

Educational Action Research In Teacher Education: Fostering Research Skills

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Abstract: The article describes the building of capacity of Institute of Sustainable Education in training for educational research aimed toward the sustainable development (SD) and education for sustainable development (ESD). The paper reflects on the process of educational action research in teacher education oriented toward the creation of dialogical learning environment for educational research training. It shows the acquisition of research skills by in-service teachers from the Master degree program in Education. The action research process in the context of several study courses is based on “cascade” approach to research training envisaging the following stages: (1) Teacher’s offer for scientific dialogue: The strategies of pilot research are demonstrated and students become the participants of the research. They learn the course content and usage of several research tools (e.g. Cmaps, V-diagrams). Teacher presents the example of scientific article containing the results of research where students have participated. (2) Students’ offer for scientific dialogue: Students analyze the article using the mastered tools of scientific analysis and complement the article with their own comments and conclusions. (3) Teacher’s offer for scientific dialogue: Teacher creates the design for the qualitative evaluation of students’ reflections on the article and the scientific review on students’ methodological perspectives and research strategies. Teacher encourages the students to create their own research design using the acquired analytical tools, content of the study course, and individual experience obtained during this action research. (4) Students’ offer for scientific dialogue: Students critically evaluate their own research design from the methodological point of view, conduct the pilot research, and analyze its’ results. Therefore, the students acquire different research skills, become the research experts themselves, identify the elements of SD/ESD in their experience and encountered articles. This experience helps to construct their new attitude to master thesis in education and research as such.

Keywords: teacher education, educational action research, research skills, reflection, “cascade” approach.

Implementing guidelines for ESD

The publication of UNESCO *Guidelines and recommendations for reorienting teacher education to address sustainability* (2005) and UNESCO ESD Global Network meetings since this publication urge the institutions of teacher training and educational research to concentrate on the implementation of these guidelines. Some feasible mechanisms for this implementation could be to:

- Change the teachers identity toward more research oriented categories of self; as only teacher, who knows how to investigate the problems he/she encounters in education, can be expected to found the independent ways of introducing ESD locally, considering all the contexts and circumstances;
- Offer the possibility for teachers to analyze the current problems and future challenges and hopes in education, set the aims for education and than receive the authentic feedback to their ideas in safe and dialogical environment, as the possibility to found the most effective ways of ESD implementation lays in a created awareness

of the incoherence of unsustainable solutions for problems, narrowly oriented hopes and aims.

The present article contains the theoretical framework of the integral educational action research, which includes the full study time of Master degree students in Education entitled to make their own research – to write the Master thesis, and shows the results of an important part of this action research.

Master degree students have to conduct the educational research and describe it, following the requirements for valid scientific reports, in their 60-80 pages long Master thesis. To achieve it, teachers have to become researchers themselves, extend their current identity with knowledge, skills, and attitudes of educational researcher, reevaluate their present time/space context and transform their individual and professional awareness. The article describes the first part of action research where the authors of this article have used the qualitative research tools in a framework of phenomenological approach to the experience of the research participants.

Educational action research

Action research investigates some social situation in order to improve the quality of performance, at the same time merging the theory and practice in a holistic unity and continuous interplay of both. Educational action research envisions the improvement of quality of action in education while “taking a systematic look at some educational practice and recording what was done, why it was done, collecting data, analyzing the data and reflecting on how the results might influence future teaching endeavors” (Action Research Network, 2005). There are many focusing points and so-called “types” of action research. In our case, the features of participatory educational action research with a strong emphasis on transformation and reflectivity have to be defined as they could be evidenced in the “cascade” action research.

Hooley (2005) stresses: “A process of transformative consciousness takes place for the researchers as their experience causes new thinking at deeper levels. Different aspects of different contradictions contend for influence and this will be resolved for a time until the process is restimulated and continues. Personal and general theories are brought into play, one merging into the other until new cognitive structures are created”. The changed personal and professional thinking can be noticed both during the process of research and in its results. And, since the practicing teachers participate in the research, “it deliberately confronts a complex net of social and educational factors that are seen to interact constantly and which exist within a political and cultural gel. It is the very explication of such an arrangement that leads to quality rather than the simplistic measurement of isolated knowledge indicators” (ibid).

The reflection, as has been argued by Kemmis (1985), is a positive active process that reviews, analyses and evaluates experiences, draws on theoretical concepts or previous learning and so provides an action plan for future experiences. This is a unavoidable part of every research and in the described educational action research the spiral of experiential learning starts from action (participation in research), than comes the reflection (evaluation of participation and analysis of results), planning for own research and action in form of independent research. The similar spirals can be traced also in the learning experience of university teacher who serves as a facilitator of action research.

Training teachers to be researchers

Dialogic learning environment – safe place for novice

Speaking about educational environment, usually, the educational process, its content and form, as well as human/social and physical environment are mentioned. In our circumstances it is more appropriate to speak about the learning environment that focuses on interpersonal relationships, learning activities and learning time (Anstrand & Kirkbride, 2002). Learning environment created within the presented educational action research can be described as an environment allowing for dialogical learning, reflecting a constructivist epistemology that presupposes knowledge to be subjective and in process (Westerhof-Shultz & Weisner, 2004). The “cascade” approach creates a learning community between Master students (in-service teachers) and their university teacher, that provide a space for authentic dialogic knowledge, skills, and attitude construction toward research work as such and especially research in ESD. In given learning situation several principles of dialogic learning are emphasized (Flecha, 2000): 1) egalitarian dialogue, as both students and teacher learn, since they all construct interpretation based on the contributions made; 2) transformation, as dialogic learning transforms people’s relationship to their environment, in our case, the relationships of in-service teachers to the environment in their class, school, community, country; 3) meaning creation, as “cascade” approach allows for meaning creation both for teacher and students at all its phases. Besides, all learning activities are context embedded and learning time is extended until the end of Master studies and even after that.

Interpreting the dialogical learning from teaching/learning strategies’ “technological point of view”, dialogical learning can be viewed as the interactive strategy, in its mentality very close to the problem solving and experiential learning. The “cascade” approach has suggested such strategies as discussion, pair work, group work, collaborative learning, case study, mentoring/coaching. One of the suggestions for researcher as a learner by Swann is that “it is better to discover error and specific limitation in a theory, model, prototype or pilot study rather than in a widely distributed document or artifact, or in a far-reaching policy” (2003).

Mastering research tools

Master’s level students should be prepared to undertake their own research and understand the full range of steps in the research process. First of all, as the researchers they need to develop that we call “methodological sense”: cognitive, intuitive, and affective awareness about the main decisions the researcher has to make, e.g. what philosophical framework should be put in the foundation of the research, what problem is worth to study, what research tools and methods to apply, etc. Though, glossary by Swann and Pratt (2003) says that methodology is (1) the system of methods and principles in a particular discipline or field of study or (2) the branch of philosophy concerned with the methods of science, we use concept of ‘methodological sense’ in a broader context, encompassing the deep understanding of both theoretical and empirical core of research and readiness to make them work in holistic fashion.

Educational Philosophy, which is one of the main subjects in Master curricula since the beginning of the program at the Daugavpils University, can foster the understanding and skills to evaluate the theoretical framework of educational research and provide the safe environment to develop own personal educational philosophy that could serve as a measure to build on in planning the independent research.

Research Methodology course, which is included in the “cascade” approach to the research training, introduces students with main research paradigms and during this course

the main idea is disseminated that “there are no exclusively quantitative or qualitative ways of doing research, only quantitative and qualitative tools and procedures” (Pratt & Swann, 2003). In educational research, which is experienced and later analyzed by students both ways of doing research is complemented though the focal point of research questions.

As the tools to manage knowledge on research and during the research, Conceptual Maps and V diagrams are used within the Research Methodology course.

From Ausubel theory (Ausubel, Novak, & Hanesian, 1978) Novak (1998) has developed the Conceptual Maps that are graphic representations similar to diagrams that indicate relationships between concepts linked by words. Cmap Tools represent an informant’s knowledge structure, for the purpose of knowledge management and transfer. The Conceptual Maps simultaneously represent the process of knowledge organization through links, and the final product through concepts.

V diagrams assess critical thinking skills and knowledge asking to classify knowledge into conceptual and methodological groups when considering a focus question, object, and events. They help to understand the constructed nature of knowledge and the complex cognitive and affective elements that interplay in designing an inquiry and interpreting the results.

Research training strategies, described in literature, are quite diverse and contain such approaches as article critique (Kennedy & Broadston, 2003), students participation as research subjects, data collectors, and consumers of research (Hitchcock & Murphy, 1999), teaching synthesis of the research literature (Upchurch, Brosnan, & Grimes, 2002), service learning incorporating experiential learning, applied research and a joint service-learning commitment between the students and the instructor (Keyton, 2001). In our action research for the purposes of research training during the courses delivered to the groups of Master students we have used the article critique, students participation as research subjects, data collectors and consumers of research, as well as the experiential learners and problem solvers.

Research identity

Identity in contemporary texts is not a stable and characteristic feature of an individual, it is conceived to be dynamic, manifold, ever changing field of personality adaptation and creation. Identity arises from social interactions – identity and practice are said to be in a dialectical relationship, in a state of constant struggle (Wenger, 1998; Lee & Roth, 2003). Identity simultaneously alleges two trends: one is belonging to different social groups, among which there are the permanent relationships of integration and disintegration, other is becoming (Bakhtin, 1981).

Research identity means the accepted self-reference to the social category of researcher, awareness about the interrelationships between this category and other categories of social identity and continuous becoming of better researcher in a way of professional development. Using the idea of interrelationships between the social identity categories and referring to the conception about the practicing teacher as a researcher, in the present study we also can speak about the scientist-practitioner identity which is “integrally linked with individual learning needs and values, the extent to which these ‘fit’ within the organizational context in which you work and the way in which you define and own that identity” (Lane & Corrie, 2006). Teachers – participants of this research – have specific motivation to obtain the Master degree in Education therefore engaging in new relationships and choosing to complement the

existing professional identity by formally given identity of Master student and achievable identity of researcher.

One of the possibilities to create and develop powerful and integrated research identity is to engage in qualitative research (Merchant & Dupuy, 1996; Reisetter, Korcuska, Yexley, Bonds, Nikels, & McHenry, 2004). If the research creates the cognitive and affective connections to qualitative research, the participants will be more inclined to conduct research in a future (Reisetter et al., 2004). Qualitative research becomes an organizing perspective that allows the complementation of the various roles in their lives: as individuals, professional teachers, Master students and as researchers. Creating and developing this identity in Master studies learning process, we can possibly trigger the life-long need to integrate the research activities in everyday professional life in school which could noticeably change the quality of learning environment and professional performance. “[...] effective teaching cannot be accomplished without active research” (Braumoh & Alade, 2005). Though, it was told about the academics in the universities, it can be right also in case of teachers working in other institutions.

To allow school-teachers creating and developing the researcher identity and starting thinking as a researcher means to resist the prevalent social obedience of teachers to those who tell them what to do and how to do and make them to become an independent creators of their individual and professional life and mission. If teachers have challenged themselves to become the researchers, together with the knowledge on ESD obtained in other Master courses this probably could encourage them to implement in life the UNESCO guidelines for ESD and give them personal and professional tools to do it.

Description and results of educational action research

Action research – ideally it is an infinite journey and, usually, a single article can include only some focusing points of it. Here we have chosen to reflect on first four stages of “cascade” approach to research training of in-service teachers. The “cascade” means that, starting from the 1st phase until the last 7th phase of research, everything which is done previously, makes the necessary foundation for the next step. The previous phases altogether, in whatever phase you are in a moment, make a holistic foundation for your activities in the current phase (see Table 1).

While the content aspect of this research considers the research training, the “meta-content” aspect creates the context to analyze the methodology, philosophy of education, teachers’ problems and hopes in education, educational aims and education for sustainable development.

Table 1: “*Cascade*” Approach to Research Training

Phases	Title of phase	Description of phase	Time/title of course
1	Participation in research	Students become the participants of the research, experiencing all stages of research procedure.	Research Methodology
2	Learning research skills	Students participate in practical classes and obtain skills how organize research and how to use some research tools	Research Methodology
3	Analysis of research article	Students receive the research article and conduct an analysis of the article using their participants’ experience and obtained research skills.	Philosophy of Education/Research Methodology

4	Teachers' meta-analysis of students' analysis	Teacher analyzes the students' reflections on article, and presents it to the students.	Philosophy of Education/ Research Methodology
5	Creating own research design	Students create their own research design using acquired knowledge, skills, attitudes	During the first year of Master studies
6	Critical evaluation of design	Students critically evaluate their own research design and discuss it with their scientific advisor	During the first year of Master studies
7	Pilot research/research	Students conduct the pilot research, discuss its results and then makes a main study for his/her thesis.	During the second year of Master studies

Research participants were first year students of the part-time Master's programme in Pedagogy at Daugavpils University. For the purposes of this paper, only data from preschool, primary school, and secondary school teachers acquiring their in-service education within this program (N=20) will be analysed here. 18 participants were women, 2 were men.

Phase 1. Participation in research

During this first phase of action research students became the participants of the research, experiencing all stages of research procedure. Although the research data were collected from the students during this process, the full analysis of these data is not the purpose of this paper. The main aim of this phase was to create the possibility for the students to obtain the genuine experience of participation in research, containing many stages, and invite them for serious personal and professional reflections.

The research design, in which the students participated, conducted previously with other Master degree students in 2005, is described in article by I.Salite "Aim of education in the context of present and future educational issues: Perspective of teachers" (2006).

The research was organised as a workshop where the activities of research participants were conceived in three stages:

1. Initial individual opinions on the present problems in education and hopes for the future education.
2. Views on the problems in education and hopes towards future education after professional reflection.
3. Views on the aims of education for current and future education.

During these stages the students participated in individual/professional reflections, conducted ranging, comparison of items in pairs, took part in group or pair work, and group discussions (2 or 3 persons in group).

The main aim of this phase was to provide the dialogical learning environment for the development of methodological sense and identity of researcher. This twofold aim was specified through the following tasks:

- to actualize the individual and professional experience of participants making them aware about the necessity to verbalize the inner position, views, emotions during any qualitative research and to know how to do it properly;
- to provide the possibility for students to participate in the authentic experience construction: obtaining knowledge, skills, and attitudes needed both for participants of research and researchers who are facilitating the qualitative research process;

- to elicit the students' views on educational problems/hopes and aims which could serve as the basis of their educational philosophy.

In the context of given article, this phase can be designated as the necessary technical/content preparation for the next steps in this action research "cascade".

Phase 2. Learning research skills

During this phase of "cascade" students participated in practical classes and obtained skills how organize research and how to use some research tools. The strategies of pilot research were demonstrated and the students learned the course content and usage of several research tools (e.g. Cmaps, V-diagrams).

The aim of this stage was the further development of the students' identity of researcher providing them tools and skills to conduct a research themselves.

Phase 3. Analysis of research article

This is a most important phase of "cascade" for this article and therefore, it will be described in details. The students received the article by Salite (2006) and conducted an analysis of the article using their participants' experience and obtained research skills. The article was provided omitting the conclusions as one of the tasks were to make the own conclusions for this article.

To organize and structure the answers of students, four main questions were suggested for students:

1. Your emotions and cognitions after the participation in the research depicted in the article. Describe your feelings and attitudes in each of the stages of the research.
2. What kind of educational philosophy was used in the article?
3. Comment on the third stage of research "Views on the aims of education for current and future education". What educational philosophy is underlying your own aims of education?
4. Write your own conclusions for this research article.

The main aim of this phase was to continue the development of the methodological sense and research identity of students while engaging in:

- Evaluation of research methodology, design, report in a form of article;
- Authentic reflection on the experience of participation in the research and the description of other students' participation in the same research;
- Analysis of methodology as it is described from the point of view of researcher and comparison of this methodology with the participants own methodological sense;
- Transformation of own methodological approaches during the analysis;
- Training to write an important part of research report – conclusions;

Further will follow the analysis of students' answers on the suggested questions. Answering on these questions, students worked in groups/pairs (2-3 persons) and all together the data obtained from nine groups of students will be analyzed.

Question 1. Your emotions and cognitions after the participation in the research depicted in the article. Describe your feelings and attitudes in each of the stages of the research.

In general, the participants accepted and understood the idea and design of qualitative research both emotionally and cognitively.

In the narratives of answers four main threads can be detected:

- Describing the emotional context of teachers' answers, the dynamic of emotions was mentioned in some groups as well as the overall positive attitude toward the procedure of the research:

“Performing the procedure, first few moments we were desperate because nothing seemed to be clear and simple. The chaos appeared in our heads. We felt that we do not understand what the researcher wants from us [...].

At the Stage 2, we continued the critical reflection, evaluating the lists of problems and traits created by all research participants. The number of items rose and, making comparison, the pair discussions turned out more intensive and complex. Though, it was interesting (Group 3).”

“Our feelings and attitudes were not unequivocal. We encountered certain difficulties to range the problems considering their urgency. [...]. Drawing from our individual work experience (we work at Waldorf School), for us the urgent problems are almost like those discerned by others, only these problems are not heightened and are continuously dealt with (Group 8).”

- Speaking about the cognitive aspect of answers, several teachers mentioned the reflection as the main tool for transformative learning and their own change of frameworks:

“Since the reflection is thinking, self-observation and self-evaluation, the theoretical activity of person directed to the grasping and comprehension of own activities and their regularities, the research procedure while analyzing our own feelings and viewpoints encouraged our reflection (Group 1)”.

- Few groups mentioned the time context of the research:

“Systematizing personal views and clarifying the advancement in our educational philosophy toward the holism, we have crystallized our professional view – we have to take the best from the past and move toward a wholeness in a future (Group 6)”.

- Influence of gender variable on the perception of procedure and performance of task was noticed in the answers of man:

“We liked the idea and method of the research. [...] We had a feeling that our (as the man) values differed from the priorities of woman. In their approach, the sources of problem were not found, but the consequences of problem were identified as a problem itself. After the critical reflection our main problems did not change, though their form became more specific (Group 4).”

Question 2. What kind of educational philosophy was used in the article?

The main ideas that could be traced in the answers of students were the following:

- Few students tried to look for educational philosophy in the answers of respondents described in the article itself, analyzing mainly the ideas of teachers enlisted in the article:

“The values, dominating in a society (ethics), determine the moral of the society that are displayed both in the problems of today and tomorrow: (1) Problems of students' identity;(2) Problems of alienation;(3) Family problems;(4) Insufficient financing of education, etc. (Group 4)”.

- Rather large number of students tried to analyze the education philosophy in the article, using as a background the schemes, structures, tables, etc. they learned during the classes on Educational Philosophy, therefore, striving to

“squeeze” the authentic idea of author in the rational schemes of education philosophy:

“In the metaphysical aspect of philosophy we can trace the problems in current educational system, epistemological aspect reveals the thinking of teachers in current educational system. In its turn, axiological aspect urges to find a solution for current problems and to implement values important for teachers (Group 2).

“In the article the analytical philosophy is used, how the answers on questions are sought, how the phenomena are perceived. The activity is undertaken: creation of norms, speculation, synthesis, analysis. Creating philosophy, we create our attitude: self-awareness, penetration, flexibility, wideness. In the research we can discern the anthropological, theological, ontological assumptions – these all are metaphysical assumptions. And also epistemological assumptions – insights, moments of enlightenment, etc. Axiological assumptions: for instance, to get – by means of depriving others or to get – by means of giving, creatively (Group 3)”.

- Several students aimed to perceive the philosophy interwoven in the article as a background for the organic structure of research, step-wise structure of article, operating in their analysis from the point of view of author of article, not from their own understanding – what needs to be included to match with standardized and generalized schemes and structures.

“We think that as a philosophical background of the research the philosophy of ESD has been used. The following assumptions can be discerned in the article: (1) Coherence between ecological, social, and economic relationships; (2) Education should foster the acquisition of knowledge, skills and attitudes, how to deal with the problems and to make the competent decisions, to provide the immediate experience of sustainable processes; (3) ESD means the practical activities aimed toward the qualitative changes and results, creating critical attitude, skills to assume responsibility and make decisions, to clarify once own attitudes (Group 2).”

“Person as a spiritual/social being is integrated in specific environment, grows and develops in the surrounding social and economic conditions. This asks to continuously review the aims of education. In the research the philosophy of sustainable education is used. The text contains the assumptions: (1) Continuous interaction between human and nature (coherent/incoherent); (2) Teacher as individual and professional; (3) Frames of references of person are based on time: past/present/future; (4) Diversity of educational aims, which asks for evaluation, investigation, and generalization; (5) Movement and development is possible, if we have a vision for future; (7) Complex essence (wholeness) – individual/professional, past/present/future, etc. (Group 8)”.

Question 3. Comment on the third stage of research “Views on the aims of education for current and future education”. What educational philosophy is underlying your own aims of education?

The answers of teachers can be divided in two groups. First part of answers refers to the aims mentioned in the research article:

- In general, eight groups of teachers agreed with the aims of current and future education, sometimes describing their emotional attitude and self-evaluation of mentioned problems:

“We agree with the formulations of current and future educational aims – looking at the whole system of education in the country – it is right! Evidently, research in every region of country could show more problems, because of different social and economical situations and also microenvironment of every school. Though, some “future problems” in our school (Waldorf school) are already solved – cooperation inside school, etc. (Group 8).”

- Only the group of man was in some opposition to the aims mentioned in article:

“Instead of mentioned aims we would like to put the following current aims: (1) to discover the potential of creativity in every children; (2) we do not have to mould the personality of children, but to allow children to express their own personality (Group 4).

Second part of answers showed the philosophy of education supporting the teachers’ own aims in education:

- Largest part of teachers used the formulations from the article’s list of future educational aims to articulate both the aims of education and the philosophy of education supporting these aims:

“Our philosophy of education coincides with the aims for future education described in the article: humanistic pedagogy, upbringing of values (with the similar educational programs, close to the life, facilitating motivation for pupils and teachers, in cooperation with the family, decreasing the alienation, developing the strive for the human values) (Group 7).

- Two groups of teachers also used the schemes from the previous classes in Educational Philosophy to explain their ideas evidencing the process of learning during the action research:

“We use the humanistic approach to our aims for education: ethics, philosophy of ethics, religion, awakening of own Self for responsibility, individual approach (Group 1)”.

“Aim of education for us means the implementation of principles of ecology, integrity, and spirituality in education as well as the provision of qualitative and stable knowledge (Group 2)”.

- Two groups of teachers suggested their own vision which were rather different from the formulations in exemplary article:

“Our aims of education: facilitate the importance of sustainability, support for the cooperation and exchange of information, stronger integration between social and natural studies. Trends for upbringing: to educate people for the development, to diminish the anthropocentrism, to actualize the ecocentrism (Group 6).”

“Our philosophy of education could be based on the assumptions about the growth of personality toward the self-realization, facilitation of welfare of state and society. The tasks we set for future: (1) orientation of the individual perception of child toward the common regularities in surrounding world; (2) direct inquiry of nature using the senses, creation of friendly attitude toward the nature; (3) encouragement to engage in the creation of sustainable development (Group 7).”

Question 4. Write your own conclusions for this research article

This question is aimed toward the generalization skills of students so needed in scientific research. In the texts of conclusions the largest diversity was noticed, though, some common traits can also be discerned:

- Though, the concept of ‘sustainability’ was not mentioned widely in the article, one group found the connections between the content of article and ideas of ESD/SD encountered during the classes:

(1) *“We depend on nature [...]. Grounding on the philosophy of sustainable education we have to evaluate our action strategies and monitor the process, we have to use the resources efficiently, monitor the incoming of new creativity.*

(2) *Sustainability is a concept, which includes every sphere of human life, including the education. The education is not separated from everything else. With this sustainable aim for education in ecological society we can show the new connections with the world – spirituality, values, care, hopes. At the same time, the disbeliefs, desperation, incompetence can rise, but we have to try to cope with it (Group 1)”.*

- Some groups continued the “old tradition” of borrowing ideas and took them either from the text of article or schemes remembered during the classes:

“Current problems in education are:

- 1) *Educational politics and societal attitude toward education;*
- 2) *Organization and realization of pedagogical process;*
- 3) *Situation and conditions of teacher work;*
- 4) *Attitude of parents;*
- 5) *Attitude of students.*

Aims of education both for today and for a future are oriented toward the need of education to realize the upbringing of values (underlined text from the article)(Group 2).”

Main aim of education – care of the possibilities of human development. Teacher has to care about the healthy development of each individual, which is a foundation for healthy society and economics. In the educational philosophy of teacher all aspects have to be considered: (1) Cosmological aspect; (2) Theological aspect; (2) Anthropological aspect; (3) Ontological aspect (Group 3).”

- One group (men) used this task to suggest the steps of further research which is a valid part of many research articles:

“Given work asked for serious, enjoyable penetration in the problems of educational philosophy. We would conduct a research with the larger sample in different regions (rural/urban, ethnical differences, etc.) and to do the research in the same group of Master degree students after 2.5 years (Group 4)”.

- Three groups used rather structured creative approach to this task and based their conclusions on deductive mode of thinking starting from the context and ending by specific suggestions for a future:

“(1) The irregular tides of educational changes, episodic projects, single undertakings to do something only create an overload – a fate of school. Growing is the learning through the cooperation, using the positive sides, and neutralizing the negative ones.

(2) The research let us evaluate problems from different angles, discern the problems of past and future, set the questions for the changes in education. Reflection on the tough daily problems makes it easier to discern the concepts for a future.

(3) *Pedagogical integration is a tool to create the new foundation for purposeful, relevant system of pedagogical science. During the reflection everybody clarified the negative problems and looked at the future differently.*

(4) *Qualitative and competitive education can be ensured by educational environment, united aims and principles of school, humanistic values. Considering the interaction between the aligned life, aligned person and aligned education in the context of biotism, we can hope for the sustainable development (Group 6)."*

Phase 4. Teachers' meta-analysis of students' analysis

Phase 4 is undertaken during the classes of Philosophy of Education/Research Methodology after the teacher has conducted the detailed analysis of the students' answers regarding the research article and their participation in the procedure. And again, students can engage in the third circle of reflection and critically re-evaluate their own views, to encounter the views of other co-students and get to know the assessment of teacher in reference to the answers of students on the questions. During this phase, students understand one of the principles of scientific journey – continuous and infinite reevaluation and reiteration of experience and findings with some breaks for displaying obtained truth and sharing the results with the colleagues.

Phase 5. Creating own research design

During the first year of Master studies students create their own research design using knowledge, skills, and attitudes acquired during this educational action research. This research could also be named participatory, dialogical, transformative and reflective educational action research made by in-service teachers on how to do research and what can help to do it.

Phase 6. Critical evaluation of design

Later in the first year, students critically evaluate their own research design using the evaluative tools and skills they obtained in the action research and discuss this design with their scientific advisors. Together they make the necessary changes and set the strategic plan for the further research.

Phase 7. Pilot research/research

During the second year of Master studies students conduct the pilot research, discuss its results and then assume the main study for their thesis. The action research culminates in the defence of Master thesis by the students – research participants.

Discussion

Doing the educational action research in academic institution - school, college, or university – it seems very appropriate that qualitative research should be evaluated “according to the extent to which its outcomes increase the potential for practical improvement in the conduct and/or organization of learning and teaching” (Swann, 2003).

Looking back on the answers of students which is a most valuable material in given case, we can infer some important patterns, which should be considered in the organization and conduct of the next phases of the “cascade”, analysed from the point of view of practical improvement of research training.

In general, teachers were satisfied with their participation in this research design and learning process, their emotional attitude were mostly positive, though they mentioned the interesting emotional dynamics and feelings of coping with hard tasks. The affective

upheaval was evidenced in cases than the experience of participants differed from that of others (e.g. men, teachers from Waldorf school, etc.). In a further development of action research teachers have to deal with the interactions of research identity with other important identities and emphasize the value of individual background of researcher and integration of personal/social identity into the fabric of the research.

Turning to the cognitive outcomes, one should say that during the educational action research the in-service teachers used both reflection-in-action and reflection-on-action (Schön, 1987), though the first type of reflection always brought with it not only application of intuitive theories but also the situational emotional attitude, while second type of reflection tended to be more cognitive exercise. The answers witnessed the strong development of reflection skills by in-service teachers – the participants of action research – as it is already recognized by other researchers (Sparks-Langer & Colton, 1991; Carr & Kemmis, 1986; Zeichner, 1986). As it was observed in research with the doctoral students, the large part of the students applied the reproductive thinking activities to construct the answers on the questions, though some important ideas came from the authors work as the teachers and previously acquired content of study courses (Pipere, 2006). Also, “the usage of terms without the deeper awareness and explanation of exact meaning used in the given context” (ibid.) was well noticeable in the answers, as it is hard for any researcher to apply and understand the meaning of unfamiliar or vaguely recognized concept in definite context. Though, the participation in this action research have a potential to trigger the students’ reflection on their failures of cognitive character, encourage the development of meta-cognitive skills, and transform their approaches to the cognitive performance.

As the research data show, it is time to change the structure of Educational Philosophy course and conceive it “much more broadly” (Swann, 2003), using the hermeneutical approach to this discipline. Even if sometimes it is rather painstaking, it is more productive to start this course from the experience of the students, not presenting them ready made schemes and classifications, though, at the beginning the terminology can suffer. Only then, the schemes and classifications from the textbooks can be introduced showing the artificial nature and weaknesses of each of classifications and completing them with the examples from personal and professional life of teachers.

Though, Pratt and Swann (2003) mention the economy as a principle of good research practice, in the limited possibilities of Master curricula to grasp the immense field of educational research, the “cascade” approach which is applied in this Master program helps to economy the different resources as all process is oriented to the simultaneous achievement of the whole array of aims: training for research, transformation of personality both in social psychological sense (construction of identity) and axiological sense reorienting the value system toward values of ESD, etc.

Conclusions

The researchers from the Institute of Sustainable Education which are the authors of this study see their mission in the developing of contextualized and validated tools for ESD/SD research and, therefore, the Master degree program, where they teach, can become a field of transformation and testing for necessary changes both in teacher education and research carried out by in-service teachers. The presented research is one of the first attempts “to deal on the state level with the possibilities of teachers to introduce the sustainable education” (Salite & Pipere, 2006). As the first results show, the idea of 7-phased “cascade” research training ending with the defence of Master thesis, have a potential to create the generation

of in-service teachers who can trigger the “grassroots” level implementation of ideas toward sustainable development.

Speaking about the limitations, article shows only several phases of “cascade” approach, it is hard to evaluate all educational action research design in general. Actually, longitudinal research would be the most appropriate design in this case, as some research participants have already suggested.

As the following steps of the research, the next phases of “cascade” approach and the collection of research data during these phases of “cascade” have to be undertaken. To extend the characteristics of research participants, also doctoral degree students can be involved in a research. The future always uncovers much more about the previous undertakings and hopefully will bring fresh insights and new possibilities for all researchers.

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