Education through multimedia among Agricultural Diploma school students: An impact study

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ABSTRACT

The present study was conducted in the Gujarat State of India to measure the effectiveness of a multimedia on paddy cultivation on gain and retention of knowledge of students of Agricultural Diploma school. There was a substantial net gain in as well as retention of knowledge about the topic by students at selected agricultural diploma schools on viewing the multimedia. The results indicated that the knowledge level before viewing the multimedia was correlated with some of the personal characteristics of the students; while no such correlation was observed with the level of knowledge after viewing the multimedia. Similar results were also observed at the level of retention.

Keywords: India; multimedia; agriculture; personal characteristics; knowledge gain.

INTRODUCTION

Rapid agricultural growth will continue to be the key to poverty reduction and overall economic development in India. The Green Revolution has been the cornerstone of India's agricultural achievement, transforming the country from food deficiency to self-sufficiency.

At the present time, the technologies required to address total farming systems are knowledge intensive. In the wake of globalization and liberalization of agricultural trade, the farmers are now becoming more diversified in terms of cropping systems, more conscious about the quality of products and more market oriented. To help ensure success in these uncertain times, it is essential to effectively communicate useful agricultural technologies to the farmers. For this, they should also need to be able to access the expertise in the field of agriculture. In the same way, the Agricultural Diploma School students, who will in future be the key transfer of technology (TOT) agents; are also required to be updated about the latest technological developments. Such institutions cannot bear the cost of employing experts from various disciplines of agriculture. However, the use of information and communication technologies can serve the same purpose. The correct communication media, used effectively, can be a useful tool for teaching the students in a more effective way. Multimedia can be one such tool that can be helpful in enhancing the communication capabilities of teachers in the educational system as well as of the TOT experts working in the extension system of India.

Among all the means of mass communication, multimedia is one of the most versatile audiovisual mediums of communication (Brun & Mangstl, 2001). Multimedia instructional material allows the learner actually to see, hear, and use the content to be learned (Roden, 1991). Interactive Multimedia Compact Disks can be used as an effective tool for the transfer of technology (Senthil, et.al., 2003). Hooper (1986) also stressed the utility of multimedia in education. It would be an ideal tool to transmit information to the huge illiterate section of the Indian population, especially the farmers, on whom such an audiovisual medium could have a profound impact. It is also an effective tool for the students studying at below college level. It can reproduce an experience with its sound and motions simultaneously and thereby creates an excellent learning effect. Not only

can it be used at the convenience of the user, but it has an added advantage in being demand driven.

Beside the preparation and use of multimedia, its evaluation in terms of its effectiveness is also essential to justify investment and to demonstrate results (benefits). A multimedia compact disk (CD) on paddy cultivation has been developed by the Cyber Extension Cell of Gujarat Agricultural University (GAU) in the Gujarati language; which can be used in an equally effective way for the farmers as well as for the students studying in the vernacular language. To evaluate the effectiveness of multimedia in the educational system, the present study was undertaken with the following objectives:

1. To measure the knowledge level before and after viewing the multimedia as well as the retention of knowledge of the students of selected agricultural diploma schools about the seedling raising of paddy crop.

2. To find out the relationship between selected personal characteristics of the respondents and their knowledge level.

RESEARCH METHODOLOGY

The agricultural diploma course is run by the GAU through 14 agricultural schools spread over the Gujarat State. Out of these, four schools - i.e., Anand, Chharodi, Dahod and Vadodara - are in the Anand zone of GAU. Two schools of the Anand zone of GAU - namely Vadodara and Anand - were selected purposively for the purpose of this study since computer facilities were available only at the two schools.

The students studying in the second year of the diploma course, who have already studied the paddy crop course during their educational syllabus, were selected. The total numbers of respondents selected from the two schools were 66. An interview schedule was prepared in Gujarati to collect information regarding the knowledge level of students about paddy seedling raising. Questions and statements on every aspect of the study were framed with maximum accuracy, clarity and objectivity. Help of experts in the field was obtained for the purpose.

The study was conducted in the year 2003. The classroom settings were utilized for interviewing the respondents. The interview schedule was supplied to the respondents and sufficient time was given to fill it in for measuring the level of knowledge before viewing the multimedia. They were then allowed to view the paddy seedling raising part of the multimedia CD. After six hours of viewing the CD, data for part II of the schedule were again retrieved to measure the level of knowledge after viewing the multimedia. Further, to measure the retention of that knowledge, part II of schedule was again distributed the respondents after a gap of 30 days.

The scoring was done on the basis of the procedure prescribed by Jha & Singh (1970). A score of one was given for a correct response, while a score of zero was given for an incorrect answer. The data were analyzed by using mean, standard deviation, per cent and paired 't' tests? The co–efficient of correlation '*r*' was used to find out the relationship of selected personal characteristics with the knowledge level of the respondents at different times.

RESULTS AND DISCUSSION

Level of knowledge

The level of knowledge of the respondents regarding the seedling raising of paddy crops was measured three times: i.e., before viewing the multimedia, after six hours of viewing the multimedia and after 30 days. All the scores were taken into consideration and on the basis of means and standard deviations; the respondents were classified into three groups of low, medium and high levels of knowledge. The data in this regard are presented in Table 1.

Table 1 : *Distribution of respondents on the basis of knowledge levels before and after viewing the multimedia as well as after one month*

Level of knowledge	Before viewing		After viewing		After one month (Retention)	
	No. of R*	Per cent	No. of R*	Per cent	No. of R*	Per cent
Low (≤7)	35	53.00	0	0.00	2	3.00
Medium (8 to 24)	31	47.00	44	67.00	50	76.00
High (25 to 40)	0	0.00	22	33.00	14	21.00
Total	**66**	**100**	**66**	**100**	**66**	**100**

R* - Respondents

It is obvious from the data that there was no respondent in the group having a high level of knowledge before viewing the multimedia. More than 50 per cent possessed a low level of knowledge, whereas the remainder possessed a medium level of knowledge. By contrast, after viewing the multimedia, there was not a single student having a low level of knowledge and almost 33 per cent possessed a high level of knowledge. Further, the level of knowledge after one month also indicated that only three per cent of the respondents had a low level of knowledge; while more than one fifth had a high level of knowledge. Thus, it can be stated that multimedia not only facilitates the increased knowledge of the viewers, but also assists in the retention of the knowledge gained.

Gains in knowledge

To assess the gains in knowledge, the data regarding level of knowledge of individual respondents for before and after viewing the multimedia as well as after one month were analyzed. Net increase in knowledge was calculated for both the levels for each respondent. They were then classified as low, medium and high gains in knowledge.

The data in these regards are presented in Table 2, which clearly indicated that nearly one fourth of respondents had a low gain in knowledge (an increase in knowledge of up to 35 per cent). Those respondents who had a medium gain in knowledge by viewing the multimedia (a 35.01 to 64.99 per cent increase in knowledge) were 53 per cent, while almost 20 per cent of respondents could gain more than 65 per cent in their level of knowledge by viewing the multimedia. The results are quite encouraging and one could conclude that the multimedia can play an important role in generating knowledge.

Table 2: Distribution of respondents according to an increase in and retention of knowledge owing to exposure to multimedia

Increase in knowledge	After viewing		After one month (Retention)	
	No. of Respondents	Per cent	No. of Respondents	Per cent
Low (≤ 35 per cent)	18	27.30	36	54.55
Medium (35.01 to 64.99 per cent)	35	53.00	27	40.90
High (≥ 65.00 per cent)	13	19.70	03	4.55
Total	**66**	**100.00**	**66**	**100.00**

Similarly, the retention of the knowledge gained was also measured. The data indicate that almost five per cent of viewers had high retention, while nearly 41 per cent had a medium increase in knowledge even after one month. There were almost 55 per cent respondents who had a low increase in knowledge after one month (retention level), which show that the knowledge gained was retained even after one month.

Further, the researcher tried also to calculate the significance of the difference in the level of knowledge before and after viewing the multimedia as well as after one month by applying the paired 't' test. The data in Table 3 clearly point out that there is a highly significant increase in the level of knowledge of the respondents as a result of viewing the multimedia. On the other hand, the significant value of the 't' test between the post-test and the retention level implies a significant decrease in knowledge level at the time of retention. However, the highly significant increase in the level of knowledge of the respondents at the time of retention over the pre-test indicates that, though there is little loss of knowledge over the post-test, there is a net increased retention of knowledge even after one month of exposure to the multimedia.

Table 3: Extent of increase in and retention of knowledge owing to exposure to multimedia

Test	Average level of knowledge
Pre-test i.e., knowledge level before viewing the multimedia	6.9091
Post-test i.e., knowledge level after viewing the multimedia	22.2576
Retention i.e., knowledge level at 30 days after viewing the multimedia	18.3030
Pair of observation	**'t' value**
Pre-test and Post–test	18.5563**
Post-test and Retention	5.2065**
Pre-test and Retention	13.9895**

** Significant at 0.01 level of probability

The findings of this study were in conformity with the findings of Pahad (1998) and Kumar, Gupta and Gupta (2000), who found a significant gain in knowledge after the respondents were exposed to video. Patel (1996) also observed that the combination of different teaching methods has a significant impact on gains in knowledge in classroom teaching. Similar results were observed by Thakur, Verna and Verna (1996) and Madan, Verna and Jain (1996), even in non-classroom settings. The results are also in line with the results of Agarwal and Kumar (2001) for the research study related to nutrition education through video film. Studies (Carlson & Falk, 1989; Roden, 1991) have shown that superior academic performance was achieved when multimedia forms of instruction were utilized.

The Comsell Company found that multimedia students move through the learning experience 30 per cent faster than in a traditional classroom (Roden, 1991). A Department of Defense study (cited in Amthor, 1991) also provided favorable findings for multimedia. When interactive video instruction was compared to more traditional methods of instruction, achievement was improved by over 38 per cent, while the time needed to teach the subject matter decreased by 31 per cent.

Marrison and Frick (1993) found that computer multimedia instruction had no significant effect on students' achievement in agricultural economics when used as a supplementary study tool. It is the researcher's contention, however, that, since the computer multimedia module was strongly patterned after the lecture material, the module proved to be well modeled after the concepts learned in lectures. However, students' learning time was decreased by 32 per cent with the use of the multimedia module.

Relationship between independent and dependent variables

To find out the relationship between independent and dependent variables, the correlation of the selected independent variables with the knowledge level of the respondents regarding seedling raising of paddy crop was measured. The correlation was measured for all the three conditions: i.e., before viewing the multimedia, after viewing the multimedia and after 30 days after viewing the multimedia. In order to study the simple relationship between these independent and dependent variables, the zero order correlation co-efficient was computed for each independent variable. The values of correlation co-efficient (r) were then tested for their statistical significance. It is apparent from Table 4 that the co-efficient of correlation value of three independent variables (caste, type of family and reading habit) was found to be significantly correlated with the knowledge level of raising of seedling before viewing the multimedia. This shows that, before viewing the multimedia, the caste, the type of family and reading habits influenced the level of knowledge.

By contrast, none of the personal characteristics was found to be correlated with the level of knowledge of the respondents after viewing the multimedia. Even at the level of retention, i.e., 30 days after viewing the multimedia, there was no correlation with any of the personal characteristics. This implies that the multimedia viewing helps eliminating the impact of personal characteristics of the respondents on their level of knowledge.

This represents a great opportunity for using multimedia in the educational system so that the impact of barriers like caste, type of family and even reading habits can be reduced and the knowledge of the students can be escalated by using the multimedia.

Table 4: *Relationship of independent variables with knowledge levels of respondents before and after viewing the multimedia and at the time of measuring retention*

Serial No.	Independent variables	Correlation co-efficient (r)		
		Before viewing multimedia	**After viewing multimedia**	**At the time of retention**
1	Age	- 0.13292	- 0.11258	-0.10435
2.	Caste	0.27764 *	0.14822	0.12780
3.	Rural/Urban background	- 0.04873	- 0.09114	0.18178
4.	Percentage in Secondary School Certificate (SSC) examination	- 0.12298	0.02539	0.04551
5.	Studied agriculture subjects in secondary school	0.05283	0.05878	0.16136
6.	Type of family	0.24505 *	- 0.05201	-0.16364
7.	Participation in extra curricular activities	0.19956	0.00952	-0.00507
8.	Land holding of the family	- 0.00211	0.20289	0.03340
9.	Occupation of the father	- 0.14302	0.03901	-0.08431
10.	Farming experience	- 0.07212	0.07792	0.01138
11.	Growing paddy crops at home	0.01898	- 0.08909	-0.19848
12.	Educational status of the family	- 0.10188	0.01550	-0.05748
13.	Reading habits	0.31177 *	0.02644	-0.01062

* Significant at 0.05 level of probability

CONCLUSION

It can be reiterated that there was no respondent in the high scoring group before viewing the multimedia, while after viewing the multimedia there was not a single student having a low level of knowledge. A majority of students possessed a medium level of knowledge regarding the paddy crop with special reference to seedling raising. A majority of the respondents had a medium gain in knowledge by viewing the multimedia. Variables like caste, family type and reading habits were positively correlated with knowledge level before viewing the multimedia. By contrast, immediately after viewing the multimedia, as well as at the level of retention, i.e., 30 days after viewing the multimedia, not a single independent variable was found to be correlated with the knowledge level of the respondents. It could be concluded not only that the viewing of the multimedia has increased the level of knowledge of the students but also that it helps eliminating the impact of personal characteristics on knowledge gain, thus providing a common learning platform for all the students.

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