

# Researching our own practice<sup>1</sup>

João Pedro da Ponte  
*Universidade de Lisboa, Instituto de Educação*  
jponte@fc.ul.pt

**Abstract.** This theoretical paper argues the value of the teacher undertaking research to deal with the problems of his/her own professional practice. It sustains the claim that research is a fundamental strategy of knowledge production and can be undertaken by professionals to better understand the problems that they face and find ways to deal with them. It discusses the characteristics of research about practice and associates this concept with related ones such as teacher researcher, action-research, reflection, and academic research. It indicates the main moments of this kind of research and underlines the fundamental importance of assuming an inquiry attitude. It also reviews the most common critiques regarding investigating our own practice, made by scholars of different fields, and discusses several possible quality criteria of this kind of research. Finally, it discusses the paradigmatic affiliation of investigating our own practice and points the scope of this perspective in mathematics education, in Portugal and elsewhere. Thus, the paper contains an agenda of theoretical work to legitimize this kind of research, besides suggesting the need to reflect on the experiences that are being carried out in the educational field.

**Keywords.** Investigating our own practice, Teacher researcher, Action-research, Quality criteria.

## Researching teachers' professional practice

In order to fulfill their mission, teachers act at several levels: conducting the teaching-learning process, evaluating students, contributing to the construction of the school's educational project and to the development of school-community relationships. At all these levels, teachers are faced with problematic situations. As a whole, the problems that arise are willingly and sensibly dealt with, based on the teachers' professional experience, but often this does not lead to satisfactory solutions. Hence, teachers' need to engage in research that helps them to deal with problems arising from their practice.

In fact, teaching is much more than a routine activity where one simply applies pre-determined methodologies. It is simultaneously an intellectual activity, a political activity and the management of people and resources. It requires a constant exploration into its practice and an ongoing evaluation and reformulation. Different forms of working that get students to reach optimal results must be tried out. To do so, it is essential to clearly understand students' ways of thinking and the difficulties they encounter. Successful teaching requires that teachers continuously analyze their relationship with students, colleagues, parents and their working context. An active, consistent participation in the school life also requires that teachers have the capacity to discuss their proposals.

---

<sup>1</sup> Ponte, J. P. (2008). Researching our own practice. In B. Czarnocha (Ed.), *Handbook of mathematics teaching research* (pp. 19-35). Rzeszów: University of Rzeszów. (available at <http://www.pdtr.eu/index2.php>).

The natural base for this way of working, both in the classroom and in the school, is research activity in the sense of inquiry, questioning and grounding.

We may thus state that researching professional practice, alongside participation in curricular development, is a decisive element of teachers' professional identity. This is nothing new. Actually, this idea was elaborated 25 years ago by an English educator, Lawrence Stenhouse (1975). This article pays close attention to researching one's practice but keeping in mind the teacher's role as regards curriculum development.

Isabel Alarcão (2001) resorts to the abovementioned author's ideas to defend that a good teacher must also be a researcher, developing investigation that is intimately bound to his/her role as a teacher. She explains this idea as follows:

In truth I cannot conceive a teacher who does not question him/herself about the reasons underlying his/her educational decisions, who does not question him/herself when some of his/her students are underachievers, that does not turn his/her class plans into mere work hypotheses to be confirmed or refuted in the laboratory that is the classroom, who does not critically read the textbooks or didactic proposals that he/she is given, that does not question him/herself about the school's functions and whether these are being carried out. (p. 5)

A reflective, inquiring activity is usually performed by teachers intuitively, not in the formal way that is typical of academic research. Actually, because it has specific purposes, teachers' research about their practice does not have to take on identical features to research carried out in other institutional contexts. But the teachers' activity will gain a lot if they cultivate a more careful approach in formulating their research questions and in conducting their intervention projects in schools.

Research is a privileged process of knowledge construction. Subsequently, researching one's practice is a fundamental process of the construction of knowledge about this very practice and is therefore a valuable activity for the professional development of those who engage in it actively. Besides the teachers involved, the educational institutions they belong to can also benefit tremendously from the fact that their members are involved in this type of activity, reformulating their working methods, their institutional culture, their external relations and even their own objectives.

We can point out four major reasons why teachers should research their own practice: (i) to emerge as true protagonists in the curricular and professional field, with more means to face the problems arising from this practice; (ii) as a privileged form of

professional and organizational development; (iii) to contribute to the construction of a patrimony of culture and knowledge of teachers as a professional group; and (iv) to contribute to general knowledge about educational problems<sup>2</sup>. In other words, problems pertaining to curriculum construction and management, and problems arising from the different levels of professional practice require that the teacher has competencies in terms of problematization and investigation, besides a dose of professional common sense and good will. Besides, in certain conditions the knowledge created by teachers researching their own practice may be useful for other professional and academic communities. We will come back to this later.

### **The concept of researching one's practice**

#### **What characterizes researching one's practice?**

Researching practice can have two main types of objectives. On the one hand, it may aim above all to change some aspect of the practice, once the need for change is determined, and, on the other hand, it may seek to understand the nature of the problems affecting this practice so as to define a strategy of action at a later moment<sup>3</sup>.

Let us start with the following question: What are the minimum requirements for an activity to be considered research? One French author, Jacky Beillerot (2001) indicates that research must meet three conditions: (i) it must produce new knowledge, (ii) it must have a rigorous methodology, and (iii) it must be public. These are undeniably important conditions.

It is natural to assume that if a certain work simply reproduces what has already been done, without producing anything new, it might be a useful "exercise", but it is not exactly research<sup>4</sup>. "New", here, refers to the actor undertaking the research. If I take on a problem similar to another already worked on by other people but whose work I know nothing about, and I produce solutions that are original (to me), then I am certainly do-

---

<sup>2</sup> This argument is subscribed by Susan Lytle and Marilyn Cochran-Smith (1990), two authors for whom research done by teachers "makes accessible [to outsiders] some of the expertise of teachers and provides both university and school communities with unique perspectives about teaching and learning" (p. 83). Kenneth Zeichner and Susan Nofke (2001) also defend that research carried out by professionals upon their practice, far from being a simple process of professional development, represents an important process of knowledge construction.

<sup>3</sup> A similar distinction between teachers' research upon their practice steered towards change or towards understanding is assumed by Richardson (1994), when she talks about the possible objectives of what she calls *practical inquiry*.

<sup>4</sup> In this sense, a simple replication of an investigation whose only aim is to corroborate the results of a previous study is not, *per se*, research. Actually, investigative work does not imply that everything is new – usually there is an "element" of novelty.

ing research. If I just consciously follow tracks that have already been beaten by other researchers, I may be doing a worthy job but I am not doing real research<sup>5</sup>. Also, to deserve being called research, the work has to involve some form of rigor, that is, it must assume a minimally methodical, systematic nature, thus allowing for its eventual reproduction. Finally, research must be communicated so it is appreciated and evaluated. Only by doing so can it eventually integrate the patrimony of the reference group and perhaps of the community at large.

It seems to me that with the appropriate adaptations these three conditions may apply to the research that teachers carry out on their own practice. The presence of some kind of novelty in teachers' research is not too problematic, as situations of professional practice tend to be unique and unrepeatable. However, the utmost attention to the specificity of each situation is indispensable. The rigor that should be used is a more complex problem and it is necessary to find a point of balance between the informal procedures that characterize teachers' professional culture and the formal procedures that are part and parcel of academic research. Finally, the question of making it public is not difficult to overcome. There are many opportunities to partake and discuss teachers' research – in their schools, in professional meetings and journals, and in educational meetings and journals.

Susan Lytle and Marilyn Cochran-Smith (1990) speak of teachers' research as "systematic, intentional inquiry by teachers about their own school and classroom work" (p. 84)<sup>6</sup>. To these authors, research arises from questions or generates questions and it reflects teachers' concern in giving meaning to their experiences, adopting a learning attitude towards their practice. Underscoring intentionality aims to stress that research requires some planning and is not merely a simple, spontaneous activity. Finally, signaling the systematic character has to do with procedures of data collection and documentation of experiences and to the way events are analyzed and interpreted<sup>7</sup>.

---

<sup>5</sup> Often it is hard to distinguish between what is new and what is *déjà vu*, even concerning a social protagonist. All new situations involve familiar elements and all social situations that we apparently know well always carry something new. Therefore, it is appropriate that the researcher takes care to highlight what is new (at least for him/her) in his/her investigation.

<sup>6</sup> Lytle and Cochran-Smith particularly stress Beillerot's point (ii) (method and rigor). However, in my opinion, points (i) novelty and (iii) public character indicated by this author are equally essentially to really consider something research.

<sup>7</sup> One Australian author, Judy Mousley (1997) considers it difficult to find an exact definition for what researching is, stressing that this concept is in constant evolution. However, in consistency with the perspective of these authors, she defends that investigative activity, even when its object is the teacher's practice, involves planned, systematic work, and also attributes a very meaningful role to the theoretical frame.

## Unravelling meanings...

Besides characterizing teachers' research about practice, it is important to confront it with other activities that are more or less alike but not equivalent. Therefore, I shall analyze other terms that are sometimes mistaken for synonyms, while other times they are viewed as having distinct meanings.

One of these terms is the '*teacher as researcher*' or '*teacher researcher*' (Stenhouse). *Teacher researchers* are teachers who carry out research, normally about their practice but sometimes about other matters too<sup>8</sup>. For instance, the teacher researcher who Regina Silva (1994) speaks of is the mathematician who, on the one hand, does research in mathematics (frontier problems) and, on the other hand, teaches at university (basic subjects such as algebra or calculus). For this teacher, the activities of teaching and of researching are located in clearly defined departments. In this manner, the concepts of researching practice and being a teacher researcher largely overlap but do not coincide totally. Another example is given by most of the basic and secondary level teachers who have concluded master theses in Portugal. As Serrazina and Oliveira (2001) point out, only six theses report on research carried out by teachers about problems of their practice. All the others refer to problems outside their practice.

Another very close concept to that of researching practice is *action-research*. The creation of this expression is attributed to the social psychologist Kurt Lewin, at the time of the Second World War. His idea was to promote the advance, at the same time, of social theory and social changes. Lewin proposed action-research as a succession of cycles involving a description of the problems present in a given social field, followed by the elaboration of an action plan, by putting that plan into practice and by evaluating it, which might, in turn, give rise to a new improved action plan, thus restarting a new research cycle<sup>9</sup>.

The nature and objectives of action-research are characterized in many different ways by other authors. For example, Zeichner and Nofke (2001) state that aside from

---

<sup>8</sup> Some authors present other concepts of what a teacher researcher can be considered. This is the case of Stephen Storer and Luiza Cortesão (1999), for whom the teacher researcher is someone who acts as an ethnographer in his/her classroom. Without questioning that an ethnographer is an important reference for whoever researches his/her own practice, it seems to me that this characterization is too restrictive, for the teacher who researches may also take up other references (such as the psychologist, sociologist, philosopher or researcher in education) and look at other objects of study (such as knowledge, students, the school, school-community relations, and so on).

<sup>9</sup> A description of the typical processes of action-research may be found, for example, in Arends (1997) and Collins & Spiegel (1995).

the “cyclical” perspective, there is another version where the questioning process has an essentially “linear” form. Carr and Kemmis (1986) define action-research as follows:

Action research is simply a form of self-reflective enquiry undertaken by participants in social situations in order to improve the rationality and justice of their own practices, their understanding of these practices, and the situations in which the practices are carried out. (p. 162)

Many teachers have been involved in action-research. But action-research is far from being confined to the field of education. As Esteves (1986) indicates, this form of work is also largely used in areas such as social services, communication, health, organizations, rural development and social movements.

Usually action-research involves a matter of immediate intervention, often radical change, which may or may not exist when we research our practice. Action-research also frequently involves teams whose leaders are not even members of the institution or community where the intervention is to take place<sup>10</sup>. Once again, we may say that action-research and researching practice are two very close, partially overlapping concepts, but they are not entirely coincidental<sup>11</sup>.

We should keep in mind that the concept of action-research has a vast history that includes many varieties and has witnessed countless controversies<sup>12</sup>. To some there is only one way of doing “good” action-research, one that follows certain objectives marked by the pursuit of justice and social change. This is not the choice made in the present paper, which seeks to cast a rather vast, problematizing view of research and finds it legitimate for the research to assume its own objectives within a vast scope (considering, nevertheless, justice and equity as fundamental values). Basically we have before us two counteracting views of research: (i) a “normative” view, filled with ideological interests – research as a means to certain predetermined ends of social change; (ii) a questioning, problematizing view – research as a process that is born within a practice and is not necessarily subject to external agendas. In an ideologically framed investigation, objectives are clearly defined – the doubt remains as to whether these can be reached under the circumstances that exist. On the contrary, when we begin a process

---

<sup>10</sup> Such is the case, for instance, of the ECO Project, an educational project that marked the 70s and 80s in Portugal (see Benavente, Costa, Machado & Neves, 1987).

<sup>11</sup> For some authors, to say that teachers perform research in their classroom is the same as saying they do action-research (for example, Arends, 1999, p. 525).

<sup>12</sup> Esteves (1986), for example, distinguishes two main variations: research-for-action and research-in/through-action.

of questioning within a practice, from the start we never know where it will take us. In this case, the investigation is also steered by values, but it is not subject to any values – except those of questioning and reflection.

And so we arrive at another expression, *reflection*, which is also very close to the notion of researching practice. As Geraldi, Messias and Guerra (1998) state, John Dewey characterized the reflective act as one that is not merely guided by impulse, tradition or authority. To this author, reflecting implies a careful, active consideration of what one believes or practices, in light of the reasons that justify it and of the consequences stemming from it<sup>13</sup>.

Once again, these concepts overlap partially. No one can research one's practice and not be a reflective practitioner... But probably being reflective is not enough to do research. In truth, the concept of reflective teacher allows for rather diverse interpretations. For some, all human beings are reflective and subsequently all teachers are necessarily reflective<sup>14</sup>. To others, being reflective implies several conditions that vary according to their proponents' theoretical frameworks<sup>15</sup>. Therefore, the degree of proximity between the concepts of researching one's practice and reflecting about one's practice depend most of all on the meaning attributed to 'researching' and 'reflecting'<sup>16</sup>.

Finally, we must distinguish researching one's practice from the common *academic research*<sup>17</sup>. As I have mentioned before, they are two types of research that correspond to distinct finalities and must be thought out in different ways. Academic research aims to increase academic knowledge in the fields and subjects established in the respective community – the academic community. Researching one's practice aims to solve professional problems and increase the knowledge regarding these problems, turned not towards the academic community, but to the professional community. These

---

<sup>13</sup> The concepts of reflective teacher and reflective practices are discussed in another chapter of this book by Oliveira and Serrazina. Other discussions in Portuguese language on the reflective teacher may be found in the likes of Alarcão (1996), Serrazina (1999), or Vasconcelos (2000).

<sup>14</sup> For instance, this is the stance adopted by Teresa Estrela at the Seminar on Conceptions and Models in Teachers' Pre-Service Education that took place at the University of Lisbon in October 2001.

<sup>15</sup> For example, to Olga Pombo (1993), the reference model of reflection is philosophical reflection. In her perspective, reflective teachers are those who interrogate their practice in the philosophers' way...

<sup>16</sup> In the present text, I think it is useful to establish these distinctions between the concepts of (i) researching one's practice, (ii) teacher researcher (in Stenhouse's sense), (iii) reflective practitioner and (iv) participant in action-research projects. Many authors do not establish these distinctions and consider these terms to be synonyms. Such is the case of Alarcão (2001), for whom these terms are all alike. It is also the case of Richardson (1994), to whom the teacher as reflective practitioner and as participant in action-research are some of the varieties of what he calls *practical inquiry*. A more in-depth discussion about the reflective teacher may be found, in this volume, in Oliveira and Serrazina (2002).

<sup>17</sup> Sometimes this distinction is not made by certain authors, who seem to view research by teachers as a "minor" variety of academic research (see Esteves, 1999, pp. 150-152). However, this distinction is greatly adopted by many other authors, such as Richardson (1994).

concepts are also partially overlapping because, on the one hand, the members of the academic community are teachers too and may want to research their own practice and, on the other hand, teachers may want to research their practice as a way of being accepted by the academic community<sup>18</sup>.

Richardson (1994) stresses that researching one's practice "is not conducted for purposes of developing general laws related to educational practice, and is not meant to provide *the* answer to a problem. Instead, the results are suggestive of new ways of looking at the context and problem and/or possibilities of change in practice" (p. 7). However, teachers' research about their practice, besides providing this type of result and being a requirement for a good-quality professional practice, as I argued at the beginning of this article, implies a series of other potentialities that should not be forgotten. Actually, this research may strongly contribute to the professional development of the teachers implied and to the organizational development of their institutions, and produce important knowledge about educational processes that will be useful to other teachers, to academic educators and to the community at large. It is an undeniable fact that teachers are in a privileged situation to provide a view from within about the school's realities and problems.

### **Critiques regarding researching one's practice**

There have been substantial critiques regarding teachers or other professionals researching their practice. Cochran-Smith and Lytle (1999b) systematise these critiques into three major groups, referring to (i) the knowledge that is generated, (ii) the methods, and (iii) the ends of this kind of research<sup>19</sup>.

The critique concerning knowledge generated by researching one's practice has an epistemological nature in that it questions the reason why knowledge generated by teachers might be considered valid knowledge. As the abovementioned authors underline, this critique is based on the premise that there are two forms of knowledge about teaching: a formal, theoretical or scientific form, and a practical, craft, situated, tacit or

---

<sup>18</sup> For example, with a view to obtaining degrees such as a master or PhD. Some authors (like Alarcão, 2001) seem to view researching one's practice and the research carried out with a view to obtaining academic degrees as belonging to different worlds. Despite the difficulties that researching practice may encounter in academic contexts (extensively discussed, for example, by Breen, 1997), I do not think these two activities have to be viewed as disconnected. On the contrary, carrying out research upon one's practice as the basis for obtaining academic degrees may, in my opinion, contribute seriously to the assertion of this kind of research.

<sup>19</sup> More critique as well as some possible answers can be found in Zeichner and Nofke (2001).



popular form. Response to this critique must be based on an epistemological discussion about the nature of knowledge. The distinction between so-called scientific knowledge and non-scientific knowledge has been questioned by several authors who balance between pointing out the limits of scientific knowledge, or of the so-called technical rationality (Schön, 1983), and suggesting that post-modern society needs a new type of relationship between scientific knowledge and common sense (Santos, 1987). This issue is not closed, but an increasing number of authors feel that different forms of knowledge can be legitimate in certain reference communities and according to certain finalities and that the idea that there is one form of knowledge universally superior to all others should be abandoned.

The critique regarding methods, besides questioning the lack of clarity and methodological rigor of much research about practice, also questions the proximity between the researcher and the object of research, wondering how research produced by those who are directly implied in the events at stake can be minimally reliable and prejudice-free<sup>20</sup>. This appreciation may be reversed through the establishment, by the respective reference communities, of appropriate standards of quality for this type of research. It is especially important to analyze the conditions that allow the researcher to distance him/herself from the object under study when it is very close, thus enabling a rational analysis.

The third critique refers to the ends of researching practice, questioning those studies whose objectives have an essentially “instrumental” nature and lack connection to larger social and political agendas. As Cochran-Smith and Lytle (1999b) state, this appreciation is based on the premise that, although this research has the power to fundamentally change the nature of practice and the role of teachers, this power is severely reduced if it is not politically branded or if it is used to solidify educational practices that are harmful to students. In response to this critique, I have already stated that research (both researching practice as we speak of in this context and research in general) can assume different objectives, according to the concerns and interests of its agents. This research can and should be steered by ethical, social and political values, acknowledged in its professional field, but it should not be at the disposal of this or that external movement. On the contrary, researching practice must emerge as a genuine process of

---

<sup>20</sup> A problem considered, for example, by Ana Paula Caetano (1997).

the actors involved, seeking to develop their knowledge, looking for a solution to the problems they encounter and thus asserting their professional identity.

### **The research attitude**

Teachers who research can begin with problems related to their students and learning, but also to their classes, the school and the curriculum. This immediately raises the question: If there are multiple possibilities as to where research can start, is there anything permanent about research? Actually, research practice is based on two main conditions: On the one hand, there must be the inclination to inquire, which implies the fields of affect and of attitudes; on the other, one must master a certain *savoir faire*, including the use of different methodological tools.

The vital importance of having an inquiring and reflective attitude in order to research is well underlined by Isabel Alarcão. In this respect she remembers John Dewey's words: "We must be ready to maintain and prolong the state of doubt, which is a stimulus for perfect research, where no idea is accepted, no belief asserted, without finding the justifications for them" (in Alarcão, 2001, p. 7). Stenhouse also stressed the importance of this research attitude, which he characterized as "a predisposition to analyze one's own practice in a critical, systematic manner" (in Alarcão, 2001, p. 3).

Therefore, research is not something that can be done routinely, with no passion or genuine intellectual and affective investment. That is, research cannot be done as a passive employee – it requires a spirit of social protagonist. Being part of a project without adopting, from the start, a stance of commitment and effort, means representing a secondary role in that project without ever living the real experience of research<sup>21</sup>.

Cochran-Smith and Lytle (1999a) point out a similar idea when they refer to *inquiry as stance*, which, to them, involves generating local knowledge, theorizing practice, interpreting and interrogating the theory and research of others. *Inquiry as stance* implies an ongoing attitude of questioning, while simple *inquiry* is carrying out a project bound in time.

To these authors, working in inquiry communities is social and political. They disagree with the distinction between formal knowledge and practical knowledge in that

---

<sup>21</sup> That is why engaging from the start in the elaboration of the questions that are to be investigated and in the definition of all the stages of a project is a fundamental requisite in the research process (see Jaworski, 1997, for more on this point).

both may be deeply integrated in the teacher's work. They also disagree with the notions of expert and novice. They advocate that (i) both experts and novices have to engage in similar intellectual work; (ii) the expert/novice distinction simply benefits the maintenance of the individual teacher model; and (iii) learning over the life span is essentially based on the relational dimension, thus highlighting the role of the communities and intellectual projects of teachers over time.

Cochran-Smith and Lytle underscore the idea of *inquiry* as agency. To them, the culture of inquiry communities has four major dimensions: (i) time – teachers need enough time in which to work together; (ii) the nature of the discourse – this involved what they call *rich descriptive talk* and *writing help*; (iii) the dynamics of interpersonal relations – which is quite complex; and (iv) leadership – here closely linked to activist features. Their fundamental idea is that teacher learning should not be considered primarily as an individual professional achievement but as a long-term collective project with a democratic agenda.

## **The practice of researching practice**

### **Moments of the research**

Any research involves four major moments: (i) formulating the problem or questions of the study, (ii) gathering elements to respond to that problem; (iii) interpreting the information gathered so as to reach conclusions, and (iv) disseminating the results and conclusions drawn<sup>22</sup>. Very briefly we will look into some of the issues arising at each of these points.

The formulation of good questions to research is of great important in investigative work. Questions should refer to problems that concern the teacher, and be clear and answerable with the available resources. Actually, if the questions do not really matter to the teacher, he/she should not be expected to make the necessary affective investment to conduct the research properly<sup>23</sup>.

---

<sup>22</sup> Arends (1999) speaks of the first three moments discussed here. If we assume that the public character is an essential feature of research, we must add the fourth moment. These moments do not always develop in a strictly sequential manner. Sometimes they may overlap or include complex back-and-forth movements.

<sup>23</sup> The idea that having good questions is a fundamental condition to research is also advocated by authors like Alarcão (2001) and Lytle and Cochran-Smith (1990).

Teachers are really interested in solving a problem that concerns them or in understanding a situation that intrigues them, not just in doing research for the fun of it. It is preferable that they channel their energies towards issues regarding which they can have tangible results that towards those that are far beyond their scope of action. Issues evolve with the development of the work itself, but it is important that this variation is oriented towards greater precision and demarcation. If issues vary erratically, it is likely that in the end there is no minimally plausible answer to them<sup>24</sup>.

As plain and simple as this all might seem, it is precisely in the formulation of questions that many investigations get lost. In certain cases, from the start they are too ambitious and it becomes impossible to answer them in the time foreseen and with the available resources. In other cases, questions lack good formulation at the start and change so radically as work advances that it is impossible to give them a convincing answer. Therefore, learning how to formulate sound questions is a fundamental requisite for researching.

Gathering elements to answer the study questions implies making a research plan, which states the working methodology in practical terms. Generally speaking, researching practice resorts to the most commonly used work plans and techniques in human and social sciences and, in particular, in studies in education. However, researching practice has certain prominent features. One of them, its defining trait, is its strong tie to problems pertaining to professional practice. Other that we often find is a collaborative dimension in that several actors intervene and organize themselves as a working team<sup>25</sup>.

The nature of the questions that are formulated determines the nature of the study object and of the data that have to be gathered. Therefore, a study essentially aimed at understanding should have quite a different methodology from a study aimed at introducing immediate changes in one's professional practice. In either case, the study object may be a well defined entity, such as a student, a class, a school, a curriculum, a project, and so on. It can also be a unique property or feature of a vaster object, such as the reasons for the difficulties a group of students has in mathematics, the way to introduce new software in the classroom, the way results in mathematics influence

---

<sup>24</sup> For instance, Tinto, Shelly and Zarach (1994) report a study where two participating teachers began by formulating some questions in a vague manner – what are the reasons for their students' lack of engagement in Mathematics classes? These questions made them try a number of changes in their practice – group work, problem-solving through the use of technology, students' writing – which allowed them to formulate much clearer questions to research, regarding these new working methods in the classroom.

<sup>25</sup> The collaborative dimension is extensively discussed in another chapter of this book, by Boavida and Ponte (2002).

students' school trajectory, and so on. The data that are to be collected may be quantitative (numerical data concerning measurable or at least countable variables) or qualitative (non-numerical data) in nature, depending on the problem of the study<sup>26</sup>.

The most common techniques for gathering data of a quantitative nature are tests and questionnaires, although observation and the analysis of already existing documents (such as students' school processes) are also used<sup>27</sup>. Analyzing quantitative data is usually with statistical techniques, both descriptive and inferential.

On the other hand, the most common techniques for gathering data of a qualitative nature are observation, the interview and documental analysis<sup>28</sup>. Recently the use of personal journals, where the researcher registers the relevant events that arise in the process of the work and the ideas and concerns that crop up, has also become frequent. To analyze these data a variety of techniques are used, including content analysis and discourse analysis<sup>29</sup>.

In either case, whether regarding quantitative or qualitative data, the most important thing is not to gather a lot of data, but to gather data that are suitable for the goals at stake and are trustworthy. To do so, the development of a global work plan is essential, foreseeing what is going to be done, when and how. It is also important that data are always gathered in the same way, with clear, well-defined procedures, so as to facilitate their subsequent interpretation.

Throughout the whole development of the work, it is essential that the researcher (or research teams) assumes control over the process. To do so it is necessary to keep in mind the aimed objectives, the finalities of the programmed activities, the roles that have been defined and its calendar. It is not about stiffly following everything that has been programmed, but about working around all the adaptations that show to be necessary, with flexibility but also with a critical eye. The work plan and the records (for example, in the personal journal) will provide the researcher with an autonomous space of

---

<sup>26</sup> Obviously this article does not withstand a detailed discussion about research methodologies and techniques. For more information on this matter, there are books on research methodologies in education, such as Altrichter, Posch and Somekh (1993), Bogdan and Biklen (1994), Lessard-Hébert (1996), Lessard-Hébert, Goyette and Boutin (1994) and Ludke and André (1986).

<sup>27</sup> There are books that pay great attention to these techniques, some are even devoted to a single technique, such as Ghiglione and Matalon (1992) or Mucchieli (1979).

<sup>28</sup> Each of these techniques, in turn, has its auxiliary tools. Observation may be supported by grids, the interview by a script and documental analysis by a set of steering categories. For observation techniques, see, for example, Estrela (1986). For interview techniques, see, for example, McCracken (1988), Nunes (1983), Powney and Watts (1987) or Spradley (1979).

<sup>29</sup> For content analysis, see, for example, Bardin (1979). For discourse analysis, see, for example, Gee, Michaels and O'Connor (1992).

reality where he/she can create a distance regarding the events of the day whenever necessary.

Finally, it is important to refer that the interpretation of the information gathered in order to draw conclusions, and the way results are disseminated, largely depend on the particular nature of each study. Disseminating results and conclusions takes on many forms, from informal conversations with actors close to the researcher (or research team) to formal presentations in scientific meetings and publications in scientific journals<sup>30</sup>. Dialogue with other actors is essential to keep in perspective what has value and what does not, what is important and what is not, so it is a decisive element for the quality of the research. Sometimes it is good to create the role of “critical friend” from the start, a kind of project consultant who asks questions (that can be uncomfortable), thus helping the researcher to reflect about the strengths and weaknesses of the work under way.

These two activities – interpretation of information and dissemination of results – far from being disassociated, cross one another often in unexpected ways. Actually, many times from the start we have an idea of the meetings or journals where we would like to publish the conclusions of the study. It is also common for the work still to be under development and be the object of dissemination, in terms of its objectives and activities but also in terms of its partial results. In these cases, public dissemination starts long before entering the final phase of the project.

Other times, it is when we produce texts with reports of the experiences and papers for presentation in meetings that we further the analysis of one aspect or another. Also, during the presentation of results questions and reflections may arise that take us in an unexpected direction, opening the way for new inquiries and new projects. All this shows how different moments of a research can intertwine deeply<sup>31</sup>.

## **Quality criteria**

The value of teachers (or other professionals) researching their practice depends on meeting certain quality criteria, as consensual as possible for the respective reference community. To this end many criteria have been proposed, but we are still far from a

---

<sup>30</sup> Several problems related to reporting and disseminating teacher research are discussed, for instance, by Smith (1996).

<sup>31</sup> Practical suggestions based on numerous experiences, regarding teachers conducting research, can be found, for instance in Collins and Spiegel (1995). On the other hand, we find a table of the competencies needed by the teacher who does research in Alarcão (2001), for instance.

consensus, which is understandable given that this is a new field of work that is being developed. What is not appropriate is to judge research carried out by teachers on their practice by the standards of academic research. As these are different activities with clearly different finalities, the criteria for rating their quality are necessarily also different. Let us see what several authors have to say about this.

Anderson and Herr (1999) suggest five quality criteria for teachers' research on their practice. These criteria concern: (i) validity of the results; (ii) validity of the processes; (iii) democratic validity; (iv) catalytic validity; and (v) dialogical validity. To these authors, the validity of the results regards to what extent the actions undertaken lead to the solution of the problem. The validity of the processes is related to the way problems are handled and solved, allowing for the ongoing learning of the people involved and of the organization itself. Democratic validity refers to the way research is conducted with the collaboration of all the parties with interests in the problem under investigation. They speak of catalytic validity when the activity that is carried out promotes reorienting and energizing participants so they understand the reality better in order to transform it. Finally, dialogical validity has to do with the way the research was subjected to a process of scrutiny and analysis by peers.

Another author who looked into this matter is Zeichner (1998), who indicates two main criteria for the quality of researching practice: (i) clarity, and (ii) expressing one's own point of view. Clarity concerns a sound problematization and the use of evidence to base conclusions on. Expressing one's own point of view is associated with the presence of the author's personal marks and their articulation with the respective social, economic, political and cultural context. In another work, Zeichner adds two more criteria: (iii) dialogical quality and (iv) the tie to practice (see Geraldi, Messias and Guerra, 1998). The criterion of dialogical quality raises the question of knowing whether the research promoted debate and reflection among teachers. As for the criterion being tied to practice, above all it defines this type of research<sup>32</sup>.

The conditions we have just systematized as defining this kind of research (see beginning of point 2) provide us with a base for reflecting about its quality criteria. With these conditions as the baseline, it is natural to assume that researching one's practice should: (i) refer to a practical problem or situation lived by the actors; (ii) contain some

---

<sup>32</sup> After having contributed greatly to the definition of possible quality criteria regarding researching one's professional practice, Kenneth Zeichner, in a text elaborated with Susan Nofke (Zeichner & Nofke, 2001) prefers not to propose any criteria whatsoever, suggesting that the teachers themselves take on this task.

new element; (iii) have a certain “methodological quality” and (iv) be public. These conditions are very close to those of Zeichner. Methodological quality may be associated with the explicit presence of questions and data collection procedures and of ways of presenting conclusions based on the data. This is not very different from Zeichner’s “clarity”. The dialogical character of research depends on its public nature, one being the natural extension of the other. Actually, as it is related to the way the research was accepted and discussed by the elements of the reference community, dialogical quality is one of the strongest features that grant a project its credibility. The tie to practice seems to be consensual. Also, the condition of expressing one’s own point of view, that Zeichner points out, in a way extends the idea of a tie to practice, and I think it should be maintained as a criterion of authenticity<sup>33</sup>. In this manner, we would have the set of criteria shown in Figure 1.

These conditions seek to adjust to what may be expected of quality research carried out by teachers on their own practice. These or other conditions that may prove more appropriate may constitute an essential reference for that which the teacher community feels to be worthy of attention. Therefore, teacher research may have interest to a larger professional community than that of the actors who lived the process directly.

Figure 1 – Quality criteria of researching one’s practice

<i>Criterion</i>	<i>Research...</i>
Tie to practice	... refers to a practical problem or situation lived by the actors.
Authenticity	... expresses the actors’ own point of view and its articulation with the social, economic, political and cultural context.
Novelty	... contains some new element, in the formulation of questions, in the methodology used or in the interpretation of the results.
Methodological quality	... explicitly contains questions or data collection procedures and presents conclusions based on the evidence obtained.
Dialogical quality	... is public and has been discussed by actors close to the team and others distant from it.

<sup>33</sup> There is still the element of novelty, that Zeichner seems not to consider relevant, but perhaps it is best to maintain so as not to trivialize the idea of research.



Also, these conditions continue to have some relation to the quality criteria demanded of certain types of educational research. This is not surprising, for within the context of the investigative process there is a common, original trademark. Researching one's practice might be less sophisticated, methodologically speaking, but on the other hand it tends to imply a strong tie to practice, authenticity, novelty and dialogicity.

We should keep in mind that the classical criteria for research in the human and social sciences (validity and reliability) are a heritage of positivism, concerned mainly with the possibility of securing the "certainty" of conclusions. Currently, the notion of certainty has become much more relative. It is understood as being unattainable (even in the exact and natural sciences) and that other values must equally be taken into account. Often the importance of a research is not in its conclusions, but in the questions it poses or in the view it provides of a given reality.

In other words, research is not just about gathering certainties, it is about pursuing various ends – understanding a situation or solving a specific problem, related to our practice or not. Quality criteria in research should be aligned with this diversity of ends and not just focused on the issue of validity and certainty.

When researching practice clearly meets the criteria mentioned in the table above, naturally it grasps the interest of the academic community. In these circumstances, the value attributed to that research takes it beyond the scope of a local research, steered towards the resolution of specific problems, to become something of added value to the whole educational community.

## **Conclusion**

Researching one's practice has emerged as a possible fourth great paradigm in research in education, beside the three great "classical" paradigms – positivist, interpretative and critical (Anderson and Herr, 1999; Zeichner and Nofke, 2001). Much is still to be done until this type of research truly surfaces, such as furthering its epistemological grounds, improving its quality criteria and, above all, using good examples to illustrate its worth and its potential as a formative tool, as a tool for educational change and as a form of constructing important knowledge about education.

To this day, the notion of researching practice and the relatively close notion of action-research have been poorly explored in the field of mathematics education, both in Portugal and abroad. However, some studies have been done. For instance, the book by Zack, Mousley and Breen (1997) contains a description of various experiences of researching practice<sup>34</sup>. This book discusses many of the problems teachers encounter when researching their practice. In the introduction, Mousley (1997) indicates that this research is a demanding activity that involves a different level of thinking from the plain learning process based on experience. He also stresses that, contrary to the simple sharing of experiences, researching practice is threatening to the *status quo* in that it puts into question the official culture of the school and challenges traditional hierarchies and roles.

In the *International handbook of mathematics education*, Crawford and Adler (1996) discuss the action-research perspective regarding mathematics teachers. The authors make a distinction between what they call “positivist conception of research” and action-research, characterizing the latter as the research that is carried out with the intention of changing professional practice or social institutions through the active, transformative participation of its actors. I find this distinction to be rather limiting, because it leaves aside all academic and non-academic research that is conducted according to an interpretative or critical perspective.

The authors suggest that action-research is somewhere along a *continuum* between reflection and (“positivist”) research. They declare that doing action-research requires abandoning the traditional cultural rules regarding authority and qualifications to exercise research activity. In this respect, their opinion is in keeping with the proposal presented in this paper concerning the definition of specific working procedures and quality criteria for the research that teachers carry out on their practice.

The potential of research for mathematics teachers has also been discussed by Beatriz D’Ambrosio (1996) and Barbara Nelson (1997). Both authors point out two recent changes in the literature in this respect: (i) the influence of the reform movement in mathematics education and (ii) the application of the same ideas about learning to students and teachers. D’Ambrosio considers that in order to accomplish the new practices recommended by the reform movements, teachers must adopt an attitude of constant

---

<sup>34</sup> The work gathered in this book derives mainly from the Anglo-Saxon world (Australia, South Africa, Canada, United States, United Kingdom), but it also includes experiences from Latin countries (Brazil, Colombia, Portugal).

vigilance as regards their students' forms of thinking. On the other hand, Nelson underlines the value of an investigative perspective for the development of the teacher's professional identity and also states that an investigative attitude towards students' mathematical thinking may be of great importance in the exchange of experiences between teachers. In her perspective, as teachers do research, these issues move to a self-sustained level of change regarding their beliefs about teaching and learning and about their practice. This author seems to feel that teachers have a lot to gain, in terms of their training, if they draw on the working methods of the academic researchers and if they study the same objects as these do. This perspective is clearly dominated by the academic tradition of research, which is presented as a model for teachers to follow.

Perspectives valuing the role of research in teachers' pre-service education can be found in several other studies. For example, Lampert and Ball (1998) recommend approaching pre-service education by basing it on research to be performed on a *corpus* of digitalized data. Similarly, Comiti and Ball (1996) indicate that in the currently ruling pre-service education in France, the end of the course includes a thesis with a heavy investigative component, although its accomplishment is turning out to be rather problematic.

In Portugal, as regards mathematics education, there is relatively little research that fits inside this paradigm and much reflection to be carried out with respect to its potential and limitations (in this sense, see Serrazina and Oliveira, 2001). However, the growing importance attributed to students' and teachers' research, as a form of knowledge construction, has helped shift this topic to the limelight. The idea has been launched. The studies gathered in this book witness much of its potential. Future practice will demonstrate its real scope.

## References

- Alarcão, I. (1996). Ser professor reflexivo. In I. Alarcão (Org.), *Formação reflexiva de professores: Estratégias de supervisão* (pp. 171-198). Porto: Porto Editora.
- Alarcão, I. (2001). Professor-investigador: Que sentido? Que formação? In B. P. Campos (Org.), *Formação profissional de professores no ensino superior* (Vol. 1, pp. 21-31). Porto: Porto Editora. [disponível no site: <http://www.inafop.pt/revista>]
- Altrichter, H., Posch, P., & Somekh, B. (1993). *Teachers investigate their work: An introduction to the methods of action research*. London: Routledge.

- Anderson, G. L., & Herr, K. (1999). The new paradigm wars: Is there room for rigorous practitioner knowledge in schools and universities? *Educational Researcher*, 28(5), 12-21 e 40.
- Arends, R. I. (1997). *Aprender a ensinar*. Lisboa: McGraw-Hill.
- Bardin, L. (1979). *Análise de conteúdo*. Lisboa: Edições 70.
- Beillerot, J. (2001). A “pesquisa”: Esboço de uma análise. In M. André (Ed.), *O papel da pesquisa na formação e na prática dos professores* (pp. 71-90). Campinas: Papirus.
- Benavente, A., Costa, A. F., Machado, F. L., & Neves, M. C. (1987). *Do outro lado da escola*. Lisboa: Instituto de Estudos para o Desenvolvimento e Fundação Bernard van Leer.
- Boavida, A., & Ponte, J. P. (2002). Investigação colaborativa: Potencialidades e problemas. In GTI (Org.), *Reflectir e investigar sobre a prática profissional*. Lisboa: APM.
- Bogdan, R., & Biklen, S. K. (1994). *Investigação qualitativa em educação: Uma introdução à teoria e aos métodos*. Porto: Porto Editora.
- Breen, C. (1997). Teachers as reseachers? In V. Zack, J. Mousley, & C. Breen (Orgs.), *Developing practice: Teachers' inquiry and educational change* (pp. 151-158). Geelong, Australia: Centre for Studies in Mathematics, Science and Environmental Education.
- Caetano, A. P. (1997). Para uma reflexão sobre processo de investigação implicada. In A. Estrela & J. Ferreira (Orgs.), *Métodos e técnicas de investigação científica em educação: Actas do VII Colóquio Nacional da AIPELF/AFIRSE* (pp. 263-270). Lisboa: Faculdade de Psicologia e de Ciências de Educação, Universidade de Lisboa.
- Carr, W., & Kemmis, S. (1986) *Becoming critical: Education, knowledge and action research*. Lewes: Falmer.
- Cochran-Smith, M., & Lytle, S. L. (1999a). Relationships of knowledge and practice: Teacher learning in communities. *Review of Research in Education*, 24, 249-305.
- Cochran-Smith, M., & Lytle, S. L. (1999b). The teacher research movement: A decade later. *Educational Researcher*, 28(7), 15-25.
- Collins, A., & Spiegel, S. (1995). So you want to do action research? (disponível no endereço [http://www.enc.org/professional/research/journal/science/documents/\\_/0,1944,ENC-002432-2432ch10,00.shtm](http://www.enc.org/professional/research/journal/science/documents/_/0,1944,ENC-002432-2432ch10,00.shtm))
- Comiti, C., & Ball, D. L. (1996). Preparing teachers to teach mathematics: A comparative perspective. In A. J. Bishop, C. Keitel, J. Kilpatrick, & C. Laborde (Orgs.), *International handbook of mathematics education* (pp. 1123-1151). Dordrecht: Kluwer.
- Crawford, K., & Adler, J. (1996). Teachers as researchers in mathematics education. In A. J. Bishop, K. Clements, C. Keitel, J. Kilparick, & C. Laborde (Orgs.), *International handbook of mathematics education* (pp. 1187-1205). Dordrecht: Kluwer.
- D'Ambrosio, B. (1996). Mudanças no papel do professor de matemática diante de reformas do ensino. In *Actas do ProfMat 96* (pp. 15-24). Lisboa: APM.
- Esteves, A. J. (1986). A investigação-acção. In A. S. Silva & J. M. Pinto (Orgs.), *Metodologia das Ciências Sociais* (pp. 251-278). Porto: Afrontamento.
- Esteves, M. (1999). *A investigação enquanto estratégia de formação de professores: Um estudo* (dissertação de doutoramento, Universidade de Lisboa).
- Estrela, A. (1986). *Teoria e prática de observação de classes: Uma estratégia de formação de professores*. Lisboa: INIC.
- Geraldi, C. M. G., Messias, M. G. M., & Guerra, M. D. S. (1998). Reflectindo com Zeichner: Um encontro orientado por preocupações políticas, teóricas e epistemológicas. In C. M.

- G. Geraldi, D. Fiorentini, & E. M. Pereira (Orgs.), *Cartografias do trabalho docente* (pp. 237-274). Campinas: Mercado das Letras.
- Gee, J. P., Michaels, S., & O'Connor, M. C. (1992). Discourse analysis. In M. D. LeCompte, W. L. Millroy, & J. Preissle (Orgs.), *The handbook of qualitative research in education* (pp. 227-291). San Diego, CA: Academic Press.
- Ghiglione, R., & Matalon, B. (1992). *O inquérito: Teoria e prática*. Oeiras: Celta.
- Jaworski, B. (1997). Developing understanding of developing teaching. In V. Zack, J. Mousley, & C. Breen (Orgs.), *Developing practice: Teachers' inquiry and educational change* (pp. 169-180). Geelong, Australia: Centre for Studies in Mathematics, Science and Environmental Education.
- Lampert, M., & Ball, D. L. (1998). *Teaching, multimedia, and mathematics*. New York, NY: Teachers College Press.
- Lessard-Hébert, M. (1996). *Pesquisa em educação*. Lisboa: Instituto Piaget.
- Lessard-Hébert, M., Goyette, G., & Boutin, G. (1994). *Investigação qualitativa: Fundamentos e práticas*. Lisboa: Instituto Piaget.
- Ludke, M., & André, M. E. D. A. (1986). *Pesquisa em educação: Abordagens qualitativas*. São Paulo: EPU.
- Lytle, S. L., & Cochran-Smith, M. (1990). Learning from teacher research: A working typology. *Teachers College Records*, 92(1), 83-103.
- McCracken, G. (1988). *The long interview* (Vol. 13). Newbury Park, CA: Sage.
- Mendes, E. (1997). *Actividade matemática escolar numa perspectiva investigativa e exploratória na sala de aula: Implicações para a aprendizagem* (Tese de mestrado, Universidade de Lisboa). Lisboa: APM.
- Mucchieli, R. (1979). *O questionário na pesquisa psicossocial*. São Paulo: Martins Fontes.
- Mousley, J. (1997). An introduction: Teachers' inquiry. In V. Zack, J. Mousley, & C. Breen (Orgs.), *Developing practice: Teachers' inquiry and educational change* (pp. 1-10). Geelong, Australia: Centre for Studies in Mathematics, Science and Environmental Education.
- Nunes, T. (1983). *O método clínico: Usando os exames de Piaget*. Petrópolis: Vozes.
- Nelson, B. S. (1997). Learning about teacher change in the context of mathematics education reform: Where are we going? In E. Fennema & B. S. Nelson (Orgs.), *Mathematics teachers in transition* (pp. 403-419). Mahwah, NJ: Lawrence Erlbaum.
- Oliveira, I., & Lurdes Serrazina, L. (2002). A reflexão e o professor como investigador. In GTI (Org.), *Refletir e investigar sobre a prática profissional*. Lisboa: APM.
- Pombo, O. (1993). Para um modelo reflexivo de formação de professores. *Revista de Educação*, 3(2), 37-45.
- Powney, J., & Watts, M. (1987). *Interviewing in educational research*. London: Routledge.
- Richardson, V. (1994). Conducting research on practice. *Educational Researcher*, 23(5), 5-10.
- Santos, B. S. (1987). *Um discurso sobre as ciências*. Porto: Afrontamento.
- Schön, D. A. (1983). *The reflective practitioner: How professionals think in action*. Aldershot Hants: Avebury.
- Serrazina, L. (1999). Reflexão, conhecimento e práticas lectivas em Matemática num contexto de reforma curricular no 1º ciclo. *Quadrante*, 8(1-2), 139-168.

- Serrazina, L., & Oliveira, I. (2001). O professor como investigador: Leitura crítica de investigações em educação matemática. In I. C. Lopes & M. C. Costa (Orgs.), *Actas do SIEM 2001* (pp. 29-56). Lisboa: APM. (republicado neste volume)
- Silva, M. R. (1994). Concepções e práticas do professor de matemática. *Quadrante*, 3(2), 11-24.
- Smith, R. (1996). *Teacher trialling in the classroom: Making the results public*. Comunicação apresentada no ICME, Sevilha, Espanha.
- Spradley, J. (1979). *The ethnographic interview*. New York, NY: Holt.
- Stenhouse, L. (1975). *An introduction to curriculum research and development*. London: Heineman Educational.
- Stoer, S. R., & Cortesão, L. (1999). *Levantando a pedra: Da pedagogia inter/multicultural às políticas educativas numa época de transnacionalização*. Porto: Afrontamento.
- Tinto, P. P., Shelly, B. A., & Zarach, N. J. (1994). Classroom research and classroom practice: Blurring the boundaries. *The Mathematics Teacher*, 87(8), 644-648.
- Vasconcelos, C. C. (2000). A reflexão: Um elemento estruturador na formação de professores. *Millenium*, 17.  
(disponível no endereço [http://www.ipv.pt/millenium/17\\_ect9.htm](http://www.ipv.pt/millenium/17_ect9.htm))
- Zack, V., Mousley, J., & Breen, C. (Orgs.), (1997). *Developing practice: Teachers' inquiry and educational change*. Geelong, Australia: Centre for Studies in Mathematics, Science and Environmental Education.
- Zeichner, K. (1998). Para além da divisão entre professor pesquisador e pesquisador académico. In C. M. G. Geraldi, D. Fiorentini, & E. M. Pereira (Orgs.), *Cartografias do trabalho docente* (pp. 207-236). Campinas: Mercado das Letras.
- Zeichner, K., & Nofke, S. (2001). Practitioner research. In V. Richardson (Org.), *Handbook of research on teaching* (pp. 298-330). Washington, DC.