

Educating about and through research

The role of research in pre-service teachers' classroom practices

Stéphane Colognesi and Virginie März

Abstract

Numerous studies have shown how pre-service teachers struggle with a research-practice or theory-practice gap: they find it difficult to implement insights from educational theory within their real-world classroom practices. As a result, student teachers rapidly return to deeply and often traditional rooted beliefs and attitudes. Teacher education institutes, therefore, are challenged to prepare student teachers for seeing the value of educational theory and research for teachers' classroom practices. In this chapter, we focus on bridging the theory-to-practice gap within initial teacher training, by educating student teachers about research through research. More specifically, we evaluated the implementation of a research-training module in the final year of teacher training. This module was characterized as a collaborative research partnership (between student teachers, in-service teachers, teacher educators, and researchers) and focused on developing and evaluating teaching scenarios. Data collection combined focus groups (N=23 primary school student teachers) with the analysis of student teachers' teaching portfolios. The study findings illustrate how participation in a collaborative research project contributed to student teachers' research conceptions and reflexivity skills. Moreover, collaborative research partnerships enabled to bridge the world of practitioners and researchers, leading them to work together on questions that both consider as being relevant. Our study contributes to the reflection on how to strengthen the quality of teaching and teacher training, by showing how collaborative research can be seen as a valuable professional learning activity.

Keywords

Theory-practice gap – Initial teacher education – Primary education – Research participation – Collaborative research – Qualitative research

Problem statement

Over the last years, we can see considerable attention to the role (teacher) research can fulfill in teacher professional development and in school improvement (Coburn & Penuel, 2016; Dobber et al. 2012). Nevertheless, teachers often struggle with a so-called research-practice or theory-practice gap: they find it difficult to implement educational theory within real-world classroom practices. Recent literature has shown how student teachers believe that the content of their training program (and more specifically theories stemming from research) are far removed from the realities of the classroom.

According to student teachers, initial teacher education often promotes certain evidenced-based practices that they perceive as being disconnected from daily classroom reality (Perez-Roux, 2016). When student teachers go through their traineeship, they therefore often encounter a tension between daily classroom reality and the ideal picture set during teacher training (Altet et al., 2013). Furthermore, research has shown that during their first steps within the teaching profession, student teachers rapidly return to deeply (and often traditional) rooted beliefs and attitudes (Caena, 2011; Shulman & Shulman, 2004). As such, teacher education institutes are challenged to convince student teachers of the value of educational theory and research: showing the relevance and usefulness of theory and research-based training programs for their classroom practice.

Successfully bridging the research-to-practice gap is important, since it could foster practitioners to use knowledge stemming from research as well as enable researchers to include the preoccupations of the latter within educational research. In this perspective, Austin's (2016) work has shown that incorporating research into teacher education curricula can bring several benefits, contributing to teacher effectiveness in the long term. For instance, research can help teachers find solutions to particular problems, it can provide them with up-to-date sources of information, and it can help determine priorities when introducing educational changes. Hammerness et al. (2005), moreover, identified that teachers who graduated from teacher education programs that make extensive use of teacher research, experienced higher feelings of preparedness. The study of Cochran-Smith et al. (2009), found that research during teacher education contributes to student teachers' critical reflection, enables them to construct new curricula, as well as facilitates teachers to modify instruction and pedagogy to meet students' needs. Duroisin et al. (2020) have also shown that training in and through research is a

key to the development of (future) teachers' reflexivity. Finally, it can also, more broadly, improve teachers' understanding of their professional and socio-cultural context. This last point seems important in relation to the current context of teachers' work. Being a teacher is not only about being a classroom actor, but also about functioning as a member of a school organization, understanding the micro-political climate and school culture determining teachers' work (Coppe et al., 2020; März et al., 2019; März & Kelchtermans, 2020).

In a recent study (Van Nieuwenhoven et al., 2021), student teachers were questioned about the effects they experienced of a program where research was incorporated in a teacher training module. The training module concerned the study of pedagogical currents. The researcher presented his latest work on the subject. He then accompanied the students in the process of developing teaching activities for their internship, based on the presented research insights. He also shared with the students the interview protocol from his research concerning their teaching practices. Several aspects emerged from the analysis of the interviews with teacher educators and students. First, in line with Austin's study (2016), we found that the research instruments, data, and the underlying theoretical frameworks provided students with up-to-date knowledge to plan and analyze their teaching scenarios during internships. Second, the student teachers mentioned that interaction with the researcher gave them a better understanding of what a researcher's tasks are. In addition, having access to recent research insights, in this case: pedagogical currents and practices, convinced some students to continue studying by following a master's program in educational sciences. In addition, we found that research, in the context of French speaking Belgium, is almost absent from teacher training programs. The involved teacher educators, moreover, did not feel competent in the area of research. This can be explained by the fact that in Belgium a Master's degree is sufficient to become a teacher educator in a teacher education institute. Other studies, in other contexts, have also shown that the lack of theoretical knowledge on the part of internship supervisors is a factor that does not facilitate the support of future teachers in the theory-practice articulation (Hernandez & Ducrey-Monnier, 2020).

In this chapter, we will present the findings of a recent study that focuses on bridging the research-practice gap within initial teacher education. More specifically, the aim of our study was to stimulate student teachers to improve their classroom practices by *educating them about and through research*. More specifically, we opted for a collaborative research design (involving student teachers, in-service teachers, teacher educators, and researchers) within the domain of

French oral skill-didactics: we evaluated the implementation of a research-training module, while training student teachers through participation in this study to value and use research. The ambition of the chapter is twofold: first, we will describe the design of the research-training module in order to show how student teachers learn to use research as well as adopt a reflexive role. Second, we will observe the impact of this research-training module on student teachers' research competencies. We will describe how student teachers have lived the role of researcher, and examine what it has brought to them.

Based on our findings, we show that a sixth type of professional learning activity is to be added to the five identified in the literature: collaborative teacher research. Collaborative teacher research cannot only improve the quality of teacher education, but as well enable teachers to cope with the multiple facets of the teaching profession (Coppe et al., 2020).

Theoretical foundations

For the design of the research-training module, we were inspired by three guiding theoretical principles: inquiry-based working, professional learning activities, and role diversity.

First, one way to bridge the gap between theory/research and practice, is to engage student teachers in research through inquiry-based working (Baan et al., 2019). Teachers are increasingly expected to be able to use and conduct research to evaluate and improve their own teaching practices (Zeichner, 2003). These new expectations call for the incorporation of a research orientation in teacher education programs. Therefore, in several countries (such as the Netherlands, Norway, Finland, and Canada), there has been a tendency to integrate an intensive focus on research in the curriculum (Darling-Hammond, 2017; Flores, 2017; Snoek et al., 2017; Van der Linden et al., 2012). For instance, by letting student teachers carrying out research projects during their studies that involve inquiry into pedagogical issues in their schools, often in collaboration with other school actors. Collaborative research aims to bridge the gap between academics and practitioners (Bourassa et al., 2007; Desgagné & Larouche, 2010). According to Rust and Meyers (2003), collaborative teacher research can be a fruitful strategy for teachers to actively participate in the examination of classrooms and schools (see also Cochran-Smith & Lytle, 2009). In addition, collaborative research pursues two objectives: it aims to develop a knowledge producing activity as well as to contribute to the professional development of all actors involved

(Mukamurera, 2014). Moreover, collaborative research makes educational research more accessible to teachers, and thus enables to 'redress some of the unequal power dynamics subjugating teachers in educational research' (Christianakis, 2010, p. 110).

Second, in order to face the rapid changes of the teaching profession, research has identified several types of professional learning activities (Geijssels et al., 2009; Janssen & van Yperen, 2004; Kwakman, 2003). The concept of professional learning is understood in terms of a continuum, and starts with initial teacher education (Portelance et al., 2008). These types of professional learning activities are : keeping updated (gathering new knowledge and information), innovation (produce something new in an existing context), experimenting (testing interventions in the classroom), knowledge sharing (sharing of theoretical and experiential knowledge between professionals), and reflective practices (questioning one's knowledge and practices).

The research-teaching module has been developed based on these five types of professional learning activities. They have been treated as principles for the design of the research-training module. To confront future teachers with these types of professional learning activities, it seems important that they are placed in a perspective of integrative alternation (Chaubet et al., 2018; Merhan et al., 2007; Pentecouteau, 2012). Integrative alternation articulates theory and practice in an interactive relationship. It is in fact a matter of working on experiences from the practice field during the learning activities in the training institute. Conversely, it is also about finding a practical use for the theoretical aspects of the training program (Nitonde & Paquay, 2011; Pentecouteau, 2012). Thus, an integrative alternation makes it possible to create a synergy between theoretical and practical knowledge.

Third, in order for these types of professional learning activities to be operationalized during teacher training, it is important that student teachers take on different roles while being engaged in a research activity. A role can be defined as 'a temporary, situated mode of action enacted by an individual according to a project, a task' (Colognesi, 2017, p. 22). It is indeed possible to change roles during the course of a task depending on the goals assigned to it (Lebel et al., 2017; Vivegnis, 2019). In a training program designed to enable teachers working in the same school to introduce an innovation into their teaching practices, Colognesi and Lucchini (in press) guided student teachers through different roles directly related to the types of professional learning activities: Learner (keeping updated), Engineer (innovation), Teacher (experimenting), Observer (knowledge sharing) and Reflective Analyst (reflective practices). This

training program is called LETRA. Results show that going through these successive roles allowed teachers to have access to complex skills, facilitating knowledge transfer and pedagogical innovation. Our research–training module takes up these roles, and adds that of researcher (inspired by the collaborative research design).

Design of the research–training module

The research–training module, named DIDAC'TIC (Colognesi & Balleux, 2018), has been implemented in the final (i.e. third) year of initial teacher training for primary school teachers (in one teacher education institute in French speaking Belgium). The objective of this module was to develop and experiment with teaching scenarios within the domain of French oral genre-pedagogy (Dolz & Gagnon, 2008; Dolz & Schneuwly, 1998; Horverak, 2016) using digital tablets. For this module, a partnership was created between different actors: student teachers, in-service teachers (of the internship school), teacher educators, a researcher and students conducting research as part of their master studies (within the faculty of psychology and educational sciences). The research-training module takes place from April through June, at the end of the teaching program of future primary school teachers. The student teachers have no other course activities at that time, and can dedicate themselves fully to the activities of this module (for example, the presentation of their research findings is done through a research report).

Within the framework of the research-training module, six roles are distinguished: the students go successively through the roles of learner, engineer, teacher, observer, while the roles of reflective analyst and researcher are transversal to the others. As for the other actors, they intervene jointly in the research process, as described in the steps below.

In a first step, student teachers are trained in oral skill-didactics based on existing research in this domain (i.e. role of learner). Since future teachers do not teach their pupils as how they are told to do so (Meirieu, 2015), but rather teach the way they have been taught themselves, we make the student teachers live through the activities themselves, so that they are able to feel what their pupils will experience. This is followed by a moment of reflection (Hatton & Smith, 1995; Schön, 1994), to make evident the levels of learning and to focus on what research on oral skill-didactics has brought to practice.

In a second step, while taking the role of engineer, student teachers are asked to develop a particular teaching scenario with the use of

digital tablets. They have to develop this in a sub-group, supported by an in-service teacher and their teacher educators. It is at this moment that, with the support of the researchers, the student teachers also develop tools for data collection, such as pre- and post-tests.

The third step brings forward the roles of teacher and observer. At this stage, student teachers (in pairs), with the support of an in-service teacher, implement their research-based teaching scenario in a classroom practice of the internship school. This is the experimentation-phase. While one pair of students is running the class, another pair is collecting data in the same class: collecting answers to pre- and post-tests, filming the different steps of the teaching scenario. The reactions of three pupils in each class are also filmed and are transcribed. Metacognitive questions (Colognesi et al., 2020) are posed in interviews to these students to gather information about how they function, the difficulties they encounter, the strategies they use, etc. During this step, teacher educators and researchers are involved in supporting the process of data collection.

While the experimentation takes place over a period of two to three weeks, the various actors collaborate in the logic of a Professional Learning Community (Darling-Hammond & Richardson, 2009). This means that they all go through a process of professional development, by collectively sharing expertise, analyzing, and discussing practices. As a result, several 'crossed auto-confrontational moments' take place during school internship in the presence of teacher educators and researchers. This is guided by the principle that each activity or action should be analyzed on their effectiveness during the implementation (Rix & Lièvre, 2005), as such that the involved actors are confronted with the results of their actions (Falzon & Mollo, 2004).

Even though the roles of reflective analyst and researcher are transversal to all the steps, they are specifically put forward during the fourth step. At the end of the experimentation-phase, the data set is analyzed collectively. The student teachers are responsible for the statistical analysis of the quantitative data. They also carry out an analysis of the collected qualitative data: answers to metacognitive questions, traces left by students, etc. All actors are involved in the interpretation of the results, thereby bringing forward the effects of the implemented teaching scenarios.

At the end of the research-training module, students are asked to produce two documents. First, they individually produce a portfolio reflecting upon their professional development. The instructions for this portfolio are to report on perceived professional development, reviewing five aspects: self as a teacher, self and others, technology integration, methodological and pedagogical advances, and their role

as a researcher. There are no constraints on the expected format or number of pages. Second, they write in pairs a research report related to their teaching scenario. They indicate the main statistical results related to the experiment. They also add qualitative data (quotes of metacognitive responses, traces of productions, etc.) to explain the quantitative results. They summarize the main results in relation to the literature.

Concerning the first production, the portfolio, a first analysis (Colognesi et al., 2019) already showed several results. First, to identify the levels of reflexivity attained by student teachers, the portfolios were analyzed on the basis of the levels of reflexivity of Derobertmasure (2012). In their teaching portfolio, students reflected upon the teaching scenario that they co-constructed with their teacher educators and in-service teachers during internship. By cross-checking the data from the portfolios and the way in which student teachers managed different levels of reflexivity (Derobertmasure, 2012), we were able to identify three main reflexivity profiles.

The first profile was the most present. It refers to student teachers who focus on the teaching scenario they designed and implemented collaboratively. They described it precisely, with a wealth of contextual details and information. The portfolios of students in this profile are characterized by a strong exploitation of the first level of reflexivity (Derobertmasure, 2012): describe, become aware, question themselves, and identify their difficulties. The student teachers representing the second profile not only described the teaching scenario, but also reflected upon their professional development. They talked in terms of 'before' and 'after' the training and emphasized what they have gained by being involved in the module. The processes of 'diagnosis' and 'evaluation' are very present. Student teachers in this profile master the processes of the second level of reflexivity (Derobertmasure, 2012). The third profile was less present. Student teachers in this profile have a more global, integrated view. They use theoretical references to justify and underpin their reflections. This profile presents a more balanced and varied use of the dimensions of reflexivity.

The current research follows up on our previous study, but focuses on studying how student teachers developed the role of researcher.

Methodology

The aim of our study was to describe how student teachers have experienced the role of researcher, as well as to examine what it has brought to them. For this, we studied the implementation of a teacher

training module with a focus on research, called DIDAC'TIC in the final year of teacher training for primary school teachers. As a reminder, the role of researcher had never been encountered by the students earlier in their training. Moreover, in the context of teacher training in Belgium, research skills are not currently expected from students. The DIDAC'TIC module is optional for student teachers, which means that the other students in the cohort find themselves in other optional modules (such as special education, extracurricular activities, didactics of mathematics, international project). All students were finalizing the last year of teacher training for primary school teachers.

This study was conducted in a typical initial primary teacher education program in French Speaking Belgium. Teacher training for primary teachers (6- to 12-year-olds) is a 3-year program at a Haute Ecole. Students are trained in the mastery of 7 major competencies (Conseil supérieur pédagogique, 2010), related to (1) communication, (2) deontology and ethics, (3) teamwork, (4) critical relationship to knowledge, (5) mastery of the contents to be taught and methodological frameworks, (6) planning, implementation and evaluation of learning situations, and (7) classroom management. The decree defining initial teacher training (Decree initial training, 2000) provides for internships organized in real-life situations. This is to enable students to acquire the know-how that is based on the articulation of theory and practice. In the first year, this internship involves two weeks of collaborative practice. In the second year, student conduct and internship of four weeks and in the third year, of ten weeks. Students graduate with a bachelor's degree, which corresponds to level 6 of the Francophone qualifications framework. There is no expectation that they will be formed in research. Nevertheless, a decree (Decree defining the initial training of teachers, 2019, art. 14, p.7) has rethought teacher training in French-speaking Belgium. A 'new' priority is visible: training for and through research. This will be possible through collaboration in teacher training between the teacher education institutes (Haute Ecoles) and universities. But the decree is struggling to be implemented and the date of implementation is constantly being postponed for the time being.

For the data collection, we made use of the curriculum materials and products produced by students as part of the teacher training module. More specifically, we analyzed the portfolios of three editions of the module, i.e. from 2016 to 2019. In these portfolios, students integrated information in relation to the researcher's role they enacted during the collaborative research. In total, productions of 35 student teachers of one teacher education institute were analyzed: 12 students from 2016 (2 men and 10 women), 15 students

from 2017 (3 men and 12 women) and 8 students from 2018 (8 women).

For data analysis, a content analysis was applied to the 35 selected portfolios (Miles & Huberman, 1994). During data analysis, different strategies were used to ensure the trustworthiness of the findings (Creswell, 2007). In the first step, we reduced the data: all the fragments in which student teachers mentioned the role of researcher were selected. This selection was conducted by three people: two researchers and one teacher educator. The presence of the teacher educator was invaluable in making sense of certain statements. Second, we did a categorical analysis. We categorized the data based on data from previous research (Austin, 2016; Van Nieuwenhoven et al., 2021), and we also allowed new themes to emerge. Third, we have attempted to highlight quotations in order to be able to illustrate each category identified. These two steps were carried out by the two researchers who discussed together the interpretations to be given to enhance the trustworthiness of the analysis (Strauss & Corbin, 1990).

Findings

The findings are presented according to the themes resulting from our analyses. Five themes emerged as follows : a complex role for future teachers ; research as an opportunity to focus on one particular domain ; research as an opportunity to change one's beliefs and update one's knowledge; research as an opportunity to have tools to better understand pupils and regulate teaching; changing representations about research. They are illustrated by carefully selected quotations.

A complex role for future teachers

The findings showed that student teachers, at the early stage of the research-training module, considered research as something complex, abstract and of secondary importance. The student teachers emphasized that a research focus was lacking during teacher training.

The first session as a researcher was not obvious, as I had never done this before. At first, I didn't really know what I was going to use it for. I didn't see what I could do with all the data I collected and how I was going to use it afterwards. I was more of a "I have to do this because it is required". (VY).

Another difficulty for the students was accepting that, during the research-training module, they were not going to be in the classroom

all day. They had to adjust and accept that they were going to go to class to do the intervention based on the teaching scenario that they have developed, and then spend the rest of the time dealing with the data.

At the beginning of the research, I had great difficulty placing myself in the role of researcher. In fact, during all my years of training, I was used to being a trainee in a classroom and taking charge of the pupils' entire school day. In this research-training module, it was normal to join "only" the elementary school to carry out the oral teaching activities and to collect data and to leave afterwards. (FA).

We were no longer trainees as usual, but research students: we were asked to film, record, transcribe, question, and also analyze the results. At the beginning, it was not simple, we did not know how to do all of that. (DE).

Difficulties in adopting the role of researcher also included the complexity for student teachers of reading a scientific article. They explained that they were not used to it. They mentioned that they have not learned how to do it. They also indicated that this requires a great degree of concentration.

When we started working on our research paper and read an article, I realized that some things were more difficult. For example, I couldn't concentrate from the beginning to the end because it was a long article and so I ended up dropping out at some point. This is, on the one hand, linked to the length of the article but also to the vocabulary which is linked to the context and therefore is not always easy to understand. (PA).

This idea gradually changed through the course of the research-training module. At the end of the module, students started to value research and educational theory. Several benefits emerged from the portfolio analysis to justify this change.

Research as an opportunity to focus on one particular domain

The students reported that the research-training module allowed them to focus on one domain: the development of oral skills. This was the first time since the beginning of their training that they have been

able to devote all their time to one aspect of teaching/learning. They explained that it was interesting because they were not in 'survival mode', what they experience when they are in charge of classroom management. They expressed that they were able to really focus on a single teaching issue, as well as to take the time to understand what was going on in the instructional program.

I was privileged to be able to participate in such a large-scale project. I had never had the opportunity to position myself as a researcher to understand a problem. Here, I had the time to dedicate myself to this. (MA).

Usually, we have to manage everything. From 8:30 am to 3:30 pm. When we go home, we make corrections and prepare for the next day. It's a rush. I must admit that I didn't have much time during my internships to really observe the students. To analyze their mistakes in the exercises. Here, we had time to sit down. There was time during the day for that. And also to watch the videos of our teaching. I really learned a lot. (TA).

Research as an opportunity to change one's beliefs and update one's knowledge

Students described in their portfolios that having read recent research in the field of oral education has allowed them to change their beliefs on the subject. They explained that it were the theoretical frameworks but also the interventions presented in the articles, which are closer to their reality, that contributed to a change in beliefs.

During my training, I never learned how to develop students' oral communication skills. And the perceptions I had about this learning process were wrong. Through reading the articles, and the interventions presented in them, I was able to adjust my knowledge and also get ideas for my practice. (TO).

Another idea that emerged is that research makes it possible to update its practices. In short, by reading up-to-date studies, student teachers learned about what practices are effective and can be used to aim for student success.

We read articles, current studies on teaching. It helped me understand the basics to guide me through my practice. With current and proven ideas. It's important to have this

information, to educate yourself, in order to be better prepared. (CH).

In addition, it seemed that a lever for students to apprehend scientific articles has been the fact that the text was closely related to what they were doing in training.

It was the first time I read a scientific article related to an experience I had. It made it really interesting to read because you could identify yourself through the article. (MA).

A personal contribution that I would also like to emphasize was developed while reading a research article. It was very similar to what we are doing. What I got from this reading was the fact that for the first time I enjoyed reading a scientific article. Indeed, I let myself be carried away by the text, the arguments/explanations of the results. This is certainly due to the fact that for once, before reading this article, I had experienced something similar myself, so I found myself in this project. (AP).

Research as an opportunity to have tools to better understand pupils and regulate teaching

Portfolio analysis showed that student teachers found that the research has given them the opportunity to observe their pupils better. They explained that the data collection tools gave them access to how students functioned. These included metacognitive questions and videos where pupils are active.

Questioning the pupils and collecting metacognitive data allowed us to really identify our pupils, and to have access to their functioning, their way of thinking, etc. The analysis of these responses allowed me to have an impact on the way I acted with them, to differentiate. I had never taken the time to do that. (MA)

Other tools also allowed student teachers to understand the pupils' level, with more rigor and evidence than usual. For instance, they referred to the tests taken before and after the interventions to measure pupils' progress.

And that allowed me to observe the students in another way, more carefully, to have identical criteria of success for each

student, to carry out an in-depth observation on a particular subject. It allowed me to realize that it is possible to objectively perceive student evolution. (SI).

Besides, having conducted the analyses allowed the student teachers to see where the students' difficulties were situated. They explained that it showed them with certainty whether the intervention worked. It also provided information on aspects of the subject matter that needed to be reworked. In the end, the research seemed to have given students keys to regulate the learning process of their pupils.

We analyzed the data collected. With the researchers, we learned to read the statistical results. This allowed us to really see what the students have integrated well and where there are still problems. I usually do it intuitively. It was a very positive experience. (CH).

We did statistics based on the pre- and post-test but also based on the children's intermediate productions. My main fear was that there would not be enough significant evolution. But I realized that the students did evolve. The fact that we have these statistics shows if the children have evolved and if they have mastered the subject better. (AR).

Doing this allowed us to see the analysis that can be done on a project and to see what we will have to modify in the following teaching activities. (AP)

In addition to these various benefits, it also emerged from the portfolio analysis that students have changed their representations from the initial ideas about research.

Changing representations about research

Students explained that the module allowed them to develop new skills: reading a scientific text, being sensitive to data analysis, etc.

Everything became clearer as time went on and I moved more into a "It would be interesting to still have this as data for later". (VY).

"Doing statistical analysis? But how? Can someone help me? I don't know what to do with all these numbers!" All these thoughts accompanied me at the beginning. Fortunately, a

trainer/researcher was by our side to enlighten us with regard to these reflections. Thus, these numbers, complex for me at the beginning, became clear and understandable, I knew how to analyze them afterwards. (TH).

They mentioned that they finally enjoyed doing it. Many also said that they would be willing to go through this again if possible.

Finally, I had a lot of fun doing the "research report", with the analysis of the graphs, the collection of data from the oral and written pre- and post-test... The interpretation of the numbers and their justification is an aspect that I really like in the role of researcher. (TA).

Although I wish I had felt more suited to this task from the start, I know that now I could take on this role again and be better prepared, if I had to do it again. (CE).

And finally, some students reported that the experience made them desire to continue their studies through research. They mentioned a master's degree in educational sciences in particular.

Finally, the last role I had to take on was that of researcher. This was the element of the project that worried me the most, as it was a role that was still unknown to me. The definition of researcher is "a member of a team, involved in scientific research". Being a member of a team still appeals to me a lot, and with Noémie, it was easy and pleasant. During my school years, I had never had to do scientific research before. So I had a lot of questions bubbling up inside of me. Now, having written my personal development and having handed in my final paper, it means, inevitably, that I have done this scientific research and that I have overcome my fear. I enjoyed taking this position of researcher. I can already read a statistical table, describe it, find a question to answer and then develop it. I am proud of what I have accomplished and how far I have come. And I think I will continue to do so next year. (JE).

Already now, I want to finalize my studies with a master's degree and thanks to the discoveries made during this module, I wonder if I wouldn't go for a master's degree in the field of research on school education rather than in the field of remedial education. (BR).

It also seems that, for some, the research module contributed to an additional awareness of the need for further training. This included, according to students, the updating of knowledge through reading studies in the field of education.

It seems essential to me to continue to train myself, in order to be able to act in this society where everything is in constant evolution. Reflective analyses have taught us to know how to question ourselves, and research, through articles and also the instruments to understand what the pupils are doing, can allow us to face up to improve and adapt ourselves. Except that all this will have been for nothing if we take our diploma as the only proof of our competence in teaching. I need to continue to read and keep up to date with research findings. (AL).

Discussion

In the current context of school organizations, and with the increasing accountability pressure, teacher research has received increased attention. Future teachers need to be able to use and conduct research to improve their own practices. In many countries, teacher education programs have incorporated research activities within their curricula, to prepare student teachers to become extended instead of restricted professionals (Afdal & Spernes, 2018). Nevertheless, studies show that it is not easy to make student teachers' see the value of educational research, nor for in-service teachers use research insights. Often, research is seen as being disconnected from their daily classroom practices.

This chapter focused on bridging the theory-to-practice gap within teacher education programs, by educating student teachers about research through research. We believed that the implementation of a collaborative research design could be a promising strategy to prepare future teachers. Through participation in a research-training module, student teachers gradually changed their perspectives towards educational theory and research. The results show how they were able to co-construct a teaching scenario and analyze its effects. In addition, the module contributed to student teachers' reflexivity (Altet, 2004; Colognesi et al., 2021; Donnay & Charlier, 2008).

The results of this study show how educating about research through research, while going through a variety of roles, is innovative both in the design of the module as well as in the protocol of the research. Firstly, this research-training module bridges the worlds of

practitioners and of researchers, leading these partners in education to work together on questions that both consider as being relevant. Secondly, by involving student teachers into a research project, they learn the importance of collaboration in future research projects.

Our study confirms the results of previous studies, in which conducting collaborative research is described as a promising activity in educating student teachers, but only when it is done in a purposeful, deliberate, and reflective way. More specifically, in the teacher-training module, research was not presented as something being disconnected from the teaching activity, but was seen as a continuous part of the teaching practice (Dobber et al., 2012), in a perspective of alternation (Chaubet et al., 2018; Merhan et al., 2007; Pentecouteau, 2012). Moreover, our study confirms how involving student teachers in collaborative research, contributes to their reflective skills, a more innovative stance, and more informed decisions in practice (Hagevik et al., 2012).

Based on our results, we postulate that a sixth type of professional learning activity is to be added to the five identified in the literature (Geijssels et al., 2009; Janssen & van Yperen, 2004 ; Kwakman, 2003): take on the role of researcher. And we believe that enacting the role of researcher should be a priority in the training of future teachers, as mentioned in the planned reform (Decree defining the initial training of teachers, 2019).

Study limitations and future research

This study had some limitations that may suggest future research opportunities. First, data collection focused on student teachers' perspectives, through a portfolio analysis. These portfolios were intended to report on the students' opinions, reactions and developments during the research-training module. They were to be read by the trainers. In this sense, we do not know if the students' words are sincere or intended to please the readers, although the content was not evaluated. Exploring this aspect, with oral interviews conducted with a researcher from outside the training module, could allow for cross-checking information.

Moreover, since inquiry-based working aims to improve classroom practice, future research needs to study the impact on pupils' outcomes. Since collaborative research implies a partnership between different actors, future research can also take into account the experiences of the different actors involved. In what way did it change teacher educators' beliefs and practices, as well as how did it contribute to school improvement of the involved schools. This is all

the more interesting because, in the French-speaking context, some teacher educators feel that they are not competent in the field of research (Van Nieuwenhoven et al., 2021).

Moreover, it is relevant to explore how student teachers once graduated transferred this to their school practices, and analyze the working conditions (structural and cultural conditions) that are necessary to implement inquiry-based working in school organizations. Here, for instance, teacher education institutes could create partnerships with school organizations to create spaces and time where student teachers, in-service teachers, and teacher educators collaborate together.

Conclusions

In conclusion, we would argue that it seems necessary that the role of researcher be assumed by the student teacher. We see at least three important conditions for this to be possible. First, teacher candidates should conduct research related to a particular teaching strategy and focused on improving student learning. As such, the research should be directly related to teachers' practices and be concrete to aim for their understanding and improvement. Second, it seems important to give them time to both understand the role of researcher they are taking up, but also to be able to devote themselves to the various activities related to it. In this sense, 'freeing up' the schedule from all other activities allowed the future teachers to focus on the objectives that the research training module was pursuing. Third, for this work to be possible, it seems necessary to have a close partnership with the internship supervisors. Thus, in a collaborative research perspective, they will also be involved in the research because the problematic at hand will also affect them. This is also a way of reducing the gap between the objects of the training and what is experienced during the internship (Hernandez & Ducrey-Monnier, 2020). Our study has shown how conducting research as a professional learning activity, can be a valuable strategy to improve the quality of teaching and strengthen the quality of teacher education (see also Van Katwijk et al., 2021; Willegems et al., 2018). Through the implementation of collaborative research partnerships (here: between student teachers, in-service teachers, teacher educators, and researchers), the involved actors not only developed their research skills, but also other competencies related to the teaching profession. On the long term, these partnerships, could further improve the quality of teacher education, by creating more close synergies between research and practice, and by closing the

space between teacher education institutions and schools (Menter & Flores, 2021).

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Stéphane Colognesi is Professor at the Faculty of Psychology and Educational Sciences of the University of Louvain, and a member of the Interdisciplinary Research Group in Socialization, Education and Training (GIRSEF). His research interest focuses on learning and instruction in both primary and secondary school as well as in higher education. More specifically, Colognesi's research concentrates on Learning and Instruction (writing and oral), Teacher Education, and support for teachers.

Virginie März is Professor at the Faculty of Psychology and Educational Sciences at UC Louvain and a member of the Interdisciplinary Research Group in Socialization, Education and Training (GIRSEF). Her research interests include the professional development of teachers (early career teachers, end-of-career teachers, second-career teachers), school development, and curriculum reform. As a methodological approach, she is particularly interested in qualitative research methods and social network analysis.