

DISCUSSING A CASE STUDY OF FAMILY TRAINING IN TERMS OF COMMUNITIES OF PRACTICE AND ADULT EDUCATION

Javier Díez-Palomar and Montserrat Prat Moratonas

Department of Mathematics Education and Sciences

Autonomous University of Barcelona

SUMMARY

This paper focuses on adult mathematics learners working on their children's algebra problems in high school. These "adult learners" have their own characteristics and dynamics as a group. Therefore we define them as a socio-cultural group. In addition we assume that to reach an identity as a member of a group is something good in terms of learning. For different reasons we have chosen Wenger's idea of "community of practice" to look at this socio-cultural group. However we are not looking at this group of parents as a community of practice, but the process of how this group of people becomes it. To understand how a group of people becomes a community of practice may provide some hints to improve our teaching and learning strategies.

KEY-WORDS: Adult Learners, Family Training, Mathematics Education and Communities of Practice.

INTRODUCTION

People who work in the field of education know that classrooms work better, and students achieve better scores, when they identify as members of a community. Many teachers look for strategies to build these complicities at the beginning of the school year, thus students could become a group[1] of people working together to learn. Much research draws on this image by providing supporting evidence to demonstrate that grouping is better in terms of learning strategies (Lou, et. al. 1996). Drawing on the prior research, some relevant questions implicit in the process of building a group of people may include issues such as how the group works, what type of elements provides unity to the group, what are the main characteristics of the "culture" of the group, and so forth. The processes of support, as well as the solidarity between students, stresses the uniqueness of a milieu that encourages inclusion and learning for all the members of the group. The positive interactions held between the different members of the group promotes a working environment that positively strengthens each member. The result in terms of learning is usually better than the one obtained when this group identity is not present (or when it is a group of people with no cohesion).

The idea of "community of practice" is present in a number of articles and books on Mathematics Education (Cobb & Hodge, 2002, Lerman, 2001, Jaworski, 2006). Usually the "community of practice" is related to good practices, because as Renshaw

(2003) claims there is “kindness” in the word “community;” and this “kindness” makes this concept attractive. However, the concept proposed by Lave and Wenger (1991) and developed by Wenger (1998) is a notion precisely used by Wenger in a particular context (the business). It was not created as a tool to be used in the context of educational research. All the research reviewed in this paper use this notion in a finalistic meaning, presenting the group studied as a “community of practice” already established.

Data used in this paper come from a research project titled “Teacher training towards a Mathematics Education of parents in multicultural contexts” (ARIE/2007 program, number of reference 00026), funded by the General Office of Research and Universities (AGAUR) from Catalonia. In this exploratory case study the focus is on families and Mathematics Education. Our main aim is to use the concept of “community of practice” as tool of analysis, in order to understand if people involved in our study are (or not) a community of practice. We consider that the process of how a group of people become a community of practice is an interesting topic to be analyzed. On one hand this transition step is something that has not been studied in the scientific literature, on the other we think that this process may present key elements to understand how this ideal situation of “community of practice” appears, and what aspects play an important role on it. We are not looking at a “community of practice” already built but discuss a process. Data collected suggests that there is some kind of correspondence between the examples found in our study and what Wenger calls a “community of practice” (1998). We look at these situations because previous research suggests that groups working as communities of practice achieve better results than groups where there is not a sense of cohesion. Our research work was held in a classroom with adult people, and as such is a set of people different from other educative targets.

ADULT EDUCATION: TOWARDS AN UNDERSTANDING OF SOME KEY ELEMENTS AROUND ADULTS’ LEARNING AS A CULTURAL GROUP

In this paper we use Woods’s (1990) and Geertz’s (1973) notions of culture to define the adult learners as subjects of our study. The notion of “culture” has been used broadly with many different meanings. The aim of this paper is not to explore the scope of this idea and its definition but we do want to highlight how we use the term “culture” in our research.

Geertz (1973) define culture as a notion that:

“Denotes an historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes toward life” (p. 89).

According to his definition “culture” is defined in this paper as a characteristic of individuals related not only to the ethnicity, language, country of origin, or social background, but also all the small groups to which these individuals belong to. In this

sense, we define “adult people” as a particular cultural group, with their own characteristics and dynamics, impacting and determining how the educational process works inside the classroom of mathematics. As Woods (1990) claimed, every single group of people has their own culture, thus we need to analyze it in order to understand the practices carried out by the members of this group.

Drawing on phenomenology, Rogers (1969) showed that all persons exist in a world of experience, which is always changing. This “world of experience” becomes the filter through which we perceive all of what is around us. Talking about how adults learn, Rogers (as well as Piaget) argued that there is a cognitive process of adjustment: when somebody finds that some kind of information coming from the outside (the real world) does not accord to his/her previous [cognitive] schemes. This person then assimilates the new information by accommodating it into his/her mental schemes. From this point of view, to learn is a “learner centred” process where the individual tries to solve the incongruence between what s/he perceives and what would represent (according to his/her previous schemas). This argument may explain why many adults have a common set of values and schemes (because their common background), which distinguish them from other social groups.

Other researchers offered key contributions to the learning theory in Adult Education, such as Knowles (1984) and Mezirow’s (1997) who both differentiate adult individuals as a particular cultural group in terms of their own learning. Knowles (1984) claims that adults are individuals who learn by drawing on their own experience and their “self-concept” (that is: the capacity to move from one being a dependent personality toward one of being a self-directed individual). Mezirow (1997) adds that this learning process is grounded in a dialogue. Before Mezirow (1997) was working on these ideas, Freire (1977) discovered the importance of dialogic action. The Brazilian professor had already demonstrated the power of the word (“la palabra”) as a tool to read the world critically. Drawing on this idea, Freire proposed what he called “Dialogical Method of Teaching.”

Drawing on the ideas of Freire and Habermas, among others, Flecha (2000) proposed what he calls “Dialogic Learning Theory.” The most important concept embedded in this learning theory is the egalitarian dialogue: learning is the result of an intersubjective process of interaction that occurs when learners use the egalitarian dialogue in order to share their prior knowledge with others. Thus the learning process is not unidirectional between teacher and students, but the result of a dialogue. Arguments always are discussed grounded on validity claims, not power claims. Flecha (2000) explains this approach using seven principles (egalitarian dialogue, cultural intelligence, solidarity, transformation, creation of meaning, instrumental learning, and equality of differences), which are the central axe of the “Dialogic Learning Theory.” Learning is a powerful experience for adult people; it really transforms their lives. In addition, learning is reached when it makes sense for them. This is a particular difference with children since adult people already have experiences to build upon new knowledge. Drawing on these principles we can affirm

that adult learners are a particular group, with their own ways of thinking and functioning.

THE NOTION OF COMMUNITY OF PRACTICE AS A METHODOLOGICAL TOOL

Wenger (1998) introduces a learning theory grounded on the notion of Community of Practice in his book *Communities of Practice: Learning, Meaning, and Identity*. This concept has the “three dimensions of the relation by which practice is the source of coherence of a community” (Wenger, 1998 p.72) as a key idea. These three dimensions are: mutual engagement, joint enterprise and shared repertoire.

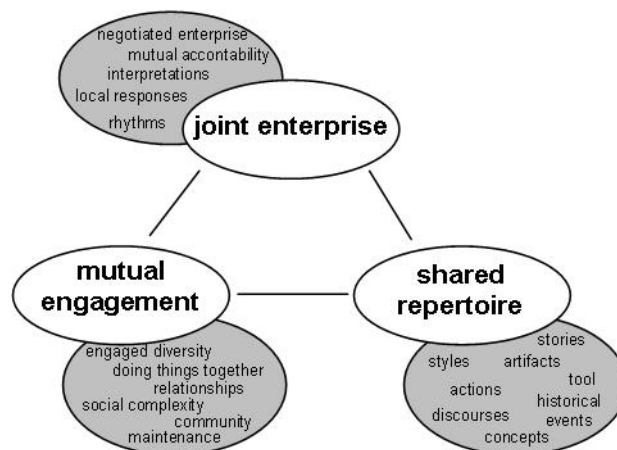


Figure 1. “Dimensions of practice as the property of a community” (Wenger, 1998 p.73)

The concept “community of practice” was created to define a group that acts as an “alive-curriculum” for the learner. For this reason the “community of practice” is a type of community present everywhere, and this is not linked necessarily to a formal system of learning.

The notion of community of practice is more than a group of people with similar (or common) interests, involved in a regular activity. This is not a synonym of group, team, or network. This does not mean (only) to be affiliate to some kind of organization, or to connect with other people (close in terms of geography or social class). This is a dynamic concept, including all members of the community of practice (not just the own participants in the practice which is studied).

Wenger’s (1998) concept of community of practice has been used as tool of analysis more than the theory embedded in it. However this “operationalization” of the theoretical concept cannot be made without taking into account several considerations to avoid doing an incorrect use from the methodological standpoint. [2]

In this paper we use the concept of “community of practice” as tool of analysis, in order to analyze if parents involved in the study became a community of practice (or not). At the same time, we also analyze how this process impacts on teaching and learning practices. Thus the research question is: what type of (social and cultural) processes happen while a group of people became (or not) a Community of Practice?

In order to answer this question, our start points are the 14 “indicators that a community of practice has formed” (Wenger, 1998, p 125). These 14 indicators are specific descriptors of the 3 dimensions quoted before (mutual engagement, joint enterprise and shared repertoire).

These 14 indicators are:

- “1) Sustained mutual relationships – harmonious or conflictual
- 2) Shared ways of engaging in doing things together
- 3) The rapid flow of information and propagation of innovation
- 4) Absence of introductory preambles, as if conversations and interactions were merely the continuation of an ongoing process
- 5) Very quick setup of a problem to be discussed
- 6) Substantial overlap in participants’ descriptions of who belongs
- 7) Knowing what others know, what they can do, and how they can contribute to an enterprise
- 8) Mutually defining identities
- 9) The ability to assess the appropriateness of actions and products
- 10) Specific tools, representations, and other artefacts
- 11) Local lore, shared stories, inside jokes, knowing laughter
- 12) Jargon and shortcuts to communication as well as the ease of producing new ones
- 13) Certain styles recognized as displaying membership
- 14) A shared discourse reflecting a certain perspective on the world” (Wenger, 1998 pp.125-126).

In this paper a series of classroom sessions of mathematics are discussed. Data was collected using videotape. The dynamics generated by the parents involved in the study are analyzed according to Wenger’s 14 indicators. A father and 19 mothers were part of the group. Almost everybody was from Catalonia, although at the beginning of the school year there were also two Latina women. Their children were freshmen in the high school (12-13 years old).

ANALYSING AN ADULT LEARNING GROUP

The group of adult learners took place in a high school classroom in Barcelona city. The learners were a group of parents come together to work on algebra problems. It is a group of people that have deliberately joined together in order to learn mathematics, although some of them knew each other before because they usually came to the high school in order to collaborate in other activities organized by the centre. The group was open to everybody (immigrant and native people, parents of low and high achieving pupils, etc.). Wenger’s (1998) community of practice concept asserts that we can neither build this type of groups as a result of a mandate, nor establish them from the outside. We cannot generate or design these communities either. According

to this viewpoint, “communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” (Wenger, 2007). That means that a group of people may become a community of practice over the time (if they follow the 14 criteria pointed out by Wenger).

Data discussed in this paper comes from the fourth session of the workshop. People involved in this group had been working together for four successive weeks doing mathematics in this classroom. Videotapes show how they were becoming (functional) as a “group” over these four sessions. The identity of every single person of the group became more defined little by little. Analyzing our videotapes in terms of Wenger’s (1998) notion of community, several clips suggest that some of the 14 indicators are achieved (or they are in the way to be achieved), such as indicators 1, 2 and 8 (“sustained mutual relationships – harmonious or conflictual,” “shared ways of engaging in doing things together,” and “mutually defining identities”). A longitudinal analysis of the videotapes indicates that people define their identity collectively (indicator 8). This process produces a number of sustained mutual relationships (indicator 1), and at the same time shared ways of engaging in doing things together appears (indicator 2). The first quote is an example of this type of dynamics. The adult learners are in a classroom placed in a high school and are taking part in an activity of translation: from natural to algebraic language. They are working with first grade equations with one unknown. The facilitator had asked how they solved the problem. Pere is the only man of a group of 20 people (all of them are involved voluntarily in the group). Some of them participate actively in the class. Pere intervenes:

Pere: Me too. Two times x , and then plus two times x .

Facilitator: You wrote two times x , and then?

Pere: One, plus two times x (a noise from the chalk when writing on the chalk board is heard, when the facilitator write on the chalkboard what Pere is saying).

It is interesting to highlight that Pere (who usually is not the protagonist, in the sense that he is not the person who has the highest index of interventions) usually intervenes before the mothers to answer the questions proposed by the facilitator (almost always). This practice always occurs when some kind of explanation or validation is required from the learners. According to this interpretation the role played by Pere is “a person who already has a prior knowledge in mathematics, and who is able to make connections between his ideas and what the facilitator explains, as well as to consolidate this knowledge in the group.”

Another aspect emerging from the data analysis is the definition of learners’ identities as members of the group (indicator 8) in opposition to their children’s identity.

People from the group identify themselves as such because all of them are parents (indicator 6). The variable “generation” becomes a common characteristic of their identity as a group, because it is also connected to their motivation to participate in this workshop of mathematics (and consequently, to consolidate themselves as a group and, perhaps, as a community of practice in the future). This aspect of their identity also helps us to understand the conflict emerging between these people and their children, in terms of teaching and learning mathematics. All these parents have children in the high school, and all the children have difficulties with mathematics. This situation produces a plethora of common experiences shared by all the members of the group. They, as parents, have a different “way to see the world” than their children. This fact, and especially how they have faced this situation as “people who engage in a process of collective learning in a shared domain of human endeavour” (Wenger, 1998), suggests that this group has some characteristics similar to what Wenger defines as a community of practice (1998).

We have observed several clips suggesting that the “parents’ group” and the “children’ group” (implicit in parents’ discourse) have characteristics that may be defined as a culturally different, in terms of Woods (1990). The values shared by parents, as well as the cognitive referents linked to mathematics (ways to act and solve problems), are really different from those used by their children. This difference may explain the “generational” conflict between parents and children, because the culture of each group is not the same. In this next quote the adult learners are once again in a classroom in the high school. The parents are working with a first grade topic “how to solve an equation.” The facilitator solves the problem using one method, and one mother claim that her daughter uses another way to do it. At this point the facilitator explains the method used by the daughter. She has divided the chalkboard into two columns: on the left there is the method used by the facilitator – which is the one known by the mother; on the right the facilitator wrote the daughter’s method – which is the one used by teachers and children in the school):

Facilitator: How it is going? Good?

Mothers: yes... very good (the mom who asked the question is the one who speaks louder).

Mother: We didn’t understand it at home.

Facilitator: eh?

Mother: I didn’t understand it like this at home; this that you have explained to us my daughter used to say “mom, we wrote this here,” and I say “where do you put this?” because I know it in the other w... in the old way (a noise in the background is heard, like admitting she is right) and I was not able to understand it because there is no explanation on the text book.

Facilitator: But, now did you get it?

Mother: (Some mothers agreeing on the background are heard) Kind of, but what happens is that here is so easy... but to me... (She starts to laugh and makes gestures with her hands to say that sometimes the activities are difficult).

Facilitator: ... well... this is the same... but you have to go to....

Mother: (At the same time) now you're getting it, because, because...

Facilitator: (At the same time) to everybody.

Mother: she explains that she does it that way, but I don't know how to explain it....

$2x + 5 = 40 - 3x$ $2x = 40 - 3x - 5$ $2x + 3x = 40 - 5$ $5x = 35$ $x = \frac{35}{5}$ $x = 7$	<p style="text-align: center;"><u>Prof</u></p> $2x + 5 = 40 - 3x$ $2x + 5 - 5 = 40 - 3x - 5$ $2x = 35 - 3x$ $2x + 3x = 35 - 3x + 3x$ $5x = 35$ $x = \frac{35}{5}$ $x = 7$
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Figure 2. Detail of the chalkboard grounded on the field notes.

The problem described in the above quote is common for many families as they experience difficulties in helping their children to solve home mathematics. Those difficulties are sometimes related to mathematics itself and how much mathematics the parents understand themselves. However, other times the problem is the difference between the methods used by parents and the ones used by children (and teachers). One possible reason may be the reforms in mathematics that have changed the procedures used in the classroom to teach mathematics. Figure 2 illustrates the difference between the way used by the mother to solve the equation, and the procedure used by the teacher (of her daughter) to do the same thing. In this figure we can see that while the mother puts all the unknowns[4] together in one side of the equation, and the numbers in the other side of the equal sign, what the teacher does is simplify the expression eliminating the same numbers in both sides of the equation. Both results are the same, but the procedure reasoning implicit is different.

The lack of more opportunities (such as the workshops of mathematics for parents) to connect school and family results in parents having less opportunities to learn what teachers explain in the classroom. Consequently there is no possibility to create a unique discourse about how to teach mathematics. Parents solve the mathematical problems using different strategies grounded on their own methods. But they do not know the methods used by their children (or they just have forgotten them). Then the conflict between them and their children (and more broadly the school) arises. This conflict makes it more difficult for them to get involved in their children' education.

SOME CONCLUSIONS

As a concluding remark, this preliminary data provides evidences that the process of becoming a Community of Practice are not an easy process, neither lineal. It involves definition of roles, interactions, identities, etc. Some indicators appear at different moments, and not according to a prefixed order. In this process some conflicts between actors arise as well. Data shows that there is some kind of generational gap between parents and children (working from a parent involvement approach to the learning of mathematics).

FURTHER RESEARCH

The analysis suggests that when a group is new, every member plays a particular role that becomes part of his/her identity. One question arising from this situation is what is the impact of the role-identity definition process in terms of individual confidence to do and solve mathematical problems? Prior research highlights that self-image (in terms of ability to do/solve mathematics) has a key impact on the self-confidence that everyone has as a mathematics solver/doer. Taking this into account, it is important to analyze the effect that may have the construction of the identity in the process of building a group (being or not a community of practice). Could somebody who is not confident about him/herself feel able to learn mathematics? What is the role of gender in this process? Can the guarantee that everyone has an opportunity to participate ensure that everyone would learn mathematics?

On other hand, in the analysis we have also observed that families and their conflicts with their children doing mathematics may open further analysis to find the elements that affect the relationship between parents and children. The community of practice offers us methodological tools (indicators) to analyze how aspects that define one group could be different for other groups, thus conflicts may be explained because of these differences (contradictions). Consequently a strategy to improve mathematics performances should take into account all the elements that may be defined as “culture” of a particular group (such as prior experience, mathematical knowledge, procedures, etc.) in order to find ways to solve the contradictions (Woods, 1990). In this sense learning approaches such as Dialogic Learning Theory (Flecha, 2000) may be a way forward for further analysis and exploration. However, before that, more in-depth analysis of culture (defined in terms of everyday life) may be needed in order to find hints to bridge the functioning of the different groups. Finally, one more question to be further analyzed is our assumption regarding the impact of “generation” conflict.

NOTES

1. We use the term “group” referring to the people involved in the study because the aim of this study is to elucidate if this “group of people” are (or not) a Community of Practice. For this reason we only use the term “community” when referring to the theoretical concept / definition.

2. “However, it is not clear how to make these learning theories operational from a methodological point of view.” (Gómez, p. 283).
3. All names are pseudonyms.
4. Unknown is “an unknown quantity of variable” (Pearsall, J. (Ed.). (1999). *Concise Oxford Dictionary* (10th Edition). New York: Oxford University Press.

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