



ICTs for Learning in the Field of Rural Communication

Rico Lie and Loes Witteveen

Contents

Introduction	2
Historical Development of the Field	3
Learning	4
Theory-based Approaches to Learning	4
Design-based Approaches to Learning	9
Conclusion	14
References	15

R. Lie (✉)

Research Group Knowledge, Technology and Innovation, Wageningen University,
Wageningen, The Netherlands

e-mail: rico.lie@wur.nl

L. Witteveen

Research Group Communication, Participation & Social Ecological Learning, Van Hall Larenstein
University of Applied Sciences, Velp, The Netherlands

Research Group Environmental Policy, Wageningen University, Wageningen, The Netherlands

e-mail: loes.witteveen@hvhl.nl; loes.witteveen@wur.nl

Introduction

Information and Communication Technologies (ICTs) cover a broad range from information leaflets and magazines to mobile communication devices with an outstanding role for radio, which has been and still is an important ICT in the agricultural sector in the so-called Global South. Agricultural advisory programs on television address large audiences in specific parts of the world and mobile phone applications have gained importance as a means of communication and information exchange in many parts of the world. ICTs have always been part of communication and information exchange in the field of agricultural extension, agricultural advisory services, and rural communication and is as such not an innovation by itself. What is new, in the past two decades or so, is that much attention has gone to so-called new ICTs as if the “T” in the abbreviation did not exist before the digital revolution. It seems limitedly recognized that e-agriculture, e-business, and e-health are becoming common terms to refer to electronic adaptations of existing concepts of knowledge exchange and learning. New ICTs claim to have the potential of easily spanning space and crossing time and reaching objectives never imagined before. Mobility and 24/7 access have created opportunities for innovative and impactful forms of communications and improved feedback qualities of communication channels.

These new features of ICTs have attracted and been given much attention. Their potential seems endless and unproblematic although currently more critical views are emerging especially in relation to the public sphere with recent Facebook scandals such as the role of Cambridge Analytica before the Brexit referendum and the Trolls used in the US electoral campaign of 2016. However, an important question that seems to be a bit under addressed is what the promising features of digital or new ICTs might mean for the quality of learning. Learning has been identified in Lie and Servaes (2015) as a central theme in communication for development and social change. Therefore, this contribution addresses the role ICTs (old and new) can play in learning in the field of agricultural extension, agricultural advisory services, and rural communication. It surveys different approaches to learning and reviews their relationship with ICTs. First, we will briefly address the historical development of the field of agricultural extension, agricultural advisory services, and rural communication and its relationship with media, ICTs, and new ICTs in learning processes. Then the contribution continues with distinguishing different approaches to learning. The theory-based approaches to learning, which are discussed first, are the approaches that are most often referred to in the context of agricultural extension, agricultural advisory services, rural communication, and the role of ICTs. These are social learning, experiential learning, collaborative learning, and transformative learning. These forms of learning have often been put on stage when dealing with complex problems in the agricultural and rural sector. Second, the design-based approaches to learning are discussed. These are learning approaches that emphasize specific aspects of an operational form and content. The aspects, which are selected for review in this contribution, are the use of visuals in learning processes (visual learning), dealing with intercultural

differences (intercultural learning) and crossing space and time through distance learning and e-learning. The design-related aspects have potential in contributing to improving the quality of learning in the field of agricultural extension, agricultural advisory services, and rural communication.

Learning in this contribution is fundamentally defined as change in cognition and/or behavior and concerns adult learning in formal and non-formal contexts. This change can be individual or collective as it, for instance, relates to groups, organizations and cultures. Social change, as well as behavioral change, is thus seen as forms of learning. Learning is positioned as ranging from establishing educational and capacity building environments, “training of trainers” (ToT) activities, vocational education and training (VET) to social and behavioral transitions (see also Lie and Servaes 2015).

Historical Development of the Field

The field of agricultural extension, advisory services, and rural communication has always been about communication and learning, but it has only been in recent decades that learning has been given explicit and increased attention. “How do people learn?” and “How can we best cater to the different learning styles of people?” became new questions pushing the field forward. Röling (1988, 1989), Chambers (1993), and others have been giving quite some attention to this central concern for learning in the field that we are discussing here. Pretty and Chambers (1993, p. 182 a.f.) even talked about a new “learning paradigm.”

In the 1960s, the Training & Visit (T&V) system was the dominant approach within agricultural advisory services, but as this approach depended on regular output from the research system resulting in blueprint extension messages, as it was strongly top-down and required a costly system whereby extension agents were in touch with contact farmers only, the ambitions for “a green revolution” did not materialize in many types of contexts (Moris 1991). Contrary to T&V, the emerging Farmer Field Schools (FFSs) and other participatory advisory approaches built the analytical capacity of the farmers to encourage experiments to find more locally appropriate solutions. With the general known change in paradigmatic thinking about communication, the view on learning also changed. Where previously the T&V system emphasized the transfer of knowledge, the FFSs emphasized the interaction and co-creation of knowledge. Learning came to be a social context related process of change. Against this background, attention rose for the importance of learning. For instance, in the 1990s, Röling and Wagemakers (1998) focused explicitly on learning processes as they relate to sustainable agricultural practices. They emphasized the importance of facilitating learning through participatory approaches and appropriate institutional support and policy structures. Leeuwis and Pyburn (2002) and Wals (2007) gathered many contributions in their edited volumes, which addressed various aspects of learning as related to rural resource management and sustainability. It is also in this context that especially “social

learning” became the dominant approach to learning in the field of agricultural extension, agricultural advisory services, and rural communication.

As the field shifted its focus toward the study of agricultural knowledge and information systems (AKIS) (FAO & World Bank 2000; Röling 1989; Reijntjes et al. 1992) and agricultural innovation systems (Klerkx et al. 2010) (see also Lie and Servaes 2015), the increased attention for learning continued to grow (e.g., Beers et al. 2016; Van Mierlo et al. 2010). The publication by Leeuwis and Aarts (2011) is seen as a key publication in this process as it calls for a focus on networks, power, and social learning (see also Lie and Servaes 2015). Networks and learning relate and cannot be disconnected in our interpretation. It is seen as important that people connect and that in this connection shared learning ambitions arise. In collective action lies additional value for improving the quality of learning. Another trend is the renewed focus on ICTs. As the general ICT and mobile phone possibilities expanded exponentially, all kinds of ICTs also became part and parcel of the pallet of agricultural advisory services. Some ICT-based approaches created new ways of communication, but several others just adapt ICTs to modernized traditional communication styles to transfer knowledge. Mobile applications for all kinds of data collection and social media are now considered as new communication forms and are currently being explored and are becoming established in the field. Underlying the use of these applications are quests for understanding vital roles and possibilities of ICTs in learning processes for communication and information exchange in the field of agricultural extension, agricultural advisory services, and rural communication.

Learning

Theory-based Approaches to Learning

This section surveys four approaches to learning: social learning, experiential learning, collaborative learning, and transformative learning. These approaches have been termed theory-based as they originate from the minds of theoretical thinkers in an academic context. They have not originated and developed specifically in an agricultural/rural setting but have been used widely in this field. This is the reason why these approaches are discussed below. Some potentials of ICTs will briefly be addressed as to how they relate to particular learning approaches.

Social Learning

Social learning has been, and still is, one of the most influential theoretical learning approaches in the field of agricultural extension, agricultural advisory services, and rural communication. The essence of social learning theory lies in the importance of the social, collective context for learning. Learning is taking place under the influence of the environment in which the learning is taking place. Through directly observing the actions of others, through listening to stories of others, or, for instance, through role-plays, a model for aspiring behavior is constructed, which influences

one's own cognition and behavior. On the one hand behavior is thus imitated; but on the other hand, learning is also based on constructing expectations based on earlier (social) experiences (cognitive learning). Based on understandings of these previous experiences combined with behavioral learning, people decide to act in a certain way in a certain situation and herewith are involved in a process of change.

Social learning theory originated from Bandura's work in the 1960 and 1970s (Bandura 1963, 1977) and has been picked up by many different scholars and practitioners since. A very useful addition to better recognize how people learn is made by Argyris and Schön (1978) and concerns the distinction between single, double, and triple loop learning. Single loop learning addresses the "what" and refers to learning outcomes such as recalling knowledge, copying behavior and applying rules. Double loop learning addresses the "how" by focusing on learning about the causes of problems; the reasons behind the way things are done as they are done. Double loop learning addresses the unknown and discovers and creates new knowledge and behavior, whereas single loop learning is about applying the known to solve problems or perfecting the way things are already done. Feedback and reflexivity play crucial roles in double loop learning. It is through these mechanisms that a deeper level of learning is reached and the "how" becomes known. Triple loop learning then refers to knowing the "why." If you know the "why" you can teach others and address the norms and values underlying second loop learning. "How do we think, behave, and learn?" "Why are we thinking in the way that we are thinking?" Seen in this way, triple loop learning is about culture. Culture underlies the assumptions and patterns of actions. Triple loop learning underlies transformational/transformatory learning, which will be discussed later.

Another distinction often made is the difference between conceptual learning and relational learning (Pahl-Wostl 2006; see also Beers et al. 2016). Conceptual learning relates to knowledge and refers to changes in cognition, conceptual understandings, and ideas. Relational learning can be understood as networked learning (see also Kelly et al. 2017) through which change occurs in one's understanding about his or her own position in a network as well as of the functioning of the network as a whole.

An important distinction to better articulate that learning itself is social and/or behavioral change is the one made by Beers et al. (2016) between learning outcomes and learning impacts. Their point of departure is that learning takes place through communicative interactions. They see learning as a discursive process and distinguish between knowledge, actions, and relations (Fig. 1). They emphasize that "during social learning, three dimensions of learning may become aligned: (1) new or changed knowledge (the what), (2) new or changed actions (the how), and (3) new or changed relations (the who)" (Beers et al. 2016). It is these three dimensions that become central in their view on learning. A learning outcome is then seen as a process of interweaving these three dimensions and an impact is the change achieved outside the discursive field of communicative interactions (see Fig. 1).

When it comes to ICTs, social learning theory has more than once been brought into relation with media and especially film (video) and television. The dominant thought here is that moving images can portray the behavior of socially desired

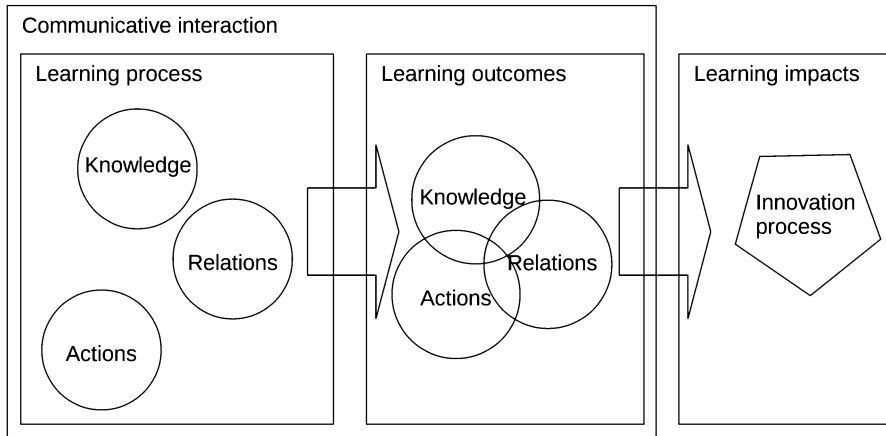


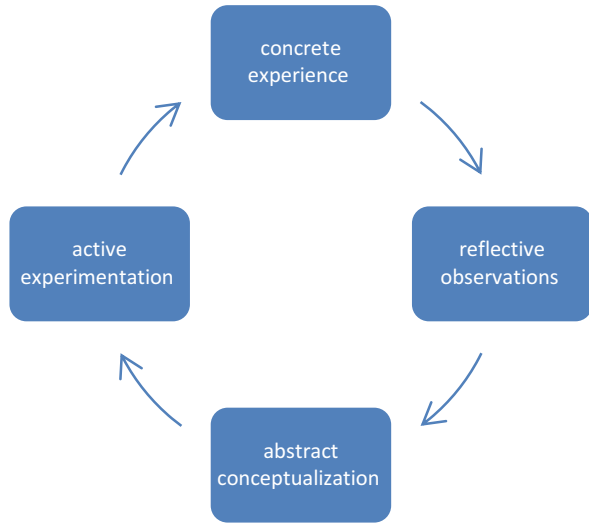
Fig. 1 Learning as a discursive process with interwoven knowledge, relations, and actions as align left outcomes

models, for instance through soap operas. Besides this role of “model function” that television and film can play, ICTs also have the potential to bring people together and this is what is necessary for social learning. In these gatherings, feedback and reflection are key concepts and visually based ICTs can be strategically used to feed into the discursive process as an additional voice or portrayal of knowledge, actions, or relations.

Experiential Learning

The field of agricultural extension, advisory services, and rural communication deals with adult learning, individually or in groups, and learning is often not classroom based. Kolb’s model (1984) is widely used within the field and describes an archetypal way in which people learn. Experience is the key word here. Learning is seen as a continuous interaction between observation and interpretation. Kolb distinguishes four different stages in a cycle of learning: a concrete experience, reflective observation, abstract conceptualization, and active experimentation (see Fig. 2).

Experiential learning builds heavily on social learning. It is often also addressed under the terms “learning by doing” and “discovery learning.” The main characteristic of experiential learning is that concrete new experiences (obtained by doing and discovery) merge with previous experiences, and such an articulated process of merging leads to change. FFSs emerged from this basic idea about learning (Anandajayasekeram et al. 2007; Braun and Duveskog 2008; Van de Fliert 1993). FFSs create space for social interactions and observations of contemporary events in the field and thus create an appropriate environment for observing others (behavioral learning) and sharing experiences and sharing and co-creating knowledge (cognitive learning). The Digital Farmer Field School (DFFS) (Witteveen et al. 2016, 2017) is an endeavor to translate some of the principles on which the FFSs are based to an

Fig. 2 Kolb's learning cycle

ICT environment. The DFFS offers a tablet-based digital learning environment for farmers and related service providers such as extension agents. The tablet comes with tailored (instructional) films (in a social learning mode) and other educational materials and learning modules, which are then linked to features like the camera function for documenting and sharing the field experiences such as the observation and documentation of pests and diseases. It also features a telephone function to interact with an extension back-office. Besides being based on the FFS learning principles, the digital interface was also designed following the principles of responsible innovation (Stilgoe et al. 2013).

Collaborative Learning

An important aspect that is emphasized throughout the field, and which to a certain extent also underlies social learning, is the importance of the group in learning processes. A group can accomplish things beyond the capabilities of an individual, and collaborative learning, cooperative learning, team learning, multi-actor learning, networked learning, and group learning all recognize this by emphasizing collective characteristics of learning. They all share the basic idea that the old paradigm of “teacher/expert vs. student/layman” needed revision. Group interactions within Communities of Practices (CoPs), stakeholder platforms, teams, and all kinds of configurations of workable groups of people, with eventually different roles but somehow similar status, are now seen as being valuable in themselves and as having a positive influence on the process and impact of learning. Another characteristic that they all share is the view that meaning is constructed in social interaction. It is also generally accepted that this social construction has greater learning potential within heterogeneous groups than in homogenous groups. Collaborative learning is defined by Laal and Laal (2011) as “an educational approach to teaching and learning that

involves groups of learners working together to solve a problem, complete a task, or create a product.” Collaborative learning seems to act as an umbrella term for other group-based learning strategies. Cooperative learning can then, for instance, be seen as a specific kind of collaborative learning and is defined as “the instructional use of small groups to promote students working together to maximize their own and each other’s learning” (Johnson et al. 2008).

Two concepts that stand out when discussing the importance of the group in processes of learning are “system interactivity” and “continuous reflexivity.” System interactions need to be understood from a system’s perspective on learning in which the value of interactions is recognized as having an important impact on learning. Within a system, learners are responsible for each other’s learning as well as for their own learning. They are accountable and have responsibility towards themselves, towards each other, but also towards the whole, the functioning of the group itself. Interactions thus come with interdependencies. The basic principle here is that people depend on each other, also for their learning. How learners act with each other requires facilitation and the facilitator plays an important role in the functioning of the learning system as a whole. Learners actively participate in the group dynamics and construct the group process.

Reflexivity has already been briefly touched upon when discussing social learning and experiential learning, and it could as well be discussed under the next heading of transformative learning. Reflexivity has a central position and plays a crucial role in all forms of learning being applied in the field of agricultural extension, agricultural advisory services, and rural communication as discussed in this contribution. Although Kolb’s interactional view on observations and interpretations implicitly incorporates reflection, it has been one of the critiques on Kolb’s learning cycle that he did not give enough attention to reflection in his model (Boud et al. 1985; Smith 2010). Reflexivity relates to rethinking, taking a step back, overlooking the situation, and deciding about how to continue. Awareness is a fundamental condition for reflexivity. One cannot reflect without being aware and this going back and forth between observations and interpretations through reflections is the core of reflexivity. Elzen et al. (2017) following Beck, Giddens, and Lash (1994) make a distinction between reflexivity and reflection and see reflexivity as a social condition, whereas reflection refers to “reflecting at the deeper level of issues, the underlying assumptions and values” (Elzen et al. 2017, p. 245). Reflexivity is thus seen as a condition for learning (b.t.w., Elzen et al. (2017) also conceptualize it as an outcome of learning) and reflection is seen as an activity in a learning process.

Transformative Learning

Learning is bringing about change and transformative learning addresses a particular kind of change; a transformational change. Transformational change is based on a holistic perspective on change and incorporates a strategic choice for a systems change and thereby links to triple loop learning. It concerns a change in fundamental principles, underlying norms and values, and deeply rooted cultural perspectives and beliefs, focusing on questioning, imagining, and achieving radically changing routines or establishing something completely new or revolutionary. The difference

between transformational change and transitional change is that transitional change replaces a practice or a condition that already exists and aims to improve the existing situation by adjusting it. Improvement and adaptation does not always require a fundamental change in norms, values, and mind-sets and when such change is not the case, it is common to talk about transitional change. Transformational change, on the other hand, does require a fundamental change, which, at the start of the transformational learning process, is open and unknown. Such learning processes align when dealing with complex problems, articulating the low predictability of future scenarios and the expected frictions or conflicts in the diverse knowledges participating in the process. One doesn't know the future outcome and needs to be flexible and adaptive during the process to be able to deal with the uncertainties, which are encapsulated in the learning process.

Mezirow is widely acknowledged as the founding father of transformative learning (1978, 1991, and 2009). To be able to change people's worldviews, Mezirow argued that people needed to be confronted with "disorienting dilemmas." Disorienting dilemmas do not fit people's existing mind-set and worldview and therefore need to be changed to be able to deal with them (see also Howie and Bagnall 2013). Other authors refer to this as "learning on the edge" or "positive dissonance." "Critical reflection" (Mezirow 1990) in a collaborative setting plays an important role in dealing with these dilemmas (see also Smith 2017). It is through confrontation – between people and between worldviews – that people learn. Transformative learning is in fact a form of experiential learning and depends on collaborative learning (see for instance Percy 2005). Collaborative learning processes in its turn is necessary to bring about transformational change. To be able to change people's frames of reference, a social learning approach, in which the social context is emphasized, is helpful to make the transformational change happen.

It is again the group that plays an important role and it is also for that reason that transformative learning formed part of the theoretical lens in the study by Taylor, Duveskog, and Friis-Hansen (2012) that explored the practice of FFSs in East Africa. But, ICTs also have the potential of bringing people together without being physically in the same room and the previously discussed DFFS is an example of that. ICTs also have the potential to offer disorienting dilemmas and offer a platform in which reflection can be facilitated.

Design-based Approaches to Learning

This section surveys three design-based approaches to learning: visual learning, intercultural learning, and distance learning. In contrast to the discussed approaches above, these approaches are design-based as they do not fundamentally discuss the theoretical groundings of learning, but instead theorize design aspects of learning processes in the field of agricultural extension, agricultural advisory services, and rural communication. These design aspects relate to crossing boundaries. Visual learning crosses boundaries between people with different learning styles and searches to overcome and challenge boundaries between literacy and illiteracy.

Intercultural learning crosses cultural boundaries and distance learning crosses boundaries of time and space.

Visual Learning

Visual Learning is one of the learning styles that Fleming distinguished in 1987 in his VARK model of learning. VARK stands for Visual, Aural, Read/write, and Kinesthetic and makes a distinction between the associated modes of learning or learning styles. Visual learning can be considered as demonstrating a particular modal preference for learning (Fleming and Baume 2006). Other authors focus on visual learners preferring learning with visual media such as colors, spatial organizations, (mind) maps, diagrams, drawings, photos, films, and so forth. Visual learning in such views leads to visual literacy as a skill and a reinforced preference for certain learning styles but also refers here to learning with visual media.

In this context, as far as visual literacy is concerned, Pratish (2006, p. 13) states that visual literacy refers to the competency to:

- Understand the subject matter of images.
- Analyze and interpret images to gain meaning within the cultural context the image was created and exists.
- Analyze the syntax of images including style and composition.
- Analyze the techniques used to produce the image.
- Evaluate the aesthetic merit of the work.
- Evaluate the merit of the work in terms of purpose and audience.
- Grasp the synergy, interaction, innovation, affective impact, and/or “feel” of an image.

Pratish further claims that visual literacy “involves problem solving and critical thinking and these can be applied to all areas of learning” (2006, p. 15) (see also Witteveen 2009, p. 4 a.f.). In the current digital age, visual literacy is a competence that is of crucial importance to read digital images and to be able to navigate through digital visual landscapes.

The other area of visual learning is using visual methods in learning processes and a variety of visual media (which contents of audio-visual ICTs in fact are). Visual methods are widely used in agricultural extension and advisory services. Video mediated learning is one of the forms of visual learning in which visuals are used for learning. Video and film have, in the past two decades, become often used in the field of agricultural extension, agricultural advisory services, and rural communication. In 2009, Lie and Mandler made an inventory of how film and video were used in rural development and one of the areas that the book refers to is the use of instructional videos (e.g., by organizations such as Digital Green, Video Volunteers, and Access Agriculture). In the past ten years, many studies have been conducted to get more grip on how video can be used (e.g., Bentley et al. 2015; Chowdhury et al. 2011) and how it connects to social learning (e.g., Karubanga et al. 2017). “The power of using film lies in its appropriate character and its multi-modal form of

communication, and can be effective, especially in illiterate and low educated environments (e.g., Bentley et al. 2016)” (Wyckhuys et al. 2017).

Another field that is addressed in Lie and Mandler (2009) is learning about complex problems exemplified with the use of Visual Problem Appraisal (VPA). VPA is a film-based learning strategy that uses filmed narratives in collaborative learning about complex problems such as HIV/AIDS, coastal zone management, and rural livelihoods (Witteveen and Lie 2012, 2018). The essence here is that learning about a complex problem takes place by listening to, and relating to each other, the stories of various stakeholders who have a stake in a complex problem. The “system interactivity” and “continuous reflexivity,” as discussed under collaborative learning, play a central role in the VPA learning strategy. Participants in the VPA workshops work in small groups of about four people and form a systemic learning unit through continuous interactivity and reflexivity. In addition, the system approach to the complex problem is being emphasized by the totality of the narratives of the various stakeholders. Complex problems can only be managed in an adaptive way as the different perspectives, which together are part of a system, are given a voice and are being heard. VPA gives a voice to these various perspectives and enhances learning in a collaborative way.

Intercultural Learning

One of the critiques on Kolb’s model is that it takes very little account of different cultural experiences/conditions (Anderson 1988; Smith 2010). “As Anderson (1988, cited in Tennant 1996) highlights, there is a need to take account of differences in cognitive and communication styles that are culturally-based” (Smith 2010). Culture has indeed hardly been touched upon in the field of agricultural extension and rural communication. Even though understanding the role of culture is fundamental in implementing effective extension and communication, culture has not been given the attention that it should have been given in extension and education.

Intercultural learning, as a concept, is difficult to grasp and is broadly defined here as “a process of learning in which the role of culture is emphasized” (Lie and Witteveen 2013, p. 22). Culture always plays a role in learning. Culture is a collective phenomenon, so especially in collaborative forms of learning, which recognize culture as a determining factor, it plays an important role. In Lie and Witteveen (2013) we distinguished two different modes of intercultural learning: a sociopsychological mode of intercultural learning and an ethnographic mode of intercultural learning. The sociopsychological mode takes place in an etic way, reduces complex situations to known and identifiable variables, centralizes the individual in his or her learning about the other, emphasizes first loop learning, is short-term, and treats culture to be a context of human behavior. The ethnographic mode, on the other hand, takes place in an emic way, treats complexity as being a complex whole, values collectivity, values learning in a participatory way with the other, emphasizes second and third loop learning, is long-term, and treats culture as being text instead of context. Understanding the differences between the two modes makes us better understand how people learn in an intercultural setting. The two

modes are complementary but develop differently over time. People often start learning in the first mode and over time the second ethnographic mode gains position.

Intercultural learning can be an essential part of transformative learning and touches upon aspects of triple loop learning. Intercultural learning is concerned with underlying norms and values. Transformative learning focuses on changing norms and values, but intercultural learning can also concern learning about all kinds of topics from a specific cultural perspective (conscious or unconscious). In group learning processes different cultural perspectives come together. In the field of agricultural extension and advisory services, people have to cross disciplinary cultural boundaries too. Farmers have a different culture as compared to policy makers, and extension officers have a different culture as compared to academic researchers. Recognizing and valuing these cultural differences has a positive influence on learning. Intercultural competence, which includes cultural sensitivity, is thus an important competence to acquire. Besides differences in disciplinary cultures, people can also have different culturally-related learning styles. These styles can, for instance, differ in relation to views on hierarchy, gender roles, recall capabilities, etc. Intercultural learning deals in one way or the other with diversity (e.g., UNESCO 2009).

Distance Learning

Distance learning can broadly be defined as learning away from a physically located (often formal) educational setting, like a university, a school building, or any other educational institution. Because of this spatial disconnection, distance learning is by definition connected through ICTs. Internet, e-learning, online education, MOOCs, and “synchronous learning and asynchronous learning” are all characterized by the use of ICTs of any kind. All the above terms might not all be falling strictly under the umbrella of distance learning (especially not in the traditional meaning of so-called correspondence courses), but the term distance learning nicely captures the ability of ICTs to cross distances of time, space, costs, and cultures. Distance learning thereby offers a playground to experiment and study a deliberate strategic use of ICTs, which can be overlooked or not recognized as such in place-based education.

ICTs in learning offer advantages that connect to crossing spatial and other boundaries. These include, among others, the following:

- ICTs can facilitate access to education (overcome space, time and finances).
- ICTs can create virtual learning environments.
- ICTs can facilitate individual learning as well as collaborative learning.
- ICTs can facilitate that the pace and form of learning can be defined by learners.
- ICTs can include varying combinations of content and cater for different learning styles.
- ICTs can be designed with benefits for low literate learners.
- ICTs offer wider options for using visual and film-based learning strategies.
- ICTs can cross cultural borders and facilitate intercultural learning.

- ICTs can create functional distance towards to subject of learning (e.g., film can show sensitive topics by letting people tell their story in a mediated encounter).

The above mentioned advantages can be put in a different perspective upon reviewing the so-called bold experiment in American Samoa (Schramm et al. 1981) where teachers were replaced by television sets. It was assumed that presenting the same content in the same way to all learners could enhance and level the learning experience. Although replacing teachers in the classroom with television sets is not distance learning, under the given definition above, it shows a valuable lesson for distance learning—namely, that a facilitator in person is essential for maintaining a high quality of learning. Even for relatively simple online discussion lists, moderators are important to observe and safeguard the appropriateness and the general working of the discussion list. In the beginning of distance learning there was a central focus on and a high belief in communication technology and the assumed ability for complete stand-alone learning configurations. In more recent years, also because of the success of The Open University, there is far less focus on technology and more focus on ways and qualities of learning.

Hybrid forms of learning have been introduced in the past two or three decades. Blended learning and flipped learning (“flipping the classroom”) combine online and offline formats of learning, which somehow combine “traditional” classroom teaching approaches with out-of-the-class formats. Flipping the classroom is built on ideas of flipping or reviewing taxonomies of learning (e.g., Anderson et al. 2001) ensuring that more complex (cognitive) learning activities take place in the classroom and less complex tasks at home. Flipped classrooms are very specific in this by asking learners to watch an e-learning video (an instructional clip) or complete an online exercise before coming to class. This somewhat trendy interpretation of flipping the classroom meaning that “homework” tasks are presented as video recordings or other digital formats can again represent an example of framing ICTs as “new,” whereas the underlying learning principles are overshadowed by new technological developments; in the case of flipping the classroom, it is built on an already existing idea of expanding the classroom to home.

The major point to make here is again, a lack of focus on the potential contribution of ICTs in a setting of combined lecturer-guided classroom session and individual homework activities. To begrime the scenario further, it deserves attention to question the feasibility of a lecturer eventually carrying a responsibility to produce a series of videos as preparations for classroom activities. If it is not about producing the videos, then the selection of visual material from a wealth of options might be time consuming. In the worst scenario, an overloaded lecturer with no qualifications, expertise, or interest has to produce videos, which leave him / her without resources for further teaching preparations. Reviewing flipped classroom evaluation creates an impression that the term attracts and motivates certain groups of teachers to rethink and innovate their teaching strategy, combining classroom activities and homework in a more coherent learning process.

Flipping the classroom is very much related to formal education, but in the field of agricultural extension and advisory services, forms of blended or hybrid learning can

also be found. For instance, distance learning in the field of development in the Global South still involves radio as a main means of communication, but through a blended learning strategy radio was combined with FFSs to attend to skills and knowledge about cocoa farming with farmers in Sierra Leone (BBC Media Action 2005). Another example is provided by researchers from Johns Hopkins University who conducted research into the potential of blended learning models to reinforce learning and application of knowledge for health professionals. The researchers concluded that blended learning is an important strategy for reaching health professionals in lower- and middle-income countries (Ahmed et al. 2017).

Conclusion

A first conclusion that can be drawn from the above presented survey of approaches to learning is the basic understanding that *learning itself is social or behavioral change*. Learning not only leads to social and behavioral change but is the change process itself. Learning and change are integrated. This is an important perspective to incorporate in designing rural learning interventions, and Beers et al. (2016) made it clear by making a distinction between learning outcomes and learning impacts. The learning process and the learning outcomes together are to be seen as communicative interaction (see Fig. 1). The process and outcomes of learning are thus to be seen as social and/or behavioral change and this change leads to impact.

What further stands out from the review is *the value of the group* in adult learning processes. The group, but also the social environment and the network, contribute in a positive way to the quality of learning. Collaborative learning is indeed a much-valued approach to learning in the field of agricultural extension, agricultural advisory services, and rural communication. Relational learning is then about learning about one's own position in a social functional whole. It is also here that the system approach to learning comes into play. System approach means that the whole is considered and that interdependencies in learning processes are not only taken into account but are also seen as adding value to the learning process itself. The emphasis is on social construction.

A third point that stands out is *the centrality of experiences and reflexivity*. Kolb's experiential learning and Mezirow's transformative learning have both emphasized the importance of experiences, and reflections and reflexivity is widely seen as an important condition for collaborative learning. Having many experiences is a strong asset in adult learning processes. Experience is the key word in experiential learning, and old and new experiences lead – by the act of reflecting – to learning. Learning can therefore be seen as an interactive play between experiences and reflections and between observations and interpretations. Reflexivity is to be seen as a condition for learning.

A fourth point is that *the visual and the cultural play crucial roles* and that there is a need for addressing these aspects explicitly. In this contribution, the visual and the cultural aspects have been operationalized as design aspects of learning. Calling these aspects “design” feels a bit arbitrary as they could as well be theoretically

explored. However, fact is that these two aspects have been undervalued in designing learning interventions in the field of agricultural extension, agricultural advisory services, and rural communication, whereas they do play a decisive role. Visual learning has its merits as visual literacy is becoming of increased importance in the current digital age. In addition, it can be concluded that visual ICTs – especially film and video – have a huge potential in learning processes. The case of the flipped classroom described in the section on distance education can be interpreted as a recent example of continuous fashionable uses of new technologies whereby underlying learning theories are easily deleted from educational designs.

How then are these four concluding points on learning and change related to the use of ICTs? The challenge is to create innovative learning strategies and learning environments, which are based on theories of learning and make use of the potential of new and old ICTs. In this regard, it is important to have a basic theoretical understanding about how people learn before engaging in designing, developing, and applying ICTs. The challenge is indeed not to center the technology. Simply wrapping existing strategies in innovative new technological designs is likely to underestimate the full potential of possibilities for learners, learning facilitators, and involved institutional arrangements. The focus should first and foremost be on articulating the guiding principles of the learning and change process and every professional and academic should have a vision on learning before taking ICT-based actions. Considering agricultural and rural learning needs in a contemporary context of climate change adaptation, increasing conflicts over resources, and issues of rural-urban and international migration as characterized by a sense of urgency, demands full attention on the smart use of available learning resources. Conceptualizing motivation, time, and other human capitals for learning as an ever-scarce resource instigates the notion that learning processes have to constitute a meaningful praxis of learning and learning facilitation. A further recognition of ICTs integrating a concise learning theory, creative design, and appropriate development carries the ambition to create a wider access and enhanced participation of rural learners in learning processes, which links to their rural realities and may influence their futures.

References

- Ahmed N, Ballard A, Ohkubo S, Limaye R (2017) *Global Health eLearning: examining the effects of blended learning models on knowledge application and retention*. Johns Hopkins University, Baltimore
- Anandajayasekeram P, Davis KE, Workneh S (2007) Farmer field schools: an alternative to existing extension systems? Experience from eastern and southern Africa. *Journal of International Agricultural and Extension Education* 14:81–93
- Anderson JA (1988) Cognitive styles and multicultural populations. *J Teach Educ* 39(1):2–9
- Anderson LW, Krathwohl DR, Airasian PW, Cruikshank KA, Mayer RE, Pintrich PR, Wittrock MC (2001) *A taxonomy for learning, teaching, and assessing: a revision of Bloom's taxonomy of educational objectives, abridged edition*. Longman, White Plains
- Argyris C, Schön DA (1978) *Organizational learning: a theory of action perspective*. Addison-Wesley, Reading

- Bandura A (1963) *Social learning and personality development*. Holt, Rinehart, and Winston, New York
- Bandura A (1977) *Social learning theory*. Prentice-Hall, Oxford
- BBC Media Action (2005) *How radio and distance learning built skills and knowledge for cocoa farmers*. BBC Media Action, London
- Beck U, Giddens A, Lash S (1994) *Reflexive modernization: politics, tradition and aesthetics in the modern social order*. Stanford University Press, Stanford
- Beers PJ, Van Mierlo B, Hoes A-C (2016) Toward an integrative perspective on social learning in system innovation initiatives. *Ecol Soc* 21(1):33. <https://doi.org/10.5751/ES-08148-210133>
- Bentley JW, Boa E, Salm M (2016) A passion for video: 25 stories about making, translating, sharing and using videos on farmer innovation. Access Agriculture and CTA, Nairobi
- Bentley JW, Van Mele P, Harun-Ar-Rashid M, Krupnik TJ (2015) Distributing and showing farmer learning videos in Bangladesh. *Journal of Agricultural Education and Extension* 22:179–197. <https://doi.org/10.1080/1389224X.2015.1026365>
- Boud D, Keogh R, Walker D (eds) (1985) *Reflection. Turning experience into learning*. Routledge, London
- Braun A, Duveskog D (2008) *The Farmer Field School approach – History, global assessment and success stories*. Background paper for the IFAD Rural Poverty Report 2011
- Chambers R (1993) *Challenging the professions: frontiers for rural development*. Intermediate Technology Publications, London
- Chowdhury AH, Van Mele P, Hauser M (2011) Contribution of farmer-to-farmer video to capital assets building: evidence from Bangladesh. *J Sustain Agric* 35:408–435. <https://doi.org/10.1080/10440046.2011.562059>
- Elzen B, Augustyn A, Barbier M, Van Mierlo B (2017) Agroecological transitions: changes and breakthroughs in the making. <https://doi.org/10.18174/407609>
- FAO and World Bank (2000) *Agricultural knowledge and information systems for rural development (AKIS/RD). Strategic vision and guiding principles*. FAO, Rome
- Fleming N, Baume D (2006) Learning styles again: VARKing up the right tree! *Educational Developments* 7(4):4–7
- Howie P, Bagnall R (2013) A beautiful metaphor: transformative learning theory. *Int J Lifelong Educ* 32(6):816–836
- Johnson DW, Johnson RT, Holubec EJ (2008) *Cooperation in the classroom*, 8th edn. Interaction, Edina
- Karubanga G, Kibwika P, Okry F, Sseguya H (2017) How farmer videos trigger social learning to enhance innovation among smallholder rice farmers in Uganda. *Cogent Food & Agriculture*. <https://doi.org/10.1080/23311932.2017.1368105>
- Kelly N, McLean Bennett J, Starasts A (2017) Networked learning for agricultural extension: a framework for analysis and two cases. *J Agric Educ Ext* 23(5):399–414. <https://doi.org/10.1080/1389224X.2017.1331173>
- Klerkx L, Aarts N, Leeuwis C (2010) Adaptive management in agricultural innovation systems: the interactions between innovation networks and their environment. *Agric Syst* 103(6):390–400. <https://doi.org/10.1016/j.agsy.2010.03.012>
- Kolb D (1984) *Experiential learning: experience as the source of learning and development*. Prentice-Hall International, Hemel Hempstead
- Laal M, Laal M (2011) Collaborative learning: what is it? *Procedia Social and Behavioral Sciences* 31:491–495
- Leeuwis C, Aarts N (2011) Rethinking communication in innovation processes: creating space for change in complex systems. *J Agric Educ Ext* 17(1):21–36. <https://doi.org/10.1080/1389224X.2011.536344>
- Leeuwis C, Pyburn R (eds) (2002) *Wheelbarrows full of frogs: social learning in rural resource management*. Koninklijke Van Gorcum, Assen
- Lie, R., & Mandler, A. (2009). *Video in development. Filming for rural change*, Wageningen/Rome: CTA/FAO

- Lie R, Servaes J (2015) Disciplines in the field of communication for development and social change. *Commun Theory*. <https://doi.org/10.1111/comt.12065>
- Lie R, Witteveen L (2013) Spaces of intercultural learning. In: Mertens S (ed) *International perspectives on journalism (internationale perspectieven op journalistiek)*. Academia Press, Gent, pp. 19–34
- Mezirow J (1978) Perspective transformation. *Adult Educ Q* 28:100–110. <https://doi.org/10.1177/074171367802800202>
- Mezirow J (1990) How critical reflection triggers transformative learning. *Fostering Critical Reflection in Adulthood* 1:20
- Mezirow J (1991) *Transformative dimensions of adult learning*. Jossey-Bass, San Francisco
- Mezirow J (2009) Transformative learning theory. In: Taylor EW, Mezirow J (eds) *Transformative learning in practice: insights from community, workplace, and higher education*. Jossey-Bass, San Francisco
- Moris J (1991) *Extension alternatives in tropical Africa*. Overseas Development Institute, London
- Pahl-Wostl C (2006) The importance of social learning in restoring the multifunctionality of rivers and floodplains. *Ecol Soc* 11(1):10
- Percy R (2005) The contribution of transformative learning theory to the practice of participatory research and extension: theoretical reflections. *Agric Hum Values* 22(2):127–136. <https://doi.org/10.1007/s10460-004-8273-1>
- Pratish KM (2006) *Visual communication beyond word*. GNOSIS, Delhi
- Pretty JN, Chambers R (1993) *Towards a learning paradigm: new professionalism and institutions for agriculture*. Institute of Development Studies, Brighton
- Reijntjes C, Haverkort B, Waters-Bayer A (1992) *Farming for the future. An introduction to low-external-input and sustainable agriculture*. Macmillan, London
- Röling NG (1988) *Extension science: information systems in agricultural development*. Cambridge University Press, Cambridge
- Röling NG (1989) The agricultural research-technology transfer interface: a knowledge system perspective. International Service for National Agricultural Research, The Hague
- Röling NG, Wagemakers MAE (1998) *Facilitating sustainable agriculture: participatory learning and adaptive management in times of environmental uncertainty*. Cambridge University Press, Cambridge
- Schramm W, Nelson LM, Betham MT (1981) *Bold experiment: the story of educational television in American Samoa*. Stanford University Press, Stanford
- Smith E (2017) Transformative learning theory (Mezirow), in *Learning Theories*, September 30, 2017. <https://www.learning-theories.com/transformative-learning-theory-mezirow.html>
- Smith MK (2010) 'David A. Kolb on experiential learning', the encyclopedia of informal education. <http://infed.org/mobi/david-a-kolb-on-experiential-learning/>. Retrieved 13 July 2018
- Stilgoe J, Owen R, Macnaghten P (2013) Developing a framework for responsible innovation. *Res Policy* 42(9):1568–1580
- Taylor EW, Duveskog D, Friis-Hansen E (2012) Fostering transformative learning in non-formal settings: farmer-field schools in East Africa. *Int J Lifelong Educ* 31(6):725–742
- UNESCO (2009) *UNESCO world report. Investing in cultural diversity and intercultural dialogue*. UNESCO, Paris
- Van de Fliert E (1993) *Integrated pest management: Farmer field schools generate sustainable practices. A case study in Central Java evaluating IPM training*. Published doctoral thesis, Wageningen University, Wageningen
- Van Mierlo B, Leeuwis C, Smits R, Woolthuis RK (2010) Learning towards system innovation: evaluating a systemic instrument. *Technol Forecast Soc Chang* 77(2):318–334. <https://doi.org/10.1016/j.techfore.2009.08.004>
- Wals AEJ (ed) (2007) *Social learning towards a sustainable world*. Wageningen Academic Publishers, Wageningen
- Witteveen LM (2009) *The voice of the visual: visual learning strategies for problem analysis, social dialogue and mediated participation*. Eburon Uitgeverij BV

- Witteveen LM, Goris M, Lie R, Ingram VJ (2016) Kusheh na minem Fatu, en mi na koko farmer, Hello, I am Fatu and I am a cocoa farmer; A Digital Farmer Field School for training in cocoa production and certification in Sierra Leone, Science Shop report 330. Wageningen UR, Wageningen
- Witteveen L, Lie R (2012) Learning about “wicked” problems in the global south. Creating a film-based learning environment with “visual problem appraisal”. *J Media Comm Res* 52:81–99
- Witteveen L, Lie R (2018) Visual Problem Appraisal. An educational package, which uses filmed narratives. In: Griffith S, Bliemel M, Carruthers K (eds) *Visual tools for developing student capacity for cross-disciplinary collaboration, innovation and entrepreneurship*. A. Rourke and V. Rees (Series Curators), *Transformative Pedagogies in the Visual Domain: Book No. 6. Common Ground Research Networks*, Champaign
- Witteveen L, Lie R, Goris M, Ingram V (2017) Design and development of a digital farmer field school. Experiences with a digital learning environment for cocoa production and certification in Sierra Leone. *Telematics Inform.* <https://doi.org/10.1016/j.tele.2017.07.013>
- Wyckhuys KAG, Bentley JW, Lie R, Nghiem LTP, Fredrix M (2017) Maximizing farm-level uptake and diffusion of biological control innovations in today’s digital era. *BioControl* 1–16. <https://doi.org/10.1007/s10526-017-9820-1>