. Since number of students getting enrolled in higher education is growing higher, considering higher education market could be profitable to any company by providing supplementary educational materials for the students.

Objectives
The major objectives of the study are-
1.   To apprehend the need for augmenting study material for engineering students for the preparation of examination.
2.   To identify the factors influencing the need for supplementary material for engineering students

Scope of the study
       The major scope of the study is to address the overall requirements for engineering students in the preparation of their examination. The study is restricted to the students in South India and onlye few select distrcts were considered for the study.

Review of Literature
LamyaAlkooheji and Abdulghani Al-Hattami.(2018) in their paper has analyzed the learning style preference among undergraduate students. The paper found that what could be the other factors which influence the students learning preference other than individual preference. The 4 main four learning style model are Visual, Aural, Read/Write and Kinesthetic and paper tries to find the preference of students to the respective learning models to that of the other.185 students were responded to the survey and it is found that IT students prefer visual to other type of medium, whereas arts and science students prefer kinesthetic to other types of medium like audio, video and text.
Panagiota Nikopoulou-Smyrni and Christos Nikopoulos. (2010) compares the video based lectures with traditional lectures. The research experiment was made with 5 participants from business studies. The participants were exposed to 16 5 minutes videos where it comprises of two subjects namely Kinesiology and Psychological issue for children. The study found that student's perspective towards the video study material superior to that of traditional lecture system.
A.K.M. Najmul Islam. (2012) proposes a research model which sequentially explains on perceived academic performance depends on the ultimate perceived usage assistance which depends on two fundamental factors such as perceived usefulness and perceived ease of use.

Research Methodology
This research is majorly based on qualitative data mainly collected from primary data and minor portions are quantitative extracted from secondary data. It is an exploratory research, where preference to supplementary video study material to complement the existing material for undergraduate technical education students has been studied and analyzed. Through this research existing problem in engineering education has been tried to found. Initially all the

secondary data has been extracted from various websites, especially intake, enrolment, pass percentage and placement ratio of engineering colleges of Tamil Nadu has been collected, stored, sorted, analyzed and inferred.

Primary Data

Online survey was conducted using social media. Facebook ad manager (figure) was the tool with which the survey campaign ran on Facebook, Instagram and Audience network. Around 378 responses were collected from online survey.

Geographic - 5 separate campaigns ran in 32 different college wise districts with radius between 27 km to 50 km, the Demographic composition are from the undergraduate students which are in the age group between 17 to 22.

Secondary Data

Various websites have been visited and collected the number of technical education institutions in India, then specifically unaided private engineering colleges in Tamil Nadu was analyzed for their college intake, enrolment and pass percentage and placement ratio.

Sample Size

Estimated population N = 12,00,000

Estimated Sample size n = 385 (Confidence Level = 95% and Margin of error = 5%)

Real Sample Size – 378

Table 2- Region wise Responses		
S. NO	Region	Total Number of response
1	Chennai	155
2	Coimbatore	83
3	Trichy	48
4	Madurai	45
5	Tirunelveli	29
6	Responses without location	13
	Total	**373**

Data analysis and Interpretation

Table 3 is showing the number of courses opted by the engineering students.

Table 3- Responses for most opted, moderately opted and least opted subjects			
S. NO	Category	Response Number	Percentage

1	Most opted	264	83.28
2	Moderately opted	30	9.46
3	Least opted	23	7.26
	Total	**317**	**100.00**

Inference

Out of total responses recorded, 83.28% of responses were from most commonly opted departments CSE, IT, EEE,ECE, CIVIL and MECH etc. Majority of the responses were recorded from CSE and MECH in specific. Only 6 departments CSE, MECH, ECE, EEE, CIVIL & IT has respondent more and also with secondary data it is confirmed that these are the departments in which number of enrolment is high when compared with the remaining departments. So the product can be developed for the above 6 departments at its initial stages and after which expansion can be done according to the need.

Table showing the difficulties faced by the engineering students related to their academics at their institution.

Table 4: showing the difficulties faced by the engineering students related to their academics at their institution

S. NO	Types of difficulties faced related to academics at institution	Number of responses	Percentage
1	Lack of access to course related material	80	25.72
2	Lack of interactive class session	105	33.76
3	Lack of reliable course related material	70	22.51
4	Unable to visualize the concepts	125	40.19
5	Unable to find relevance with current industry requirement	157	50.48
6	Others	6	1.93
	Total	**543**	

Inference

Out of total responses recorded, 50.48% of respondents stated unable to find relevance with current industry requirement as their difficulty, 40.19% of respondents stated unable to visualize the concepts and 33.76% of respondents stated lack of interactive class session Majority of the respondents stated unable to find relevance with current industry requirement as their difficulty. From the previous questions the most opted courses was known. All these courses are abstract in nature where the students are not able to understand the concepts by reading alone and the university curriculum has not revised to the level of current industry requirement where the students lack the knowledge and unable to get through the placements. So this product should have contents comprising of practical application.

Table 5: showing the type of subject for which the students prefer supplementary study materials for better understanding

S. No	Type of Subject	Number of Responses	Percentage
1	Theoretical Subjects	62	19.56
2	Problem-based Subjects	102	32.18
3	Both	145	45.74
4	None	8	2.52
	Total	**317**	**100.00**

Inference

Out of total responses recorded, 45.74% of responses stated both theoretical and problem based subjects requires a supplementary material and 32.18% of responses stated problem- based subject requires a supplementary material, Majority of the respondents stated both type of subjects. However problem based subject is likely to become a reason to have a supplementary material as the cumulative responses for this is higher.

Table 6: showing the satisfaction level with available course related study material

S.No	Satisfaction Level	Prescribed Books	%	Guide	%	Video	%	Tuition Center	%	Mobile App	%
1	Highly satisfied	56	18	41	13	71	22	32	10	51	16
2	Satisfied	141	44	128	40	117	37	76	24	111	35
3	Neutral	91	29	108	34	77	24	110	35	89	28
4	Dissatisfied	20	6	19	6	26	8	45	14	25	8
5	Highly dissatisfied	3	1	6	2	6	2	10	3	7	2
6	Not used	6	2	15	5	20	6	44	14	34	11
	Total	**317**	**100**	**317**	**100**	**317**	**100**	**317**	**100**	**317**	**100**

Inference

Out of various level of satisfaction level, the highest number of responses for each study material are considered; for Prescribed Books – 44% stated as satisfied, Guide – 40% stated as satisfied, Video – 37% satisfied, Tuition Center – 35% stated as Neutral and Mobile App – 35% stated as satisfied. The current satisfaction among the engineering students shows that they prefer prescribed books and this result matches with the responses collected in the pilot study through telephonic interview.

Table 7: showing the suggestions on improving the available course related study material

S. NO	Suggestions on improving the available course related material	Number of Responses	Percentage
1	Study materials can have more example related to Indian Industry	187	59.55
2	Study materials can have more case studies	160	50.96
3	Study materials can contain appropriate text and image size for easy readability	129	41.08
4	Others	4	1.27
	Total	**480**	

Inference

Out of total responses recorded, 59.55% of responses stated study materials can have more example related to Indian Industry, 50.96% of responses stated study materials can have more case studies and 41.08% of responses stated Study materials can contain appropriate text and image size for easy readability. Majority of the responses stated study materials can have more example related to Indian Industry. From the previous question it is known that students prefer prescribed book, along with that they have suggested having Indian related example, from this we could infer that students are facing two issues namely **abstract concepts** in text format containing **foreign examples** which makes them **less interested and less relevant to the subject**

Table 8: showing the reasons for not preferring the course related video

S. NO	Features	Number of Responses	Percentage
1	Time consuming	14	48.28
2	Lack of reliability	4	13.79
3	Lack of details	7	24.14
4	Language accent	3	10.34
5	Not interesting	8	27.59

6	Difficult to locate the specif content	5	17.24
7	Others	0	0.00
	Total	**41**	

Inference

Out of total responses recorded under the reasons for not watching the videos, 48.28% of respondents stated videos are time consuming, 27.59% of respondents stated videos are not interesting and 24.14% of respondents stated video contents are lacking details.

From these responses the product which is going to be delivered should be simple, short, engaging and reliable. Table 9 shows the correlation analysis between the satisfaction and the preference level of the course related study material.

Table 9: showing the correlation between the satisfaction and preference level of the study material

S. NO	Type of study material	Correlation between satisfaction and preference levels on the study material (r)	Rating
1	Prescribed book	0.47	Moderate
2	Guide	0.55	Strong
3	Video	0.47	Moderate
4	Mobile App	0.65	Strong
5	Tuition Center	0.56	Strong

Inference

There is a strong correlation for Guide, Mobile App and Tuition Center and Moderate correlation for the remaining, These results shows there is correlation between the satisfaction level and preference level on the study material.

Findings

Based on the analysis it is noted that majority of the respondents were male students with nearly 82.54%, also most of the respondents were from B.E./B.Tech degree program (and they all belong to Anna University with nearly 83.86%. It is noted that the majority of the respondents stated that unable to find relevance with current industry requirement as their difficulty faced related to academic. The analysis also shows that the respondents prefer supplementary study materials for better understanding for both theoretical and problem – based subjects. Moreover, the responses from the engineering students of unaided private colleges were the highest (83.86%). Thus the engineering students will be the target group for the new product.

Finding related to objective which was to identify the factors influencing the need for supplementary material for engineering students.

The analysis clearly finds that there is a need for supplementary material by collecting the data on the current challenges faced by the students related to academics at their institution, type of subjects that requires the supplementary study material, suggestions on improving the available study material, satisfaction and preference level towards the existing study material, first source of study material access for reference and doubt clarification.

Finding related to objective which was to identify the students' preference towards study material in video format

Moreover the preferences towards the study material in video format is tested. Video study materials are already in usage among the engineering students next to prescribed books. This could be inferred from collecting data on satisfaction and preference level towards the existing study material, first source of study material access for reference and doubt clarification, period at which the videos are being watched by the students and finally a binary question on opting a video study material if it is available in well-structured manner.

Conclusion

The demand for the new product is confirmed when the online survey was made through social media. 90% of the students showed positive response towards the product and 91% of the students who belong to Anna University also showed the same response. This level of acceptance towards the product shows that there is a larger market for this product due to its unique feature of delivering the content in a simple, structured, reliable and relevant way to the engineering students. Required features to be added in the video study material was recorded and found that the demanding features are case study based contents and animated contents and features which curbs the students from watching videos was also recorded and found that the time, interest level and lack of relevant details are main features which makes the students not to prefer video study material as a supplement.

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