

TEACHER-CARRIED RESEARCH AS A TOOL FOR TEACHERS' PROFESSIONAL GROWTH

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Abstract

Inquiry among the schoolteachers' needs to be embedded, cultivated, sustained and nurtured as a tool for a better understanding of the processes in the education and for fostering teachers' ongoing professional growth. This study explores teachers' self-evaluation of their competency to conduct research and to incorporate it in the classroom. Both qualitative and quantitative research methods were employed to seek answers about teachers' engagement with research and to explore the factors of resistance for carrying out research in the classroom setting. This study also dwells upon some mechanisms that lead teachers to carry out research. The focus group interviews which were conducted reflect on the factors that encourage teachers to become more involved in the research and point to the advantages they perceive as emanating from the research. The qualitative part of inquiry reflects teachers' narrative ways of construction and reconstruction of their personal and professional knowledge. The authors discuss the processes that foster teachers to move from the fragmentary use of research strategies to the ability to live in the inquiry, practice new behaviours in the classroom, unlearn the old ones, reflect in action and stay open to a range of new initiatives.

Key words: teacher-carried research, professional growth, sustainability perspective

Rationale for conducting research – the sustainability perspective

The United Nations Research for Sustainable Development identifies research as an important tool for enabling education for sustainable development (ESD) in practice (UNESCO, 2005). As stated in UNESCO documents, the primary objective of ESD is to re-orient education in the direction of a more sustainable society with the intention of enhancing the quality of education (UNESCO, 2005). Sustainability is highlighted as a priority in the United Nations Decade of Education for Sustainable Development (DESD, 2005–2014) with the aim of addressing social, economic and environmental issues. UNESCO states that education is the major pathway towards sustainability (UNESCO, 2001). Agenda 21 (United Nations Conference on Environment and Development, 1992) also recognises Edu-

cation as a tool for sustainable development with its role of developing students' values, attitudes, skills and behaviours that are consistent with sustainable development. Hill and co-authors (2003) relate sustainability to ways of thinking about the world as social and personal practice. This encourages ethical, empowered individuals who act responsively in participatory and just communities of practice.

Sustainability can be conceptualised as: *ecological sustainability*, *economic sustainability* (sustainable use of resources), *socio-cultural sustainability* (respect of diversity amidst learners and the diversity of worldviews) and *political sustainability* (participation and agency) (Carr & Kemmis, 1986). Research as a tool covers all areas of sustainability with the aim of developing the values, attitudes and behaviours of students and teachers towards sustainability, particularly political sustainability. By overcoming a sense of alienation and fears that constrain teachers' ability to exercise freedom in the decision-making processes regarding their teaching, teachers actively engage in a transformative action with the aim of improving their stance and develop their existential sense of responsibility towards students.

It is also essential for teachers to be aware of the unsustainability of their practice: *discursive unsustainability* (false and misleading discourses), *social unsustainability* (placing limits or constraints of self-expression of individuals involved), *personal unsustainability* (undervaluing students' capacities, bodily integrity, resources and time) and *political sustainability* (students' and teachers' agency in creating a more sustainable future through transforming ways of thinking and acting) (Adams, 1990; UNESCO & UNEVOC, 2004; Edwards, 2005; Kemmis, 2009).

The main features of sustainable education as viewed from epistemological point of view are the following: the emphases on the learner and his/her meaningful questions, constructivist modes of learning implemented through the inquiry, a democratic learning community where each participant is involved in active decision-making concerning his/her learning; multidisciplinary teaching with a goal of integrating environmental, social, political, economic dimensions of sustainability and metocognition. Education for sustainable development means not only changing the content that we teach but also the traditional notions about how we teach.

Huckle (2003) emphasises that "education will need to reorient itself radically, shifting its emphasis from the past, industrialism, modernity.... to the future, post-industrialism, postmodernity, and global society" (p. 5). For this transition to take place, teachers need to develop a deep awareness of alternative worldviews and ways of doing things. Hargreaves (1994, 2003) emphasises that in a new "creative-interpretive" mode of teaching teachers needs to be able to generate creativity and ingenuity among students by experiencing creativity and flexibility themselves. Learning viewed as an inquiry starts from experience already present in the learner, generation of themes of research by learners themselves and an active process of negotiating meaning and values critically and reflectively. By encouraging teachers to be active agents of change by doing research themselves and integrating inquiry in their classrooms, they will incorporate complexity as an interpretive and constructivist paradigm. This will lead to introducing flexibility and contextualisation of the learning process; new teaching and learning methodologies, creation of more space for reflection and democratic participation, as well as working with alternative perspectives and scenar-

ios. Teachers' involvement in doing research with the aim of improving their own classroom practices and gaining a deeper understanding about the processes in education develops confident teachers who engage in new processes, adopt new approaches towards teaching and support students' learning in innovative ways.

Research helps to generate vital themes and to question "taken-for-granted" assumptions; it raises awareness of new perspectives and actions that contribute to the transformation of old structures, practices and meanings. Research is aimed at transformations of teachers' practices and the way they understand their practices and fosters reflective thinking that gradually becomes a habit of mind. Teachers gain new insights and understandings and engage in an ongoing dialogue and meaning to enhance the quality of education. They develop the skills of critical thinking of what is occurring in their classrooms and reflect on processes going on within the classroom setting and beyond, which leads to innovative solutions. Ultimately, teachers negotiate meanings, purposes and values critically, reflectively instead of passively accepting the social realities defined by others" (Mezirow, 2000). By embracing tensions and opportunities for the democratic transformations in their classrooms, teachers also experience risk, potential discomfort and anxiety. The main tensions, which teachers need to overcome, are between safety and challenge, confidence and uncertainty, action and intent, telling and growth. Therefore, teachers need to acknowledge the spaces, tensions and opportunities for transformations to take place in their everyday activities.

Researchers and scholars often disagree regarding how education can best be conceptualised. Scholarly analyses have articulated tensions between dominant approaches and emerging sustainability perspectives. These tensions can be summed up by saying that education is essentially transmissive, with the results being prescribed by a small group of experts. The consequence is a "deprofessionalisation" of teachers who become technicians, return to didactic teaching, decline in teacher-led innovations. Teachers share less experience and time responding to the different needs of students (Sterling, 2004). In contrast, more transformative approaches are being practised by some teachers who encourage knowledge that is co-constructed by learners.

Creation of more sustainable learning communities involves a change in teachers' attitudes towards sustainability, as well as re-visioning and re-orienting educational praxis. Both teachers and students need to develop such qualities as flexibility, creativity, participation skills and a sense of responsibility to handle transitions in society. Organisation of teaching as the inquiry emphasises genuine participation, flexibility, diversity and development of "creative learning communities" (Sterling, 2004, p. 46). Active engagement with the inquiry helps teachers to regain ownership of their teaching and organise it as more meaningful, engaging and participatory, rather than passive and prescriptive. Teachers' engagement in research supports students' learning; teachers learn to take risks and to tolerate a level of vulnerability and ambiguity in order to enact productive change. Teachers' involvement with the research also has a number of benefits for professional growth and self-enrichment because it contributes to a new knowledge base (Pring, 2000) and provides a reflexive learning experience (Wood & Bennett, 2000). It allows a closer examination of a work environment that encourages teachers to bring more sustainable changes into their practice.

Teacher-carried research positions teachers' work in a sustainability perspective: it allows teachers to overcome the sense of powerlessness, disconnectedness and marginality (Freire, 1993; Allan & Turner, 2000; Gerretson, Iliško, & Fortino, 2010); it helps teachers to create inter-subjective meaning with others to contribute responsibly to the world. It allows teachers to re-evaluate and overcome the reductionist foci on teaching that leads to exercising responsible agency in the world. Schon (1983), Kincheloe (1991), Cochran-Smith (2001) and Grišāne (2010) have emphasised the integral connection between teaching and research and the need to develop teachers' ability to engage in a reflective activity as a part of professionalism. They argue that it is essential for each teacher to develop a habit of questioning and critical thinking. As Stenhouse (1981) and Salīte (2008) argue, teachers need to be active meaning makers by selecting areas of concern for themselves and by exploring those issues teachers can resolve in their own classrooms.

Research methodology and participants

The authors chose a questionnaire to gather quantitative data about teachers' engagement with the research as well as studied teachers' self-evaluation of their research competency in all stages of doing research. The teachers who participated in the study (N=133) represent all parts of the country in the age group from 19 to 59, (Mean=37.5) that comprise 50% of all the participants. The participants in the research are either pre-school (34%) or primary school teachers (65%).

In the study, 91% of all teachers claimed that they had experience doing some kind of research. From all the teachers who took part in the study, 25% teachers were the teachers who have a secondary school education, 57% of the teachers held a bachelor's degree and 17% of teachers a master's degree. The questionnaire helped to reveal teachers' competency to carry out research.

The qualitative part of the study reflects on data gained in the focus group interviews that support quantitative data from the questionnaire. The data illustrates the driving forces that lie behind teachers' educational practice (Maclure, 1996). The authors conducted, transcribed and analysed focus group interview data and identified key issues emerging from three one and a half hours long interviews with the group of teachers with the aim of understanding the obstacles and motives that are behind teachers' willingness or unwillingness to organise their teaching as an inquiry. The authors gathered data using a multi-step and co-operative procedure (Rubin & Rubin, 1995). The authors also paid a close attention to epistemic, sociolinguistic and psychological factors that shape teachers' meaning perspectives.

Research findings

The quantitative part of this study seeks to answer the following questions: *Are there any statistically significant differences between teachers with a different period of work experience and education regarding their engagement with research and implementing research in their classroom setting?* and *Are there any statistically significant differences between*

the teachers who are at different stages of their professional development and education, in relation to the stage of the research where they evaluate their competency as the highest?

In the quantitative part of the study, the authors identified the following groups of teachers:

1. teachers currently studying to obtain teacher's qualifications – the teachers who have a secondary school education and no experience of work (30 respondents, 63% of all respondents);
2. teachers with a secondary school education and from one to six years of experience currently studying to obtain a teacher's qualification (27 respondents, 20%);
3. teachers with a bachelor's degree and from seven to 20 years of experience (31 respondents, 23%);
4. teachers with a bachelor's degree and 20 or more years of experience (25 respondents, 19%);
5. teachers with a master's degree and more than 21 years of work experience (20 respondents, 15%).

After the teachers completed the questionnaire, the authors conducted focus group interviews with each group that comprised of 25 teachers. The goal was to obtain a more detailed information about the teachers' views regarding their motivation and obstacles to engage in research. For the statistical analyses of data, the authors used IBM SPSS Statistics 19 program.

Teachers' self-evaluation of their research as well as teachers' education and experience were two key factors of success in teachers work as researchers.

The authors are aware that years of service are not the only criterion that effects teachers' professional development as related to their ability to reach the highest level of competency. All the teachers who are highly competent do not necessarily function at the highest level in all situations and areas of professional work at all times

Years of work and education do seem to be the most important factors directing teachers to engage with research. Younger teachers who are just entering the teaching profession concentrate on classroom management issues and the establishment of their position of power in the classroom. Still, they are open to experimenting, new ideas and new commitments. Their experience of doing research is updated after the experience of writing a diploma paper, but their initial passion for innovations appears to decrease very soon. Teachers soon become more confident (2nd and 3d group), stay with a routine and prefer traditional approaches and methods. Their interest in research decreases, and they are less engaged and less enthusiastic.

Teachers with a master's degree and work experience of more than 20 years evaluated their competency to carry out research quite highly. They are mostly prepared to participate in improvement of their classroom practice; they judge the value of research according to applicative value and its potential for improving practice.

By taking into account the assumption of the homogeneity of variance, the one-way ANOVA showed statistically significant differences between teachers with different period of work experience regarding their self-evaluation of their research competency in the following phases of the research: planning the research, preparing for the research, processing the results, reflecting and presenting the research findings.

Teachers were asked to evaluate their competency of conducting research on a 5-level scale:

1. My competency of doing research is not sufficient;
2. My skills and competency to carry out research is satisfactory;
3. I have enough skills and competency to carry out a research activity in my class-room setting;
4. I have all skills and competencies needed to carry out research better than my colleagues;
5. I can teach others to do research.

The teachers evaluated eighty statements about their research competency. All statements were classified according the type of activity: intellectual competency, communicative competency, information, analytical competency and reflective competency. In addition, all types of research activities were classified in the following stages of carrying out the research, for instance, to formulate the theme of the research, to prepare for the research, to conduct the process of the research and to present research findings.

The indicators that allow evaluating the level of competency correspond to diverse types of research activity in different stages of the research as represented in Tables 1, 2, 3, 4. The level of competency has been evaluated as Mean of the corresponding indicators.

Table 1. Indicators of the intellectual research activity

Setting the theme of the research	to formulate the research question;
	to discover the undiscovered aspect in the research;
	from all the themes suggested to choose the most topical and up-to-date theme;
	to discover cross-curricular connectedness;
Preparing for the research	to identify new problems and issues in the frames of recently studied issues
	to divide processes in research stages;
	to find out the most appropriate methodology for one's research topic research;
	to choose the methods of the research that match the chosen theme;
The process of the research	to choose the type of research (qualitative and quantitative);
	to choose a representative sample in line with the chosen type of research
	to find out the most optimal ways of solving the problem, based on the existing algorithms;
	to combine familiar algorithms when the typical solution is not possible;
Presentation	to compare, classify, contrast and range objects;
	to combine and to use interchangeably qualitative and quantitative methods of research;
	to use conclusions formulated for the solutions of one's own question
	to summarise the research findings;
Presentation	to discover a new aspect in one's own research;
	to see the practical application of the research findings;
	to choose the most topical results of the research;
	to interpret the results of the research

The acquisition of cognitive skills develops systemic thinking. It involves learning basic concepts through discovery and understanding the reciprocal relationship between the con-

cepts and articulation of one's own theory based on solid arguments. By working in a systemic context, the students have a better grasp of the research concepts.

The results of the research indicate that the level of intellectual competency in all stages of the research is sensitive both to the level of education of the respondents and to their work experience ANOVA, $p < 0.001$. The lowest teachers' self-evaluation of intellectual competency was for the teachers who have a secondary school education, and this evaluation was significantly different from the self-evaluation of respondents with a master's degree (Multiple Comparisons, Scheffe, $p < 0.001$).

Teachers' work experience significantly influenced the level of intellectual competency related to the stages of research that set the theme (ANOVA, $p = 0.001$) and the process of the research (ANOVA, $p = 0.007$). The lowest evaluation of the intellectual aspect in carrying out the research was among the teachers who had no work experience. During the preparatory stage of the research, the influence of teachers' work experience was on the level of a statistical tendency (ANOVA, $p = 0.062$), but, in the stage of the process of doing research, the work experience had no significant influence on teachers' level of intellectual competency in doing research (ANOVA, $p = 0.259$). Independent of teachers' work experience, self-evaluation of their competency for doing research in this stage was particularly high. The analyses of the influence of both, the level of education and the work experience of teachers were studied by comparing the competencies of respondents in five selected clusters.

The lowest level of intellectual competency for all stages of the research is characteristic of the respondents in the first cluster who had a low level of education and no educational experience of work. The highest level of intellectual competency was among the respondents from the 5th cluster that comprised of teachers with a master's degree: 45% of respondents in this group had more than 20 years of work experience.

Table 2. The indicators of the information research competency

Setting the theme of the research	to see the unusual in usual things;
	to formulate the research themes in the process of doing research;
	to discover different aspects of the issue of the discussion;
	to demonstrate interest in the scientific literature;
Preparing for the research	to suggest interesting themes of research
	to formulate interview questions;
	to design a questionnaire;
	to find out information from diverse sources;
The process of the research	to design the necessary research instrument;
	to work with scientific categories
	to carry out content analyses of the text;
	to read diverse types of texts;
Presentation	to analyse the results of the questionnaire;
	to work with diverse sources of information;
	to analyse the results of interviews
	to present research findings orally;
Presentation	to formulate research finding in a written form;
	to formulate conclusions of the research;
	to analyse the information in graphs, tables and diagrams;
	to offer results of one's own research for the practical usage

The level of information competency and intellectual competency depended on teachers' work experience and their education. The information competency on the research stage – setting the theme of the research – for all respondents in all clusters was evaluated as low, and there were no statistically significant differences in those evaluations (ANOVA, $p=0.130$). On the research stage: preparing for the research, the differences in the evaluation reached the level of statistical significance (ANOVA, $p=0.083$).

Table 3. Indicators of the communicative research activity

Setting the theme of the research	to carry out a dialogue with adults and interesting people while choosing the theme of the research; to make listeners interested in one's theme of the research; to discuss publicly the topicality of the chosen theme; to formulate the themes of the research in the process of communication with other people; to find the themes of the research in internet
Preparing for the research	to distinguish between facts and opinions; to evaluate ethical aspects of communication while doing the research; to compare the opinion of different respondents about the chosen theme; to do piloting of the interview questions; to probe professionals for a deeper and more thorough study on the issue of the research
The process of the research	to carry out the interview; to listen attentively the opinions and the ideas constructively expressed by other people on the theme of the research; to exchange the information via technology; to work on a team; to formulate questions about the chosen theme with experts in the field
Presentation	to formulate one's views in a logical way while presenting research findings; to discover creative ways of presenting the results of the research; to present one's research findings publicly (monologue, discussion, polemics); to follow ethical norms and rules while carrying out the dialogue; to discover the practical applications of the results of the research

By incorporating inquiry in teaching, the main shift takes place from what is taught to what the students acquire – both cognitive and meta-cognitive skills, knowledge, understandings, interpersonal skills and ethical values. Research contributes to strengthening students' ethical competencies – the capacity for dialogue, social skills and the ability to transform the environment. Students internalise values of co-responsibility, solidarity and cooperative attitudes, which are all basic from the sustainability perspective. In teaching, the main emphases should be put on values, ethical motivation and ability to work with others to build a sustainable future. Open 'communicative space' allows open communication and discus-

sion to take place, sharing thoughts, experiences and challenges to promote ideas and knowledge and communicating those ideas (Carr & Kemmis, 1986; Kemmis & Smith, 2008). Collaborative inquiry and being a part of like-minded people can become a source of joy and inspiration.

From all types of competencies, communicative competency is the least sensitive to the combination of such factors as education and work experience. The respondents with the highest level of education and the work experience evaluated their communicative competency higher than other competencies in doing research although the differences are not statistically significant (ANOVA, $p > 0.05$). The highest self-evaluation of communicative competency was among the respondents in the research stage called the process of the research; the lowest self-evaluation of the communicative competency was in the stage of preparing for the research.

Table 4. Indicators of the reflectivity during the process of the research

Setting the theme of the research	to discover one's interests;
	to formulate one's attitude to the issue of the study;
	to see the global aspect of the theme of the research;
	to evaluate the chosen theme;
	to analyse ethical aspects of the chosen theme
	to set the main goal and to discover the methods of research;
Preparing for the research	to analyse necessary methods for the study of one's research problem;
	to evaluate the representativeness of the sample;
	to evaluate the quality of the questionnaire;
	to evaluate the possibility of solving the issue using the availability of limited resources
	to discover the causes of difficulties in the process of the research;
	to relate the efforts employed to obtain the results of one's research issue;
The process of the research	to compare conclusions formulated with the available ones on the theme of the research;
	to analyse the validity of the research findings;
	to use known patterns and to discover innovative aspects of the issue of the study
	to evaluate one's achievements;
Presentation	to evaluate one's research in light of ethical norms and values;
	to critically analyse the issue of the research;
	to analyse research findings in light of their practical usage;
	to relate research results to one's theme of the study

Constructivist educators reject the notion of teaching as a one-way linear activity and to view learning as a collaborative problem-posing process of inquiry that fosters higher forms of reflection such as dialogical (Biggs, 1999), critical (Carr & Kemmis, 1986; Kincheloe, 1991) and meta-reflection (Hatton & Smith, 1994; Jacobs, 2008; Schon, 1987). Meta-reflection is the highest form of reflection that requires students' ability to question their reflective and learning process during the process. Dialogical reflection requires interaction between the learners and the teacher in the process of knowledge construction where the

teacher has an important role of a facilitator who invites comments, encourages ideas and gives feedback. Critical thinking skills can be fostered by providing an active learning environment and dialogical and collaborative learning process in order to increase students' critical understanding. The sustainability perspective requires critical thinking and reflection on issues from the environmental, economic and political perspectives, which implies a re-constructivist approach to knowledge supported by ethically informed values that leads to change. The sustainability perspective draws on constructivist theory and actively engages learners in the process of reflection through democratic, cooperative and collaborative strategies where all participants learn from each other in the process of seeking change for sustainability. For the reflexivity to become the teachers' habit of mind in their professional lives, it is necessary to promote the development and a renewal of the teachers' own philosophy of teaching and to change their epistemic stances.

The level of reflective competency for the respondents from different clusters differed significantly on the research stage: preparing for the research (ANOVA, $p=0.003$), but, on the research stage, the process of the research, the differences were seen at the level of statistical significance (ANOVA, $p=0.077$). The lowest level of reflective activity was for the respondents of the 1st and the 2nd clusters who had only a secondary school education.

From all types of competencies, the most sensitive towards the level of education and the experience of work was intellectual and information competency. The reflective competency of the respondents from all clusters had the lowest evaluation, and this competency was statistically significant (ANOVA, $p=0.251$).

The comparison of the respondents from different clusters in different stages of research indicated the differences on the level of statistical tendency as observed in the stage – setting the theme of the research (ANOVA, $p=0.068$) and the process of the research (ANOVA, $p=0.081$). The respondents with an insufficient education (a secondary school education), comprising the 1st and the 2nd clusters, evaluated reflective competency lower than others.

All types of competencies were significantly connected. All correlations were not less than $r=0.75$, and all connections were direct. The closest connection was among the intellectual and information competencies ($r=0.858$).

The process of inquiry is influenced by a number of factors. Inquiry is influenced by cultural and social background, our values and beliefs and the way we approach the issue. Our psychological characteristics also influence the way the approach the issue.

Teachers' motivation to engage in research-based activities

From the data gained in focus group interviews, it becomes evident that a variety of activities that teachers perform mirror their research. Preparing the lesson plan requires teachers to engage in some kind of research and to do some scholarly reading of the latest literature in the field. The project week and mentorship of students' research requires teachers to do some kind of research, though teachers are frequently unaware of the linkages that exist between research and teaching.

The data obtained from the focus group interviews indicates that there were a number of contextual factors that influenced how and why teachers integrated teaching and research in their practice. They are as follows:

1. understanding the broader meaning of the research;
2. perceiving research as a collaborative venture;
3. the supporting environment;
4. the support of administration in their institution.

In addition, some crucial conditions were acknowledged for the efficient work of a teacher as a researcher.

1. To become active agents in their own classrooms, teachers needed to know the basics of good research, the latest developments of the educational research as well as to comprehend the broader meaning of the research (Stenhouse, 1975; Cambell, 2003). Even in making the decision not to carry out research, teachers needed to critically analyse the available research and to judge it to make a well-informed decision. Teachers trained in a positivistic research tradition needed to be exposed to a broader meaning of the research base using a more pluralistic and constructivist epistemology with its emphases on *phronesis* (Eisner, 2002) and teaching as *art* (Stenhouse, 1975).
2. The other factors that motivated teachers' engagement with the research were perception of inquiry as a collaborative venture and availability of a supportive environment (King, 2002; Campbell et. al., 2003; Loughran, 2003). Loughran (2003) suggests that teacher-carried research needs to be genuinely collaborative, problem-solving and reflective (Schon, 1987) and should be a venture where the teacher can communicate with others in a friendly and non-threatening environment. Research is a collaborative venture that includes dialoguing with others, spurred on to a greater insights and creativity by the excitement of dialogue, alternative options and ending with a serendipitous discovery of a new insight or 'aha' moment.
3. A supportive environment includes cooperation among all participants involved and respect for diverse opinions. Such an environment allows taking into account other peoples' perspectives and constructing an interpretation of the situation. In constructivist classrooms, teachers create environments where students engage in an activity, foster student-to-student interaction and structure learning within relevant and realistic environments.

Using the stories told, it is possible to trace a few stories of good practice if making research as an everyday venture. Teachers' efforts in integrate inquiry type of learning can be traced in their efforts to make students active participants in the learning process, to engage students in sense-making processes, while taking into consideration students' interests and needs.

Constraints and tensions of engagement in the research

In focus group interviews, teachers shared their struggles in overcoming several epistemological tensions caused by institutional and epistemological causes: the dichotomy of teaching as a normative venture and innovations in teaching, the dichotomy of the emphases on the result vs. the priority of both the process and the result, the dichotomy of limited time and space, the curriculum demands, the need for exploration, understanding, critical reflection and reflection on the meta-cognitive level of teaching.

Among the other constraints of doing research mentioned by the teachers were the following: a low status of the teaching profession, low salary, time constraints, domestic responsibilities, anxiety, pressures, teachers' previous experiences as students, a lack of support from the administration, burn-out and frustration related to leaving profession. Teachers commented that even if they chose to do research with the aim of improving their practice, it is added on top of their existing work and thus became a burden for them because of the increased workload.

Teachers' previous experience in learning and work in non-constructivist classrooms were also a serious obstacle to building teaching as inquiry. The traditional view of learning is comfortable, predictable and a long-standing tradition among teachers. Teachers, being custom-bound, overemphasised traditional ways of doing things, with too much reverence for the past. A 'fear of the unknown' philosophy of teaching leads to teachers avoiding situations that lack clarity and to striving towards certainty before moving forwards. This leads teachers to rigidity in problem-solving responses. Traditional approaches towards teaching do not allow teachers to discover the essence of things and leads to polarising opposites.

One teacher, who was deeply committed to integrate research into her everyday reality, shared her worries about difficulties the students faced in adjusting to an inquiry type of learning.

I spend hours in preparing materials, made the lessons intriguing, [but] the students were not getting as much as I wanted" ... "Still, I continued to experiment until I felt at a comfort level..." She continued: "I come to gradual awareness about how I could better engage my students in meaningful learning." "I have learned to wait, to be patient until the desired changes occur.

She shared her success that can be clearly read in the response of one of her students who stated:

I did not like this lesson because I could not participate fully in this lesson, because I did not spend enough time at home preparing for this lesson.

The most often mentioned constraint is the pressure of time. Time constraint relates to practical, emotional and explanatory factors. Time also has to do with priorities, possibilities and teacher's professional identity. The limited availability of time and space of doing and integrating research indicates what is prioritised by the teachers.

The other obstacles impeding integration of research in the classroom setting mentioned by teachers were orientation of teaching towards students' achievements, social expectations, administrative demands, time pressures and burn out. The teachers stressed the ambiguity, discomfort and anxiety faced while introducing research in a classroom setting.

As Montuori (2008) remarked, the research process is "spiritual practice" that involves "both – divergence and convergence, order and disorder, risk and safety, boredom and anxiety" or the experience of "riding on the wave of the paradox of boredom and anxiety, innovation and tradition" (p. 21).

The teachers pointed to the tensions to resolve the shifting emphasis from searching for a better instructional technique to improve practice to focusing on a more sophisticated understanding about the processes and sense-making about the existing reality. One teacher who was identified by others as successful in her teaching, reported that her focus gradually moved from "what to do and how to do it" towards paying more attention to what is going on and why. The teacher commented:

First, when I introduced inquiry, I come across the misunderstanding on the part of the students about the different approach towards teaching that I have introduced. Later, the students gradually adjusted to new approaches. This required them to spend more time analysing how they are thinking and how they come out with this particular solution to the problem.

Conclusions: Implications for teacher training institutions

Using research as a tool to work towards the sustainability perspective as a *frame of mind* in our vision and reality requires adopting a perspective based on the most fundamental ethical, epistemological and metaphysical considerations, essentially concerned with values embedded in them (Bonnett, 2002). Integration of research with the goal of improving classroom practice for teachers means embracing "epistemology in which knowledge is situated, plural and contested" (Jacobs & Murray, 2010, p. 332). Teacher training programmes should offer frames for teachers for examining their own teaching in regard to educational purpose and social vision as well as preparing teachers to become reflective researchers who can investigate problems that arise in their teaching practice.

The quantitative part of the study indicated that there are statistically significant differences between the teachers who have a longer period of work experience (21 years and more) and a master's degree and their engagement in the research and implementing research in their classroom setting. There are statistically significant differences between the teachers who are at the different stages of their professional development and education and the stages of the research where they evaluate their competency as the highest.

Successful integration of teaching and research depends upon certain factors: teachers' views about possibilities and practicalities of doing research, consideration of the teacher's workload and multiple responsibilities and roles, the supportive environment of the institution in which teachers work, the support and the encouragement or the lack of support

teachers receive from the administration and a long-term institutional strategy for developing research-based curriculum in their schools.

One of the major challenges in teachers' professional development is to overcome a teacher-centred transmission mode of delivering knowledge and to move towards building a research-based teaching practice that allows teachers to generate personal knowledge.

There are only a few cases of transforming curriculum as inquiry and building one's work as ongoing research for the purpose of improving practice among the participants of the focus groups. This still remains a modest activity carried out by enthusiastic teachers who do not gain control of broader institutional agendas.

Still, teacher training programmes fail to prepare teachers to become reflective practitioners and critical researchers who can work towards improving their classroom practice in a thoughtful and nuanced way. Teacher training programmes should narrow the gap between teaching and research, since both overlap in values and skills, and the difference lies in positional constraints and practices. Teacher trainers in teacher training institutions need to be sensitive to the traits and hopes that teachers bring with them.

The transition from being a teacher to accepting the additional role of the researcher in the classroom setting becomes a major challenge for teachers, and this requires a change in professional priorities as well as a shift from normative to a more theoretical, conceptual, reflective and process-oriented approach to teaching. This requires adding new perspective and joy to teachers' repertoire rather than abandoning something else.

Teachers' readiness to change involves the teachers' awareness that change is necessary and their willingness to overcome fears, doubts and resistance to make this change possible. Teachers need to be aware of which curriculum models (transmission, constructivism) are dominant in their teaching practice and to gain understanding that higher levels of learning (application, integration and synthesis) are more learnable though inquiry-based modes of teaching in a constructivist curriculum model.

The emphases in teacher training programmes should be put on developing a mindset of a teacher-researcher and a reflective practitioner. The acquisition of the mindset of a teacher-researcher is more important than any other skill or knowledge that teachers gain in the teacher education programme because it can help teachers to negotiate the challenges they encounter in daily teaching. Embracing this mindset can lead teachers to think at a meta-level about their goals, lessons, methods and can help them to overcome estrangement and deal with complex educational reforms.

Facilitation of teacher research involves not only disseminating tools and strategies for doing research, but reshaping and redesigning teachers' subjectivities, dispositions and identities. This also includes leading teachers out of comfort zones, creating new spaces and encouraging teachers' ownership of research.

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