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THE PERPETUATION OF KNOWLEDGE INDEPENDENT OF FORMAL RULES: THE CASE OF BRAZILIAN JEWELRY MAKING

Lorena Oliveira

Instituto Federal de Minas Gerais – IFMG – Campus Ouro Preto

Raoni Rocha

Universidade Federal de Itajubá – UNIFEI – Campus Itabira

Abstract: Learning a trade and playing it with quality means following rules and going through formal training? Some authors argue that, yes, showing that the rule occupies a central place in human learning at work and that, for this, training should be done to the novices so that, later, the knowledge can be applied in the field. On the other hand, several works show that the know-how is acquired, mainly, tacitly, based on experience and independent of the formal rules that exist in the organization. This article defends that last point of view. Through a bibliographical review on the subject, this work will seek to illustrate a practical example, that of Brazilian jewelry, which, despite being a very old craft and requiring a high technical skill for its execution, has perpetuated itself in our society without no type of rule directed to the operationalization of its activities. We conclude with the fact that know-how is socially constituted through the interaction and experience of the members of the same social group, without the formal rules having any kind of influence on this process.

Keys Words: Goldsmiths, Goldsmithing, Human Learning

1. INTRODUCTION

The goldsmith's craft in Brazil, since its origin devoid of a large number of formal rules, was transmitted over time in a tacit way, without a structured set of prescribed rules that could help new workers learn. This, however, did not prevent the perpetuation of the profession, which began in the colonial period and is strongly active today, and did not compromise the technical quality of these professionals, who require great manual skill to develop the activity.

Thus, it is reasonable to think that the high technical quality developed by goldsmiths and transmitted from generation to generation, evolved tacitly, independent of the set of structured rules (technical manuals or guides, operational procedures, etc.) or the formal learning process, as conceived in classic knowledge management studies (from the areas of Administration and Economics), which assumes that tacit knowledge must be made explicit to generate learning for a novice. In this sense, as Ribeiro (2012, p.38) maintains, the classical approach to human learning can be “creating an illusion – for novices and those who believe in it – that people [who receive formal training] are qualified to perform work, when, in fact, they are not. Formal classroom training is just the beginning of an acculturation process that often takes years to complete and is only successful if based on a practice-based approach to learning.”

This article is a bibliographical review on the learning process in Brazilian goldsmithing. Primary sources were researched, such as the Annals of the National Historical Museum, the archive of the Parish of Nossa Senhora do Pilar de Ouro Preto and the collection of silver pieces at the Museu de Arte Sacra de Ouro Preto, as well as other sources, such as books and articles scientific studies on the topic in question.

Although several more traditional works argue that the learning process at work only takes place through a set of explicit rules, it is possible and

necessary to counterpoint this through a concrete example in which learning took place in a tacit and independent of the rules: that of Brazilian goldsmithing.

2. BIBLIOGRAPHIC REVIEW

2.1. *The process of learning mechanical trades*

An interesting chapter in the history of work in Brazil is marked by the form of organization of crafts in corporations, which were present from the beginning of colonization until the 19th century, when they were abolished by the Constitution of 1824. In general, craft work in the Colony followed the model of Portugal, where the trade guilds, through their regiments, systematically organized the so-called mechanical trades. According to Cunha (2005), mechanical officers – also known as craftsmen, artists, craftsmen and artisans – were workers directly linked to productive activity, such as carpenters, bricklayers, blacksmiths, shoemakers, goldsmiths and others.

Some authors, such as Reis (2005), maintain that the regulations of these trades are expressive testimonies of the art they produced, as, in general, they prescribed the professional practice, determined the number of apprentices, the hours of daily work, the number of pieces that each tent could manufacture the required social morality, internal discipline, the ritualistic examination, the discrimination of duties and the institution of authorities and hierarchies. Other authors, such as Martins (2012), emphasize that in the “pedagogical aspect”, that is, in the context of learning, corporations did not leave written records of their production techniques and secrets about the practice of trades. Many of these mechanical trades were, therefore, transmitted from generation to generation without there being any explicit rules or

formalities within corporations that could assist newcomers in the learning process.

This behavior of “guarding know-how” dates back to the first craft communities, formed in France. The statutes of those corporations were simple, but extremely severe. The secret of the profession was transmitted from father to son under sworn commitment. The possibility of any technical knowledge falling into foreign hands was so feared that it was prohibited, for example, to write certain formulas (FRANCESCHI, 1988). In the case of goldsmithing – an activity that employs and works with precious raw materials – this family system was further reinforced, both to protect the secrets of the techniques and to prevent materials, such as gems and gold dust, from being stolen. In a way, this system explains the existence of family monopolies in this craft, which developed centers for the preservation of technical knowledge, devoid of written rules on the execution of the craft.

2.2. Working means producing rules... but which ones?

Several studies in the areas of Administration and Economics look to rules as the most important reference in the operationalization of work activities. North (1990), from this perspective, states that rules govern the conduct of individuals and organizations. Furtado (2002, p.251) identifies that the role of rules “is seen as being primordial” in the coordination of individuals within organizations, so that rules “have an important function of coordinating collective action (...)” and “have a cognitive role by incorporating learning from the organization or social system”.

On the other hand, many other authors, mainly in the areas of Ergonomics, Ergology, Sociology of Organizations and Sociology of Scientific Knowledge, reflect on the limitation and insufficiency of rules in work systems and in learning the trade.

Ergonomics, for example, distinguishes, since its origins, prescribed work from

real (OMBREDANE & FAVERGE, 1955; HACKMAN, 1969; LINHART, 1978; LEPLAT & HOC, 1983; TERSSAC (de), 1992; WISNER, 1995). AND

what Leplat (1997) calls the difference between “prescribed task”, or that established by the work organization and imposed on the worker, and “effective task”, or the task redefined by the worker in order to enable its execution, depending on the particularities of the situation. Thus, the execution of a work activity, whatever it may be, will always be translated as a confrontation between what is anticipated by the rules produced by managers – based on general knowledge and models – with the variability of specific situations that were not anticipated in its specificity (GUÉRIN et al., 1991; LAVILLE et al, 1972).

All these authors show that formal rules alone are never enough, whether to ensure learning about work, or to guarantee productivity, individual health or safety of the socio-technical system. The formal rule therefore needs to be complemented by the practices of workers, or by the rules created among themselves to make a formal rule effective (ROCHA et al, 2015).

In this sense, Terssac (1992) shows that every operational group develops tacit rules to be able to produce. According to him, the development of an activity is the result of the combination of two major sources of rules: one of them official and the other effective. The official source is characterized by laws, standards, procedures or agreements negotiated with unions or professional societies that seek to regulate, organize and structure a work activity. The effective source comes both from the practice itself, from which unwritten rules emerge among workers, and from acquired experience, from which customary and habitual rules emerge among them.

Thus, effective, tacit or informal rules must be taken into consideration in all work activities, as they have legitimacy, at the same time external – as they complement formal rules

and allow workers to achieve the results desired by management – and internally – as they contribute to the creation of a collective of individuals around the same work object (CAROLY, 2010). Formal and effective rules should not conflict, since they are two sides of the same coin, or two complementary facets of work, as they allow the diversity of situations and risks to be managed (TERSSAC, 1992).

Working is, therefore, producing rules, also informal (TERSSAC & REYNAUD, 1992). Workers' behavior is defined neither by a pre-existing normative system nor by common values that would absolutely guide individual decisions. The social system is not previously defined in a stable manner, but is constituted during the work activity itself.

2.3. Human Learning and tacit knowledge management

Throughout the 19th century and much of the 20th century, theories of human learning were based on positivism. It is a behavioral approach (behaviorist), which assumes that learning consists of acquiring a pattern of behavior to achieve a goal or reduce a need (SIMON, 1957). In it, reality is objective, governed by laws and mechanisms independent of the context, capable of being grasped, explained and generalizable (GIPPS, 1999). During the 20th century, the current of cognitivism began to oppose that of positivism. For the cognitivist approach, the individual's capacity for reflection-action plays a central role in the analysis, so that learning results from the structuring, integration and processing of information. Under this approach, a change in cognitive structure can occur when an experience is repeated (LEWIN, 1951). In the second half of the 20th century, the “situational” aspect gains more strength and the notion of knowledge becomes the result of an individual and social construction of knowledge.

reality. This is a constructivist approach, as knowledge is considered a social construction. Learning results from complex interrelationships between cognitive, sociocultural and affective factors (MARTINS, 2008).

Human perception constitutes the central point in studies of the constructivist approach to human learning. Goodwin and Goodwin (1996) argue that perception is the result of the interaction of the human perceptual system with the environment. It is not only located “in the head” of the individual and does not occur only through physiological mechanisms corresponding to the sensory stimuli that reach the cerebral cortex, thus being, above all, a social phenomenon. In this sense, learning is situated and socially constructed by human relationships, as an individual progressively becomes a member of a sociocultural practice (LAVE & WENGER, 1991).

To achieve this, it is not enough for individuals to be in classrooms or training for the learning process to occur. For this, individual participation plays a fundamental role. Schön (2000) proposes a participatory learning process, based on learning by doing, instruction rather than teaching and reflective dialogue between novice and expert. In it, the role of instructors is to indicate what should be learned and create conditions that enable the beginner to go through the experiences necessary for learning. The beginner, in turn, uses the instructor's perceptions and feedback to detect and correct his errors, progressing towards competent achievement. This approach to learning differs greatly from traditional ones, based on teaching between instructor and student in expository classes, for subsequent application of knowledge.

This process of situated and participatory learning, where the rules are nothing more than a reference (especially for beginners), but which are far from being the main source of knowledge, is thus based on the experience of individuals and the development of tacit knowledge, or knowledge that is not made explicit through written rules or procedures. This idea has been discussed for a long time in scientific literature, since Polanyi (1969), in his famous phrase, stated that “we know more than we can say”.

Tacit knowledge differs from so-called explicit knowledge, which can be articulated in formal language, including grammatical sentences, mathematical

expressions, specifications, manuals, etc. This does not mean, however, that they are opposites. If Nonaka and Takeuchi (1997), defenders-symbols of the traditional approach to knowledge, maintain that knowledge is only produced through processes of conversion between tacit and explicit¹, other authors, such as Tsoukas (2005, p. 158), argue that “ Even the most explicit types of knowledge are supported by tacit knowledge.” Echoing Tsoukas, Ribeiro (2012) evokes that all knowledge, even the most explicit of them, is fundamentally tacit, or “a type of knowledge that human beings develop only through experience acquired over years and that cannot be transmitted through a set of instructions, manuals, etc.” (Ibid., p.2). In this sense, Collins (2007) deepens studies on tacit knowledge, defining collective tacit knowledge as that which comes from immersion in a society. Ribeiro (2012) also coins the concepts of somatic tacit knowledge, arising from the functioning of the human body and brain, and contingency tacit knowledge, arising from the historical development of a technical domain or due to contingency matters.

¹ According to Nonaka and Takeuchi (1997), to be produced, knowledge must necessarily go through four modes of conversion: tacit to tacit (socialization), tacit to explicit (externalization), explicit to explicit (combination) and explicit to tacit (internalization). These authors named this dynamic as the “spiral of knowledge”.

3. Discussion

Learning in Brazilian goldsmithing

In Brazil, craft corporations became better structured from the end of the 17th century, due to the enormous migratory flow caused by the discovery of gold and, later, diamonds. In this context, it became necessary to organize and regulate the work of the countless craftsmen who arrived, mainly from Portugal, in search of a new life where they could prosper (SOUZA, 1999). Given so much mineral wealth and an expanding consumer market, goldsmithing was a very attractive craft that survived even during difficult periods of prohibition of the activity imposed by the Crown (FRANCESCHI, 1988).

A diversity of silver and gold pieces produced throughout the 18th, 19th and 20th centuries, which are now found in museum collections or private collections, testify to how the craft of goldsmithing was perpetuated without the need for rules or formal training. (Figures 1 and 2).



Figures 1 and 2: Palm in silver and bronze dating from the 19th century. 18th century (on the left) and silver torch holder from the 18th century. XIX (right). Collection of the Museum of Sacred Art in Ouro Preto (MG). Photography: Augusto Neiva

With this, it can be concluded that most of the techniques, and probably the most significant ones, continued to be learned and reproduced by the goldsmiths of the following generations. Evidently, neither

all techniques persisted. Some techniques were lost over time, possibly due to several factors, including changes in fashion at the time (that is, certain types of work were no longer commissioned, so novice goldsmiths did not learn or practice such techniques) and the arrival of industrialization (some types of artisanal work were replaced by industrial ones considered more “modern”).

The training of the workforce and the development of goldsmiths' skills theoretically followed the same hierarchy as the Metropolis model. The craftsman began learning in the workshop with the status of an apprentice, progressing to an officer until becoming a master, who had the greatest knowledge and taught the work to novices (MARTINS, 2012). However, goldsmithing in Brazil adapted to social reality and developed with distinct characteristics, especially because it was largely in the hands of black and mulatto people, even if this contradicted the laws of the time². Many of them learned to work with goldsmiths of Portuguese origin who, to fulfill orders, ended up employing and qualifying slaves or freed slaves in their workshops. Others, such as the Islamized blacks from Upper Sudan, when they arrived in Brazil as slaves, already mastered several ancient goldsmithing techniques, including casting, engraving, chiseling and repousse, thus starting to work both in legalized workshops as well as clandestine ones. While, before the law, black and mixed-race people could not even practice the trade, in practice they were always present in the workshops and carried out exquisite work, even without being able to sign their pieces or achieve the status of master (FRANCESCHI, 1988).

² The laws of the Metropolis, supported by religious justifications, prohibited the exercise of the profession by anyone of “suspect origin”, under the belief that noble metals could only be manipulated by hands of pure origin, that is, by white artisans and Old Christians. This fact is illustrated by a charter dated October 20, 1621, which stated that no mulatto, black or Indian, even a freed man, could hold the position of goldsmith (OLIVEIRA, 1948).

Dreyfus & Dreyfus (1986) propose a learning model based on five levels, namely: the novice follows rules, not taking into account the subtleties of the problem or the decision to be made; the advanced beginner uses more sophisticated rules, acquired by observing similarities with real-life phenomena; the competent person faces problem-solving situations consciously, planning and analyzing the risks and important manageable factors; the proficient associates new situations with old ones, relating solutions to plans that worked in the past; the expert has the natural ability and ability to discriminate a large number of contextual variables and does not need to make a great effort to decide. Thus, black and mixed-race people who may be proficient or experts in the Dreyfus and Dreyfus model, as they are highly specialized and have long-term prior experience in their countries of origin, would never become masters in the Portuguese model, for political and social reasons.

6. CONCLUSION

In practice, the teaching-learning process of the goldsmithing activity in Brazil involved several agents from different regions of Europe and Africa, bringing with them previous knowledge that came together around the same art. The know-how was developed informally, in a private training process that took place in the masters' workshops. The lack of formal prescribed rules for the activity did not prevent production techniques from being transmitted and reproduced accurately.

Faced with such plurality, colonial Brazilian goldsmithing can be understood as a great mosaic that was built under different cultural influences, without any type of formalization in learning the craft. Know-how, in this case, was taken as the property of a social group that was developing in Colonial Brazil, thus constituting what Wittgenstein (1976) called a “form of life”, or the fact that knowledge is developed through interactions produced by individuals from the same group. In this sense, knowledge is socially agreed and modified, requiring, for it to be developed, an immersion of the individual in the work collective. It is “collective tacit knowledge”, defined by Collins (2007)

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