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Connected Learning and Agricultural Extension: shall the twain meet?

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The greatest success of agricultural communication and extension was the Green Revolution in South Asia, especially India. Almost 50 years later, it still remains the most significant achievement of the paradigm of agricultural communication. In the right policy environment, a unique blend of scientific leadership, committed extension work and focused radio broadcasting, supplemented by print media, brought about the success of the Green Revolution.

In the period since that notable success, there has been a revolution in the communication paradigm as a whole, aided greatly by a host of new technologies such as satellite-based broadcasting, massive spread of personalisable communication devices (cell phones) and rise of the interactive Web as a medium and of Social Media. Many observers have noted fundamental changes in the notions of mass media and mass audience. Leaders of an important business, the Bollywood, have recognized the fragmentation of mass audience in the way movies are produced and marketed now. This is even better reflected in rapid spread in popularity of programming in TV in every regional language, whose net viewership is massive. Social Media is a latecomer in the commercial and political scene in a country like India. Its influence is now acknowledged by leaders in politics and in media, with the latter becoming Mainstream Media, or one more stakeholder in media that influences opinion. Social Media's role in electoral politics and public life has been debated; while its role in facilitating more targeted relief in a disaster situation (floods in metropolitan Chennai, India, early Dec 2015) is now widely acknowledged.

It is not out of place to suggest that agricultural extension communication has by and large remained immune to all these developments. Broadcast media are still at the core of extension

communication, supplementing or supplemented by face-to-face contacts between practicing farmers and extension professionals. There have been sporadic, non-strategic attempts, on minor scale mostly, to harness mobile phone technology. This technology is also used, however, in a broadcast mode, more to deliver bulk messages in voice or text medium, without many opportunities for engagement between key stakeholders. Attempts to use Social Media in extension communication are even more sporadic.

This is at a time when there are gradual changes in the core of theories of extension, indicating a general shift away from the almost classical "diffusion of innovations" approach (an elite group acquiring new ideas first and spreading them to others, the less gifted ones) to an Innovation Systems approach which is yet to gain ground in practice. There is also a range of theories in extension communication, especially where actual producers are concerned. Frequently, one comes across views about the importance of "getting into the mud" with the farmer as the ultimate step or ideal method of extension communication. This is not the place to review them. Our point is to emphasize that extension communication can be greatly strengthened and made even more effective and outcome and impact-oriented through a consideration of new developments in technology-enabled learning and human capacity development sector. They do have relevance in agricultural extension communication.

There have been theories in education, especially in Higher Education, about the critical importance of face-to-face interaction between the teacher and the student. Success of Open Universities in at least some areas of learning has given clear evidence that the importance of face-to-face instruction needs to be carefully revisited. An example: the Open University (OU) in the UK has been ranked among the top ten universities in terms of student satisfaction. While OU students are predominantly part-time students, it is also ranked among the top 50 UK universities- all with fulltime students- when teaching quality, student satisfaction and research are combined.

Online education today has become the mode of convergence for both campus-based universities and Open Universities. The Babson Survey of Online Learning (2014) shows that about a one-third of all students in the US universities now have participated in an online course. These numbers continue to grow, and the rate of growth is considered high. Less than ten percent of senior academics in the USA consider online learning to be inferior to face-to-face learning in

generating educational outcomes. This makes it even more necessary to revisit conventional theories about the critical role of face-to-face training in general.

Continuing popularity of MOOCs (Massive Open Online Courses) should be placed in this context. MOOCs are a form of online learning but they are more than that. MOOCs are better described as a form of Connected Learning. MOOCs enable multiple types of interactions in the same space of learning: learner- content; learner-learner and learner-mentor. Further, MOOCs are Internet-centric. This aspect enables all the interactions to proceed meaningfully and together, with the course providing the backbone and structure to these interactions. In some of the first set of highly popular MOOCs, massive number of learners signed up (touching almost 200 000 in one course). The only barrier to entry for a learner was the need for Internet access. Four years after the launch of some of the truly massive courses, it is estimated that over 25 million learners have signed up for MOOCs in all. The original MOOC in 2007 in Canada was designed with learner-learner and learner-content interactions in focus. The bigger MOOCs of 2011-12 focused much more on learner-content interaction.

MOOCs for Development, a new way of designing and delivering MOOCs, focus much more on learner-mentor and learner-content interaction while facilitating learner-learner interaction. Careful attention is paid to Internet access conditions that the learner faces in a typical situation in a developing country. This has led to a few important innovations being incorporated in MOOCs. One of them is the facility provided to a learner to listen to the audio track of a talk/lecture in the cell phone. Another is the facility to use popular Social Media applications like Twitter, Facebook or WhatsApp to follow and contribute to discussions in the course. These applications generally use lower bandwidth for access compared to viewing a video online using a PC; there is an advantage of convenience as well. Given such possibilities, senior academicians in the agricultural sector in India agreed that MOOCs would be relevant in meeting the needs of training on very large scale among various stakeholders in Indian agriculture (NAAS, 2014).

Commonwealth of Learning and the Indian Institute of Technology Kanpur (IITK) are partners in building a number of MOOCs for Development. Starting Oct 2013, COL and IITK have offered three MOOCs on topics such as mobiles for development, ICT basics for agriculture and a MOOC on how to build a MOOC for developing countries. Recently, COL and IITK provided the MOOC platform and management support for the University of the South Pacific to offer a MOOC on

Climate Change in the Pacific Islands. Each MOOC had an average of 2000 participants and about 60% of them were active through the course, with 20% of receiving certificates of participation and competence. In some of these courses, there were participants that had limited access to the Internet. Instead of streaming course videos on the web, they were able to use the audio track of the talks via cellphone (anywhere in the world), and could download scripts and slides using even low bandwidth connection. For a group of learners in Sierra Leone, the course managers made learning materials available via DVD's that were couriered to them so that they could participate in online discussions and assessment. A portal called MOOC-for-Development, www.mooc4dev.org, enables access to all the course materials to anyone.

This MOOC-for-development practice was technologically augmented so that a course (with learning materials and assessment) can be delivered to those that use only a basic cell phone as an access device- not a smartphone or another type of computer. With instructors using the web and learners using basic cell phones, Delivery of an interactive course on a reasonable scale is a challenging proposition technologically. Here is where the core of a technology that IITK had developed for expert-farmer two-way interaction was brought in to help. A team at IITK had developed and implemented an advanced web-to-mobile and mobile-to-web communication arrangement. It was popularly known by the name "vKVK" ("Voice KVK" is an informal expansion of this term). This set of technologies enabled an expert in a *Krishi Vigyan Kendra* (KVK) or an equivalent setup to help form farmers into groups based on crops or locality, and create and deliver messages to them in an audio format. An expert can do all these tasks using a computer that has access to the web. Delivery of messages took place using the "missed call" approach popular in business practices in India. A farmer who had opted to join the service received a "missed call" indicating that a message waited for her/him. S/he could call a pre-assigned, toll-free number to listen to that message at own convenience. A farmer could also use the same number to leave voice messages for an expert who would pick it up using a web interface! This is how the cycle from web-to-mobile and mobile-to-web gets completed. The technology has been described in greater detail elsewhere (Balaji and Prabhakar, 2014). During its operational phase (2011-12), close to 30 000 farmers used services from vKVK daily during the *kharif* seasons, and rated them highly useful. An important strength of vKVK is that it is totally independent of any telecom service provider. The users could avail services from anyone of their choice or using any handset. (In general, a number of mobile information services in agriculture are allied with

particular telecom companies or with handsets/Apps). It is important to note that in spite of the innovations developed and deployed and the practical success, this initiative has not been able to attract support from public agencies in Indian agriculture.

This vKVK suite of technologies was significantly modified and adapted for deployment in a MOOC for farmers where a basic cell phone would be the only access device. Voice was the only medium to receive the messages; keystrokes on the number pad in the phone and voice were the modes of interaction/transaction. The purpose of the course was to improve awareness of practicing horticulturists (or, "mali"s) about essential concepts and practices of scientific horticulture. A team of senior experts in horticulture analysed the approved "package of practices" in the State of Uttar Pradesh (UP) and created a series of audio modules comprising audio clips of about 15-60 seconds duration. Hindi was the language of the course. The total duration of all audio clips was 120 minutes; these were delivered under crop-specific topics over a period of six weeks starting Nov 2014. Assessments were included; learners could answer a quiz (question delivered in voice) with pre-assigned key strokes on the number pad. The course team created a virtual call center with a toll-free number for registered learners to call. This arrangement served to support mentoring and served also as a helpline for access related issues.

This course attracted 1055 learners most of whom were located in five districts of central UP State. About 60% of the learners were active through the course and 294 were found eligible to receive certificates of participation. A small number were found eligible for special recognition for high competence. An evaluation of the course outcome was carried out using the Bennett's Hierarchy Model that is widely used in agricultural extension (Yadav, 2015). There was a text-based survey as well as filed-based surveys with willing participants. Results from this evaluation showed that most of the practicing gardeners that joined the course were in the age group 25-39. Only about 18% considered themselves illiterate; about 30% had been to primary school while almost 40% had finished high school. Participants found that the course content was suitable (90%) and was easy to comprehend (without using jargon or technically intricate concepts). It also emerged that almost all the participants were sharing information, on an average, with 6 more people, mostly fellow gardeners. They were able use the knowledge gained almost immediately and to a great extent (63%). Participants considered this route as the fastest way to acquire new and useful information and were willing to recommend this and similar courses to others. They did not

consider the time spent as expensive in terms of lost opportunity or entertainment. A key factor appreciated by all was that the audio quality was excellent throughout. The team at IITK has gone on repeat the course to smaller groups to continue refinements in technology.

IITK and COL have gone on to found a new, informal consortium of willing experts and institutions to launch MOOCs in agriculture. Called AgMOOCs Consortium, this group has as its aim design and delivery of MOOCs that will be useful to students, researchers and extension professionals in agricultural organizations in public and private sector (www.agmoocs.in). These MOOCs can be viewed as providing supplementary topics or continuing education opportunities with formal certificates from national institutions to those eligible. Many of the AgMOOCs would be useful as general awareness courses as well. Specific courses to acquaint practicing farmers with important techniques in scientific agriculture have been planned, and will use the specially designed technologies deployed in the MOOC for "mali"s. The first MOOC on ICT Basics for Agriculture (March-May 2015) was a success, attracting 2100 registrants. The next set of courses have been announced and will start in January 2016. In all, 20 MOOCs have been planned for delivery in 2016-17. Currently, AgMOOCs receive significant support from NPTEL, a globally renowned project under the Ministry of HRD, India, that has published very large volumes of high quality course materials on Science, Technology, Engineering and Management (STEM) topics.

It is clear that deep changes in processes and technologies in communication have impacted critical areas such as broadcasting in a fundamental way. Broadcasting has been a key ally in agricultural extension and communication, but the changes in the milieu of broadcasting are not fully reflected in the way extension communication is organised in India currently. Learning for development paradigm is similar to agricultural education and research for development in keeping human development in its focus. Learning for development is able to take advantage of new developments in IT and communication technologies. It is also able to harness newly emerging practices of social learning and bottom-up innovations to further contribute to the agenda of sustainable development. Agricultural extension and communication paradigm should be able to take advantage of technology-enabled new developments in a similar way. Stakeholders in the learning paradigm have invested adequately to create new and comprehensive systems of connected learning technologies. Leaders in agricultural research, education and extension should make adequate

investments in innovations that create new and sustainable channels and opportunities for multilateral communication among farmers and experts.

It is possible that there is less interest internationally in this matter. In OECD countries this would be so because it is assumed that for-profit organizations have found all the solutions. This is not the situation in a large emerging economies. Global Climate Change is a reality and it is requires rapid adaptations in agriculture in a vulnerable region such as South Asia. Continued internationalization of agricultural commodities also requires adaptation strategies at every point in the agricultural value chain. India faces the challenge of developing new knowledge and information services for highly varied types of farmers and allied stakeholders in a short time and on a massive scale. A paradigm that combines the advantages of new developments in communication and connected learning technologies and the development of a more nuanced approach in agricultural extension and communication are important for India and developing countries.

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