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Attitude: A Determinant of Agricultural Graduates' Participation in Videoconferencing Technology

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Abstract

The study envisaged to evaluate the attitude of agricultural graduates towards Videoconferencing (VC) technology. Study focused at persuasion stage of adoption process of innovations. A Likert-type-scale was developed, which consisted of 23-items. The scale instrument had four sections, viz., training, distance learning, agricultural communication and extension management. Cronbach's alpha coefficient ($\alpha=0.85$) of reliability test was measured. Instrument was administered to randomly selected, seventy agricultural graduates of Punjab Agricultural University (PAU), Ludhiana, India during 2006-07 academic years. Attitude survey proved insightful with agricultural students. They had positive attitude in applied areas of VC technology, viz. training, distance learning, agricultural communication and extension management. Significant difference between users and non-users of VC technology was observed. Users had significant positive attitude towards VC technology. An enhanced understanding of attitudes is imperative before effective intervention strategies to moderate attitudes for enhancing acceptance and implementation of VC technology. Including transfer of agricultural innovations, VC can be encouraged in services like training, distance education, extension management, communication, administration, health, education and knowledge sharing. For these, infrastructure available within National Agricultural Research System (NARS), India can be effectively utilized for learning and technical counseling. This study adds value to the body of knowledge in evaluation and theory building from attitude perspective. As standard methodology is lacking to comprehend mindset of agricultural students, it will serve foundation for other future investigations.

Keywords: Attitude, Agricultural students, Videoconferencing, Technology

1. Introduction

About 11900 agricultural graduates pass out every year in India, of which, hardly 2000 get employed in public and private sectors (Meena and Jain, 2003). Employment opportunities are declining due to reduction in cadre strength, both in government and private sector. Hence, creating better opportunities for agricultural graduates is a challenging task. Diversified agriculture can offer numerous career opportunities as well as lucrative options in farming, horticulture, dairying and animal husbandry and other domains of agriculture. Need based information with regard to improved agricultural practices, better employment opportunities etc., can only be made accessible through Information and Communication Technologies (ICTs). Benefits in utilization of ICTs for agricultural extension and training purposes are well documented (Hafkin and Odame, 2002; Richardson, 2005). ICTs can be used to increase effectiveness and efficiency of extension work and also helps farmers to utilize such information in solving their pressing problems (Klink in Leeuwis, 2004). As a communication tool, Videoconferencing (VC) can play a pivotal role. Student satisfaction with VC and web based learning can be expected to be high (Valents *et al.*, 2001). Future of this technology, particularly in rural professional education is prominent (Du and Simpson, 2002; Lant, 2002; MacIntosh, 2002), however, it is still out of reach in many developing countries where it is most needed (Ekblad, 2004). VC is an enormously useful adjunct to traditional educational delivery modes, and can enable quality education opportunities that would otherwise be prohibitive due to time, travel, and cost constraints (Birden and Page, 2005).

In Indian context, success of VC technology has already been demonstrated. MANAGE (National Institute of Agricultural Extension Management, Hyderabad, India) an autonomous organization under Ministry of Agriculture and Cooperation, Government of India has successfully conducted communication and learning sessions in different villages for rural community (Reddy, 2003). Virtual Academy for Semi-Arid Tropics (VASAT) which is an informal virtual information communication and capacity building coalition has also used VC technology effectively to bring experts and farmers together, to enhance their reach and impact on knowledge empowerment of rural communities. It facilitated information communication between them starting from the stage of selection of suitable varieties till post-harvest management, animal health, management and distance learning aspects (Dixit *et al.*, 2007). Many authors have successfully experimented with VC technology in diverse areas. The justification of using VC in education may come from concepts and principles of social learning (Abbey, 2000). It is often used for large groups, colleges and universities as distance learning and web based courses (Gehris, 1998). Attitude of agricultural students towards VC technology is one of the major components of human behavior for further action. Strong attitudes have more impact on behavior, are less susceptible to self-perception effects, and more stable over time (Holland *et al.*, 2002). Hence, there was dire need to measure the attitude of agricultural students before putting effective intervention strategies for moderating their attitudes. The study formulated with the specific objectives: (i) to study demographic attributes (ii) to determine information source utilization, and (iii) to measure the attitude of agriculture graduates towards VC technology.

2. Research Methods

Before developing an attitude scale, related available instruments were initially examined. Due to lack of specific instrument, a Likert-type-scale developed which consisted of 23-items. Cronbach's alpha coefficient ($\alpha=0.85$) of reliability test was measured, which indicates a good internal consistency (George and Mallery, 2003). This instrument was administered to randomly selected, seventy agricultural graduates of Punjab Agricultural University (PAU), Ludhiana, India during 2006-07 academic years. Data were solicited through personal interview method and scale was used to assess level of agreement on items dealing with VC technology. Respondents rated their levels of agreement using following scale: 1=Strongly Disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly Agree. Possible minimum and maximum score were 23 and 115, respectively. Finally, attitude scale was further categorized according to applied areas of VC technology namely; training ($\alpha=0.95$), distance learning ($\alpha=0.90$), agricultural communication ($\alpha=0.92$) and extension management ($\alpha=0.89$) aspects. Data were solicited on variables such as age (AGE), education (EDU), marital status (MSATUS), gender (GEN), land holding (LHOLDING), and training (TRG), information source utilization (ISU) and attitude (ATTITUDE). Data were statistically analyzed using SPSS 11.0. A summary of description of variables is presented in table 1.

3. Results and Discussion

3.1 Demographic Attributes

Among 70 agricultural students, 91.42 % were over 29 years of age and 8.58 % were between 19 and 29 years. Most of the students were male (85.72 %) and unmarried (94.28 %) and about fifty percent (47.14 %) had

obtained their bachelors degree followed by masters (40 %) and doctoral degree (12.86 %) in agricultural sciences. Almost half of the students (44.29 %) were from landless families, around one-third (31.42 %) had land up to 10 acres, 14.28 %, between 11-20 acre and only 10 % had more than 20 acres of land. Majority (41.42 %) of agriculture students had attended long-term training, followed by short-term training (11.42 %) in their respective areas of specialization. Few of them, also attended trainings in dairying, tractor repairing and rice milling technology (Table 2).

3.2 Information Source Utilization

Data on information source utilization were obtained on three-point continuum namely always, sometimes and never (Table 3). Newspaper was the most sought after source of information (94.28 %), followed by television (81.42 %), internet (69.58 %), group discussion (67.14 %), and visits to research institutes (58.57 %), radio (51.42 %), and research journals (48.58 %). About fifty percent of them were already exposed to VC technology.

3.3 Attitude towards VC Technology

Attitude of agricultural students towards VC technology was assessed through applied areas of VC technology namely training, distance learning, agricultural communication and extension management. Mean values of statements varied from 3.14 to 4.22, whereas, standard deviations (SD) ranged from 0.53 to 1.15 (table 4). Mean value of more than 4 showed a departure from agree to strongly agree about a particular attitude statement. Mean value of 3 to 4 showed a good signal towards moving to agreeing situation from an undecided situation. Low standard deviations implied a close agreement with participants' ratings whereas high standard deviations show variations in response.

3.3.1 Training

Training is an essential process to increase knowledge, change attitudes and to develop skills. It enhances self-confidence, competency and proficiency in communicating desired knowledge among peers and clients. The mean value of responses obtained under training aspect varied from 3.50 to 4.12. Agricultural students were of the view that VC technology reduces unproductive travel time, saves money and energy ($\bar{x}=4.12$; $\sigma=0.67$). VC is an interactive and comprehensive learning technique like other interpersonal transactions ($\bar{x}=4.01$; $\sigma=0.71$). A number of agricultural students, staff and farmers can be trained ($\bar{x}=3.98$; $\sigma=0.87$) through this facility. It reduces trainers-to-trainees ratio many folds ($\bar{x}=3.72$; $\sigma=0.79$). The respondents also felt that planning for VC can be done at a short notice ($\bar{x}=3.50$; $\sigma=1.07$). In developing countries, regular and systematic training for agricultural students, extension personnel and farmers usually gets hampered due to inadequate number of qualified trainers and increasing cost of training and this creates a lag in transfer of technology. In this context VC offers a better solution and researchers experienced that students and teachers are generally positive about VC technology but needs systematic training to exploit this technology (Pitcher *et. al.*, 2000).

3.3.2 Distance Learning

Agricultural students agreed that VC technology provides quality learning to wider audience over distances ($\bar{x}=4.05$; $\sigma=0.96$) and also provides global educational, cultural information and knowledge in a network environment ($\bar{x}=4.22$; $\sigma=0.67$). VC offers information to institutions, learners and researchers with limited resources ($\bar{x}=3.98$; $\sigma=0.95$) and has technological feasibility of having meaningful dialogue between experts and students by virtually connecting remote ends. Instead of lectures at study centers, special lectures can be delivered and practical training can be imparted through VC. VC can be of immense advantage to students in attending classes from distant locations. Indian universities and educational institutions like Indira Gandhi National Open University (IGNOU), New Delhi have started imparting distance education in agriculture, putting VC to good use. However, issues of economic viability need to be addressed in due course of time.

3.3.3 Agricultural Communication

The role of VC technology as a communication medium is imperative. Agricultural students responded that VC is a language neutral medium and provides face-to-face communication with instructors ($\bar{x}=4.15$; $\sigma=0.73$), as it delivers information in more convenient manner ($\bar{x}=4.08$; $\sigma=0.73$) and also reduces travel related costs ($\bar{x}=4.04$; $\sigma=0.89$). It disseminates information far quicker than other means ($\bar{x}=3.82$; $\sigma=0.76$) and improves the efficiency of experts and extension workers in reaching a large number of farmers with less effort ($\bar{x}=3.91$; $\sigma=0.82$). It also reduces money and labor involved in organizing / demonstration / producing video films and publishing farm literature ($\bar{x}=3.88$; $\sigma=1.07$). Multiple site connectivity through VC helps participating institutions to have a face-to-face dialogue with renowned agricultural scientists and policy makers ($\bar{x}=3.82$; $\sigma=0.88$). VC technology can help the agriculture students' to intensify their motivation level and in learning communication skills.

3.3.4 Extension Management

Extension management is an important issue. Study reveals that agriculture students were not much aware about extension management issues. However, they agreed that VC technology can improve quality of extension management ($\bar{x}=4.02$; $\sigma=0.72$) as VC links persons isolated by space ($\bar{x}=3.88$; $\sigma=0.71$) and by integration of VC into extension system, efficiency and effectiveness can be increased ($\bar{x}=3.97$; $\sigma=0.53$). This technology provides methods to explore techniques of managing people and services ($\bar{x}=3.72$; $\sigma=0.72$) and through this technology hands-on experience is favored ($\bar{x}=3.31$; $\sigma=0.94$). VC technology allows even shy people to interact ($\bar{x}=3.14$; $\sigma=1.15$) and people feel satisfied even though no contact or affinity exists between trainers and trainees ($\bar{x}=3.20$; $\sigma=1.04$). Interactive improvement in teaching skill is also possible though this facility ($\bar{x}=3.22$; $\sigma=1.09$). The study reveals that most of agricultural students (78.58 %) had favorable attitude towards VC technology (table 5). Fig-1 depicts average values of attitudes of students. They had favorable attitude ($\bar{x}=4.08$) on training and distancing learning ($\bar{x}=4.06$) aspects of VC technology. Although, response on agricultural communication aspect had ($\bar{x}=3.95$) very close to agreeing situation. Their attitude was less favorable in extension management ($\bar{x}=3.55$) which may be due to lack of working experience with VC technology. Increasing concern over efficiency and effectiveness of technology transfer through this medium has made it emerge as an alternative method for managing people and services. It links students isolated by time and space and provides an interactive and face-to-face environment to conduct electronic meetings, tele-seminar, tele-training, teleconferences and distance education. Attitude survey proved insightful with agricultural students and there was a significant difference between users and non-users of VC technology (t value=18.23; $df=34$; $P>1\%$). Users also had significant positive attitude as compared to non-users (t value=5.11; $df=34$; $P>1\%$) of this promising technology. Positive attitude depicts a clear expression for adoption. Undoubtedly, there is a need to create awareness among agricultural graduates especially among non-users to bring attitudinal change in their outlook. VC may offer new possibilities for schools, colleges including formal instructions, connection with guest speakers and experts, multi-school project collaborations, professional activities etc. Consideration should therefore, be given to increasing the role of VC in expanding social as well as academic opportunities for rural masses and students. However, landscape of VC is changing and evolving quiet rapidly and educational institutions are now putting support systems in place to make technology easier to use. Implementation and greater adoption of VC technology can be facilitated through providing adequate access to equipment and technical support, addressing issues of time and scheduling, and providing sustained training.

4. Conclusions and Recommendation

Attitude is a complex mental process which is relatively stable and, once adopted, can provide a long-term positive effect. The study indicates positive attitude of agricultural students towards VC technology. Most of the students were well educated, which enabled them to access and make sense of information available. In Indian perspective, VC technology has a wider scope and can prove to be a boon for transfer of agricultural innovations. Following measures can be recommended for its wider application: (i) Besides transfer of agricultural technologies, more services such as training, distance education, extension management, communication, administration, health, education, and knowledge sharing may be encouraged (ii) VC infrastructure that already exists within National Agricultural Research System (NARS) which include, Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs) and Krishi Vigyan Kendra (KVKs) may be effectively put to use for learning and technical counseling (iii) Knowledge generation institutions must be encouraged to keep pace with changing scenario and develop content that can be put to use by using new tools (iv) Large scale interactive demonstrations must be organized (v) Technological change based on clients feedback (agriculture students, farmers etc.) should be incorporated, and (vi) Understanding of VC technology must be built into system to gear-up for serving the farming community.

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Table 1. Description Summary of Variables in Attitude Study

Variables	Definition
AGE	Age of respondents in years
EDU	Number of years spent by respondents in a formal institution
MSTATUS	Value is 1 if respondents is married and 0 otherwise
GEN	Value is 1 if respondents is male and 2 for female
LHOLDING	Land in hectares
TRG	Value is assigned as: 1=short-term training, 2=medium-term training, and, 3=long-term training
ISU	Value is assigned according to frequency of information source used: 0=never, 1=sometimes, and 2=always
ATTITUDE	Rating scale: 1=Strongly Disagree; 2=Disagree; 3=Undecided; 4=Agree; 5=Strongly Agree

Table 2. Demographic Attributes of Agriculture Students, PAU, Ludhiana (Punjab)

Demographic Attributes		Frequency	(%)
Age (in years)			
Low	(< 19)	-	-
Medium	(19 - 29)	6	8.58
High	(> 29)	64	91.42
Education	Bachelor of Technology	33	47.14
	Master of Science	28	40.00
	Doctor of Philosophy	9	12.86
Marital Status	Married	4	5.72
	Unmarried	66	94.28
Gender	Male	60	85.72
	Female	10	14.28
Land Holding (in hectares)	Landless	31	44.29
	1-10	22	31.42
	11-20	10	14.28
	> 20	7	10.00
Training Attended			
Agriculture	Short-term	8	11.42
	Medium	6	8.57
	Long-term	29	41.42
Dairying	Short-term	-	-
	Medium	9	12.85
	Long-term	3	4.28
Tractor Repairing	Short-term	1	1.42
	Medium	1	1.42
	Long-term	2	2.86
Rice Milling Technology	Long-term	2	2.86

Table 3. Information Source Utilization of Agriculture Graduates, PAU, Ludhiana, (Punjab)

Information sources utilization	Frequency (%)		
	Never (%)	Sometimes (%)	Always (%)
Radio	3 (4.28)	36 (51.42)	31 (44.28)
Television	-	13 (18.58)	57 (81.42)
News Paper	-	4 (5.72)	66 (94.28)
Group Discussion	10 (14.28)	47 (67.14)	13 (18.58)
Research Institute Visit	14 (20.00)	41 (58.57)	15 (21.42)
Research Journal	12 (17.14)	36 (48.58)	24 (34.28)
Internet	4 (5.71)	17 (24.14)	49 (69.58)
Videoconferencing	36 (51.43)	29 (41.43)	5 (7.14)

Figures in the parentheses indicate percentage of each source of information.

Table 4. Agricultural Graduates' Attitude towards VC technology, PAU, Ludhiana (Punjab)

Statements Rated	Mean (\bar{x})	Standard Deviation (σ)
Training		
VC reduces unproductive travel time, money and energy	4.12	0.67
VC offers an interactive and comprehensive learning like other interpersonal transaction	4.01	0.71
By using VC technology more number of staffs and farmers can be trained	3.98	0.87
VC reduces trainers-to-trainees' ratio many folds	3.72	0.79
VC can be planned in short notice	3.50	1.07
Distance Learning		
VC provides quality learning to wider audience over distance	4.05	0.96
VC offers information to learners, researchers and institutions with limited resources	3.98	0.95
VC can provide global educational, cultural information, and knowledge in a network environment	4.22	0.67
Agricultural Communication		
VC is a language neutral medium which provides face-to-face communication with instructors	4.15	0.73
VC disseminates information quicker than other means of communication	3.82	0.76
VC improves efficiency of experts and extension workers in reaching a large number of farmers with less effort	3.91	0.82
VC delivers information in more convenient manner	4.08	0.73
VC reduces travel related cost	4.04	0.89
VC reduced money and labor involved in organizing / demonstration / producing video films and publishing farm literature	3.88	1.07
Multiple site connectivity through VC helped in face-to-face dialogue with renowned agricultural scientists and policy makers	3.82	0.88
Extension Management		
VC improves quality of extension management	4.02	0.72
VC links persons isolated by space	3.88	0.71
By integration of VC into extension system, efficiency and effectiveness could be increased	3.97	0.53
VC provides methods to explore techniques of managing people and services	3.72	0.72
Through VC technology hands-on experience is favored	3.31	0.94
Shy people can ask questions through VC facility	3.14	1.15
People feel satisfaction as no contact or affinity between trainers and trainee	3.20	1.04
Interactive improvement in teaching skill is possible through this facility	3.22	1.09
Rating Scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Undecided; 4 = Agree; 5 = Strongly Agree		

Table 5. Agricultural Graduates' Distribution based on their Attitude towards VC Technology, PAU, Ludhiana (Punjab)

Attitude		Frequency	(%)
Less Favorable	< 80	7	10.00
Favorable	80-95	55	78.58
Most Favorable	> 95	8	11.42