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Action research as a methodology for professional development in leading an educational process

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ABSTRACT

The need to resolve a researcher's discomfort, resulting from the inherent gap between values and beliefs and their practical implementation, led to using action research methodology during an academy-field partnership. Two teacher educators, 24 pre-service teachers specializing in science, and six teachers participated in the study. Throughout the two years of the partnership this study describes a reflective perspective process that focuses on actions, events, thoughts, dilemmas and feelings of the participants that emerged from the researcher's reflective journal. Cycles of reflection on thinking and doing helped monitoring the complex process of the partnership that bridges the gap between the academic and field cultures. The collected data underwent three stages of interpretative content analysis that point to the role of reflection cycles on thinking and doing, resulting in the interweaving of cognitive, affective, theoretical and practical features during the academy-field practice model.

1. Introduction

The discomfort I experienced as a leader of an educational process resulting from the inherent gap between theory - my values and beliefs as an education researcher - and its practical implementation was the motivation for this study. Or as Whitehead (2009) puts it, I sometimes felt that I believed in one thing but was doing something else. The attempt to cope with this contradictory situation led to the search for a way to put my values and beliefs into action that might enhance my activities as a leader of the educational process of promoting science education in an academia-field partnership model (AFPM).

This was the starting point for the implementation of action research as a methodological approach to improve performance and outcomes as proposed by McNiff and Whitehead (2006). I discovered that the values I believe in, including the integration of pre-service teachers (PSTs) as part of the professional learning community (Ronen, 2018b), were not fully expressed in the traditional practicum model (Kemmis, Mctaggart, & Nixon, 2014) and I decided to examine the possibility of an AFPM which would define the shared interest in the professional development of the PSTs and the school staff (Pillay, Watters, Hoff, & Flynn, 2014). Naturally, the collaboration between two independent organizations, an academic institution and a school, revealed inherent gaps pertaining to the cultural setup of organizations with different goals: theoretical versus practical, research versus execution, raising questions versus problem solving, ambiguity versus objectives and targets, sharing versus hierarchy.

During the partnership, it became clear that the sense of discomfort was shared by other participants - the PSTs, the teachers and the teacher educator (TE) - which was described in terms of challenges. The choice to confront these challenges via the methodology of action research (McNiff & Whitehead, 2006; Whitehead, 2009) - by defining a plan of action, executing it and gathering data to test the effectiveness of the action - enabled a better implementation of the values defined (Kemmis et al., 2014). Analysis of cycles of action occurring in the first two years of the partnership drew my attention not only towards my development as the supervision leader, but also towards the contribution of the change to the AFPM as perceived by participants.

2. Theoretical framework

2.1. Action research as a methodology for reflective teaching

Action research plays an important role in the professional development of teachers and PSTs, since it is linked to research about practical knowledge and demonstrates educational improvement entails analysis and change both on the side of the individual and on the side of the culture of the group (e.g., Kemmis et al., 2014; Whitehead, 2009).

Kemmis et al. define such collaborative commitment to engaging in iterative cycles of planning, acting, observing, and reflecting to address inconvenient consequences of social practices as critical participatory action. Understanding and improving processes of change in education

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also occurs as it encourages the growth of new knowledge to improve educational practices and problem solving (Johnson, 2012). Action research is an attempt to bridge the gap between conceptual knowledge (episteme) and perceptual knowledge (phronesis) (Korthagen, Kessels, Koster, Lagerwerf, & Wubbels, 2001), as "episteme is scientific, fixed, expert, and abstract knowledge, whereas phronesis is knowing through experience about concrete particulars" (Kessels & Korthagen, 2001, p. 25). Korthagen et al. (2001) argue that focusing on conceptual knowledge (episteme) throughout traditional teacher education creates a gap between the PSTs' understanding of concepts and their perceptual knowledge (phronesis) experiences. By reconceptualizing the traditional view of the practice-to-theory model participants seek to transform for their understandingsof their practices; the conductof their practices; and the conditions under which they practice (Kemmis et al., 2014, p. 67).

One way of identifying a required problem for an action research can be self-study. Self-study is about looking back and changing your own understanding, and it can be a starting point for the action research (Briggs & Coleman, 2007). Working in action research by self-study can support teachers` pedagogical growth through practice (Peercy & Troyan, 2017), and emphasize the importance of theories in collaborative learning activities (Voet & De Wever, 2018).

In self-study the focus of investigation is making the scholars` "tacit nature of practice explicit" (Loughran, 2014, p. 5), and supporting novice teachers to better absorb abstractions about teaching and learning (Bullock, 2016). Explicit modeling involves the TE demonstrating pedagogical moves and working with novice teachers to unpack the reasoning behind them (Swennen, Lunenberg, & Korthagen, 2008). Another self-study approach - "realistic teacher education" (Korthagen, Loughran, & Russell, 2006) in which novice teaching interspersed with workshops - is also discussed, however, self-study research has not been broadly adopted, nor taken up in any systematic way within the teacher education community (Peercy & Troyan, 2017). Indeed, self-study requires critical collaborative inquiry where personal insights are documented, shared and critiqued for validation (Samaras, Gudjonsdottir, McMurrer, & Dalmau, 2012, p. 305), acknowledging the vital role of dialogue with colleagues and a critical friend (CF) to more deeply transform their practices (Peercy & Troyan, 2017). Despite its limitation, the work in self-study is firmly grounded in conceptual frameworks emphasizing reflection and the situated nature of one's practice, for understanding the development of PSTs and one`s knowledge as a researcher.

Integrating action research in the education system is not always a success, and reflection is often performed as the action of an individual as a goal, regardless of an educational process involving other participants (Kemmis et al., 2014). Despite the difficulties in implementing action research, the attempt by an individual to link theory and practice is important for understanding and interpreting the practice for execution and enhancement of educational activity (Saldana, 2009), in science education particularly (Laudonia, Mamlok-Naaman, Abels, & Eilks, 2018). The authors summarize three modes of action research that have been developed to address the gap between educational research and everyday teaching practices: 'knowledge-generating' action research researching a specific innovation in a classroom setting; teacher-centered action research driven by practical teaching in the classroom; and a field of interactive (also called 'practical' or 'participatory') action research. The present study simulates the `practical` mode combining "close cooperation and mutual negotiation between external experts and hands-on practitioners […] to identify problems and suggest potential actions" (Laudonia et al., 2018, p. 483). One of the proposed methods of enhancing practices and professional development among teachers and PSTs, which invites the inclusion of action research, is the challenging partnership framework between academia and the field.

2.2. The AFPM as a framework for professional development

Planning professional development schools (PDS) based on the AFPM is designed to promote teacher professional development (Pillay et al., 2014) that connects to the desire to improve the traditional practice and link episteme and phronesis. The ongoing joint effort to create teaching-learning situations in which the theories can deepen understanding based on PSTs' practical knowledge will raise the quality of PSTs' learning and achievements (Kessels & Korthagen, 2001; Pillay et al., 2014; Voet & De Wever, 2018).

An example of the great importance attributed to teachers' practical knowledge has been reported in a study (van Driel, Beijaard, & Verloop, 2001) examining the professional development of science teachers, which highlighted the need to recognize the importance of teachers' beliefs and practical knowledge, and their integration in collaborative learning to ensure its success. The researchers pointed out the following strategies as effective for shaping practical knowledge and applying it successfully: group learning, CF, and collaborative action research. These strategies improve collaborative learning with the aim of advancing professional development of teachers and PSTs.

Professional development is a wide-ranging term, covering occasional and long-term engagements, designed to successfully lead to changes in teachers' beliefs, confidence and knowledge (Voet & De Wever, 2018). This process of knowledge construction is a cognitive and affective challenge in any traditional setting, to which is added a cultural, organizational challenge as well as one of implementation as expressed in the AFPM (Ronen, 2018a). However, the AFPM enables ongoing interactions between the participants, the exchange of ideas and insights and collaborative learning (Shields, 2012; Spillane, 2012); there is examination of the dialogue that is trying to confront the inherent ambiguity within the shared space (Akkerman & Bakker, 2011), and there is an attempt to adapt the participants' practices to varying needs in order to generate change (Smith & Southerland, 2007) in anticipation of future practices (Cuenca, Schmeichel, Butler, Dinkelman, & Nichols, 2011).

A new focus on action research in science education connected to teacher professional development was recently added by Burmeister and Eilks (2013). Their study changed the focus from action research in school science curriculum development and teacher continuous professional development (e.g. Eilks & Markic, 2011) to performing action research on their own practices as university teacher educators, which is the current self-study notion.

3. Methodology

3.1. Action research paradigm

This qualitative action research describes a reflective perspective that focuses on actions, thoughts and feelings of the research participants (Areljung, 2018; Peercy & Troyan, 2017; Pillay et al., 2014) - my self-study as the researcher (Burmeister & Eilks, 2013), two TEs (one per year), 24 PSTs (12 per year) and six teachers. The aim was to answer the question: What was the contribution of the action research to my supervision development as the leader of the educational process? and to the development of the AFPM as perceived by the participants?

This means that important learning must be undertaken by TEs and by myself as we grapple with how to best engage PSTs in the work of practice, where 'practice' was shaped by the TE and staff-teachers, and 'research' took place within school practice traditions (Kemmis et al., 2014). This collaborative learning with colleagues aims to rethink and reframe practice which takes on significant importance for the continued development of TEs (Fletcher & Bullock, 2015), as well as for PSTs (Hamilton & Pinnegar, 2013). For me this reflective self-study (Samaras et al., 2012) was conducted in collaboration with a CF. We discussed my reflective journal (Kemmis et al., 2014) on a regular weekly basis, to enhance my activities in a critical and rational process

supported by theory (Peercy & Troyan, 2017), to better understand the personal and social situations in which the practical work takes place, for the development of TEs (Fletcher & Bullock, 2015), PSTs and the educational process (Kemmis et al., 2014). The high level of access I had, as the leader of the educational process and as the researcher, to the process, the participants and the organizational setting, as well as my involvement in the planning, control and assessment of the partnership, further enriched the process and allowed me to rapidly implement the ideas I wished to examine.

During the practicum, each PSTs performed his/her own action research to better understand his/her teaching-learning methods on a science topic of their choice (Laudonia et al., 2018), from more technical toward more emancipatory interpretations (Kinskey, 2018), covering both improving professional environments and general interest (Mamlok-Naaman & Eilks, 2012). For example, how research work contributes to the pupils' understanding of the material being studied; ways of including outdoor learning in science teaching; building and running a petting zoo as part of a syllabus; planning and execution of a peak day as a means to engage pupils in the learning. Although the action research activities conducted by the PSTs were not included in the data for the current study, their contribution was evident, in applying the PSTs' skills of reflection as they investigated their own teaching (Cuenca et al., 2011; Samaras et al., 2012), and in the collaboration between the TE - representing conceptual knowledge (episteme), and the teacher, representing the perceptual knowledge (phronesis). These served the purpose of the partnership in leading a process that demands a collaborative style involving reciprocity, commitment and shared responsibility for professional development (Fletcher & Bullock, 2015; Mamlok-Naaman, 2018), where action research is regarded as a practitioner-oriented inquiry into participants' work (Feldman & Minstrel, 2000).

In the second year of the partnership, in which changes often start (Eilks & Markic, 2011), we aimed to advance to participation that would express itself in the blossoming of a shared culture demonstrating a third space between academia and the field (Cuenca et al., 2011). Lessons learned from the first year were addressed in the second year, which maintained the same format with the following modifications: the TE1 was replaced and new PSTs joined as part of their training-program. This necessary change is one of the limitations of the study, although it did not affect the nature of the challenges raised by the teachers who participated in both years, nor the changes I have made; issues that emerged were dealt with; assessment was formative rather than only summative; there were eight discourse group sessions focused on content and problem solving (Teubert, 2010) instead of two plenaries focused on general reflection.

3.2. Data collection

Throughout the two years of the partnership I wrote a reflective journal in which I described: the personal conversations with the participants, my non-intervening observations – based on general questions (presented by the TE), and of the discourse group fluent conversations, my interview, events, thoughts, dilemmas and feelings that accompanied me during the self-study (see Table 1).

The journal was the basis of my conversations with my CF who "acts as a sounding board, asks challenging questions, supports reframing of events" (Schuck & Russell, 2005, p. 107), and helped me better understand my actions along the axis of time and the progression of the partnership and enabled in-depth thinking and internal debates with the theory, events and processes I underwent. The questions I asked myself became more precise during this self-study which led me to discover the most appropriate path for me (Peercy & Troyan, 2017) to answer the question of creating my identity as a leader of an educational process in the space between theory and practice (Cuenca et al., 2011). In this space, learning mechanisms were revealed that included new insights, identity development, practice and institutional development (Akkerman & Bakker, 2011). These were documented during the research: *conversation transcriptions* - reflections on personal conversations I had during the partnership at the end of the first and second semesters with the PSTs, the TE and the teachers; my non-intervening *observations* in each of the practicum classes twice a year (of the PSTs, their relationship with the pupils and the teacher, the outcomes of the activity and the class atmosphere), and the discourse group sessions. In the two plenary sessions held in the first year (Table 1) the participants were asked to express their opinions of the partnership through general questions that enabled free personal reporting of their feelings, ideas and insights. For example: What do you think about the practicum in the college-school partnership model? How do you feel professionally and socially in terms of school climate? What is the partnership's contribution to your professional development in the sciences? In all the conversations and sessions, the atmosphere was good - the participants were frank and spoke of their difficulties and challenges during their practices and the learning outcomes, analysing their teaching, drawing conclusions, and suggesting what changes to make in order to improve their teaching (Kemmis et al., 2014). The discourse groups sessions (Table 1) dealt with ongoing issues chosen by the participants (TE2, PSTs, teachers), lasted about 3 h. Creating such professional learning groups becomes an effective bottom-up way of emphasizing the co-construction of knowledge by learners and professional development (Mamlok-Naaman, 2018). I was *interviewed* by the CF after the end of the year (about one hour - recorded and transcript), which enabled a hindsight perspective of time and activity. The study demonstrates cycles of action research during two years of practice including: defining an action plan (e.g., establishing discourse group); activating it (e.g., improving critical decision-making tasks by sharing problem solving with the participants), collecting data (e.g., non-intervening observations) that evaluates the efficiency of the action in relation to the values defined by me.

Table 1
Project timeline and related data sources.

Year of AFPM	Participants	Activity	Related data sources
1	Researcher	2 FM - Plenary	FM transcript
	6 teachers	2 PC	PC transcript
	12 PSTs	CF- monthly reflection	Reflective journal entries
	TE1	CF- monthly correspondence	CF correspondence
		2 NI Observations	General questions
2	Researcher	8 FM- discourse group	FM transcript
	6 teachers	4 PC	PC transcript
	12 PSTs	CF- weekly reflection	Reflective journal entries
	TE2	CF- weekly correspondence	CF correspondence
		4 Observations	General questions
		DG, NI observations	Discourse group
		Interview	Interview transcript

TE-Teacher educator; FM- Feedback meetings; PC- Personal conversations; CF - critical friend; DG - Discourse group; NI - non-intervening.

3.3. Data analysis

Data was analyzed by me and the CF (an expert in content analysis). The collected data underwent three stages of interpretative content analysis: (a) initial open coding of statements expressing ideas relevant to the research question, which led to the formulation of themes via an 'emic' approach - observing the studied phenomenon from an internal viewpoint, that of the participant; (b) the main themes that also emerged from my reflective journal were sorted into the appropriate categories (Whitehead, 2009) which distinguished between groups

Table 2
List of reflection on the challenges in the first year of the AFPM and action facing challenges in the second year.

4.1 **Reflection**	*4.2* **Action**
Challenges to the AFPM - Year 1	**Factors facing challenges - Year 2**
Gap between theory and practice	Discourse group - collaborative learning
Mentoring style	
Ambiguity	
Problem solving	
	4.3 **Development of my role as a leader**
	My turning-point
	4.4 **Fostering:**
	Interaction - caring relationships
	Motivation - sharing in decision-making
	Involvement - sharing responsibility

representing different viewpoints - PSTs, teachers, TEs - and the categories that emerged; (c) data triangulation was based on the comments brought to the surface as challenges with the partnership (a gap between theory and practice, TE mentoring style, ambiguous situations, problem solving). In the second year of the partnership, ideas emerged pertaining to factors facing challenges (discourse group, my turning point as a leader - fostering interactions, motivation and involvement (Table 2). In most cases there was agreement regarding the analysis and where there was disagreement (e.g., themes or categories definition), we (CF and me) discussed options and came to an understanding that best described the event. This broader perspective reduced possible bias on my part as a researcher regarding the data analysis, thereby helping to overcome the research limitation of the subjectivity of researchers examining their own work (Peercy & Troyan, 2017). Thus, a full picture was obtained, describing and summarizing the insights as a researcher regarding my development as a leader of the process and the development of the AFPM.

3.3.1. Research reliability

One of the key principles guiding the choice of quotes is that the excerpt chosen should be representative of other quotes that cannot be included because of the limited scope available. Cross-referencing was conducted by examining the match between the findings and the theoretical literature (Corbin & Strauss, 2008). Moreover, the 'thick description', i.e., multiple details, made it possible to extract meanings and explain phenomena (Saldana, 2009), while ensuring direct quotes from the transcripts. The units of meaning that were repeated in my reflections and taken from what the other participants said reinforced my choosing of them. While it is true that the act of choosing quotes constitutes an interpretative decision and an expression of my position as the researcher, nevertheless the quotes have introductory explanations that inform the reader of the purpose of their inclusion.

3.3.2. Ethical issues

As a leader and researcher of the practicum, I was responsible for the partnership, for the TEs, and indirectly for the PSTs and the teachers. On the other hand, I sought to explore the development of the AFPM as well as my professional development as a leader - a complexity that might influence the participants and even lead to biased reporting. For this reason, I chose to share the challenge we were facing with the participants (in the discourse group) and encouraged them to share their challenges with me, since we were all exploring and observing a new experience. Indeed, the participants, who agreed to take part in the research knowing that the information was only for the purposes of the study and that their rights would be protected, freely and openly described the problems and challenges in the partnership.

3.3.3. Research limitations

My dual role as leader and researcher might have led to bias in my treatment of both the process - an action driven by the desire for the AFPM to succeed, even at the expense of execution that did not match my beliefs - and of the results. Hence, I needed a high level of awareness and professional integrity regarding the discomfort I felt during the research. This was supported by the CF who accompanied me throughout the two years of the partnership and was my 'sounding board' throughout the dilemmas that arose. Another limitation is the 'halo effect' (driven by the sense of innovation in the AFPM) that might have caused the PSTs to exaggerate the assessment of their satisfaction and the contribution of the partnership to their development. This was balanced by the observations, during which I was able to witness the challenges that accompanied the partnership, alongside its opportunities that reflected the developing AFPM.

4. Findings

The data analysis revealed statements that were sorted into key categories relevant to the research questions: a. challenges to the AFPM; b. factors facing challenges; c. the development of my role as the leader of an educational process; d. fostering interaction, motivation and involvement (Table 2). The quotes present my reflections, and key ideas that reflect PSTs' experiences as reported by them, except for the instance of a single PST who held a contrary opinion, which I shall elaborate on in the discussion.

4.1. Challenges to the AFPM

4.1.1. A gap between theory and practice

The action research conducted by each PST might contribute to the lessening of the gap between theory and practice - one of the main challenges to the success of the practicum - which caused the initial discomfort I felt. The findings from the participants' reflections showed that while the TE1 saw the research as an opportunity to expose the participants to the integration of theory and practice, for both the PSTs and the teachers thought it constituted a difficulty for the other. The PSTs saw it as a factor threatening the teachers:

> The action research was meaningful - for everyone, I learned, so did the pupils, and even the teacher learned - about research, observation, reflection. I have an important role - presenting the connection academy and class not only to myself, but also to the pupils, the class, the teacher - although I sometimes felt it was threatening to the teacher (PST1)

Indeed, "action research [] is commonly used to foster the integration of science fields (and beyond). This strengthens the relationship between science (as perceived by the students) and the learners' everyday environment" (Laudonia et al., 2018, 484). However, the teachers saw the action research as something that put more pressure on the PSTs: "Although the action research taught us all, it seems that for the PSTs it was a tremendous burden, including the pressure of the action research." (Teacher1)

This is an interesting point and indicates the different attitudes of the teachers and the PSTs to research; the PSTs saw it as a source of power while the teachers saw it as a heavy duty. On the other hand, the action research can contribute to a change in the role and status of the PSTs in the practicum. A differing viewpoint of the PSTs and the teachers regarding the partnership also emerged in terms of the TE's mentoring style.

4.1.2. The TE mentoring style, ambiguity and problem-solving

The PSTs felt the TE's mentoring style was challenging and frustrating (beyond other common weaknesses that were easily resolved during the 2nd year of partnership), since they were used to a 'strong', authoritative tutor who freed them from responsibility, they need to deal with uncertainty during problem solving:

> The TE1 wanted us to plan and do things on our own, we are not used to this - it is stressful, I felt that I was not ready yet, I felt alone,

that no-one was guiding us. We are used to a different kind of tutoring… There was no clear instruction - I had to solve problems both in content and in organization. (PST2)

In contrast, all the teachers described the mentoring as challenging and contributing to their professional development:

Although the work was challenging - the topics were new to us, but I felt a partnership, we consulted with the TE1 about the teaching methods, she respected our knowledge, we felt we were contributing as well as being contributed to. (Teacher2)

In the reflection I wrote following my conversations with the participants, I understood the PSTs' difficulty:

The PSTs are seeking a clear structured framework that is always essential for them, particularly in the new, unfamiliar setting of the partnership, the establishment of which was accompanied by an inherent sense of uncertainty; they find it hard to cope with problem solving. The teachers praised the TE1's respectful attitude, the unmediated connection and her contribution to their knowledge in science. The TE1 stressed the importance of coping with ambiguity, which is part of the work. But were the PSTs able to cope with such situation?

The need to reconcile the contradiction between my theoretical knowledge - the importance of cultivating tolerance for uncertainty during problem solving as part of the participants' professional development - and its actual implementation bothered me. I had to find a way to act that would not contradict my worldview; what should I do to help the PSTs? I wrote:

The TE1 believes, as I do, in the importance of uncertainty and applies it in her counseling. The situation challenges both her and the PSTs, but the PSTs are my prime responsibility. I must see to it that the year continues despite the gap between their viewpoints, I must continue to try to mediate between them and the TE1, until the end of the year, then I will consider whether to replace her or not. Do I also prefer certainty to ambiguity?

At the start of the *second year* of the partnership and following the need to improve the feeling among the PSTs, I decided without consulting with the PSTs and teachers to replace the TE1 who had a challenging tutoring style with a TE2 who had a different style. Only in retrospect did I learn - in order to solve a problem, I acted contrary to what I believed. The conversations I held with the participants right at the beginning of the second year made it clear that this decision reversed matters. The PSTs who generally prefer an authoritative instruction described the TE2 as supportive: "The TE2 is authoritative, guiding, clear, I learned from every session, and I progressed with the action research. I felt that we were putting the theories we learned into practice, we dealt with the action research and were open to it." (PST3)

On the other hand, all the teachers were disappointed with the conduct of the TE2, as one of them summed up:

The TE2 treats us as if we are inexperienced, she doesn't appreciate our abilities and practical knowledge, her attitude is condescending and offensive, we felt that she has left us out of things. Last year there was the TE1 who involved us, and we felt we belonged. (Teacher3)

The new situation of the teachers' discomfort made me think about my conduct as a leader and what this had cost:

It seems that removing the 'obstacle' of uncertainty the PSTs had experienced last year did not solve the problem - replacing the TE1 created a new problem. Was I wrong in rushing to replace the TE1? Doesn't my conduct also express a gap between theory (sharing decision-making) and practice (deciding on my own)?

It became apparent that the authoritative mentoring style of the TE2 cast a shadow over her relations with the teachers, reduced their involvement in the PSTs' action research, and even led to a sense of having missed out on something - the teachers felt left out of the increased interaction between the TE2 and the PSTs. These feelings indicate the importance of *caring relationships* (Zygmunt et al., 2018) between participants and the role of the leader in creating fruitful interactions (Shields, 2012) that support not only the cognitive, but also affective aspects.

4.2. Factors facing challenges

4.2.1. The discourse groups

The discourse groups in which individuals develop thoughts, feelings, ideas, beliefs and attitudes in collaboration, encouraged non-hierarchical participation between all the participants. 'Participation' in critical participatory action research, is drawing on notions of 'communicative action' and 'communicative space'. Communicative action happens when a group collectively creates a communicative space in which all are free to express their points of view (Kemmis et al., 2014, p. 33). Indeed, the participants described factors such as collaboration, motivation, involvement, responsibility, and setting goals as a change that contributes to the success of the discourse and to their professional development, as PST4 put it:

In the discourse group we felt we were partners in all the processes of planning pertaining to sciences in the school, together we defined what we wanted to mention, what the peak day would be like, how we would build the petting zoo. Motivation increased, we were involved, we took responsibility, we talked about my action research which contributed to my progress.

As Eilks and Markic (2011) assert, group discussions during action research is used as appropriate tool to reflect upon both the effects of classroom innovations and the professional growth of teachers. Indeed, the teachers mentioned the contribution of the discourse groups to their individual and shared learning (Teacher5):

The discourse groups contributed to the shared learning, cooperation on the action research, I learned from my student about its importance and I suggested ideas that enhanced her teaching. High motivation, a sense of belonging, involvement and shared responsibility, we were talking "eye-to-eye".

The TE2 added the setting of a goal and the affective aspect as a cohesive factor:

Setting the goal, they decided upon together in the discourse group became a cohesive factor, shared…. There were also conversations about feelings, and these contributed to the sense of togetherness … I understood that the sensitivity I displayed towards the teachers, following your [the researcher] reflection, changed our relationship for the better.

Ambiguous situations were not described as threatening, but rather as a necessary part of the process. I conveyed my insights in the interview:

I wanted to encourage collaborative learning that combines the advantages of the academic culture, reflection and research, with the culture of practice, based on action, experience and emotion, while taking responsibility for its outcomes. I understood that one can use the methodology of problem solving not only for content (problem-based-learning), but also in daily situations. The combination of experts led to a sense of success that was based on the motivation to act out of mutual esteem.

During self-study I changed my behavior, shared my dilemmas with the participants (not only with my CF) and tried not to offer solutions but to encourage thinking.

4.3. The development of my role as the leader of an educational process

Recognition of the gap between my values and performance, was a significant turning point for me. I began to examine my actions as the leader of the process, and I understood that the change must start with me. I had acted in a traditional-hierarchical style (even though I believed in a sharing style) and I saw the problem of the PSTs' tension as a troubling factor (even though I believed in the participants' ability to face challenges):

> During self-study I learned that a traditional-hierarchical management style does not work well with a collaborative process, I should have adapted my leading style to the principles of the partnership. I should have bridged the inherent academia-field gap with the help of authentic caring relationships that would have exposed me to different ideas, opinions and viewpoints that could contribute to the participants' willingness to confront problems and take responsibility. These could take place only if I see problems as an opportunity for growth, for achieving greater familiarity with the participants, fostering motivation, and decision-making that would integrate different interests.

If I had shared the decision-making (Clayton, 1997; Phillips & Ochs, 2003) with the participants (Kazemi, Ghousseini, Cunard, & Turrou, 2016), perhaps they would have shared the responsibility and shown motivation and commitment to the academy-field environment. Such reflection upon, and self-critical inquiry of one's own practices are suggested as a necessary requirement of action research (Önder, Kaplan, & Besoluk, 2011). It introduces a new view of practice architectures as composed of distinctive sayings, doings and relating that provide their content in the project of the practice (Kemmis et al., 2014, p. 53).

4.4. Fostering interaction, motivation and involvement

4.4.1. The use of ambiguous situations to encourage interaction

From the discourse group I learned that situations of doubt contributed to fruitful interactions between the participants which was disrupted by the TE2, which, in hindsight, did not allow for any such situations:

> With the arrival of the TE2 with an authoritarian style, the PSTs were no longer responsible for the development of their knowledge, and uncertainty was reduced. At the same time, their interaction with the teachers dwindled… this contributed to the understanding that an authoritarian style (which I also applied) was ineffective in a partnership.

The attitude towards uncertainty changed, when the leader's role to encourage interaction between the participants, among other things, via problem solving that invites meaningful interaction, was changed, as I wrote:

> Bridging the gap between the definition of the partnership and its implementation was made possible when the problem-solving was in the hands of the participants. What did I do? I enabled interactions which led to successful coping with the feeling of uncertainty and motivated the problem-solving.

Indeed, the PSTs managed to cooperate with the teachers, and arrived at creative solutions, PST5: "During the discourse group I realized - we can manage! the sense of satisfaction and success is great."

4.4.2. Problem solving enhancing motivation, involvement and collaborative learning

Dealing with problems and their solutions, which also appeared in the next reflections as part of the process of developing self-awareness as well as in my conversations with the CF, marked a possible idea for confronting the issue of the gap between traditional leadership and post-traditional leadership (Shields, 2012). Despite the possibility of objections and resistance to change, which might have turned into problems affecting the success of the partnership (Smith & Southerland, 2007), factors described by the participants as problems (1st year) were perceived in the second year as ones that encouraged motivation of participants and contributed to involvement and collaborative learning as described by PST6:

> Instead of panicking about the problems, I shared them with the teacher and the TE2 and we began to work on them, to learned to decide together to collaborate - the teacher saw what I was doing in the action research, I consulted with her about the discipline problems I was having. I helped with the sciences - Each one with her own area of expertise.

Such authentic interactions between the PSTs and the teachers led them to enhance awareness, knowledge sharing (Teubert, 2010), thinking, problem solving (Megowan-Romanowicz, 2011), and decision-making, and helped to dissipate the sense of alienation they had felt at the beginning of the second year. What was the contribution of the action research on my development as the leader of an educational process?

4.4.3. Action research encouraging professional development

The challenging setting that required confronting the gaps between theory and practice, between sharing leadership and traditional hierarchical leadership, between tolerance for uncertainty and the need for immediate problem resolution, broadened my knowledge and helped me build my professional identity as an educational leader. These gaps, which led to discomfort, were revealed through the circles of reflection that accompanied action research, where discussions in the discourse groups made it possible to confront them and the discomfort they cause, and they became the cornerstone of the development of the AFPM and of my own professional development.

4.4.4. From traditional leadership to sharing leadership

I learned that despite the declared intention to build a distributed leadership based on the development of shared responsibility (Spillane, 2012), there was no reciprocity between myself and the team, and as a result, between the teachers-TE-PSTs, as I wrote in self-study reflection:

> I observed the partnership process from the 'outside', as a traditional-hierarchical leader. I managed things from outside the interaction with the participants, and the teachers found themselves outside the interaction between the TE2 and the PSTs. After all, interaction is one of the meaningful factors in management and learning.

Indeed, creating the discourse group contributed to the establishment of a new relationship characterized by 'symmetrical' reciprocal treatment based on trust, encouragement to act and be engaged (Stahl, 2006), where each participant could choose to be a partner in the decision-making, an important stage of change in a PST7: "We were not told what to do, we were together, sharing ideas in the discourse group, there was a problem - we deliberated together and decided together, the ideas were also ours, we didn't just receive instructions, we were partners".

4.4.5. The importance of reflection

I realized the importance of the self-study reflection that accompanied the action research and the discourse groups, as a strategic component of learning in general and in the learning of the PSTs and the teachers, I wrote: "Reflection is important for all participants, not just for me as a researcher. The partnership is a process that requires a combination of thinking and doing". And as one of the teachers argued:

> We don't have time to integrate reflection, both personal and group, we don't *find* the time. In the discourse group we discovered that

shared thinking based on reflection are important to solve problems, integrated theoretical knowledge - with practical knowledge.

As Laudonia et al. argue (2018) "the process of reflection and understanding seems to better support more 'constructivist' learning environments and curricula" (p. 487). Thus, the methodology of action research in the sciences was applied also to solving problems connected to social, ethical and professional growth (Eilks & Markic, 2011). In Parallel, we learned about the importance of the emotional-affective aspect of learning and the success of the partnership.

4.4.6. The emotional affective aspect

From the reflections and reports of the participants it emerged that the emotional aspect is also vital for learning. After one of my conversations with the teachers I wrote: "I learned to listen, to spend time with the problem, to see it as an opportunity for learning, to relate to the manifest and hidden feelings of the participants". Listening to everyone, understanding each one's viewpoint, the ability to show empathy for the teachers` position also arose in my conversation with the TE2, who understood her key position in the partnership, as a mediator between theory and practice:

> I had no idea that the teachers felt that way, that they see my attitude as condescending. I strove to include the teachers in the activities. I am highly appreciative of their practical knowledge. I am glad that you [the researcher] brought up the subject.

The conversation about the teachers' feelings was a role-model, time was also allocated in the quality performance management discourse group (Darwin, 2017) to conversations about experiences, feelings, thoughts, dilemmas as part of the routine activities, during which the participants displayed greater sensitivity to their peers.

5. Discussion and implementation

The question of how I could enhance my activities as the leader of an educational process was the motive for this study. This led to an action research methodology approach which developed as a plan of action to examine the source of discomfort, my actions and their outcomes, while testing each claim to see if it was logical, fair and appropriate. The findings resonate strongly with the assertion of Peercy and Troyan (2017) "how [Peercy] attempted to make practice a more explicit focus of her pedagogy of teacher education," while adopting "a cyclical relationship between phronesis and episteme: reflection on her practice led to a refining of her conceptual knowledge, which then led to a subsequent re-articulation of her practice" (p. 34).

5.1. Discomfort as a factor that inspires reflection

The cycles of reflection on thinking and doing helped me monitor the complex process of the partnership, identify sources of discomfort and harness them as motivators to fruitful interactions (Kemmis et al., 2014), that bridges the gap between the academic and field cultures (episteme-phronesis). Indeed, Kessels and Korthagen (2001) argue that "episteme is too abstract for novice teachers to apply to their classroom settings, [while] working from [their] perceptual knowledge (phronesis)…. can help [them] to become aware of the salient features of [their] experience" (p. 28).

5.2. Changes must start with me: from a Hierarchical Style to one of sharing

Based on the participants` quotations, I recognized a clear distinction between the group of PSTs and the group of teachers, apart from one PST, who, unlike her peers, but like the teachers appreciated the first year TE1 with the challenging style, and even displayed involvement and responsibility. She said: "In my opinion, the TE1 is actually challenging, she lets us decide, choose, take responsibility; it suited me, I prefer to deal with the 'big picture', but I know my opinion is the exception". I ignored this finding when I decided to replace the TE1 to allow the PSTs a more centralized kind of mentoring, and to minimize the criticism. Self-study in its practical-reflective-collaborative format (Peercy & Troyan, 2017) enabled me, although only in hindsight, to recognize that I might have missed something. I could have used the potential inherent in this contradictory attitude as enabling ongoing discourse that might have encouraged interaction among the participants and even contributed to decision-making. One challenge that has not been discussed by those doing work in practices is that of the decision-making (Clayton, 1997; Phillips & Ochs, 2003) involved in identifying upon which to focus with novice teachers. Is this a flaw? Or is it perhaps a necessary cost involved in professional development? The challenge of decision-making should be discussed in identifying the practice of PSTs. In fact, my professional development as a leader was expressed in my giving up on a dichotomous construct of thinking (episteme-phronesis, sharing-authoritativeness, ambiguity-certainty, interaction-leading). This expanding perspective paved the way for the recognition of the importance of seeing the opposing situations as a possibility for movement along a continuum between them, according to changing needs. This insight was significant for me, since I learned that problem-solving focusing on the learners' knowledge construction through self-regulation, collaboration and context (Hamilton & Pinnegar, 2013), supports effective learning (Voet & De Wever, 2018). Indeed, the problems were laid at the feet of the teachers and the PSTs and they coped with them successfully, improved their capabilities in terms of content and social aspects, and they even learned to relate to problems as contributing to learning and partnership.

5.3. The change I underwent resonated with the participants

I learned of the connection between the profound personal change I underwent - developing a new paradigm to match reality - and the profound change within the partnership (Glaser, 2001). This transformation influenced the participants' behavior in the discourse group. They collaborated with their colleagues in problem solving and showed appreciation and empathy for abilities and difficulties. Such collaboration echo with the fruitful cooperation between the teachers (Megowan-Romanowicz, 2011) in the 'communicative space' (Kemmis et. al., 2014) that helped promote their teaching strategies, as well as their professional development (Laudonia et al., 2018).

What insights contributed to this transformation? Deriving benefit from the sense of discomfort (although it leads to a sense of uncertainty experienced as being unpleasant and even unsettling). Suspending the tendency to resolve any discomfort I felt (e.g., regarding the TE1), since this keeps one alert and aware of the need for a degree of self-doubt which might encourage introspection, awareness and empathy. Encouraging authentic relationships among the participants (as the discourse group summoned), which enabled the expression of reciprocity and appreciation, and the mode of problem solving. This mode turned out to be a means of cultivating decision-making and tolerance for ambiguity. These insights are interlinked and complementary. For example, although I shared my decision with the CF, I retrospectively understood that I should share the conflict also with the participants (PSTs, TE1 and teachers), as part of decision- making (Kazemi et al., 2016). The path I adopted was to present the problem to the participants, encourage interactions among them and create conditions to support its resolution - the behavior that changed the nature of the interaction between the participants in the discourse group. Similarly, the insight about encouraging relationships is linked to the issue of authority, which stems from the need for control, while multiple interactions are accepted as a delegation of authority (Ronen, 2018b) and thus desirable. My goal was not to provide PSTs with a set of guiding principles for each of these foci, but rather to have PSTs consider principled reasoning in teachers` professional development using my experience as an example.

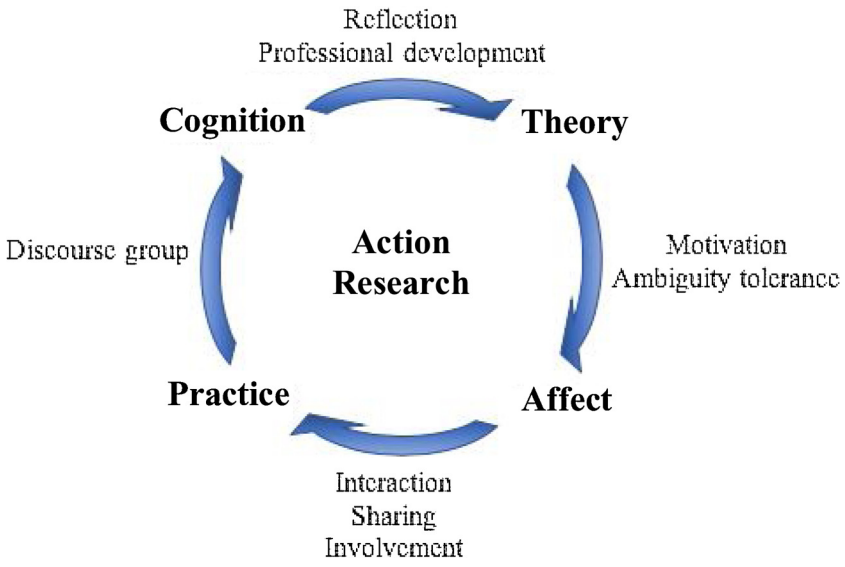

Fig. 1. Action research intertwines cognition, affect, theory and practice features.

5.4. The importance of the emotional affective aspect

The ongoing reflection made it possible to give up that authority in a controlled manner, encourage relationships among the participants representing different viewpoints, revealed the ability to listen and support participants who expressed concern about uncertainty (e.g., the action research of the PSTs, discipline-problems in class, the TE-teacher-PST relationship), and supported the performance ability of the participants which led to a shared outcome. As Kessels and Korthagen (2001) claimed, "the rightness of tone and sureness of touch only holds good for the particular situation" (p. 28). Problem solving during self-study became a means to creating fruitful and high-quality interactions, reflecting an empathic effort and recognition of different perspectives (Akkerman & Bakker, 2011). Such pedagogy has been proven to be supportive of involvement in activities, collaborative investigation and learning (Hamilton & Pinnegar, 2013; Ronen, 2018a). The PSTs explored their activities as teachers in class and analyzed their insights together with the teachers to expand their knowledge about teaching-learning processes, and thus they adopted a constructivist approach which gradually established an environment that supported learning and self-exploration (Kessels & Korthagen, 2001; Peercy & Troyan, 2017). The teachers, who at the start of the partnership signaled that they had been uncomfortable with teaching science through experiments (Areljung, 2018) practiced together with the PSTs through shared learning (the discourse group, feedback conversations, decision-making) in their action research and during teaching.

5.5. Action research encouraging professional development

This autobiographical narrative study contributed to the understanding that my professional identity is not fixed, but rather *transforms* (Glaser, 2001) according to the changing situation, expanding its boundaries, yet without sacrificing basic values and without choosing 'either … or', but rather choosing 'both …and' as needed. Throughout this experience I tested, changed, preserved and innovated various features of my professional narrative to match my expectations of myself and my work (Whitehead, 2009), presenting critical participatory action research as a response to the critique of traditional social enquiry traditions of research (Kemmis et. al., 2014, p.67). I asked a series of questions: what problem bothers me? What can I do about it? What will I do? How will I ensure that my conclusions are correct, fair and reliable? How will I change my practices following my conclusions? These questions required as unbiased an introspection as possible, reaching conclusions that would oblige me to change my behavior, and reflect on the outcomes of the change.

The action research, which *intertwines theoretical, practical, cognitive* and *affective,* features (see Fig. 1), is turned into a methodology that contributed to my **professional development** (Eilks & Markic, 2011; Laudonia et al., 2018) as a leader who learned to: identify the participants' need to share **reflective processes** (Samaras et al., 2012); cope with problem solving through **interactions** that led to the realization of ideas (Shields, 2012); mentor the participants but leaving room for **challenging uncertainty** that motivated them to engage and act (Collinson, 2012) by including them in the decision-making during **discourse group** (Kazemi et al., 2016); recognize the **unique capabilities** of each participant to construct knowledge and attain common goals (Laudonia et al., 2018); listen to the manifest and **hidden needs** of the participants through personal conversations (Kessels & Korthagen, 2001); and reconceptualize the traditional view of the **practice-to-theory** model participants seek to transform for their understandingsof their practices, the conductof their practices, and the conditions under which they practice (Kemmis et al., 2014, p. 67). These *interwoven* features are described as central to *distributed* leadership (Shields, 2012) and are also relevant to teaching (Ronen, 2018b).

So how can we use these research insights for the professional development of teachers in a traditional setting? Although this study focuses on a researcher examining her own work in an academic setting, action research is recommended as a methodology supporting professional development of teachers leading an educational process, though these changes should also be examined empirically. This self-study indicates that action research is part of a broader task of expanding the boundaries of knowledge while constructing the professional identity of the researcher and the participants in the educational process. Beyond the ongoing collection and documentation of data, the shared thinking, reexamination of combining academic and practical knowledge, and involving colleagues in decision-making, the researcher undergoes a process of increasing self-awareness that strengthens confidence in the process. In such a complex system in which change in one of the participants generates a change in others (e.g., Martin & Dismuke, 2018; Teubert, 2010), changes can be accepted when the atmosphere among the participants reflects attitudes of tolerance, listening, inclusion, fruitful reciprocity and encouragement, which contribute to the sense of sharing and success.

While some of the work in self-study has engaged PSTs with practice through explicit modeling (Korthagen et al., 2006), it will be

informative to scholars and TEs as undertaking the revisions required. This can improve PSTs' conceptual and practical knowledge as each can inform the other, however, further attention is required of "tying the practical knowledge back to theoretical moorings." (Peercy & Troyan, 2017, p. 34). A change in pedagogy toward action research is recommended to bridge the gap between practice and theory and to enact practice-based learning (Laudonia et al., 2018), and to the professional evaluation of teacher's teaching practice and their qualifications (White, Fox, & Isenberg, 2011). Similarly, this study indicates the importance of action research as a methodology integrated into the work of the TEs, the PSTs and the teachers as well as its potential contribution to their professional development (e.g., Mamlok-Naaman & Eilks, 2012), even though it challenges the traditional school framework. Action research also highlights the central and complex role of the teacher in the success of educational processes, it enables learners to confront conflicts, contributes to the development of professional knowledge, and at the same time, identifies affective aspects in the approach to learners, and cultivates an atmosphere of safety and reciprocity. One of the questions that remains is how can we ensure that all this can take place also in a traditional setting that enables the testing of its own boundaries?

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