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Comparative Analysis of Learning Models in Distance Education

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ABSTRACT

The study was conducted to know the comparison between online and offline learning among faculty in Agricultural Universities by considering the factors such as topical preferences, additional topics requirements and cost effectiveness analysis. A distance education course on 'Enhancing teaching competency' was offered by ICAR-NAARM through online and offline learning mode. Forty respondents underwent the learning through offline mode (hard copy of the learning resources) and 18 respondents learnt through online mode (e-learning resources). An exploratory type of research design was used for the present study.Statistical methods used for analysis of data. The 'z' test for proportions tests the null hypothesis that there is no significant difference between the proportions among two groups in case of topical preferences against the alternative hypothesis that there is some difference. The null hypothesis is rejected when the probability is <0.05. Most of the learners preferred as afirst preference that "require more time for submission of assignments" followed by "inclusion of small surveys as activities". The additional topics suggested by offline learners are different from online learners. As per the study it can be concluded that offline learners require more expenditure to carry out the distance education course compared to online learners. Hence, it is better to consider online mode rather than offline mode for any distance courses, as online courses have more attention due to its cost effectiveness, flexibility and convenience in learning.

Key words: Online mode, Offline mode, Cost effectiveness, Cost analysis, Competency enhancement

1. INTRODUCTION

For centuries, lecturingisthe most commonly resorted teaching practice undertraditional mode of education. To increase the competency level of the teachers many academic and training institutions organizes teacher training programs. Teacher training in all fields generally include advanced digital competency for teaching to develop skills of

the teachers on Information and Communication Technology (ICT). Therefore ,these topics should be part of both foundation training of teacher and in-service training. The training should consider aspects of using ICT both as a learning tool within subject teaching and as a tool used by learners for their coursework. Thus, there is a need to develop systematic strategy for personnel training and updating skills regularly and also provide support services and networks for teachers, embedding digital tools in the institutional learning environment [1]. Presence of competencies in communicational skills (e.g., adjusting your message to the target audience) or interpersonal skills (e.g., developing rapport) enable the employees to propel change in organizations [2][3].Technology integration with face-to-face instruction can reinforce both interactive and communicative learning environment and provide meaningful learning outcomes [4][5]. From a historical point of view, some of the digital technological developments used in education are very important.

Distance education has been evolved from early correspondence education using primarily print based materials (offline mode) into a world-wide movement using various technologies. It is fast becoming an acceptable and indispensable part of the main stream of educational systems in both developed and developing countries. Online learning is one of the fastest growing trends in application of education. Online learners are often more willing to try things out in a dynamic way than they would be face-to-face.One class of online learning models uses asynchronous communication tools (e.g., e-mail, threaded discussion boards, newsgroups) to allow users to contribute at their convenience. Synchronous technologies (e.g., webcasting, chat rooms, desktop and audio/video technology) are used to approximate face-to-face teaching strategies such as delivering lectures and holding meetings with groups of learners [6]. E-learning, increases return on investment because users are dividing the fixed production costs. E-learning ,enhances savings through decreased travel, reduced material and improved performance [7].

Many of the authors reported that the common problems of distance learners are deficiency of personal contact and quick feedback from the instructor that some learners prefer [8][9][10][11]. Various reports on history of distance education indicated that researchers have been concerned to find an accessible and

available technological tool that can be used as a mode of instruction delivery for distance learners [12]. Financial resources form a key factor to the successful implementation and integration of ICTs in education.Cost implications of e-learning technologies includes downloading of free products, replication of the same or buying ready-made products which are lower the cost than printed materials. There are two types of costsinvolved in online mode of learning viz., setting up the videoconferencing system and operational costs. Hardware cost implications includes cost for maintenance, operational costs (technical and administrative support), license fee (annual fee) [13].

It is imperative that future belongs to online/distance education with effective use of technology. It is necessary to assess cost effectiveness of these modes over traditional mode of learning. Hence an attempt was made to evaluate the cost effectiveness of online and offline modes of learning under distance education.To enhance the teaching competency of faculty membersof Agricultural Universities and also to analyze cost effectiveness, a course on 'Enhancing teaching competency' through distance learning mode was developed for both online and offline learners. The study also conducted to improve the course structure by collecting suggestions, utility aspects, additional topics which may be added in the existing course structurebesides cost effectiveness analysis.

2. MATERIALS AND METHODS

The study was conducted among 58 nominated faculties of Agricultural Universities who were selected for one month course for enhancing teaching competency. The course was offered by ICAR-National Academy of Agricultural Research management (NAARM). Out of 58, forty respondents opted the learning the course through offlinemodeand the remaining 18 through online mode. Offline learners (40) cover 32 Assistant Professors and 18 Associate Professors. Online learners (18)comprise13 Assistant Professors and fiveAssociateProfessors. Anexploratory type of research design was used in the present study. Data were collected by using the open ended questionnaire. Collected data from the respondents were analyzed based on the parameters such as utility aspects, suggestions for improvement of the course and additional topics required.Cost effectiveness also evaluated considering the fixed and variable costs that constituted in both the modes of learning. Statistical

methods used for the analysis of data are Frequency, Percentage, Mean, Standard Deviation and two sample 'z' test for proportions.

2.1 Instrument

The research instrument used in this study was an open ended questionnaire to elicit qualitative data regarding faculty perceptions about teaching competency course. It mainly focuses on improvement of course based on their utility aspects, additional topics and suggestions for improving their e-learning experience.

3. RESULTS AND DISCUSSION

The study covered comparative analysis of online and offline learning modes, considering the factors such astopical preferences, suggestions, suggested additional topics and cost effectiveness analysis. The detailed parameter wise analysis is given below.

3.1 Topical Preferences

The course on enhancing teaching competency covers eight topics. The learners have been directed to give preference of each topic as first and second based on usefulness of the subject content in relevance to teaching competency enhancement. Some of the useful topics about the course were mentioned by both the learners was analyzed. Based on mean and standard deviation 'communication skills, 'teaching competency and attributes' were preferred by majority of the learners as per Table 1. It also reveals that the results of the two-sample z test performed to compare the proportions of respondents belonging to online and offline learners with respect to their first preference towards different topical preferences. The z test for proportions, which examines the null hypothesis that there is no significant difference between the proportions among two groups against the alternate hypothesis, variations may occur. The null hypothesis is rejected when the probability is <0.05. The results in Table 1 clearly indicates that the null hypothesis of equal proportions cannot be rejected for any of the aspects establishing that there is no significant difference between online and offline respondents on their first preference about different aspects.Some of the authors also mentioned that the development of mobile learning course content, services and a project-based structurewhichhelps toenter into mainstream of education[14].

Table 1: Distribution of the respondents according to their preference of topics

Sl. No.	Topics	Offline learners (N=40)				Online learners (N=18)				Z-Statistics	Probability
		First preferred	Second preferred	Mean	SD	First preferred	Second preferred	Mean	SD		
1.	Communication skill	52 (26)	14 (14)	33	19	26 (13)	5 (5)	16.5	9.5	0.056	0.811
2.	Teaching Competency and Attributes	50 (25)	15 (15)	32.5	17.5	26 (13)	5 (5)	16.5	9.5	0.179	0.673
3.	Overview of Educational Technology	48 (24)	16 (16)	32	16	24 (12)	6 (6)	16	8	0.037	0.848
4.	Innovative Teaching Practices	46 (23)	17 (17)	31.5	14.5	22 (11)	7 (7)	15.5	6.5	0.001	0.999
5.	Teacher centered methods	44 (22)	18 (18)	31	13	22 (11)	7 (7)	15.5	6.5	0.022	0.882
6.	Student centered method	42 (21)	19 (19)	30.5	11.5	20 (10)	8 (8)	15	5	0.001	0.999
7.	Experiential learning method	40 (20)	20 (20)	30	10	20 (10)	8 (8)	15	5	0.012	0.914
8.	Psychology of learning	38 (19)	21 (21)	29.5	8.5	20 (10)	8 (8)	15	5	0.001	0.999

(The figures in the parentheses indicate frequency)

(Score of 2 was given to first preferred, and one was given to second preferred)

3.2. Suggestions for the Improvement of Course Structure

During the study, the offline learners came out with many valuable suggestions for the improvement of course. Some of the significant suggestions were identified and are given below based on their preferences. Majority of the learner's first preference was requirement of more time for submission of assignments'. Because they are facing problems while submission of hard copies of the assignments through post and second preferred suggestion was 'inclusion of small survey as activities' based on the learning in the course (Table 1). Probably this will increase the skills of teachers to provide suitable project work to the students and engaging the students in more academic activities.

Table 2:Distribution of the offline respondents according to their suggestions for improvement of the course

Sl. No.	Suggestions	Preferences (offline (N=40))			
		First preferred	Second preferred	Mean	SD
1.	More time for submission of assignments	58 (29)	11 (11)	35	23
2.	Inclusion of live examples	54 (27)	13 (13)	33.5	20.5
3.	More Contact hours with the facilitators	52 (26)	14 (14)	33	19
4.	Improvement of reading material	50 (25)	15 (15)	32.5	17.5
5.	Inclusion of small surveys as activities	48 (24)	16 (16)	32	16

(First Preferred=2, Second Preferred=1)*(The figures in the parentheses indicate frequency)*

Suggestions were given by online learners was different from offline learners for improvement of course content because mode of study was different. Most of the learners suggested that 'course should be conducted for two months instead of one month', as the duration of the course is not sufficient to overcome the activities undertaken by them. They also suggested that 'course content needs to be modified' as per changes in day to day educational technology(Table 3), which leads to the improvement in teaching quality of faculty to engage students actively/enthusiastically towards academics. In the same way, some of the authors have suggested that soft Skills (communication or interpersonal skills) should be included as a separate subject or as essential part of all courses in teachers' training programs [15].

Table 3: Distribution of the online respondents according to their suggestions for improvement of the course

Sl. No.	Suggestions	Preferences (online (N=18))			
		First preferred	Second preferred	Mean	SD
1.	Increase the course duration	28 (14)	4 (4)	17	11
2.	Course content needs to be modified	26 (13)	5 (5)	16.5	9.5
3.	More graphics, visuals in the course material.	24 (12)	6 (6)	16	8
4.	Requirement of Webinar	24 (12)	6 (6)	16	8

5.	More time for online examinations	22 (11)	7 (7)	15.5	6.5

(First Preferred=2, Second Preferred=1)*(The figures in the parentheses indicate frequency)*

3.3 Suggested Topics

The course structure for enhancing of teaching competency was developed with eight courses. To improvise the course structure, the respondents suggested few additional topics. Some of the topics were mentioned by offline learners were management skills and inclusion of case studies under each chapter (first preference). Most of the learners' second preferred topics were human resource development and research methodology (Table 4). The same was reported by other author that inclusion of management topic in teacher training programs is necessary [16].

Table 4: Distribution of the offline learners according to their Suggested topics

Sl. No	Topics	Offline (N=40)			
		First preferred	Second preferred	Mean	SD
1.	Management skills	54 (27)	13 (13)	33.5	20.5
2.	Inclusion of case studies under each chapter	52 (26)	14 (14)	33	19
3.	ICTs in teaching / multimedia in teaching	50 (25)	15 (15)	32.5	17.5
4.	Learning / Listening styles	46 (23)	17 (17)	31.5	14.5
5.	Research methodology	44 (22)	18 (18)	31	13
6.	Human Resource Development	40 (20)	20 (20)	30	10

(First Preferred=2, Second Preferred=1)*(The figures in the parentheses indicate frequency)*

The course structure, which has been developed for both online and offline learners was same but the list of topics suggested by online learners was different from the offline learners, but e-learning was suggested by both the learners. Some of the topics listed out by the online learners particularly are E-learning, Teaching methods in class room presentation and Instructional Design. Some of the authors also suggested that recent development of electronics has led to active inclusion of

information and communication technologies (ICT)/multimedia in case of teaching purpose[17][18][19][20][21].

Table 5: Distribution of the online learners according to their Suggested topics

Sl. No.	Topics	Online (N=18)			
		First preferred	Second preferred	Mean	SD
1.	e-Learning	28 (14)	4 (4)	17	11
2.	Teaching methods in class room presentation	26 (13)	5 (5)	16.5	9.5
3.	Instructional Design	24 (12)	6 (6)	16	8
4.	Scientific and effective teaching ways	22 (11)	7 (7)	15.5	6.5
5.	Self-assessment and self-management	22 (11)	7 (7)	15.5	6.5
6.	Subject specific teaching methodologies	20 (10)	8 (8)	15	5

(First Preferred=2, Second Preferred=1)*(The figures in the parentheses indicate frequency)*

3.4 Cost Effectiveness Analysis

Cost effectiveness analysis was done by comparing the investments/costs incurred for both online and offline mode of distance education. The fixed cost and variable cost were used for cost effectiveness analysis. The operational definition of fixed cost is a cost that does not change with an increase or decrease in the amount of services produced and the variable cost is a cost for each unit produced that is affected by changes in an activity level.

The expenditure spent on offline learners varies with online learners**.** The fixed cost of offline learners includes fixed charges of Honorarium for Writers, Experts and Editors (Rs.36000/-), Conducting exam (Rs.12000/-), Postal charges (Rs.8500/-), Printing charges includes printing of Banners, Books, Certificates (Rs.27000/-) and Travelling Allowances of Staff to conduct exam (Rs.5000/-). The variable cost of offline learners includes Travelling Allowances of 40 candidates (Rs10000), Miscellaneous Expenditure (Rs.500/-) and Operational charges which includes Postal stamps, Envelopes and Stationery items (Rs.3500/-). The total cost spent on offline learners is Rs.102500/- (Table 6 and Fig. 1).

The fixed cost of online learners includes fixed charges of Honorarium for

Writers, Experts, Editors (Rs.36000/-) and maintenance of e-learning portal which includes uploading of lessons, questions and configuration of exam (Rs.20000/-). The variable charges includes Printing charges of certificates (Rs.2700/-), Sending certificates by speed post (Rs.900/-) and Miscellaneous Expenditure (Rs.1000/-).The total cost spent on online learners is Rs.60600/-(Table 6 and Fig. 1).

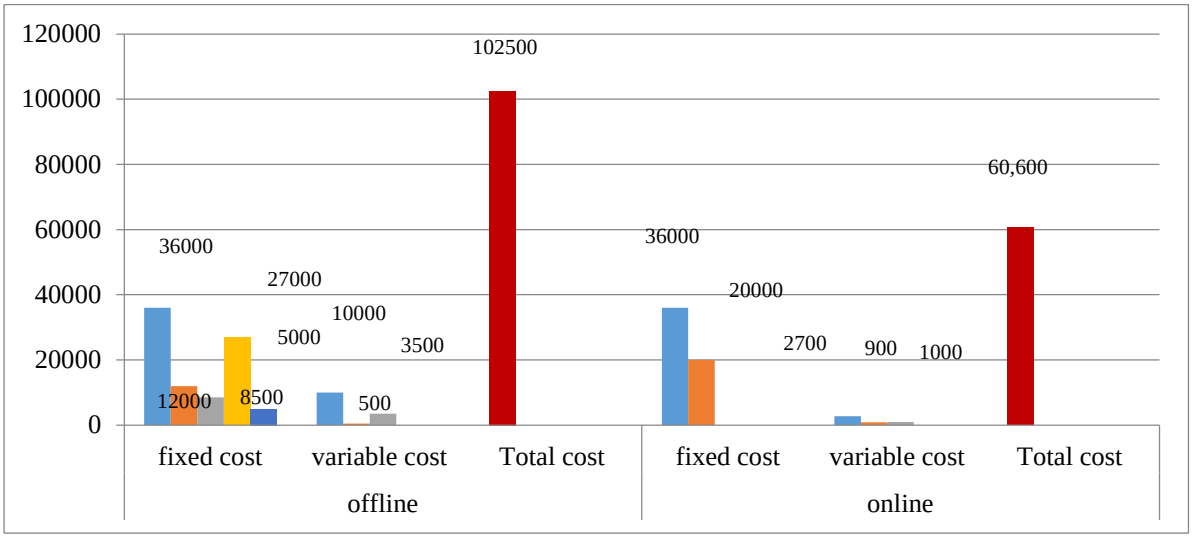

Figure 1: Cost effectiveness Analysis of Offline and Online Mode

Table 6: Details of Fixed and Variable Costs

This comprehensive analysis aims to explore online and offline mode from the perspective of both the learners. Cost comparison of offline and online mode reveals that the total cost was Rs.102500 and Rs.60600 respectively (Table 7). It can be concluded that offline learners require more expenditure to carry out the course compared to online learners. However, in remote areas internet accessibility will be less, in such exceptional case they may opt offline mode. As referred by an author that online mode is more attractive on the ba

sis of cost and convenience as effective as offline mode [22].

Table 7: Cost comparison of online and offline mode

Sl. No.	Particulars	Cost, (Rs.) Offline (N=40)	Online(N=18)
1	Fixed cost	88500	56000
2	Variable cost	14000	4600
3	Total cost	102500	60600
4	Variable cost per head	350	256

Expenditure of Offline learners (N=40)		
Sl. No.	**Fixed Charges**	**Amount @ Rs.**
1.	Honorarium for writers, Experts, Editors	36000
2.	Conducting exam	12000
3.	Postal charges	8500
4.	Printing charges (Banner, Books, Certificates)	27000
5.	Travelling Allowances of Staff	5000
Total Fixed Cost		**88,500**
Sl. No.	**Variable Charges**	**Amount @ Rs.**
1.	Travelling Allowances of 40 candidates	10000
2.	Miscellaneous Expenditure	500
3.	Operational charges (Postal stamps, Envelopes, Stationery items)	3500
Total Variable Cost		**14,000**
Expenditure of Online learners (N=18)		
Sl. No.	**Fixed charges**	**Amount @ Rs.**
1.	Honorarium for writers, Experts, Editors	36000
2.	Maintenance of e-learning portal (which includes uploading of lessons, questions and configuration of exam)	20000
Total Fixed Cost		**56,000**
Sl. No.	**Variable charges**	**Amount @ Rs.**
1.	Printing charges of certificates	2700
2.	Sending certificates by speed post	900
3.	Miscellaneous Expenditure	1000
Total Variable Cost		**4600**

Cost comparison reveals that approximately Rs.100000 has been spent on 40 respondents of offline mode and around Rs.60600 spent on 18 respondents of online mode (Fig 5). With reference to the Fig 5, it reveals that, if there is increase in number of respondents, the online learning will be more cost effective.

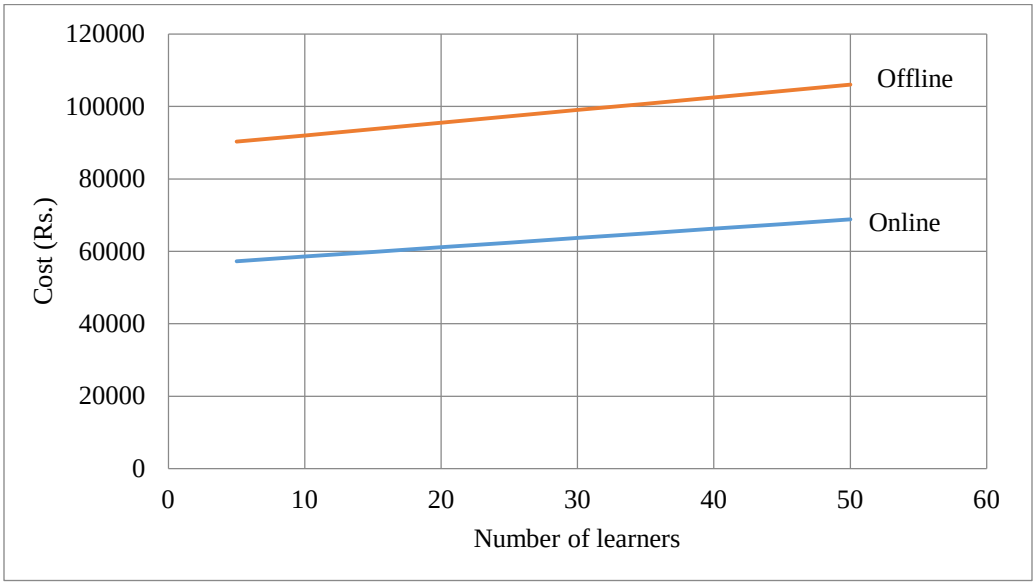

Figure 2: Cost comparison of online and offline mode

4. CONCLUSIONS

Enhancement of quality learning, maintenance of competitive advantages and improvement of access to education the training shall be made essential for the faculty at University level. Suggested topics, suggestions, useful aspects and cost effectiveness analysis are considered for further improvement of the course structure. Communication skills, teaching competency and attributes are the most useful aspects in case of both the learners. There is no significant difference between online and offline respondents on their first preference about different aspects. As per the study it can be concluded that offline learners require more expenditure to carry out the course compared to online learners. So the research study suggests that it is better to consider online mode rather than offline mode for any distance courses because

online courses have more attention due to its cost, flexibility and convenience. For faculty or already who are working in relevant institutes will have less time to participate in training programs through offline, so online mode is convenient for them as they can go through video tutorials/multimedia at any time anywhere to improve themselves. The study inferred that online learning mode, increases return on investment because users are dividing the fixed production costs.Further, e-learning, enhances savings through decreased travel, reduced material and improved performance.

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