

THE DEVELOPMENT OF A MATHEMATICS TEACHER IN THE ROLE OF SUBJECT LEADER

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Abstract: This paper addresses the development of one middle/secondary school mathematics teacher surprised with her recent election as “subject leader”. The goal is to understand, from the teacher’s perspective, the challenges and difficulties that she faces when attempting to carry out new task in a context of collaborative working group. The theoretical framework includes two main domains, collaboration and leadership, two important catalyst processes for educational change and for promoting the development of the school culture. The methodology of this study is qualitative and interpretative. Data collection includes field observations with reports from working sessions and other notes taken in a researcher’s diary and one interview with the teacher. With this study I hope to contribute towards a better knowledge of the goals, processes and issues faced by teachers when they work collaboratively in curriculum management and to understand the role of leadership.

Introduction

Nowadays, teachers work in a world marked by economical, political and organizational change. Change is also the nature and the context of the curriculum, of the teachers’ roles and of the in-service teachers’ training needs. However, educational change requires a simultaneous and articulated action between teachers’ professional development, curriculum management practices, development of professional and school culture, and organization and leadership processes (Hargreaves, 1998).

This paper focuses on the development of one mathematics teacher surprised with her recent election as “subject leader”. This is a role that she recognises not to be prepared to face. Specifically, the paper aims at understanding how this teacher deals with this challenge and difficulties that she faces when carrying out her new task, in a context of a school project developed by the mathematics subject group, that decided to undertake collaboratively their curriculum management tasks.

Collaboration and leadership in school context

Collaboration is a favourable context for reinforcement of trust which is necessary for innovation, as well as to improve effectiveness, reduce overload, situated certainty and opportunities to learn and continuous improvement (Boavida & Ponte, 2002; Hargreaves, 1998). Furthermore, reflection and collaboration promote learning (Hargreaves, 1998; Schön, 1993). Sharing experiences, analysing and reflecting about practice can promote teachers professional development and the development of a new professional and school culture (Nunes & Ponte, in publication).

During a collaborative work teachers are not alone dealing with an issue but working together with other teachers that face the same problem. This creates an empathy that provides energy to overcome frustration, isolation and the feeling of not being able to deal with the problems. With collaboration it is possible to build an action strategy, where everyone has a role, responsibilities and works towards the same goals. The structure of collaborative work is quite demanding, since all interventions are necessary. This work does not demand a complex logistics but requires a real experience, sharing time, concerns, knowledge, expectations, and dedication. This sharing enables building better strategies to overcome difficulties and problems, a feeling of trust that turns a problem into an added value (Boavida & Ponte, 2002; Hargreaves, 1998).

According to Boutinet (1990), the methodology of projects came as “a possible answer to the challenges put on the educational system” (p. 195). If we assume that all of the projects are built on personal interests and expectations, on former experiences of the team elements, any project is unique because it arises from the participants’ concerns on a particular situation within a social context, developed in a given space and time. We also have to consider the complexity of the situations and the uncertainty that motivates the elaboration of a project. During the project work – within a context of professional problem solving and training – there is a systematic reflection and collaborative process characterizing their features.

One essential element of collaboration is leadership. Leadership requires listening to the colleagues’ experiments and preserving professional relations. These can occur in a more formal way (subject group working sessions) or informally when a colleague asks for an opinion, an advice or share a personal experience, a task or a classroom episode (Field, Holden, & Lawlor, 2003). Each individual contribution of the group elements makes the collaboration stronger. According to Stewart (1997), the leadership process has, necessarily, to be shared and symbiotic. Effective management of interpersonal relationships requires that the subject leader know how to maintain a leadership role within the group, take decisions, express him or herself and listen, ask for and give information, stimulate discussion, know how to mediate and share, know how to encourage and facilitate communication, create a climate of trust, and solve possible conflicts (Boavida & Ponte, 2002; Field, Holden, & Lawlor, 2003, Stewart, 1997).

As Sergiovanni (2004) refers, the leader is an orchestra conductor and manager of meaning. He or she identifies what is important and gives a sense of direction and of purpose through the articulation of a compelling worldview. The *vision* (Bryman, 1996) and leader expertise and skills, in association with personal experiences and creativity of his colleagues (Field,

Holden, & Lawlor, 2003) are key elements for a well succeeded project of professional development of teachers, thus creating a new professional and school culture (Sergiovanni, 2004).

From this discussion we can say that there is a strong connection between collaboration and leadership, namely there is no collaborative work without leadership, and there is no leadership without collaboration (Hargreaves, 1998; Krainer & Koop, 2003; Sergiovanni, 2004).

Methods

Methodological options. The methodology of this study is qualitative and interpretative (Bodgan & Biklen, 1994; Erickson, 1986; Merriam, 1988), using a study case design (Ponte, 2006; Stake, 1994; Yin, 1989). The study case is one teacher belonging to a group of mathematics teachers involved in innovative collaborative work in a middle/secondary school. Data collection occurs during the school year 2007/08 (it will be finished in July) and includes: (i) field observations (Jorgensen, 1989; Ludke & André, 1986) with reports from working sessions and other notes taken in a researcher's diary (Adler & Adler, 1994; Smyth, 1989) and (ii) one interview with the case study teacher (Fontana & Fey, 1994; Patton, 1982; Stake, 1995). The observations include different aspects of the teacher's activity, especially attending meetings and classroom work. The role of the researcher in the study is an external participant observer in the working group sessions and in some classes (Adler & Adler, 1994). According to the research plan, a first moment of data analysis takes place simultaneously with data collection. In this way, data analysis may point the need for new data gathering. The data analysis is processed at three levels. The first has to do with organizing the collected data, the transcripts, documents and the notes from the fieldwork. The second level of analysis involves the development of categories, subjects or classes that provide an interpretation of the data. The third level of analysis seeks to explain the meaning of the data in order to provide input to the understanding of the phenomenon under study (Merriam, 1988).

Context for the study. The mathematics' group of this middle/secondary school has 14 mathematic teachers from grades 7 to 12. The group has carried out several school projects in mathematics during the past decade. Most of these projects came as an answer for the teachers' need to improve their own practice or to overcome students' difficulties and improve their learning. During the year school 2007/08 the project *Investigation, proof and problem solving tasks in curriculum management and textbooks* is carried out from grades 7 to 12.

This is a very dynamic group and their members usually participate in professional meetings. This dynamic is based on a particular concern of the group in being always updating their professional knowledge and being aware of the educational changes.

The interpersonal relationships between group members are friendly and the working environment is very healthy and inviting. However, there are different *status* and role assignments for each group member. Following the group, it is possible to identify that there is one member, Simon, which is recognised by the others as the catalyst element of the group and thus also identified as a charismatic leader by the school community.

Results and reflections

Ana. Ana is 39 years old. She has been a teacher for 12 years and she has a master degree in mathematics. Her capacities and work are recognised by all teachers of the group and the school community. For this social recognition contributes the results that her students get in the national exam and also the number of her students who enter university.

At the beginning of the year school 2007/08 she was elected, by her colleagues, the subject leader of the mathematics department. Her colleagues mention that “Ana’s first reaction was panic because she feels that she was not prepared to face the challenges and she did not know all the tasks that overcome with this job” [Researcher’s diary].

It was during the first two weeks of work that Ana became aware of her duties. As subject leader, she has to plan, prepare and coordinate the group meetings, the projects working sessions, the activities with which the group participates in the school plan activities, but also supervise the classroom practices of her colleagues, evaluating them and writing an evaluation report that will influence the decision on who progresses in the career.

She shows great sense of responsibility towards the tasks that come with the job, that the reason why she is very anxious and worried with her performance, especially with the evaluator role as subject leader.

[25] Coordinating group activities won’t be very difficult for me. But, I confess that I am not prepared to take a task of this nature, there is a lot of things that I don’t know. Worst of all is that I have to evaluate my colleagues, which I regard as competent teachers and about whom I can only speak well. Also, I have to choose the better one of them all. That makes me feel very anxious and nervous.

[27] Someone told me that my task is evaluating them and write an evaluation report that will influence the decision on who progresses in the professional career. [Interview].

Another reason for her uncomfortable feeling seems so exacerbated is that she was taken by surprise with the outcome of the vote in the election of the subject leader. She explains:

[39] I confess that I thought that were another colleague, Simon or Sebastian, the elected one to this job (...) because they have a larger experience as they have been subject leaders, and they made a good job. They both are good coordinators [Interview].

She also proves to be a strong and determined person. When she has problems or doubts, she is not afraid of asking for help. Ana knows that it is important to have this experience of coordinating the mathematics' subject group, although she feels she is not a leader. Another issue is the fact that she is one of the youngest teachers at the mathematics group, in which takes part her mathematics' teacher when she was a high school student at that school.

[43] There are some people that have better leader skills. This task is mostly about managing interpersonal relationships, and I don't like to do that. I like students and dealing with them. For instance, I have older colleagues in the mathematics' subject group, and I have to tell them "You have to do this..., you have to do that..." [sigh]. One of my colleagues has been my teacher! It feels awkward. [Interview]

Ana has good relationships with all of her subject group colleagues. However she recognises that she deals differently with the two older colleagues of the group. An example of this issue was the moment when she had to explain them their new tasks, particularly, the role of teachers' partner of "study lessons'" classes.

[57] The two older colleagues were not present in the group meeting were we planned and decided this situations, and they aren't used to have another colleague with them in the classroom, helping them. They are finishing their professional careers' and they have never had such experiences, that's the reason why I was more careful explaining them how and why. [Interview]

As a teacher she mentioned that she likes to follow their colleagues' practices to be well informed and learn with their own experiences. As a subject leader she feels that she has to know what her colleagues are doing as teachers, "so that I can defend them in school pedagogical plenaries and principals" [Interview].

Project working sessions. As a mathematics teacher, Ana needs to share and work with her colleagues. As a subject leader, she considers this to be a "special" group, where all work is planned in group and there's a strong reflective attitude and sharing each other's own practices and experiences.

[69] A – This is a special group. We work together for a long time. I hope it stays like this! This is a special group, because I have already worked at four different schools and this one is the first where the mathematics' subject group works in collaboration and sharing all tasks. [Interview]

Since the beginning of the school year, Ana evidences some small changes in the way she participates and contributes in the project's working sessions. She intervenes more, enriching group discussions and reflections with her suggestions and ideas. She reveals that she has capacity of sharing, listening, and integrating their colleagues' suggestions, especially those that come from Sebastian and Simon. The subject for the project group at *moodle* highlights that fact, as all group members are teachers at *moodle*. Thus, all teachers in the group have the opportunity to create discussion forums, or to publish didactic materials (in particular tasks and tests), which can be enriched and improved without having to wait for the working group sessions (Boavida & Ponte, 2002; Hargreaves, 1998).

Ana refers Simon as the catalyst element of the working processes developed inside the mathematics' subject group and in the different projects developed by the group. She refers that, "He has his own beliefs about how professional and school culture should be – with strong collaborative work and a continuous development and learning attitude – and the entire group follows his *vision*" [Researcher's diary] (Bryman, 1996). Furthermore, and besides being the subject leader, Ana decided to share the coordination of the school project. She looks at collaboration as a natural working situation of the subject group and a synonym for help, support, and sharing: "I am always telling what happens in my classes and I like to know my colleagues experiences, so I can have different opinions on my decisions and classroom strategies" [Interview].

Project sessions have three different moments of work: a 1st moment of plenary work; a 2nd moment of subgroups' work, where teachers' work by school grade; and a 3rd moment to take decisions and attributes individual tasks until the next project working session. Usually, is Ana that coordinates the 1st and 3rd moments. However, during all working sessions everyone is invited to share the leadership, give opinions and make suggestions, participate with ideas, tasks, materials, classroom strategies and experiences, in a environment of trust and learning (Boutinet, 1990). As Ana said reporting her subgroups' work,

[103] "Look, I did this and I think it is interesting. Look, this [task] didn't go well. I did this task and my student's didn't get the answer, we really have to reflect on and

change it”. So, I like to share these things with my colleagues and my own experiences. [Interview]

In project working sessions, this group works collaboratively in curriculum management. In subgroups of two or three teachers, they start planning using the textbook and following the program unit. They look carefully to the textbook’s tasks, solve them and then they decide about which are the more interesting and enriching for students to solve. If necessary they construct a worksheet with investigations, proof or problem solving tasks to help students improve their learning.

Ana recognises that projects are a fundamental strategy for professional development of teachers and for the development of professional and school culture: “with these projects people always learn something [and] they are always enriching in some way” [Interview]. On the other hand, if there were no projects,

[119] The group would continue being a group, but a much poorer one, I think. Also, our task would be much more impoverished. [Interview]

Reflections. Ana feels that she still has much to learn. But the context in which she develops her profession, in particular the subject group she leads, represents an advantage for her. As one of the younger members of the group, when she was elected subject leader she chose to have a humble and learning attitude. Every time she needs help she asks her colleagues and she can count on them for collaboration and experience, mostly from Simon. The interpersonal relationships and working group environment seem to be key elements for Ana’s development of professional and leadership skills, not only as teacher but also as subject leader (Hargreaves, 1998; Krainer & Koop, 2003; Sergiovanni, 2004).

The mathematics’ subject group highlights being a cohesive and collaborative group, sharing and reflecting on their own practices. These characteristics represent two catalysing elements that facilitate and reinforce trust and collective feeling of support, which is necessary for educational innovation and change (Boavida & Ponte, 2002; Field, Hargreaves, 1998; Holden, & Lawlor, 2003, Stewart, 1997).

With this study I hope to contribute towards a better knowledge of the goals, processes and issues faced by teachers when they work collaboratively in their curriculum management practices and to understand the leadership processes.

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