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Artículo

A model of organizational learning in practice

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ABSTRACT

The paper analyzes the organizational learning process experienced in the design of a new packing service for the pharmaceutical sector, using the 4I model designed by Crossan, Lane and White (1999) and its further developments. It was carried out an exploratory study using qualitative research methods. It was found evidence supporting the learning processes stated by the original model and its further developments. The interviews and focus group results suggested that organizational learning is not always a lineal process as stated by the model. Individual and group learning are parallel interacting and unfinished processes. This study contributed to adding empirical evidence to the 4I model of organizational learning and its further developments, in a manufacturing firm.

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Un modelo de aprendizaje organizacional en la práctica

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RESUMEN

El artículo analiza el proceso de aprendizaje organizacional evidenciado en el diseño de un nuevo servicio de empaque para el sector farmacéutico, utilizando el modelo 4I de Crossan, Lane y White (1999), y sus desarrollos posteriores. Se realizó un estudio exploratorio, utilizando métodos de investigación cualitativa. Se encontró evidencia de los procesos de aprendizaje identificados en el modelo original y en sus desarrollos posteriores. Los resultados de las entrevistas y el *focus group* sugieren que el aprendizaje no es siempre un proceso lineal como está establecido en el modelo. El aprendizaje individual y grupal son procesos paralelos, interactuantes e inacabados. El estudio contribuye a adicionar evidencia empírica del modelo 4I de aprendizaje organizacional, y sus desarrollos posteriores, en una firma manufacturera.

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RESUMO

O artigo analisa o processo de aprendizagem organizativo que surgiu durante o planeamento de um novo serviço de embalagem para o sector farmacêutico, utilizando o modelo 4I de Crossan, Lane e White (1999) e os seus desenvolvimentos posteriores. Realizou-se um estudo exploratório utilizando métodos de investigação qualitativa. Foram encontradas evidências nos processos de aprendizagem identificados no modelo original e nos seus desenvolvimentos posteriores, Os resultados das entrevistas e dos *grupos de trabalho* (*focus group*) sugerem que a aprendizagem não é sempre um processo linear como modelo estável. A aprendizagem individual e em grupo são processos paralelos, interactuantes e inacabados. O estudo junta evidência empírica ao modelo 4I de aprendizagem organizativa e aos seus desenvolvimentos posteriores, numa empresa transformadora.

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1. Introduction

In the last two decades, the concept of organizational learning grew in academic publications as itself (Easterby-Smith and Lyles, 2003), and as a process of knowledge management (Briceño and Bernal, 2010; Dingsoyr, Bjornson and Shull, 2009). Since organizational learning is a multidisciplinary concept, there is not a unified definition for the term (Aramburu, 2000; Salk and Simonin, 2003). Organizational learning is understood as changes associated to environment adaptation (Cyert and March, 1963; Hedberg, 1981; Lloria, 2001), environment adaptation and transformation (Argyris and Schön, 1978; Argyris and Schön, 1996; Molina, 2000), knowledge acquisition (Huber, 1991), environment adaptation and knowledge acquisition (Garvin, 2000), environment adaptation or transformation and knowledge acquisition based in people, depending on the organizational grade of development (Castañeda and Pérez, 2005), the exploration and exploitation of learning (March, 1991), or the process of change in individual and shared thought and action, which is affected by and embedded in the institutions of the organization (Vera and Crossan, 2003). In this paper organizational learning is understood as a process that implies changes in cognition and behavior of individuals (Bandura, 2005; Castañeda and Fernández, 2007; Vera and Crossan, 2003) and also the institutionalization of knowledge (Crossan, Lane and White, 1999).

The organizational learning process involves a tension between assimilating new learning, frequently called exploration, and using what has been learned, this is exploitation (March, 1991). In words of Vermeulen and Barkema (2001), exploration is the search for new knowledge and exploitation is the ongoing use of a firm´s knowledge base. Exploitation is based on local search, experiential refinement and selection and reuse of existing routines (Baum, Li and Usher, 2000).

Organizational learning is a process involved in the creation of a new service (Pohlmann, Gebhardt and Etzkowitz, 2005); however there is little empirical evidence on how it occurs. A well-known model of organizational learning in academic contexts, which integrates levels of learning as well as cognitive and behavioral changes as parts of the learning process, is the 4I Model of Crossan et al. (1999). This model has been enriched with some contributions (Zietsma, Winn, Branzei and Vertinsky, 2002; Castañeda and Pérez, 2005; Castañeda and Fernández, 2007).

The purpose of this paper is to provide some empirical data on the organizational learning processes involved in the design of a new service, using the 4I model of organizational learning, and further improvements of the models, in particular the one stated by Castañeda and Perez (2005), where a more complete explanation of individual learning is suggested based on the social cognitive theory of Bandura (1986).

The 4I organizational learning model states some premises: organizational learning is multilevel (individual, group and organizational), the three levels of organizational learning are linked by social and psychological processes, and cognition affects action and vice versa; however, there is little empirical research that offers support to those premises (Crossan, Maurer and White, 2011). The paper contributes to fill this gap, providing empirical support on the way learning processes take place in the design of a new service.

Next, a description of the 4I Model of organizational learning will be presented, and further improvements developed by Zietsma, et al. (2002), Castañeda and Pérez (2005), and Castañeda and Fernández (2007).

2. The 4I model of organizational learning and its further developments

The 4I model of Crossan et al. (1999) identifies four processes of learning: intuiting, interpreting, integrating and institutionalizing (fig. 1). The first process, intuiting, takes place at the individual level and it is defined as "the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience" (Crossan et al., 1999, p. 525). Even though, some human learning is preconscious, most of learning is conscious (Bandura, 1986). Subsequent improvements of the 4I model take into consideration this point. The second process, interpretating, occurs at the individual and group levels. It is defined by Crossan et al. (1999) as "the explaining through words and/or actions, of an insight or idea to one's self and to others" (p. 525). Although some conversations in groups are about intuitions, most conversations are based on current situations, ideas, beliefs and other complex cognitive processes associated to human capacities (Bandura, 2006). According to Crossan et al. (1999) the third concept of the model is integrating, defined as "the process of developing shared understanding among individuals and of taking coordinated action through mutual adjustment" (p. 525). The fourth concept, institutionalizing, "is the process of ensuring that routinized actions occur. This is the process of embedding learning that has occurred by individuals and groups into the organization and it includes systems, structures, procedures and strategy" (Crossan et al., 1999, p. 525). Knowledge institutionalization contributes to build competitive advantage by converting learning into practice (Flores, Zheng, Rau and Thomas, 2012).

Zietsma, et al. (2002) presented an improvement proposal of the 4I model of Crossan et al. (1999) adding two processes: attending and experimenting. Attending is an active process at the individual level of seeking information from the environment. In relation to experimenting, Zietsma et al. (2002) stated that "individuals and the groups experiment and the result of their actions add substance to their cognitive interpretations" (p. 63). The main contribution of the work of Zietsma et al. (2002) consisted of emphasizing the importance of active learning.

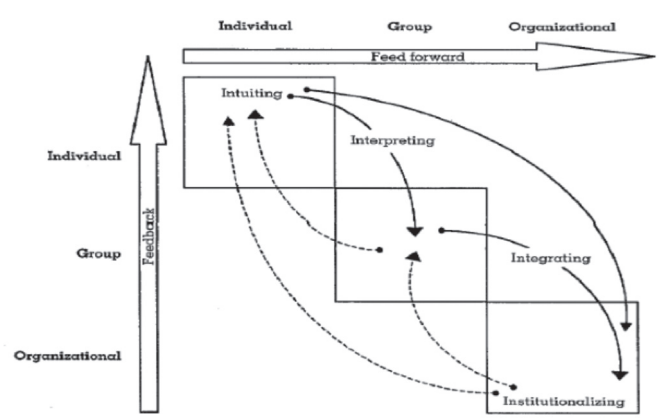

Figure 1. 4I Model of Organizational Learning.
Source: Crossan, Lane and White (1999, p. 532).

Castañeda and Pérez (2005) based on the social cognitive theory of Bandura (1986, 2005) stated that human learning is a complex process that may not be explained only based on intuitions and attention. Intuition is characterized by a lack of awareness about how judgements and results are acquired (Hogarth, 2001). In this sense, intuition only explains a kind of learning where attention is not required; most learning in the context of organizations, however, is based on direct experience and conscious observation. Organizations are changed by people's behaviour (Bandura, 1988; Bandura, 1997). Organizational learning is a collaborative effort where individuals create new ideas by sharing their knowledge through interaction with others. In this context, Castañeda and Pérez (2005) added to the individual level of the 4I model of Crossan et al.

(1999) the concepts of human capabilities and learning processes (Bandura, 1986, 2005). Bandura (1986) stated that humans are capable of: symbolizing, forethought, learning through modeling, self-regulation and self-reflection.

Symbolizing means using codes as a mechanism of individual change and adaptation to the environment. Through symbols people give significance, shape and continuity to their own experiences. At the same time, people use previous knowledge and the capacity to symbolize to decide what actions to take. It is not necessary to perform a certain action in order to solve a problem, but people symbolize multiple situations in their mind before acting. Forethought means the capacity to regulate future actions. People use forethought to predict consequences of actions, to formulate goals and to motivate themselves in an anticipatory way. Additionally, people not only learn from their own behaviour, but they can learn through modeling, observing other's behaviour and through the consequences of their own actions. Through modeling, individuals can learn the rules of behaviour just by observing. Self-regulation means that part of people's behaviour is self-motivated and regulated by self-evaluation. Finally, self-reflection relates to people capacity to know themselves. Individuals can observe their ideas and predict their actions accordingly.

In addition, observational learning is governed by four component processes: attention, retention, motor reproduction and motivation (Bandura, 1986). Attention is a cognitive process which regulates exploration and perception. Attention determines in a selective way what is observed. Retention consists of transforming the information of an event in order to be represented to memory as rules or concepts. Motor reproduction or production is about conversion of symbolic representations into actions. In order to act, it is necessary for the individual to recover information from the memory. Motivation is the fourth process. An existing learning turns into behaviour depending on the importance of perceived consequences of actions (Bandura, 1986).

Castañeda and Fernández (2007) added to the group level of the 4I model of Crossan et al. the concepts of conversation and social modeling. In the original proposal, Crossan et al. (1999) stated that group learning can be explained by a process called interpretation. The authors stated "interpretation has to do with refining and development of intuitive insights" (p. 525). The raw material for interpretation is intuition, a preconscious process. However, conversation, a conscious process, is a central aspect of a functioning organization (Denning, 2005). Most organizational actions are based on conversation. In this sense, conversation is a learning opportunity in groups. In addition, authors like Harris (1995) and Bandura (2003) emphasize the role of modeling and observation in group learning. People in groups learn by observing others. Figure 2 shows the 4I model with its further developments.

Crossan et al. (2011) stated that few strategy researchers have taken an interest in organizational learning, while organizational learning researchers with underlying expertise in psychology and sociology have been uninterested in strategy. As stated by Marín and Velasco (2001), it is common companies develop strategies without reflection and documentation of the learning process. This research contributed to bridge the gap, studying the organizational learning process in the context of the design of a new organizational service, which is a strategic task in a firm.

3. Methodology

It was carried out an exploratory study using qualitative research to evaluate the relevance of the 4I model and its further developments, to describe the organizational learning process in the creation of a new packing service in a firm. The single case study was based on D & A Farmaempaques (DFE), a Colombian firm dedicated to the design, development and administration of packing services for the pharmaceutical sector. This approach was used before by Zietsma et al. (2002) to investigate facilitators and impediments of organizational learning processes in a wood company in Canada. The methodology contributes to identify the relationship between learning processes in the achievement of a strategic task, in this case the design of a new service.

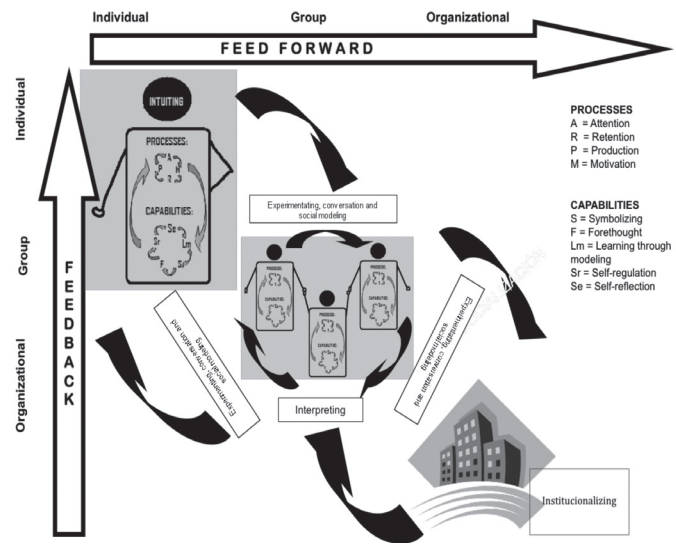

Figure 2. 4I model of Organizational Learning and its further developments. Source: Castañeda and Fernández (2007, p. 369).

Below, it will be described the participants in this research, the instruments used to collect information and the procedure it was followed to complete the proposed objectives.

3.1. Participants and instruments

In-depth interviews were conducted with four workers who participated in the creation of a new packing service in DFE. In addition, a focus group was conducted with six workers of the firm (three managers, two technicians and one operator) who also were part of the process of creation of the same new packing service in DFE. The chosen categories to design the interviews and the further content analysis were the learning processes of the 4I model of Crossan et al. (1999) and its further developments (Zietsma et al., 2002; Castañeda and Pérez, 2005; Castañeda and Fernández, 2007): intuiting, interpreting, integrating, institutionalizing, attending, experimenting, symbolizing, forethought, modeling, self-regulation, self-reflection, retention, production, motivation, conversation and social modeling.

3.2. Procedure

The first stage was approaching the firm to study the organizational learning processes in the creation of a new service, following the 4I model and its further developments. The second stage was the definition of categories for the analysis. The chosen categories were the organizational learning processes stated in the last version of the 4I model (Castañeda and Fernández, 2007). The third stage was the design of an interview guide and its validation by academic pairs. The fourth stage was the interview process. Permission was asked to record the interviews. Then, interviews were transcribed and information was verified based on the audio records. The fifth stage was the codification of the information based on the categories. The sixth stage was the content analysis using the program called *Software for Qualitative Research Nvivo 8*. The seventh step was the

focus group. The eighth step was the analysis of the information of the focus group and its relationship with individual interviews.

4. Results

Interviews and focus group were conducted according to the plan. Evidence was found for each of the processes of the 4I model and its further developments. Here are the categories and examples from the narratives of workers.

The idea conception of the new packing service arose as an intuition of one of the owners of the company. In the interview the owner said "the idea came from my experience. I worked in a lab dedicated to the overwrapping processes of medicines. My job was repairing the machines. Later, I decided to have my own company and designing machines for the pharmaceutical sector. One day I thought, if I can build the machines, why not to do the packing service myself? It may be profitable" (Personal communication, october, 2010). According to Crossan et al. (1999), the expert view of intuiting is a process of past pattern recognition. In the example, the experience of the owner was fundamental as an explanation of the origin of the intuition.

Individuals share the intuitions with others, engaging in collective interpreting what facilitates collective understandings (Zietsma et al. 2002). In DFE the owner of the idea talked to the person in charge of finance. In the interview the second person expressed: "He discussed the idea with me. At the beginning we did not agree, since the process seemed to be costly. Over time, we agreed the project was important but difficult to implement because adapting the plant could be expensive" (Personal communication, october, 2010). Language plays a fundamental role in interpreting (Crossan et al. 1999). At the beginning, based on their established cognitive maps, the same idea may evoke different meanings for different people (Walsh, 1988). Language helps to solve differences.

The essential characteristic of integrating is shared understanding of the members in a group (Crossan et al. 1999). One of the workers of DFE expressed: "Everybody helped, management, production and finance. It was something we had to move forward together" (Personal communication, octubre, 2010). Another worker said: "In order to get the certification, all of us had to learn what was recommended by the World Health Organization" (Personal communication, october, 2010). When integrating consolidates, organization moves from group learning to organizational learning.

Institutionalizing occurs when new actions become part of the organization routines and systems (Crossan et al. 1999). One interviewee said: "with the good manufacturing practices we had to learn, everybody changed habits, even the way to do things" (Personal communication, october, 2010). The new service of packing become institutionalized, and once implemented, it was a profitable business.

Attending is an active process of information seeking from the environment (Zietsma et al. 2002). In DFE a worker made a comment: "We went to many laboratories. We paid attention especially to the distribution of areas and the management of locks" (Personal communication, october 2010). Through attending, the persons in charge of the project learned fundamental characteristics of the potential business.

Experimenting is an active process based on action (Zietsma et al. 2002). A worker expressed: "Once we had the procedures, some of them were tested. For example, when we evaluated the income of materials procedure, we found backflow, which was not accepted because contamination could occur" (Personal communication, october, 2010). Experimenting was in DFE a process which leveraged the group learning.

In relation to the learning process at the individual level incorporated to the 4I model by Castañeda and Pérez (2005) based on Bandura (1986), there is a common process with Zietsma et al. (2002): attending. The second process is retention. What is learned by the individual is represented in memory in symbolic form. A worker said: "Once, what I did was to see the machine working, and then went back to my office and draw up plans based in what I remembered" (Personal communication, october, 2010).

Reproduction is a cognitive process by which, what it is in memory, is recovered to facilitate action (Bandura, 1986). An interviewee said: "The supervisor expressed, you know the procedure, so come here and do it" (Personal communication, october, 2010). Sometimes, the individual knows the answer but he or she is not able to reproduce the answer that is already in the memory. In this case there is no evidence of learning.

Motivation is the process that leads the individual to action (Bandura, 1986). An interviewee expressed: "The design of the new service was difficult but interesting. At the beginning the idea was crazy but we carried it out with effort. We made it" (Personal communication, october, 2010). Motivation was a key factor to maintain people working in the project when problems arose.

In relation to human capabilities, they were identified in interviews and focus group through spontaneous comments. Symbolizing is the capacity to represent things and concepts in the brain without seeing them (Bandura, 1986). An employee said: "To create a new service pushes people to think differently and learn new concepts" (Personal communication, october, 2010). Without symbolizing there is no complex learning.

Forethought is the capacity to regulate future actions (Bandura, 1986). Somebody at DFE said: "Once I said, I think we should plan a pilot test to evaluate if what it is written corresponds with reality. In this way we can anticipate problems and solutions" (Personal communication, october, 2010). Forethought is a human capacity helpful in any planning process, for example the design of a new service.

Learning through modeling is a process based on observation and imitation. Most of human behavior is learned in a conscious way observing others (Bandura, 1986). A worker at DFE said: "What I do is to observe the specialists and to try to do the same. If I cannot, I ask them to explain it to me" (Personal communication, october, 2010). Modeling indeed is a good method of learning when the action is not to complex, otherwise mistakes can be made.

Self-regulation is the capacity that allows an individual to control his or her own actions (Bandura, 1986). One of the interviewee said: "With so many problems that arose in the process I sometimes wanted to give up, but I didn't" (Personal communication, october, 2010). People behavior is regulated by external contingences and personal direction (Bandura, 1986).

Self-reflection is the most distinctly human capability (Bandura, 1986). One worker expressed: "When one works with good manufacturing practices, the way of thinking changes. Before that, I never thought about bacteria or cross contamination topics" (Personal communication, october, 2010). Through self-reflection, people make sense of their experiences, and explore their own cognitions and beliefs (Bandura, 1986).

It was also found support for the two processes at the group learning, incorporated to the 4I model by Castañeda and Fernández (2007): conversation and social modeling. Conversation is a central aspect of organizational functioning (Denning, 2005), and learning is not an exception. An interviewee said: "In the good manufacturing practices committee we talk about the presented ideas, the cost of initiatives and the time we need to implement them" (Personal communication, october, 2010). Learning occurs in the interaction of people who work together (Brown and Duguid, 2000).

People in groups learn by observing what others do. This is called social modeling. Effective modeling teaches general rules for dealing with different situations (Bandura, 2000). One of the workers said: "I had knowledge of the process, but I gained experience by observing my teammates run the machines" (Personal communication, october,

2010). Finally, some interviewee reported that frequently conversation and social modeling occur simultaneously. This is an example: "People I work with know a lot. What I do is to observe them and ask questions; this is the way I learn what it is needed" (Personal communication, october, 2010).

5. Conclusion

According to the 4I model (Crossan et al. 1999) organizational learning is a process nourished from individual and group learning to become institutionalized. In DFE, the new packing service for the pharmaceutical sector may be understood as an output of a process that began with individual learning, continued with group learning and then became an institutionalized profitable business. However, learning is a complex process that cannot be understood only from preconscious dynamics as stated in the original version of the 4i model (Crossan et al. 1999). In this research, it was found evidence of conscious process of learning at the individual (attending) and group (experimenting) levels of learning as proposed by Zietsma et al. (2002). However, the previous concepts are not enough to explain complex learning, like the design of a new service in a firm. The proposals of Castañeda and Pérez (2005) and Castañeda and Fernández (2007) based on the concepts of human capabilities and the learning process of Bandura (1986, 2005) enhanced the understanding of the individual and group learning, which are indispensable for the organizational learning. The design of a new service is better understood when taken into consideration complex human capabilities as the ones studied here, and cognitive processes like retention and reproduction.

From interviews and the focus group it was also found that organizational learning is not always a lineal process that begins with individual learning, becomes group learning and then organizational learning. Individual and group learning are parallel interacting and unfinished processes. Sometimes, an idea is institutionalized by a manager without group discussion. It also happens that an idea starts with a person, goes to a group to be analyzed there, and then it returns to the person who had the initiative to improve it. It occurs many times before institutionalization. Additionally, the learning process is not only contextualized to a group. In DFE the owner of the idea expressed that he had learning inputs coming from different groups within the organization like finance, production and management and also from other pharmaceutical organizations. Then, the organizational learning process has not a lineal sequence because it comes from different sources, at the same time. Additionally, Learning may happen as a result of different tools used simultaneously, for example observing somebody doing a task and having a conversation about what it is perceived.

In the study it was found an emerging category called fuzzy strategy. It was denoted a lack of strategy for implementing the service by the leader appointed to run the project. When there is a lack of strategy, workers do not have a framework to undertake initiatives. The leader began the project ignoring the rules of good practices of manufacturing and some mistakes were made in the use of locations. This situation affected the process of organizational learning. As is expressed by Mundet and Suñé (2002), dysfunctional dynamics limit organizational learning.

In conclusion, there is empirical support from the study to assert that the learning processes identified by the 4I model and its further improvements are involved in the design of a new service. This contributes to have a better understanding of the dynamics of organizational learning in a firm based on a theoretical model. On the other hand, there is evidence that organizational learning is not always a linear process that starts with an individual, goes to a group and then it is institutionalized. Learning involved in the design of a new service has multiple sources inside and outside the organization, and uses different tools, sometimes simultaneously, like modeling and conversation. A contribution of the study is the identification of the necessity to investigate the no lineal interaction between individual cognitive processes, group and multigroup interactions, organizational conditions and environmental facilitators. However, due to the nature of this study was exploratory and the results are based on what was found in one company, the scope is limited. Further research is recommended for a deeper understanding of the findings.

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