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Capitalizing on Organizational Knowledge: Imperatives for Decentralized Agricultural Extension Systems

Agricultural extension services have been organized to provide producers scientific farming technologies and knowledge to give them competitive edge in making farming decisions. Such an edge would have the effect of transforming the agriculture sector into a modern and profitable industry where the rural poor graduate from poverty into the middle class. However, because such is not the case in many countries like the Philippines, extension systems worldwide have been under scrutiny for falling short of their objectives.

The current study looked into a decentralized municipal agricultural extension system in a layer and swine based municipality—San Jose, Batangas, Philippines. Secondary data from 1993 (or two years after the enactment of the Decentralization Law) were complemented by interviews and focused group discussions. It was found that the municipality has active private extension for its swine and layer industry, the major source of agriculture income, but the government agricultural extension system needs to re-evaluate its traditional role from a monolithic producer of traditional services to that of an enabler where it catalyzes the effective involvement of public and private agencies or organizations to build the intellectual capital of the locality to make superior business decisions. Such a shift in perspective by the municipality requires a shared vision among the key stakeholders in the community. It is argued that extension systems, whose function is primarily to develop human capacities in agriculture, need to maximize strategies to create knowledge that addresses the multi-functional nature of agricultural development. Knowledge creation strategies should be prioritized as these could significantly improve extension's contribution to facilitating a learning community adept at addressing complex problems at the municipality level.

Agricultural extension has been a major tool in accelerating farm productivity and income by providing agriculture producers superior scientific knowledge and skills. Worldwide, it has helped shape the transformation of the agricultural landscape by providing choices to farmers, including selecting what commodity to produce and when to

produce, what technologies to use, and where to market and at what price to sell. In other words, agriculture extension has helped enhance the economic rights of farmers, in turn motivating them to make good business decisions. But such is not always the case of agriculture extension in many countries such as the Philippines.

The persistence of rural poverty and hunger, environmental degradation and the growth of the private sector coupled with the drive to reduce government interventions have forced extension to re-examine its traditional role. In the light of all these plus the financial crises facing developing countries, extension organizations are pressed to address issues that are not only limited to increasing food production but now include those associated with the food chain such as food safety and security, global competitiveness as well as environmental issues, and social issues including poverty alleviation, social equity, and empowerment. The transformations needed in terms of thrust and the governance required are what Chambers (1993) calls a paradigm shift.

The success of the transfer of technology (TOT) model in the European and American organizations became the prototype for developing countries. Realizing that farmers in developing countries have more diverse landscapes, capabilities and resources, agricultural extension along with other policy instruments, focused on the removal of constraints. This gave rise to the farming systems and extension (FSRE) approach that eventually led to the participatory approach like farmer-led extension that seeks to ensure farmer participation in decision making (Chambers, 1993). However, the still dominant technology transfer mode, despite the complexity of issues surrounding the agricultural sector, has sparked criticisms from extension professionals and among those involved in rural development. As Rivera, Qamar and Van Crowder (2001) asserted, "Extension systems have been failing or are barely functioning at all". Extension professionals have a key role to play, but must seek models and strategies that would help improve their organizational skills, given the complexity and magnitude of the situation.

The Philippine agricultural extension system underwent a major shift when extension was devolved to the local government units (LGUs) through the passage of Local Government Code (LGC) of 1991. Under the code, LGUs take on the central role of formulating plans and managing the delivery of services that aim to improve the lives of their constituencies. The Agricultural and Fisheries Modernization Act (AFMA) of the Philippines enacted by President Fidel V. Ramos in 1997 and the Philippine Fisheries Code of 1998 stipulated major policy interventions to modernize agriculture. Section 87 of the AFMA stated that extension services to farming and fishing communities included provision of training, farm advisory, demonstration services and information, and education and communication through tri-media. AFMA is the main policy guide for the agricultural sector (Refer to http://www.da.gov.ph for the full document).

While decentralization was seen as a move towards democratizing the system, it was likewise perceived as having further fragmented the extension system as local government units struggled to prioritize human, financial and logistical resources in order to cover their expanded responsibilities and, at the same time, create a positive political impact on the voting populace. Given the wide scope of extension as advocated by leading rural development workers (Farrington, Christoplos, Kidd & Beckman, 2002) and the pressure to become relevant amidst lack of financing, it was interesting to note how a fifth class municipality was addressing the challenge of modernizing agriculture based on the goals stipulated in AFMA.

Objectives of the Study

The main rationale for the devolution of agricultural extension was to improve the delivery system by ensuring that management functions are decided upon at the local level. By doing so, programs could be tailored to the particular needs of the community and problems could be addressed at the local level. In principle, the move was seen as a solution to managerial problems such as relevance, efficiency and effectiveness. Considering that the main function of extension is to develop the human capacities of the populace for improved decision making, this study used the knowledge creation model of Nonaka and Takeuchi (1995) to determine how improvement in the knowledge system is addressed. In this context, an investigation was made into the dynamics of providing agricultural extension services and assessing the knowledge creation system of San Jose, Batangas using the model of Nonaka and Takeuchi with the objective of making practical recommendations for the improvement of agricultural extension service at the local level.

Methodology

Focused group discussions (FGDs) and key informant interviews were conducted. Two FGDs were held with the personnel of the office of the municipal agriculturist (OMAg). There were iterative interviews with the municipal agricultural officer (MAO), the provincial agriculturist, and the provincial veterinarian and their staff. There were also interviews with the Municipal Mayor, the Municipal Planning Development Officer, Budget and Licensing Officers, two outstanding farmers, two successful black pepper growers, four vegetable and fruit growers, two cooperatives in the area, all of the eight veterinary suppliers in the area, two veterinary sales persons in the area, the owner of a poultry dressing plant, the owner of a private slaughter house, the vice president of a cooperative feed milling, the President of the Feed millers Association, meat shop owners, two swine and three egg *viajeros*, eight small, five medium, and four commercial hog raisers, and seven small, two medium and two large layer owners.

Theoretical Framework

Knowledge provides the competitive edge in any undertaking as it is the source of decisions and actions that allow people, groups and organizations to plan, manage, control, and evaluate activities and reinvent and create something new. According to Davenport and Prusack (1997), knowledge is a fluid mix of framed experience, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information.

In the study of knowledge creation, a distinction between tacit and explicit knowledge is often made. Tacit knowledge refers to what a person knows, including habits, insights, intuition, assumptions, beliefs, values, judgment, and intelligence. On the other hand, explicit knowledge refers to numbers and words translated as manuals, documents, and so on. Explicit knowledge can be articulated, codified or stored in certain media and thus is more easily shared than tacit knowledge. While tacit knowledge is acquired primarily through socialization, explicit knowledge is generated through formal study of codified knowledge. Accordingly, tacit and explicit knowledge are complementary and when they interact dynamically, they produce organizational knowledge (Nonaka & Takeuchi, 1995).

Knowledge creation is a central challenge to development practitioners. In the past, diffusion of knowledge was assumed to take place using a top-down approach. Linear models assumed that knowledge proceeds from generation, transformation, integration, storage and retrieval (Roling, 1990). On this basis, development initiatives attempt to manage the exchange of information from the research to the general users. However, failures in the top-down model proved that knowledge cannot be simply transferred. Tacit knowledge for its part results in the processing of information as a result of interaction with the environment. In this context, knowledge creation can only proceed if spaces for interaction are provided among different individuals and organizations. For knowledge to be created, there should be reflexive learning that allows exchange of ideas and experiential learning where reflection and revision of original proposed actions are encouraged.

Nonaka and Takeuchi (1995) defined organizational knowledge creation as the capability of a company as a whole to create knowledge, disseminate it throughout the organization and embody it in products, systems and services. The dynamic interaction and conversion of tacit to explicit knowledge leads to organizational knowledge creation. This dynamic process involves four modes of knowledge conversion represented as a spiral having five phases. The dynamic, spiral process includes first of all 1) the First mode, socialization (tacit to tacit), involving the sharing of tacit knowledge or the interpersonal exchange of tacit knowledge (first phase) and 2) the Second mode, externalization (tacit to explicit), referring to the transformation of tacit to explicit knowledge through codification into metaphors, analogies or diagrams thereby developing a common understanding (second phase: creating

concepts). This eventually leads to collective reflection of the concepts and comparing and evaluating it with other explicit organizational concepts (third phase: justifying) models and practices with the intent of coming up with an innovation. The Third mode is combination (explicit to explicit): This leads to the integration of the new knowledge to existing knowledge structure or the formalization of the new knowledge (i.e. concept, process or system) within the organizational context (fourth phase). Finally, the Fourth mode is internalization (explicit to explicit), where the new knowledge is interpreted and is manifested in practice within the organization (fifth phase). The process eventually kicks off again and starts the cycle of knowledge creation.

Findings of the Study: How the Municipal Agricultural Extension Office is Getting By

San Jose is an agricultural municipality known mainly for its robust livestock, and poultry and egg industry. It generates an estimated 2.2 million eggs daily and supplies hogs to the nearby cities of Batangas, Lipa and Metro Manila. Residents actively engage in backyard poultry and swine raising activities because the proximity of the town assures them of commercial linkages and markets.

Personnel Profile, Activities and Expenditure Pattern

With one municipal agriculturist and five extension workers, there were approximately 937 farmers and 878 hectares (ha) of agricultural land for each extension technician. However, based on functional responsibilities, there was only one technician in charge of each of the livestock and crop production sectors. The remaining technicians functioned as meat inspectors. This meant that there were 2,811 farmers for every extension worker and 2,634 ha for every technician. There was, however, no data on how many farmers were involved in the swine and/or layer industry and/or crop raising or on how many hectares are devoted to a particular crop.

Based on focused group discussions, the Office of the Municipal Agriculturist (OMAg) spent 50% of its time doing inspection, 20% monitoring of Department of Agriculture (DA) downloaded projects, and the remainder of the time was spent for dispersals, vaccination, techno-demonstrations, training and farm visits and linkage. Training in this sense is a coordinative activity as these are mostly sponsored by the private sector. Vaccination of dogs was mentioned as one of the major activities. Farm and home visits remain as the major extension method. A major chunk of the budget for extension (74%) went to personnel services, leaving only 24% for operational expenses (MOOE) and 1% for capital outlay. Analysis of the MOOE showed that funding allocation was politically oriented as funds were distributed among different barangays, at times, spread very thinly. The influence of the DA came in the form of funding for selected national projects, normally crop

based. As funding for locally initiated projects are limited, the OMAgs are only too happy to participate in national-led projects.

Extension Providers

There were many extension providers catering to the layer and swine industry, most of them coming from the private sector, such as personnel from the feed mills, veterinary and feed companies, private veterinarians, and private consultants and associations. Other raisers, feed mill personnel and veterinary suppliers were in constant contact with the farmers. The OMAg was considered only as an occasional source of information by small raisers. A septagram validated by small, medium and large farmers indicates that the prime movers of the industry were the feed mills, other growers, veterinary companies, *viajeros* (middle-persons) and banks.

Planning, Monitoring, and Evaluation Activities

Planning is done regularly at the end of the year (as a requirement for the annual budget) by the Municipal Agricultural Officer (MAO) in consultation with the Mayor. It was normally based on the budget released and accomplishments during the year. There were no planning sessions that involved the staff at the OMAg; neither were there any long-term extension plans.

Although second only to inspection, monitoring and evaluation activities were identified as important by the OMAg. However, there is no record of these activities and none about the scope and outcome of interventions. It appears that monitoring and evaluation of projects were done mainly to comply with requirements of the provincial office. Ironically, documentation of project progress was not a priority. The only source of data for past activities was the accomplishment report of the outgoing mayor, listing all activities of the LGU from 1992 to 2001, the list of which came from the memory of the MAO. There was no system of monitoring and evaluation, making it difficult to account for the accomplishments as well as problems of the office.

Conceptual Understanding of Extension and Agricultural Goals

While the LGUs (provincial and municipal) agreed that extension activities centered on distribution of brochures, conduct of techno-demonstrations, farm visits, dispersals, monitoring and conduct of training, the private sector articulated other activities they believed should be the concern of agricultural extension. For instance, the large raisers expected the OMAg to be more active in the prevention and control of diseases, to provide updates on strategies of industry players from other countries, to offer information on new policies relevant to the industry, to provide timely price information and to protect the industry from foreign competition through

active lobbying. Clearly, there are disparities in terms of what is being offered by the government and what is expected. There are also overlaps in functions as the private sector, represented by feed millers, and feed and vaccine companies, do their own extension work as well.

Understanding AFMA Goals and Objectives of OMAg

The municipal agricultural officer (MAO) was able to articulate four of the goals listed in AFMA: food security, sustainable development, global competitiveness, and poverty alleviation. The MAO failed to mention two other important goals: social equity and empowerment.

In the pursuit of these goals, the MAO saw the role of the national government as one that sets policy directions, provides funds, and ensures low lending interest rates. On the other hand, the private sector saw the role of the local government as implementers of projects to fit national and local priorities, distributors of goods and providers of tax incentives. While unable to identify any of the goals, the other staff members were able to explain the goals. However, it is questionable how these national goals can be translated at the local level if members of the OMAg fail to identify them in the first place.

In summary, the OMAg suffered from traditional, reactive and politicized planning, budgeting and project fund allocation, report-oriented monitoring and evaluation, lack of systematic data sets, a mainly production-oriented concern and farm-and-home-visit-focused extension, lack of common understanding of AFMA goals among the staff as well as lack of congruence on the kind of extension the private sector expects versus what is currently delivered. All of these point to a poor emphasis on knowledge creation.

Summary, Conclusions, and Recommendations

The San Jose OMAg is largely focused on the regulatory aspects of extension with 50% of its time spent on monitoring slaughter houses and one dressing plant. In addition, a major activity is the vaccination of hogs and dogs to curtail the spread of diseases though funding for this is minimal. Farm and home visits remain a major extension method. Thus, with the limited number of technical persons, technical advice and government programs reach only a select few. Distribution of material inputs is politically influenced.

The OMAg does not have a systematized set of agricultural data about San Jose, about its major accomplishments, its best practices, nor of the current projects and the monitoring of these projects. Monitoring and evaluation are seen mainly as obligatory functions that are not anchored on improving project planning and implementation. The status, budget, performance of its projects, best practices monitored and major problems encountered are not properly documented. Organizing and storing of these data for retrieval and the use of stakeholders are not prioritized. Relative to this, planning becomes a listing activity by the MAO and the Mayor. As

such, there is no common understanding of what AFMA goals are within the OMAg. Likewise, shared activities with the private sector are not maximized as OMAg serves mainly as organizers of farmer participants. Without the proper sharing of knowledge and the storing of data, knowledge creation could not proceed, in turn leading to failure in the knowledge creation process (Figure 1).

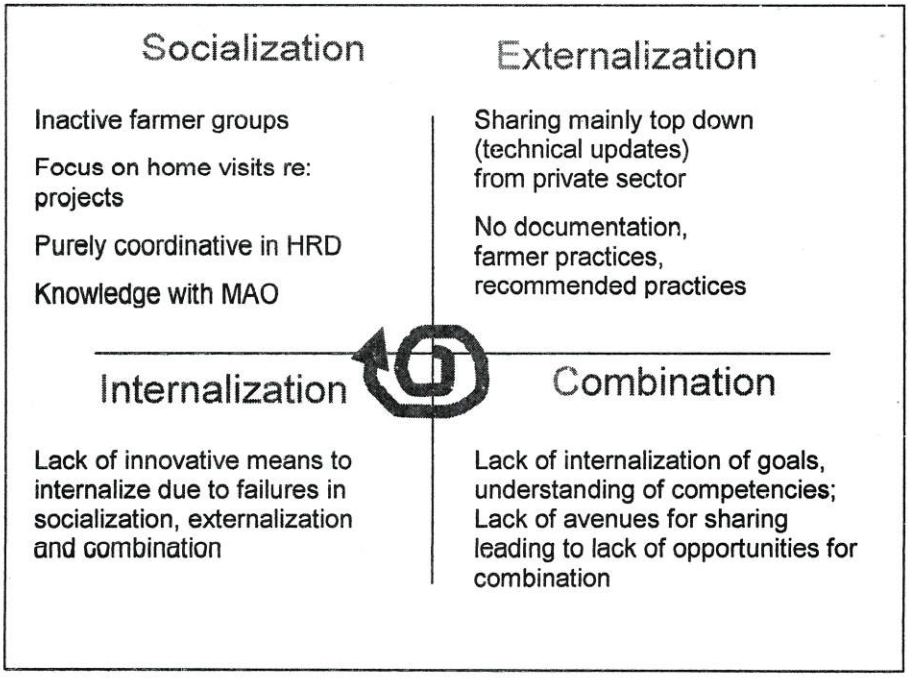

Figure 1. A summary of inadequacies in knowledge creation at the study site (Based on the Nonaka and Takeuchi Model)

In the history of agricultural development, extension have been credited for playing a significant role in increasing the availability of foodstuff and in increasing income of farmers through introduction of new technologies and provision of technical advice. However, in the case of the swine and layer industry, technologies and information are becoming more specialized. This has of course been a significant challenge to government workers who suffer from poor funding and inadequate and regular technical training. It has to be recognized, however, that the private sector has been more than willing to take over this government function as a result of positive market growth. As the private sector is pushed to achieve higher production efficiency and effectiveness, the kind of support it needs from the government sector changes.

No longer are they just interested in production related information, they are very much expecting support on price monitoring, trade policy updates, and lobbying.

In the advent of globalization, the demand for efficiency and effectiveness remains the biggest challenge for both the private sector and the government. While the private sector has to contend with issues such as local market inefficiencies and global competitiveness, government grapples with financial inadequacy and changing expectations and roles. Knowledge creation becomes imperative.

Organizational Knowledge: Platform for Reform

An analysis of the four modes of knowledge creation requires certain fundamentals. For one, the model implies that there should be opportunities for learning among people—whether formal or informal—in order to proceed to the second mode of the knowledge creation process. Secondly, it becomes necessary that the organization systematically collects, documents, and stores explicit knowledge in written documents or data bases accessible to the people. It likewise documents and stores information related to their business coming from such sources as books, journal publications, policy discussion papers, policies, and policy briefs. People know where to locate these and can access information without difficulty.

The third implication is that the organization explicitly states its vision, principles, culture core knowledge, and skills that people should internalize to serve as framework for planning and implementation of programs. It also requires that the context for any changes in vision and plans is recorded in order to provide basis for strategic planning. The absence of these would lead to the failure of the third mode in the knowledge creation model. Finally, the last requirement is that the organization documents innovations, the context of its success (or failure), and the mechanisms supporting it that lead to the last mode in the model.

It should be noted that all these imperatives are absent in the San Jose case. In relation to the first imperative, for example, only the MAO attends meetings with other MAOs in the province and there is no evidence in the sharing of the knowledge among the other members of the group. Most of the data and information derived were mainly from the MAO, illustrating that expertise is embodied in only one person. As observed in the study, the OMAg does not have a filing cabinet or a filing system, for that matter. It does not have documentation of its accomplishments and history whether in print or in a soft database. It likewise does not have documents related to agricultural extension other than flyers. The vision part is likewise problematic as evidenced by the response of "Ask the MAO as he knows" by members of the OMAg. Addressing the imperatives in each of the phases of knowledge creation becomes imperative if extension focuses on developing human capacities.

Identifying knowledge creation strategies

Socialization, or the interpersonal exchange of tacit knowledge, is an important mode if not the most important mode in the spiral model of knowledge creation. Hence, opportunities for creating a forum of exchange among and/or together with extension workers and other key stakeholders in the form of communities of practice (COPs), formal work group, project teams, and informal networks become necessary (Wenger & Snyder, 2000). Wenger and Snyder emphasized the importance of COPs as these are self-selecting members who share a concern or passion for something they do and learn. In such gatherings, exchange of ideas is not pre-determined or piecemeal as inter-relations of problems and opportunities are discussed. To complement these, opportunities for cross farm visits, and formal and technical knowledge sharing are necessary activities that open up spaces for dialogue and collective learning to take place.

The transformation of tacit to explicit knowledge is considered a focus of research scientists. It was only during the 1980s that the rural peoples' knowledge (RPK) became recognized (Scoones & Thompson, 1994). The dominance of the transfer of technology in agricultural extension, however, prevented the dynamic exchange of ideas among the stakeholders in the knowledge information system as information in this case was often predetermined by agricultural extension workers. The farmer-first advocates, however, changed this perspective by documenting farmer knowledge. While Scoones and Thompson (1994) speak of the danger of such activities, especially taking into consideration the contextual and differentiated nature of knowledge, Chambers (1983) earlier cited some innovations resulting from exchange of knowledge between farmers and researchers. While such possibilities are exciting, Scoones and Thompson (1994) caution development workers about the political dimensions of knowledge sharing. Nevertheless, opportunities that promote better understanding among researchers, extension workers, and farmers, provide avenues for development of relevant interventions towards contextual problems. Understanding and documenting rural people's knowledge and the context of this knowledge is necessary. Participatory planning, monitoring, and evaluation and farmer-led extension models provide spaces for such exchanges and documentation of knowledge.

On the organizational side, any extension system should have its vision, cultural norms and well codified and stored materials coming from external environment. Among the extension workers, there should be easy access of their organizations' knowledge base and those of the other organizations that are deemed public in nature (e.g., technical bulletins, recommended practices, price monitoring, and the like). These exchanges should no longer be within government agencies only but in partnership as well with the private sector, civil society, and people's organizations as they have become more active in the provision of extension services. Such sharing could further lead to a better

complementation among the various stakeholders and help define the catalytic and supportive role of the government extension system. Technological support (Intranet, Internet, SMS) should be considered as enablers.

Mode three requires the combination of different sources of knowledge (research, extension, farmers) to form a new technology, methodology or practice. Co-management of demonstration farms and sharing among farmers should be emphasized. Documentation of such meetings, practices and sharing should likewise be stored to serve as basis for learning. The example given by Chambers (1993) as to how documenting rural people's knowledge can lead to innovative solutions led to improved conceptualization of research problems. Mode four requires the strategies and activities identified in mode one in order for the internalization process to proceed. Dialogue, involving sharing and reflection, is a very important process for both modes 1 and 4 in the knowledge creation model. For mode 4, it likewise becomes imperative that extension workers enhance their knowledge and skills through formal training, by working closely with farmer groups and by continuous updating through various reading materials. This is necessary to ensure that extension workers are able to internalize new knowledge and skills and at the same time, facilitate internalization of these to COPs. Again, the spiral knowledge creation model (Figure 2) of Nonaka and Takeuchi (1995) provides a useful framework for ensuring the facilitation of agricultural learning communities. It likewise alerts leaders and administrators on the weaknesses of an organization.

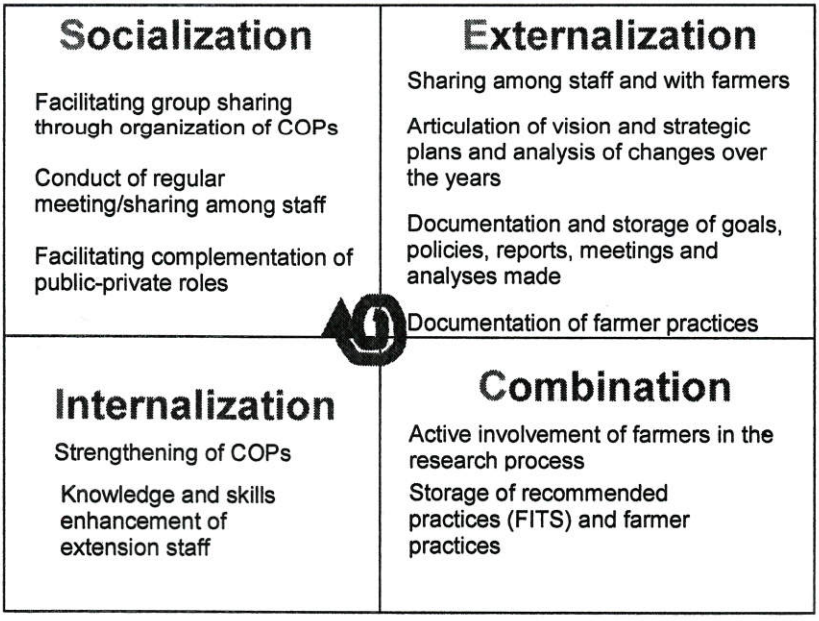

Figure 2. The knowledge creation model of Nonaka and Takeuchi (1995).

Using the knowledge creation model could bring about improvement in the development of knowledgeable farming communities who are more able to address complexity. These activities approximate the focus of extension as facilitators of learning communities, not just conduits between research and farmers. Research studies in documenting best practices in pursuing strategies in the different modes, particularly the creation of COPs, and the effect of changes in leadership and technology in knowledge creation, are researchable areas that could further help facilitators of learning in various fields map out better strategies to bring about learning communities.

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