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Effectiveness of Four Mass Media Channels on the Knowledge Gain of Rural Women

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Abstract

An experimental study of the relative effectiveness of four mass media channels (radio, television, newspaper, and Internet) on knowledge gain was conducted among 144 rural women belonging to self-help groups of three villages in Tamil Nadu, India. The selected technology, rabbit farming, was developed into parallel messages and was delivered through these channels to assess the knowledge gain. All the respondents (100%) had gained “adequate” knowledge after exposure to television, newspaper and Internet, while 97% of those exposed to radio had gained adequate knowledge after exposure. Traditional media were found to have a slight edge over new media in terms of influencing knowledge gain. Television was found to be the most effective treatment, followed by newspaper, Internet and radio.

Keywords: Mass Media, Knowledge Gain, New Media, India.

Introduction

Aristotle divided human knowledge into three categories of discipline: (a) those whose task is to know, e.g. mathematics and the basic sciences; (b) those that are practical and help to make decisions, e.g. ethics & political sciences; and (c) the creative disciplines, e.g. the arts and agriculture (Blum, 1996).

Modern day agriculture, however, operates in a complex and dynamic environment subject to a number of social, economic and environmental factors. In the present context, agriculture may not restrict to a single category as during the days of Aristotle, but draws heavily from all the three categories and this study is concerned with the task of “knowledge,” the first discipline. Knowledge, which belongs to the cognitive domain of the human mind, is the first stage in the innovation – decision process (Rogers & Shoemaker, 1971).

For agricultural development, knowledge and information on important farm technologies, methods and practices need to be imparted to the farmers at the right time. Traditional mass media, such as radio, television, print and recently, new media such as Internet have been playing a role in imparting knowledge to the farming community over the years. Their potential for influencing knowledge gain, public attitude and behaviours has been well recognized through several research studies.

Missing from the literature however is a direct comparison of the merits of specific media approaches in terms of influencing the cognitive behaviour experimentally. Eberle and Shroyer (2000) had observed that because of the relatively recent emergence of information and communication technology as a driving force, most studies do not directly compare the use of new technologies versus traditional approaches. . . . more research is needed to determine the relative usefulness of information and communication technologies compared with traditional approaches, both in terms of user preference

and learning effectiveness. The value of such a comparison is also apparent where budget and feasibility constraints require careful consideration of the most effective media-mix for specific targeted audience such as, rural women.

Taking all the above points in to consideration , this study was formulated to test the hypothesis that there would be significant differences in the effectiveness of different mass media formats on the cognitive behaviour by way of assessing the effectiveness of mass media and by comparing changes in the knowledge gain of rural women that resulted from listening to radio, watching television, reading newspaper and browsing a Web site.

Theoretical Framework

In developing countries, the low “extension worker – farmer” ratio is resulting in less direct contacts between the change agents and farmers (Chandrashekar, 2001). Deficient information has always impeded growth and development in the rural sector (Ray, 1978) and mass media may have to discharge the duty of technology transfer more intensively in the near future. Further, studies have shown that neglect of the female farmers in dissemination of technologies have reduced total agricultural outputs (Blackden & Bhanu, 1999), which points to the need for increased efforts to effectively communicate appropriate farm technologies through mass media to them.

The distinctions among the media such as radio, television and computer-based media have become less sharp and vague as a result of changes in technology (McQuail, 1994) and media comparison studies would help the change agents in choosing the right mass communication channel to bring about changes in behaviour and knowledge (Hornik, 1989). Theories of communication say that the success of the language of communication or its effectiveness depends on (a) understanding of the message, (b) knowledge gain, (c)

perception of the value of the message, (d) recall and retention of the message, (e) persuasion to action, and (f) ego-involvement (Sudarsanam, 1979). Of these, researchers had predominantly taken up knowledge gain for experimental analysis (Chandrakandan, 1982; Manoharan, 1988; Philip, 1995). Additionally, Cook (1995) stated that sometimes people only remember that they have seen a video film rather than the message it conveys.

In order to overcome this lacuna, it was decided to take up an experimental study rather than an *ex-post facto* one, to assess the effectiveness of farm communication in terms of knowledge gain among the rural women.

Purpose and Objectives

The purpose of the study was to experimentally find out the effectiveness of four mass media channels on the knowledge gain of rural women with the hope that the results would help the workers of government departments and Non-Governmental Organizations in designing a viable strategy for disseminating farm technologies. The following three objectives guided the study.

- 1) Find out if mass media are effective enough in terms of knowledge gain;
- 2) Compare the effectiveness of traditional and new media; and
- 3) Assess the relative effectiveness of radio, television, newspaper and Internet.

Methodology

The experimental study was conducted in three villages (Madhvarayapuram, Narasipuram, and Devarayapuram) of the Thondamuthur block in Coimbatore district of Tamil Nadu, India. The sample villages were selected at random from a list of villages prepared in consultation with the officials of the animal husbandry department, keeping in mind the number of active women Self-Help Groups (SHGs) in the area, physical facilities

available in terms of communication, distribution of livestock farmers, computer literacy, awareness or the lack of it about rabbit farming, etc.

Based on the sampling design, it was decided to select 12 experimental groups consisting of 12 subjects in each group. All the SHGs of these villages had exactly 12 members each. Four groups of 12 subjects each in a village formed one replication. Similarly, there were two other replications with similar number of subjects from the other two villages. The groups at each village were selected at random for the study. In all, 144 subjects from three villages formed the sample.

Newspaper and e-magazine were chosen as the appropriate methods to represent print and Internet media respectively. The problem of comparability has been the basic obstacle to studying differences between message formats of different mass media in experimental studies. Slater (1991) had stated that to simply select from existing print and broadcast messages and then compare their impact would be impossibly compounding. Hence, it was decided to develop a message that would be comparable conceptually, and that would vary only by the formats in which it was produced.

The technology chosen for testing the effectiveness of different mass media involved in farm communication was "Rabbit farming." The materials for each medium, which included an offline Web site, were developed in Tamil, the local language, by a collaborative, team approach that included scientists of Tamil Nadu Agricultural University and Indian Council of Agricultural Research, farmers and communication experts.

Interview was to be the common mode of presentation in all the media. For the study, knowledge was operationalized as the quantum of scientific information known to the experimental subject regarding the technology. Knowledge gain was operationalized as the quantum of

information newly learnt by a subject due to communication through a mass medium on “rabbit farming.” Knowledge scores of 33 and above were operationalized as “adequate” knowledge gain. Multiple randomized group design procedure was adopted for the study.

The same group was measured twice – once before the introduction of the stimulus and then after the introduction of the stimulus (Pre-test—Post-test technique). Based on Difficulty and Discriminatory indices, 22 items were selected for the

knowledge test to be interviewed and in each village. The experimental treatments (Table 1) were assigned at random, using the random table. The messages were delivered with the help of All India Radio, Coimbatore, India, Video unit of Tamil Nadu Agricultural University and *Dinamalar*, a popular Tamil language daily. The 22-item multiple choice knowledge test was then administered immediately prior to exposure to a particular treatment and again immediately after exposure.

Table 1

Research Design

Number of treatments	4
Treatment 1	Radio programme
Treatment 2	Television programme
Treatment 3	Newspaper message
Treatment 4	Message through Internet
Number of villages	3
Rural women/treatment	36
Total number of subjects	36 X 4 = 144
Control	Since base level knowledge was to be measured, the question of having a control group does not arise

The whole experiment was conducted in such a way that the respondents were personally interviewed using an interview schedule (not by questionnaire) for pre-testing which did not in any way suggest the possibility of a post-test. Further, during the conduct of experiment, the subjects were requested not to exchange information about the treatment till the completion of the study. Interactions were kept to a minimum before and during the stimulus, except for the pre-exposure evaluation.

SPSS (Statistical Package for Social Sciences) version 10.0 software program was used for analysis of data employing Paired *t*-test, percentage analysis, ANOVA, Duncan’s Post Hoc, and McNemar’s tests.

Findings and Discussion

Are mass media effective enough in terms of knowledge gain?

The results of the study indicated (Table 2) that the mean knowledge gain of those subjects exposed to radio was 59.2%. Those exposed to television had a gain of 68.5%, while those exposed to print and Internet had a knowledge gain of 64.1 and 62.6 respectively. Knowledge gain in all the four treatments was statistically significant at 1% level of probability. The significant *t*-value in all the four treatments indicated that all the four channels (radio, television, newspaper, and Internet) had effectively influenced the cognitive behavior of the subjects.

Table 2

Mean Knowledge Gain Due to Exposure to the Treatments (n = 36 each)

Treatment	Treatment	Mean Knowledge Gain		Knowledge Gain		<i>t</i> -value
		Before Exposure	After Exposure	<i>M</i>	%	
T ₁	Radio	23.03	36.06	13.03	59.2	30.04**
T ₂	Television	22.94	38.03	15.08	68.5	52.31**
T ₃	Newspaper	22.64	36.75	14.11	64.1	45.81**
T ₄	Internet	23.28	37.06	13.78	62.6	44.98**
	Overall					78.32**

Note. **Significant at 0.01 level

For confirmation of these results, the changes in knowledge level between pre-

exposure and immediate post-exposure were analyzed using McNemar's test.

Table 3

Significance of Change in Knowledge Gain among the Experimental Groups (n = 36 each)

Nature of Change	Treatments			
	T ₁	T ₂	T ₃	T ₄
Subjects who had adequate knowledge (33 and above) before exposure and lost after exposure	0	0	0	0
Those who had adequate knowledge before and after	0	0	0	0
Those who did not possess adequate knowledge before and after	1 (2.8)	0	0	0
Those who did not possess adequate knowledge initially, but gained adequate knowledge subsequently due to exposure to treatments	35 (97.2)	36 (100)	36 (100)	36 (100)
χ^2 value (McNemar's Test)	33.02**	34.02**	34.02**	34.02**

Note. (T₁ - Radio; T₂ - Television; T₃ - Newspaper; T₄ - Internet). Figures in parentheses indicate percentages.

**Significant at 0.01 level

The results of this analysis presented in Table 3 indicated that all the respondents (100%) had gained "adequate" knowledge after exposure to television (T₂), print (T₃) and Internet (T₄). Around 97% of those subjects exposed to radio did not possess adequate knowledge on rabbit farming before exposure, but gained subsequently after exposure. None of the subjects were found to be in the category those who possessed adequate knowledge (a score of 33 and above) before exposure and lost after exposure. Also, none belonged to the category, those who had adequate

knowledge before and after exposure. This confirmed the interpretations of the paired *t*-test, that the mass media were indeed effective in influencing the knowledge gain of the rural women. Further, the pre-exposure knowledge on rabbit farming of all the respondents was poor, which highlighted the need for conduct of more popularization campaigns.

Traditional media Vs new media

Both traditional and new media are playing a major role in knowledge and information for the farmers (FAO, 1998;

Forno, 1999). A simple comparison of the effectiveness of the traditional media (radio, television, and newspaper; pooled) with the new media (Internet) was carried out.

Table 4

Traditional Media versus New Media on Mean Knowledge Gain Due to Exposure to Treatments

Particulars	Means	
	Traditional Media (Radio, Television, and Newspaper)	New Media (Internet)
Before exposure	22.87	23.28
After exposure	36.96	37.06
Mean knowledge gain	14.09	13.78
% of knowledge gain	64.05	62.64

The results showed that (Table 4) the traditional media had a slight edge over the new media with a mean knowledge gain score of 14.09. New media had a mean score of 13.78. In considering these results, it is evident that traditional media are still effective when compared to new media in terms of knowledge gain despite the fact that it allows for relatively less interaction with the users. Further, the results indicate that the traditional extension teaching methods that have evolved during the last two

centuries are still effective today. With many farmers still not using the new media for any purpose (Márquez-Berber, 2003; Suvedi, Campo, & Lapinski, 1999) the change agents may go slowly in disseminating technologies through Internet.

Relative effectiveness of mass media channels in terms of knowledge gain

To find out the relative effectiveness of different treatments, Analysis of Variance (ANOVA) test was applied.

Table 5

Analysis of Variance for Gain in Knowledge among Treatments

	Degrees of freedom	Sum of Squares	Mean Square	F-value
Between Groups	3	78.500	26.167	6.322**
Within Groups	140	579.500	4.139	
Total	143	658.000		

Note. **Significant at 0.01 level

The *F*-value that was significant at 1% level of probability (Table 5), indicated group differences i.e., there existed significant differences in the effectiveness of the four treatments in imparting knowledge and this confirmed our hypothesis. Through

these results it may be inferred that at least one of the treatments differed from the others. In order to determine which treatment groups differ, Duncan's Post Hoc Test was performed.

Table 6

Duncan's Post Hoc test for Comparison of Differences

Medium	Means for Groups (Subset for alpha = 0.05)		
	1	2	3
Radio (T ₁)	13.03		
Internet (T ₄)	13.78	13.78	
Newspaper (T ₃)		14.11	
Television (T ₂)			15.08

The results (Table 6) revealed that the treatment groups, radio and Internet were homogenous in nature (column 1); the treatment groups, Internet and newspaper were also homogenous (column 2). The television treatment group (column 3) however, differed from the other two. This would indicate that the subjects exposed to television differed significantly from the other three groups in terms of knowledge gain.

The group mean of 15.08 indicate that television was the most effective and superior treatment in terms of influencing knowledge gain. This was followed closely by newspaper, Internet and radio, in that order. In analogous studies conducted by Agarwal and Rao (1980), Goodman (1992), and Kumari (1999), the superiority of television over other information channels had been substantiated. The reason for this might be that the visual mass medium, television, possesses the right characteristics, which determine the ease of learning.

Though this finding may appear to only reiterate the results of previous studies, this study is different in a way that it was conducted under controlled conditions, unlike other studies that were mostly *ex-post facto* in nature. Further, though all the respondents had previous training on computers, the researcher could observe that most of the respondents were rusty in using this medium and this also could have caused a decrease in their knowledge gain. If this handicap would not have been there, there is scope to presume that new media might

have fared better. In short, the results revealed that, apart from television, all the other three media were almost equal in their effectiveness.

Conclusion

The results of this experimental research have direct implications for extension outreach efforts in the developing countries. Rabbit farming is a relatively new technology in countries such as India and the extensionists can now plan their mass media strategies taking a cue from these results. They can utilize television frequently for dissemination of farm technologies, more so, when the target audiences happen to be rural women. However, the major drawbacks in utilizing television are the reluctance of television channels in beaming developmental programmes, farm programmes in particular and the problem of accessibility for rural women since most of the television facilities are shared public access.

In India, the proposed rural channel by *Prasar Bharati* (Broadcasting Corporation of India) could be the right step in this direction ("DD seeks funds from Agricultural Ministry for its rural bonanza," 2003). Print media that were placed second too have proven to be effective in influencing the knowledge gain of rural women. There is a general feeling that print media are being under-utilized due to the low literacy levels prevailing in India. On the contrary, statistics show that rural literacy has been showing a steady progress over the years.

Rural female literacy in India, which was 4.87% in 1951, had risen to 43% in 1997 (National Sample Survey Organization, 1997). Internet has closely followed “print” in influencing knowledge gain and has a definite role to play. Nevertheless, Internet should first be made accessible to rural women before we recognize it as an effective medium for farm communication. Hence, the change agents need to carefully choose the appropriate medium and develop farm messages for effective dissemination.

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