



Review

Towards a new paradigm for rural extensionists' in-service training

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ABSTRACT

Changes in the conceptions of extension and rural innovation, as well as the persistence of diffusionist extension approaches, require rethinking training strategies for rural extensionists. Drawing upon conceptual insights pertaining to the theory of action, the social learning theory, and the communities of practice framework, in this paper, current training and educational strategies for extensionists will be critically reflected upon, lessons learnt will be extracted, and proposals will be generated. Amongst them, the need for expanding and reframing what we understand 'training extensionists' to be, overcoming the traditional transfer-of-knowledge approach, focusing on the reflection on the reflection on practice process, supporting the horizontal exchange of knowledge and experiences, and facilitating the development of extensionist communities of practice, are highlighted. Finally, it is argued that there is a need for advancing the conceptual discussion, systematizing innovative training practices, and researching trainings for extensionists and their impact.

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1. Introduction

Over the last few decades, the conception of rural extension (RE) has changed enormously and increased in its complexity (Leeuwis, 2004; Leeuwis and Aarts, 2011; Sæther, 2010), which requires rethinking and updating contents and strategies for training rural extensionists (Christoplos et al., 2012; Kahan, 2007; Sulaiman, 2012). Thus, in this paper, we will reflect upon rural extensionists' in-service training processes from a critical and complex perspective, contributing to the articulation of a transdisciplinary theoretical framework in order to address them.

Three changes in the conception of RE may be highlighted. The first is from approaches aimed at a linear and hierarchical transference of technologies to horizontal, interactive and participatory ones (Knickel et al., 2009; Landini, 2016). Second, from approaches centered on the practitioner-farmer relationship, to others of a territorial or interinstitutional character (Aguirre, 2012; Klerkx et al., 2012; Moschitz et al., 2015; Selis, 2012). And third, from a conception of innovation attached to the diffusion of predefined technologies, to innovation as a non-preestablished co-construction that occurs in the interaction between social actors with different experiences, types of knowledge, and capabilities (Leeuwis and Aarts, 2011; Sæther, 2010; Wauters and Mathijs, 2013).

In consequence, we assist a process of multiplication and diversification of the types of knowledge, competences and even attitudes that extensionists need in order to do their job effectively (Aguirre, 2012; Landini, 2013; Sulaiman and Davis, 2012), even when most of them have backgrounds in agricultural sciences (Landini and Bianqui, 2014a). Thus, it is to be expected that, over the last years, numerous authors and institutions have highlighted the importance of educating and training extensionists in order to work within the current extension paradigms (Ardila, 2010; Preissing et al., 2014).

A second element that leads to rethinking extensionists' training is the persistence of institutions and practitioners that use diffusionist assumptions in order to understand their practice (Chowdhury et al., 2014; De Lelis et al., 2012; Faure et al., 2013; Landini, 2012a, 2015; Landini and Bianqui, 2014b; Minh et al., 2010; Pavón, 2014; Turiján et al., 2012). Thus, the challenge of creating training strategies aimed not only at developing knowledge and capabilities for RE, but also at undoing the diffusionist approach that a technical education impresses upon practitioners and even RE institutions emerges (Landini et al., 2009; Bocchicchio, 2013). In consequence, there is a broadening of factors to rethink, given they do not only include the development of new types of knowledge and competences, but also the process of learning through reframing, including complex subjective changes (Landini et al., 2013a; Rogers, 1996), which are intertwined with extensionists' identities as well as with more ample socio-institutional frameworks attached to them.

Hence, changes are needed in extensionists' training regarding three issues. Firstly, the expansion of the technical-productive knowledge needed to fulfill their job, depending on the context of action (Ragasa et al., 2015). Secondly, a diversification of the types of contents to be considered, including now not only technical knowledge but also other types that stem from an array of areas such as commercialization, marketing and agribusiness (Christoplos et al., 2012; Méndez, 2006; Ragasa et al., 2015; Sulaiman and Davis, 2012); group work and bonding with farmers (Cuevas et al., 2014; Landini, 2007; Swanson, 2010); participation and facilitation of social processes (Christoplos et al., 2012; Leeuwis, 2004; Ortiz, 2009; Thornton and Cimadevilla,

2010); and communication methods (Christoplos et al., 2012; Cuevas et al., 2014; Mulder, 2012), among others, all of which is an invitation to think of RE in terms of interdisciplinarity (Carballo, 2002). And thirdly, the development of reflective capacities (Bocchicchio, 2013) and of critical analysis of their own conceptions and practices (Cerf et al., 2011; Landini et al., 2013a) with regards to their conceptions of RE and professional identities.

However, despite the clear importance of extensionists' education and training (Kahan, 2007; Ragasa et al., 2015; Ryan et al., 2012), current training programs, at least in Latin America, "do not seem to be solid enough to train extensionists in the needed capabilities to face the challenges raised" (Aguirre, 2012, p. 46). Even worse, not only do these training programs appear to be solid enough to tackle the needs that emerge from practice, but they also tend to reproduce traditional training models that focus on the diffusion of contents and not on the development of capabilities to manage complexity (Rogers, 1996).

Undoubtedly, there are publications that address the issue with certain detail, such as the systematization of training experiences carried out by FAO (Kahan, 2007), or the analysis of competences and training needs conducted by Bocchicchio (2013) and Landini (2013). Also academic works on the evaluation of alternative training strategies can be found, such as the participatory, internet-based strategy implemented by the University of Caldas in Colombia (Parra and Méndez, 2005) or the reflexive training conducted in Paraguay with practitioners of the Ministry of Agriculture and Husbandry (Landini et al., 2013a). Nonetheless, it is clear that the available scientific literature on the topic is still scarce and disperse, in contrast with the multiplicity of papers on topics such as training for farmers, or learning and innovation processes that occur in the articulation between different social actors, amongst others. At the same time, it also draws attention the lack of consideration paid to current developments within the area of education and learning for rural development and innovation, such as social learning (Morgan, 2011; Moschitz et al., 2015) or communities of practice, in order to address the issue of extensionists' training. Thus, as was argued previously, in this paper we will reflect on extensionists' training processes from a critical and complex perspective, contributing to the construction of a transdisciplinary theoretical framework that allows us to think about them in the context of the institutional and social frames wherein extension practices take place.

2. Knowledge, learning and the limitations of traditional trainings for extensionists

Before addressing training processes for rural extensionists, the concepts of 'knowledge' and 'learning' will be discussed, in order to generate a solid base for the analysis.

2.1. The notions of 'knowledge' and 'learning'

The concepts of 'knowledge' and 'learning' have diverse meanings depending on the perspective used to address them. In order to organize this diversity, different conceptual contrasts will be presented and unfolded.

In general terms, a first distinction refers to the contrast between behavioral and constructivist theories. Behaviorism understands teaching and learning processes in terms of the transference of knowledge from experts to apprentices, assuming that the latter are passive subjects in the process of learning (Boghossian, 2006). In RE, the behaviorist approach supports

traditional diffusionism, wherein knowledge is generated by researchers and transferred by extensionists to farmers (Aguirre, 2012), who are expected to passively adopt technologies developed by experts (Landini, 2016; Sulaiman and Hall, 2002). In this context, knowledge is understood as a mental content or as the right capacity for doing certain things (that is, unique and not subjected to a diversity of perspectives) which can be linearly transmitted from experts to laymen, while learning is conceptualized as a passive adoption process.

In contrast, constructivism is in line with an actor-oriented approach (Long, 2001), that considers those who learn (for instance, farmers or extensionists) to be active builders of knowledge (Moschitz et al., 2015; Rogers, 1996; Parra and Méndez, 2005) in the process of making sense of their experiences (Boghossian, 2006). From this perspective, knowledge is acknowledged as the result of a fundamentally social processes of construction (Ibáñez, 2001; Leeuwis, 2004), which tends to undermine the traditional relationship between 'knowledge' and 'truth'. Thus, learning is seen not as the result of a process of adopting externally generated knowledge, but as the consequence of the individual and collective process of lending meaning to ones' experiences and to the surrounding world.

In the context of Latin American RE, the constructivist approach may be seen in Paulo Freire's (1973) contributions, which propose the construction of a dialectical type of knowledge that stems from the dialogue between farmers and practitioners. On a global level, constructivism is also at the foundation of social learning theory, which is conceived as the result of interactive processes among individuals, actors and institutions with different experiences and types of knowledge (Morgan, 2011). As Moschitz et al. (2015) argued: "the central proposition of social learning theory is that knowledge is acquired in interaction. [...] During those learning interactions they co-create new meanings." (p. 3).

Similarly to the differences noted between behaviorism and constructivism, a contrast between knowledge as truth versus knowledge as interpretation or assignation of meaning, can also be identified. The traditional conceptualization of knowledge conceives it as a 'truth', in opposition to the idea of 'ignorance' (Leeuwis, 2004). In line with a positivist epistemology, from this perspective and *stricto sensu*, knowledge tends to be equated to a universally valid scientific knowledge that is independent from its context (Álvaro, 1999; van Beek, 1997). Here, there is no diversity of kinds of knowledge, but only one, true knowledge.

In contrast, there exists a different way of framing knowledge, tied to the individual and collective action of lending meaning to our experiences and to the world around us. As Long (2015) argues: "knowledge is conceptualized [...] in terms of the different modalities through which individuals respond, interpret and give order to the world." (p. 86). Understood in this way, knowledge does not appear as true or universal, but as something that emerges from, and is dependent on, the context wherein it is generated (Álvaro, 1999; Brown and Duguid, 1991, 2001; Ingram et al., 2014; Long, 2001), as well as being something that is useful for practice. In this sense, the idea of the existence of multiple types of knowledge, including local ones generated by different actors in the context of their practice, remains open (Sæther, 2010; Moorea et al., 2014). At the same time, this conception establishes a direct link between knowledge and identity (Brown and Duguid, 2001; Moschitz et al., 2015), given that the latter emerges as the results of the interiorization of socially constructed frames of meaning (Landini, 2012b).

The contrast between explicit knowledge, generally associated to what is discursive, and implicit knowledge, generally linked to practice, is also of interest to this article. This differentiation resembles the distinction between 'know that' and 'know how'

(Brown and Duguid, 2001). Leeuwis (2004) clarifies this distinction: "discursive knowledge refers to knowledge that we are aware of, have reflected upon, and can easily capture in language [...] Practical knowledge, however, is something we know and apply, but find it difficult to talk about" (p. 97).

Brown and Duguid (1991) argue that, in our society, abstract knowledge (here similar to discursive knowledge) receives much more acknowledgment than practical knowledge: "the education, the training and the design of technology generally focus on abstract representations, in detriment, even the exclusion, of real practice" (p. 40). This is particularly important when acknowledging that discursive training contrasts with 'know how', which is more related to abilities, expertise, competences, beliefs and values (Brito et al., 2012), that, due to being integrated into concrete practices in specific contexts, are much more difficult to address during training processes that are usually detached from practice. In this sense, Rogers (1996) highlights that "unless that new knowledge [generated in the context of training] is made part of a person's life, it will be useful only for the performance of mechanical tasks rather than for creative problem-solving, which is the real purpose of learning." (p. 89). Thus, the author points out an essential element to be considered in the context of training processes for extensionists: how to develop know-how in the context of training processes that are usually based on discursive strategies.

2.2. Trainings for extensionists found in scientific and institutional literature

As argued previously, there is ample consensus regarding the critical relevance of training extensionists in order for them to carry out successful interventions (Aguirre, 2012; Christoplos et al., 2012; Kahan, 2007; Ragasa et al., 2015; Sulaiman and Davis, 2012; Wanjiku et al., 2010). Nonetheless, numerous authors highlight existing limitations in extensionists' education as well as in the strategies used to train them (Aguirre, 2012; Christoplos et al., 2012; Rogers, 1996).

Firstly, several authors point out that trainings tend to focus on technical and productive issues, leaving out content relevant to RE practice (Landini, 2013; Ragasa et al., 2015; Rivera, 2011). This leads to the claim for the inclusion, within the curricula, of content, abilities and competences that are generally not taken into consideration (Sulaiman, 2012; Sulaiman and Davis, 2012), particularly those aimed at facilitating and managing group and social relationships (Cerf et al., 2011; Kahan, 2007; Ragasa et al., 2015; Sulaiman and Davis, 2012).

Along with pointing out limitations with regards to content, training methodologies have also been criticized. On the one hand, the need for a more practical and less theoretical education/training (Kahan, 2007; Wanjiku et al., 2010), has been pointed out, a characteristic which Sulaiman (2012) describes in terms of shifting from 'training' to learning 'by doing'. At the same time, the traditional, hierarchical, and barely flexible character of training strategies has also been identified (Rogers, 1996). Thus, the need for "new and unconventional approaches to learning" (Sulaiman and Davis, 2012, p. 13) becomes apparent, as well as the need for "alternative forms of training design and delivery" (Kahan, 2007, p. 58).

Taking into account the reflections put forth above, the following diagnosis may be drafted. Firstly, there is a clear limitation with regards to the scope of the content covered in trainings for extensionists, given that they are mainly aimed at addressing productive issues and not the array of areas implicated in their practice.

Likewise, traditional training formats seem to be prioritized, which leads to two main consequences. On the one hand, discursive

training is emphasized, leaving out the development of capabilities and practical competences in areas such as group facilitation and co-construction of knowledge, to name a few. Thus, conceptual knowledge is prioritized over practical knowledge. On the other hand, trainings tend to be based on a behaviorist or diffusionist pedagogy wherein valid knowledge is always in the hands of those who train, and extensionists are expected to simply 'adopt' the knowledge being transmitted. In this context, Rogers (1996) argues that, "trainees learn more from how they are taught than from what they are taught" (p. 92). Thus, the following question arises: How can extensionists trained according to these parameters facilitate horizontal processes of co-construction of knowledge when all the training they have received has been conducted using the opposite rationale? How will they be able to generate participatory dynamics when the structure of the training they received was hierarchical?

Thirdly, training strategies for extensionists seem to lose sight of the existing relationships between knowledge, RE approaches, and identities. The value of 'truth' that extensionists give to their technical knowledge, coupled with the idea of knowledge understood as being a scientific truth, does not only constitute a way of framing knowledge, but also of providing the identity of the owner of said 'true' knowledge. Additionally, this also shapes the way in which farmers' local knowledge, and RE work in general, is conceptualized as a mere transfer of technology, despite the fact that participatory methodologies are valued on a discursive level. Undoubtedly, changes in these conceptualizations and practices are not going to be achieved by intervening only at a cognitive level or by simply helping develop capacities for establishing different types of relationships. Greater changes are required with regards to extensionists' worldviews, identities and sources of self-esteem, which have to be taken into consideration when developing training strategies (Cerf et al., 2011).

Lastly, traditional training frameworks for extensionists centered on the trainer's –usually considered an 'expert'– figure, tend to persist without the acknowledgment of the existence of alternative methodologies that focus on the facilitation of reflective processes or the horizontal exchange of knowledge and experiences, some even without the presence of experts or external facilitators.

In brief, there is a general consensus amongst authors that transforming, broadening and strengthening extensionists' training is needed. However, there is no clear agreement on a specific, innovative training alternative to do so. Thus, in the following sections, different conceptual proposals are going to be analyzed in order to contribute to building approaches that could potentially overcome these difficulties.

3. Agency, reflection on practice and the theory of action

3.1. The theoretical framework of the theory of action

When reflecting upon the training received by rural extensionists, the emphasis tends to be predominantly placed on the transfer of conceptual knowledge. However, the inquiries carried out above led to the recognition of the limitations of such an approach, particularly when it is clear that a significant portion of practitioners' learning and expertise is based on their practice and on the relationship with their peers (Brown and Duguid, 2001; Yeo, 2008), which in this case consists of other extensionists. In this context, the Theory of Action (Argyris, 1991) provides a potentially interesting conceptual proposal for articulating training content with the ability to resolve practical problems (Peixoto and Pereira, 2013) and, furthermore, for the broadening of what we understand by 'education' or 'training' of rural extensionists.

The Theory of Action conceives people as being subjects aimed at achieving ends, subjects that execute specific actions in order to reach desired goals (Peixoto and Pereira, 2013). In a manner similar to constructivism and to an actor-oriented approach (Long, 2015) it focuses on human agency, assuming that people are capable of constructing knowledge, generating ways of making sense of their environment, and taking action so as to reach objectives.

In this line, one of the Theory of Action's basic premises is that people build theories to organize actions aimed at ends (Houchens et al., 2012), theories which may be defined as frameworks of meaning, beliefs, assumptions, guidelines and action rules that allow for the interpretation and explanation of how the world functions in specific areas of practice. Thus, these theories allow people to design and implement strategies in order to reach their goals (Houchens et al., 2012).

Argyris and Schön (1974) argue that there are two different types of theories of action. However, it is more precise to say, like Sánchez and Rojas (2005) write, that theories of action have two different 'dimensions'. The explicit dimension of a theory of action refers to the set of beliefs, assumptions and action rules that a person is conscious of having, can verbalize when is asked about them, and believes that it guides their behavior in a specific area of practice. In contrast, the in-use dimension of a theory of action refers to the set of beliefs, assumptions and action rules that a person actually uses to guide and organize what he or she does, regardless of whether they are conscious of using them or not. Contrary to the explicit dimension, the in-use dimension of a theory of action is inferred externally through the observation of people's behavior.

Interestingly, authors generally agree upon the fact that the explicit dimension tends to not be consistent with the in-use one (Peixoto and Pereira, 2013; Rodríguez et al., 2008; Rogers, 2004; Tagg, 2010) of which the case of the extension practice is an example, given that rural extensionists tend to describe their practice as being horizontal and participatory and yet, despite not being aware of their doing so, implement actions that are based upon a diffusionist, in-use theory of action (van Beek, 1997).

When implementing different strategies to reach desired goals, people evaluate their actions' feedback (Sánchez and Rojas, 2005; Tagg, 2010). Thus, in the context of the problems encountered in practice (understood as those in which obtained results are unsatisfactory), people seek to reshape and adapt their actions (Cristóvão et al., 2009). In these situations, authors identify three types of learning: single, double and triple loop learning.

Single loop learning is a 'trial and error' learning method (Houchens et al., 2012) wherein change is limited to modifying the strategy used to reach a desired goal when previous attempts lead to negative or unsatisfactory results (Kim et al., 2013). However, when this type of learning does not lead to the expected results, double loop learning is needed (Tagg, 2010). Double loop learning does not take place when only the strategies used to obtain desired results are challenged and modified, but also instead, when assumptions, premises, values and objectives that guide action (that is, the theories of action themselves) are challenged as well (Rodríguez et al., 2008). Interestingly, authors highlight that reflection on practice and awareness of implicit in-use theories of action play a fundamental role in fostering double loop learning (Houchens et al., 2012; Leach and Leeuwis, 1997; Peixoto and Pereira, 2013; Rogers, 1996; Yeo, 2008; Zuin et al., 2011). When comparing these two types of learning, Schilling and Kluge (2009) argue that the former consists of assimilating facts to previous schema, while the latter of accommodating or reorganizing the schemas (that is, theories of action) that guide practice.

Andersen (2004) points out some fundamental aspects of double loop learning. Firstly, that its results are unpredictable, given

that they are based on a creative process of questioning previous assumptions and paradigms, a process that Wu and Looi (2012) describe as “thinking out of the box”. Secondly, because it challenges people’s theories and assumptions (that is, their beliefs), double loop learning also puts into question the person itself, their identity and self-esteem, which leads people to feel frightened and tend toward reacting defensively (Argyris, 1991).

Finally, different authors also mention a third type of learning, named triple loop learning (also deutero-learning), which in general terms refers to the process of ‘learning to learn’ (Wong et al., 2008). As Tosey et al. (2011) argue, there is no clear agreement on the definition of triple-loop learning. However, it tends to be understood as the process of reflection upon and understanding of how learning processes occur and what motivates them (Yuthas et al., 2004). Thus, triple-loop learning could be understood in terms of the development of metacognitive skills that help us in our own learning process (Barbat et al., 2011).

3.2. Contributions to the training of extensionists

The Theory of Action’s contributions allow us to generate some interesting reflections on extensionists’ training. Firstly, Argyris and Schön’s (1974) proposal radically breaks the traditional idea of a ‘training’ or ‘instruction’ of extensionists characterized by a transfer of knowledge process. Certainly, this does not imply denying the relevance of such spaces, but it does imply allowing for a much wider set of options. Thus, learning in contexts of real action and in settings focused on problems that arise from concrete practice take on a central role. Learning from experts or from those who know more is not the only option; in fact, learning from experience and reflecting on it is also an extremely fruitful process.

The Theory of Action also allows us to think in terms of different types of learning. This leads to the acknowledgement of the importance of double loop learning when working in changing and complex environments and, in consequence, when attempting to obtain better intervention results. Likewise, this perspective also allows us to perceive the central role of change that is based on the reframing of mental models or, in other words, of the assumptions and beliefs that guide RE practice. Undoubtedly, this offers us a solid conceptual framework with which to analyze why extensionists change the models of RE that they utilize.

At the same time, double loop learning and its relationship with extensionists’ beliefs, assumptions and even worldviews, also clearly demonstrate the link between RE practices and practitioners’ identities. Thus, the relationship between the affective dimension (associated to self-esteem), and double loop learning, in this case a reference to the shift from vertical-hierarchical to horizontal-participatory RE, becomes apparent.

In consequence, it becomes easier to understand the (mostly tacit) subjective resistance and defensive attitude adopted in the face of this type of change and the vital importance of taking into consideration the emotional angle in these types of transformation processes. As Höckert and Ljung (2013) argue, the new RE models require that extensionists distance themselves from their role as experts when working with farmers. However, this is very difficult to do when acknowledging that the legitimacy of such a role was obtained through considerable time and effort (van Beek, 1997).

Finally, contributions from the Theory of Action also helped recognize the importance of reflecting on practice and reflective learning in extensionists’ work. Nonetheless, it is clear that RE institutions do not tend to support these kinds of processes nor generate opportunities for reflection on practice (Cerf et al., 2011).

In summary, the conception and scope of training, instruction or education for extensionists broadens, breaks and is reframed, but without the appearance of a new, complete or definitive model

with which to approach it.

4. From individual learning to communities of practice and social learning

The analysis of the individual or intra-psychic dimension of learning processes was emphasized in the previous section. In this section, we present contributions that allow us to think about its interpersonal and social dimension.

4.1. Social learning

Over the last 20 years, there has been a growing interest in the notion of social learning within the context of rural development (Bailey, 2013; Cazorla et al., 2013; De los Ríos et al., 2011; Hurlbert, 2015; Morgan, 2011). Although there exist many definitions of ‘social learning’ (Bailey, 2013), none of them follow Bandura’s (1977) traditional behaviorist approach, which frames it in terms of an imitation of others. Following the constructivist approach, within the context of rural development, social learning is conceived as that which takes place in the process of interaction between different individuals and social actors with different types of knowledge and experiences (Moschitz et al., 2015) when they interact in order to overcome problems or to reach shared goals (Bailey, 2013; Maarleveld and Dangbégnon, 2002; Morgan, 2011). In this vein, social learning is conceived as an interactive process wherein knowledge is shared and co-constructed within interactions, and not transferred by experts (Sæther, 2010). According to Axelsson et al. (2013) social learning involves a process of reflection on experiences, ideas and values, a search for a holistic understanding of problems, an integration of scales and disciplines, and a process of negotiation and collaboration in order to deal with conflicts.

Thinking in terms of social learning allows us to generate new approaches that address the learning processes and education of extensionists. In order to delve deeper into this line of thought, we will develop the communities of practice’s (CoP) framework as a way to operationalize social learning processes (Ingram et al., 2014; Morgan, 2011).

4.2. Communities of practice

The notion of CoP was originally developed by Lave and Wenger (1991). Within the field of RE, the concept has been used often to address learning that takes place among farmers, but not among extensionists, which shows how the concept has been generally underused (Ingram et al., 2014; Morgan, 2011).

Wenger and Snyder (2000) define CoP as “groups of people informally bound together by shared expertise and passion for a joint enterprise” (p. 139). Thus, in general terms, CoPs can be described as informal and self-organized organizations (Morgan, 2011) of people who share the same task or practice (without necessarily sharing the same profession), which allows them to reflect jointly on it, thus developing competences and sharing and co-constructing knowledge (Moura, 2009). In this sense, the knowledge dynamics of CoPs tend to be structured in terms of exchange and joint construction of knowledge with regards to the problems that arise in a shared practice (Brown and Duguid, 1991; Cristóvão et al., 2009; Ingram et al., 2014), instead of the transfer of knowledge from experts to apprentices (Morgan, 2011).

Morgan (2011) argues that in order to be a CoP, its participants have to have a joint enterprise, build relationships and commitments around it (mutual engagement), and share a repertoire of routines, experiences, stories and ways of thinking and doing things. In this process, the members of the CoP develop a shared

identity (Brown and Duguid, 1991; Morgan, 2011) around this common understanding of their practice (Brown and Duguid, 2001), which encourages the exchange of experiences and knowledge within it.

One of the most important aspects of CoP is its great potential for generating learning within the very process of solving problems that arise in practice with great agility (Wenger and Snyder, 2000). This makes CoP a fundamental tool for helping participants to act proficiently in complex contexts (Gazzoli, 2012) through continuous innovation (Brown and Duguid, 1991). In this line, Sulaiman and Davis (2012) highlight the importance of benefiting from extensionists' experiences and knowledge, creating the opportunity "to experiment, reflect and share their learning while solving real problems in the organizational context" (p. 14). Nonetheless, it is clear that RE institutions, as well as extensionists themselves, are aware of the importance of CoPs for their own learning and for farmers' learning.

4.3. Social learning and communities of practice in the training/education of rural extensionists

Developments in the area of social learning and, more specifically, of CoPs offer some interesting reflections on the training and/or education of rural extensionists. Similarly to the Theory of Action, social learning's and CoP's frameworks also break the assumption that training processes (in this case for extensionists) always have to be organized in terms of transferring knowledge from experts to apprentices, which brings forth the possibility of thinking and imagining new alternatives and strategies. Likewise, social learning and CoPs also show the importance of reflection on practice and on practical problems as ways of learning and constructing new knowledge for RE work.

Moreover, these new theoretical contributions bring additional, interesting reflections to this area of work. Firstly, social learning theory helps to identify the importance of the exchange between extensionists and other social actors such as farmers, businessmen and public servants, among others, as a way of learning and generating a more ample and complex understanding of the intervention scenario. This is interesting, given it usually only tends to be seen as part of extensionists' work, without acknowledging that it is also important tool for learning.

Developments on CoPs also generate awareness of the fundamental role played by extensionist groups within the horizontal exchange of knowledge, the encouragement of reflection on practice processes, and the construction of alternatives for action. Here, the exchange of perspectives and points of view plays a central role given that extensionists, as members of a CoP, may incorporate them as part of their repertoires for daily actions, thus increasing their capacity to choose the best action or intervention for each context. Likewise, reflection on practice, facilitated in the context of RE groups (Jørgensen and Lauridsen, 2005), allows practitioners to synergistically co-construct new alternatives for action drawing upon the experience and innovative capacity of the CoP's members.

Thinking in terms of social learning and CoP also helps acknowledge the situated character of knowledge and learning. The mere transmission of expert knowledge tends to distance itself from the territorial and social contexts wherein it has to be applied. In contrast, knowledge that emerges from the exchange among extensionists with regards to the problems found in their practice intrinsically fits contextual specificities, thus making it more operative.

5. From the individual and group to the social and complex

Theory of action, social learning, and CoPs have provided tools to

analyze learning processes that take place during instances of reflection on practice and exchange and co-construction of knowledge among extensionists. Nonetheless, its individual and group focus has tended to obscure the institutional and social frameworks wherein these learning processes take place. Additionally, some reflections also have implicitly introduced a linear and evolutionary assumption with regards to learning processes, which leads to the conclusion that that which is 'learnt' is always better than that which was believed previously, and that it can never be 'unlearnt', all of which has to be put up for discussion. Thus, a set of reflections will be presented in this section in order to broaden the proposed approach.

5.1. The influence of institutional frameworks

The institutions and organizations wherein extensionists work delineate, facilitate, and limit the learning that can occur in the context of practice, in two ways. On the one hand, actions entrusted by institutions to their practitioners generate fields of experience wherein learning may occur. Likewise, institutional frameworks also exert influence over the possibilities for horizontal exchanges of experiences and/or for reflections on practice processes among extensionists.

5.2. The social framework of practice

The Theory of Action conceives double loop learning as a change in the theories, assumptions or premises that guide action. The processes of reflection on practice that take place in CoPs constitute a privileged space for such learning. However, in order to fully understand the complexity of this process it is imperative to address the social and subjective embedment of the theories of action.

The way in which human beings understand and give meaning to the surrounding world is the result of a process of social construction (Burr, 1999; Ibáñez, 2001). Hence, in order for people to keep their 'subjective reality' (that is, their way of understanding reality), they need a set of relationships and social bonds that legitimize and validate that specific way of understanding the world (Berger and Luckmann, 1972). Thus, when reflecting upon double loop learning, the origin of the new frames of meaning generated or acquired in order to guide RE practice (that is, the new theories of action) would have to be identified, as well as the set of social relationships wherein the new theories of action on RE practice are legitimized, discussed or even rejected within a dialogue with other actors, particularly with the members of the CoP of which the rural extensionists are part.

In this way, theories of action generated by extensionists individually or incorporated into certain spaces, such as postgraduate courses, will not be able to be subjectively maintained if they are not validated (that is, acknowledged) by the extensionists' social context. What's more, it is possible for a new theory of action to be incorporated into the context of new social relationships, but that later the old theories are reinstalled due to not finding enough support from peers in the context of practice.

Hence, in order to fully understand the dynamics of double loop learning in the area of new RE approaches or models, the process needs to be situated in its complexity. This should include, at least, an understanding of subjective change on an individual level, the interpersonal dialogues that take place jointly within extension practice (particularly in the context of CoPs), the institutional frameworks wherein extensionists implement their actions, practitioners' educational trajectories (Cerf et al., 2011), and the wider social frames where the different perspectives on the status of knowledge, science and development are disputed and contested.

In brief, the various levels in which different conceptions of RE are reproduced, discussed and, potentially, transformed (Gergen, 1993) will have to be taken into consideration.

5.3. Conceptions of extension and subjective embedment

Argyris (1991) points out the existence of defensive attitudes when one's own theories of action are contested. If theories of action about RE, shared in the context of the CoPs, constitute an essential aspect of extensionists' social identity and extensionists' self-esteem, any criticism of such theories will not only be perceived as an intellectual fact, but also as a threat.

Likewise, it also has to be acknowledged that theories of action cannot be conceived as independent entities given that they are entangled with much wider social assumptions, beliefs and frames of meaning. For instance, a diffusionist theory of action implicitly assumes the supposition of the superiority of scientific over empirical knowledge, the preeminence of expert over lay people, and the idea that innovation is a predefined productive technology that has to be transferred and adopted. Thus, the act of contesting an orientation towards the diffusion of technologies, characteristic of this RE theory of action, and suggesting a horizontal and participatory alternative instead, will generate a contradiction with this wider set of assumptions, including the extensionist's identity as well as the value that he assigns to his own person and knowledge (Landini et al., 2013a). Hence, the incorporation of a new theory of action with regards to RE or to any of its dimensions, cannot be thought of as a onetime change, but as the introduction of a subjective contradiction that could lead to different outcomes, such as the questioning of some aspects of his/her own worldview, a progressive abandonment of the new perspective, a denial of the existence of these contradictions, or a combination of all of the above. As a research conducted in Paraguay on conceptions of RE suggested (Landini et al., 2013b), extensionists may have different and even contradictory conceptions of RE that co-exist simultaneously (for example, a diffusionist and a horizontal-participatory conception), which may be activated differentially depending on the material or social context wherein RE practices are to be implemented (Landini, 2012b).

5.4. Learning and complexity

In brief, extensionists' learning processes and the reflective dynamics of CoPs, particularly those referred to changes in the core assumptions of the theories of action, have to be examined in a much wider and complex context than the individual one proposed by the Theory of Action, or the group one characteristic of CoP. Despite the fact that deepening this complexity exceeds the aims of this paper, the articulation and entanglement that exists between subjective and identity embedments, learning processes, institutional dynamics, and wider disputes regarding social meanings and power have at least been displayed.

6. Individual learning and institutional innovation

Usually, when seeking to improve rural extensionists' education and training, the problem tends to be framed in terms of the extensionists, the training processes, and the knowledge that extensionists are expected to acquire. Hence, the articulation between learning and institutional dynamics is neglected.

However, on the one hand, institutional frameworks may facilitate as well as hinder extensionists' learning. For instance, the existence of defensive attitudes on an institutional level (Bain, 1999), or limitations in terms of sharing experiences among field staff will limit the possibilities for thinking, experimenting and

implementing new action strategies. In contrast, organizations geared toward sharing information (Fitzpatrick, 2006), that are open to new ideas and willing to learn from their mistakes (Sulaiman, 2012), will tend to facilitate the learning of their staff.

At the same time, being aware of the opposite process, that is, the importance and usefulness of extensionists' learning processes within the dynamics of the organizations in which they work, is also fundamental. In this vein, Brown and Duguid (1991) argue that the CoPs that make up an organization are an essential part of their dynamism and their capacity to rapidly adapt to changes in its environment. Fitzpatrick (2006) highlights that in order for organizational learning to take place, individual learning has to be incorporated into the organization. This, in general terms, would lead to changes in the organization's own theories of action (Kim et al., 2013), which would generate continuous impacts on organizational routines and structures (Rodríguez et al., 2008; Schilling and Kluge, 2009).

Thus, it becomes apparent that extensionists' learning processes cannot be understood without considering the institutional frameworks wherein they take place. Likewise, and even more importantly, when addressing extensionists' in-service training, its potentiality for generating organizational learning as well as institutional innovation will have to be taken into consideration. In many senses, different individual and group learning processes will not be able to be put into practice if certain aspects of the institutional dynamics are not modified. And conversely, an organizational use of such learning processes could encourage institutional innovation processes.

7. Strengthening learning and institutional innovation processes

Having established the argumentations and reflections of the previous sections, several ideas and proposals with regards to the strengthening of rural extensionists' learning and the facilitation of innovation processes in the context of RE institutions will be presented. Thus, the crucial importance of the following is highlighted:

- To be aware of the significance of rural extensionists' education, training and learning processes, support the systematization of innovative initiatives, and support research on the topic. This also includes that extensionists, as well as their institutions, have to think about their experiences, mistakes and successes in terms of potential learning, in order to benefit from them.
- To widen and reframe extensionists' training, education and learning. In this line, surpassing the traditional conception of training as a transfer of knowledge process carried out by experts to apprentices based on a behaviorist pedagogy is essential, so as to consider extensionists' education and learning with a much wider and more diverse perspective.
- To focus on the knowledge, capacities and attitudes extensionists need to face in their practice, which exceed the merely technical or productive content usually mentioned when brainstorming topics for extensionists' training (Landini, 2013). In this vein, we highlight the importance of valuing the development of capacities to act in concrete, real contexts, vis-à-vis the focus on abstract or discursive training content. This undoubtedly includes the implementation of training initiatives aimed at extensionists' 'knowing how', but also at identifying and operationalizing the practical implications of new types of knowledge for the innovative resolution or surpassing of the problems that arise in practice (Landini et al., 2013a). That is, extensionists' training not only has to generate new knowledge but, also, and especially, new ways of doing geared at facing the problems faced in 'situated practice' (Rogers, 2004).

- To acknowledge the critical importance of the extensionists' trainer or educators' profiles with regards to their capacity to put into practice alternative and innovative training strategies. As Rogers (1996) argues: "many of the instructors in agricultural colleges themselves are products of the traditional mould of education and training and have much the same attitudes" (p. 100).
- That extensionists and their institutions recognize the fundamental role that the processes of reflection on practice and on its problems, the horizontal exchange of experiences among extensionists, and the CoPs play in practitioners' training and learning processes. This implies that RE institutions support these spaces and dynamics, generating an organizational culture aimed at learning and innovation, "that focuses on experimentation, openness to new ideas, reporting and learning from mistakes, regular staff reflection, incentives for good performance, and guidelines for staff assessment" (Sulaiman, 2012, p. 215). In this context, we have highlighted the importance of RE institutions valuing horizontality (Brito et al., 2012), as well as the freedom of field level staff to experiment with new approaches (Sulaiman and Davis, 2012). Likewise, Moschitz et al. (2015) also have pointed out the crucial importance of enabling these processes through proper facilitation.
- To understand that the most valuable lessons do not correspond with the incorporation of new knowledge but to the reframing of extensionists' RE theories of action, which have been analyzed in terms of double loop learning. In this context, a fundamental double loop lesson is that of surpassing the diffusionist RE theories of action that implicitly guide many practitioners' interventions. As argued above, these learning processes are highly complex, given that these theories of action are closely linked to extensionists' identity and self-esteem, as well as with institutional and wider social frameworks.
- To encourage and help extensionists and other RE institutions members learn about learning and, particularly, how each ones' learning works (Leach and Leeuwis, 1997). Of course, this does not mean teaching about 'learning theories', but supporting triple loop learning processes (that is, learning how we learn), which will facilitate learning in general terms.
- To generate innovation systems within institutional dynamics that recover, circulate and make use of field staff's knowledge, experiences and proposals, particularly those that arose in the context of extensionists' CoPs.

8. Final reflections

In this paper, the education and training of rural extensionists was critically and reflectively approached, with emphasis placed on the limitations and problems of current training strategies for extensionists that attempt to address the complexity of their practice. Thus, different theories and approaches, such as the Theory of Action, the social learning framework and the CoP approach, were presented in order to contribute to the construction of a theoretical framework that allows us to generate alternative training and learning strategies. In this context, reflection on practice, double loop learning, the change of RE conceptions, the relationship between learning and the problems of practice, and institutional innovation, amongst others, appeared as key elements for reshaping training strategies for extensionists.

In the academic literature reviewed, three proposals were highlighted: the participatory training experience presented by Rogers (1996), the action learning approach (King et al., 2001; Sulaiman and Davis, 2012) and reflective training conducted recently in Paraguay (Landini and Bianqui, 2013; Landini et al.,

2013b), all of which draw upon processes of reflection on practice.

In general terms, this paper shows the existence of an interesting consensus on the need for generating alternative strategies for extensionist training in order to effectively approach the context of complexity within which they work and the new requirements presented by their practice. However, this will does not seem to have translated into a consolidated proposal or framework. In fact, what appears to be lacking is a new paradigm for thinking about extensionists' trainings and learning processes. In this vein, this paper contributed to this end through the articulation of different theoretical conceptualizations into one, guiding thread. Nonetheless, it is clear that our contributions are aimed more at opening the discussion than at presenting a completed proposal. In consequence, it seems necessary and imperative to continue the conceptual discussion, systematizing innovative training/learning practices, and researching on training practices and their results. These are the tasks that await us.

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