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Sustainability from the Transdisciplinary Perspective: An Action Research Strategy for Continuing Education Program Development

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Abstract

The need to focus on a transdisciplinary approach in education for sustainable development (EDS) has been reflected in research and especially action research as a possible solution, which can open a new perspective for understanding and interpretation of the complex phenomenon of sustainability as well as for developing new open continuing education programmes by integrating research and learning activities in the context of open transdisciplinary research.

The content structure of the article: (1) it describes the experience that has evolved at one faculty and its subordinate scientific institute and has been proposed to be used within the entire institution; (2) it generalises issues arising from the extensive experience, which in action research manifest themselves as issues relating to the appropriate perspective choice in terms of sustainability, approaches that in education make it possible to understand the sustainability phenomenon, as well as features that help identify sustainability at different levels. Well-known cases in the history of science, philosophy of science, and systems development research have been used to highlight the relationship among the dynamic interaction of complex problems that can systematically appear as sustainable or unsustainable. Therefore, the article provides insight into a specific relationship among science development, integration and Anthropocene phenomena with sustainability / non-sustainability phenomena and their interaction; (3) it offers the experience necessary for the creation of participatory action research ideas and research base to expand the cooperation of university and its graduates using a stakeholder approach and connecting it with a transdisciplinary research framework, which envisages an activity around the sustainability phenomenon and its deep relationship to the openness for the evolution of sustainability consciousness as concerns individuals and societies; (4) it describes the first three activities of the first phase of the undertaken action research, which allowed determining the participants' motivation to take part in the action research, identifying participants' attitude and understanding sustainability and Anthropocene phenomena, as well as establishing a strategic vision of open transdisciplinary framework benefits and opportunities through participatory action research to develop open evolu-

tionary study programs for continuing education, which would extend and deepen the cooperation of university and its graduates for social innovation creation and achieving quality education for sustainable development by reorienting the society and education towards sustainability and sustainable development.

The present article aims at establishing an open transdisciplinary research framework, which is necessary for undertaking action research, and outlining a strategic vision for developing continuing education programs in the participatory action research that will help reorient continuing education to sustainable development.

Keywords: participatory action research, sustainability phenomenon, transdisciplinary approach, continuing education, partnership

Action Research Experience and Characteristics of its Expansion Intentions

The article introduces the experience relating to changes, which gradually evolved at Daugavpils University (DU) at the end of the Decade of Education for Sustainable Development and emerged as a new challenge to further development of ESD research and its wider use in education. In fact, it was a gradual internal structural change that began to appear along with the idea, which was included in the DU Development Strategy (2009–2016) about the establishment of UNESCO Chair at Daugavpils University. The Chair was established in 2013, and it took time to understand that it was the most important outcome within the Decade of Education for Sustainable Development, which introduced internal structural changes into Daugavpils University for ESD research development and ESD measure implementation in a broader perspective. After the establishment of the Chair, platform preparation was started in order to recognise the responsibility for ESD as the strategic objective of the entire university.

Looking back on the formation of this situation, it is evident that there was interest in the education for sustainable development. It has emerged and developed within the historical development of scientific activity at the Faculty of Education and Management (FEM) and its subordinate Institute of Sustainable Education (ISE), and obtained as a personally relevant experience gained by the staff members who have been engaged in ESD research and programme development. The FEM and its subordinate ISE proposed using the gained experience throughout the university by drawing up the application for the establishment of DU UNITWIN UNESCO Chair on Teacher Education and Continuing Education: Interplay of Tradition and Innovation in Education for Sustainable Development.

The Chair was established and became the structural unit of the university. At the same time, this structural transformation was the assessment of the FEM and ISE experience, which was acquired and developed at a time when they were involved in a global project on the reorientation of teacher education to address sustainability and were one of the partners involved in the preparation of the Decade of Education for Sustainable Development (2000–2005) and later also one of the partners involved in the implementation of the Decade objectives. The research conducted by the FEM and ISE was organised on the participatory action research basis. To establish the UNESCO Chair, the ISE shared its own experience, inviting other DU structural units, individual staff members and students to participate in the UNESCO Chair action research. The Latvian National Committee for UNESCO supported this proposal.

At present, structural change processes on institutional involvement in the ESD and education research have shifted the responsibility to the UNESCO Chair, which is historically the continuation of the FEM work undertaken in a broader perspective. Historical continuity has been maintained, as the FEM and Centre of Sustainable Education (former the ISE) are the partners involved in the implementation of UNESCO Chair objectives.

During the first three years of its operation, the development of the Chair became apparent in the area of promoting cooperation at the institutional level both nationally and internationally, which became recognizable as a *network of networks*. The approach of a network of networks is based on the Chair proposals, which are formulated by developing specific issues, enabling all stakeholders to participate in the networks set up by the UNESCO Chairs or in the networks, in which the UNESCO Chair is involved as a member. Opportunities to participate in academic or research interest networks at various levels increase with the increase in the activities provided by the Chair. At present, the Chair invites to participate in the BBCC (the Baltic and Black Sea Circle Consortium in Education Research), BSRESD (Baltic Sea Region in Education for Sustainable Development), the European Environmental Education Alliance, GUPES (Global Universities Partnership on Environment and Sustainability), WEEC (World Environmental Education Congress), Homo Europeanus Network, and many others.

In the closing event of the UN Decade of ESD taking place in Japan, DU UNITWIN UNESCO Chair has agreed to cooperate in the UNESCO Chair network, which addresses the ESD issues. Through the UNESCO Chair, DU continues to participate in the Global Action Programme (GAP, 2015–2020), which envisages through activities to address sustainability issues, and it is initiated in a broader perspective as institutional, regional and wider international cooperation towards achieving ESD objectives.

Participation in the GAP as well as the establishment of the Chair with responsibility for ESD in broader perspective first requires a strategic perspective that can be created under the condition that there is understanding of the current sustainability and ESD phenomena and the ability to apply it in the participatory action research, which by its nature is a complex process. Reflection on experience is also necessary to consider these phenomena in a deeper perspective of historical causes as well as scientific development perspective, which makes it possible to predict the possible direction towards the ESD and sustainable development. To fulfil the GAP objectives, it was necessary to undertake participatory action research, which was prepared and started in the 2015/2016 academic year.

In cooperation with the Baltic Sea Region countries with the aim of implementing GAP objectives, since September 2015 DU UNESCO Chair has participated in the project "Local Research and Education Hubs – Key for Sustainability Education", which laid the foundation stone for the centre "Local Research and Education Centre – Sustainable Education Solutions" at Daugavpils University. DU Graduate Research and Education Centre for Sustainable Education was opened in May 2016 and was approved as a structural unit of UNESCO Chair. DU graduate network has been set up, and it started as a participatory action research, the prospective strategic goal of which is:

> *establishment of open evolutionary relationships between university and its graduates for partnership, which through the synergistic quality achieved in relationships will contribute to the development of open evolutionary con-*

tinuing education programmes in order to influence the reorientation of continuing education towards sustainability and promote public awareness, cooperation evolution and adaptation relationship harmonisation for achieving sustainability and education for sustainable development.

Taking into account the fact that from 1993 to 2013, the issue of sustainability and education for sustainable development was within action research participants' line of sight, an ambitious review of this issue is no longer useful. In the context of action research experience, most of the previously studied sources have become obsolete, but part of the theoretical sources was used in participatory research and became extension of its experience. Therefore, the experience used in the previous action research is planned to be based on the synthesis and, if necessary, we will resort to the analysis in cases, which are essential in the context of research experience, and in cases when theoretical sources have become the cause of issues provoking discussion. These issues attracted the action research participants by conflicts or inconsistency between real situations and conclusions of theories that resulted in mistrust.

One of these problems in education research is known for the fact that action research in education is most often denied in terms of importance and assessed in terms of strength and majority of other sciences, when it is stated that neither pedagogy nor education is a science. Nevertheless, it should be recognised that changes even occur in the recognition of action research theory, although action research has evolved since the beginning of the 20th century and even the end of the 19th century. At DU, the analysis of this issue has been one of the issues related to the use and development of action research theory (Salīte, 1993, 1998, 2000, 2008, 2009, 2015; Pipere & Salīte, 2006; Salīte, Mičule *et al*. 2007; Grišāne, 2007; Belousa, Oļehoviča *et al*., 2007; Salīte, Gedžūne, & Gedžūne, 2009; Salīte, Ignatjeva, & Salitis, 2009; Salīte, Gedžūne, & Gedžūne, 2010; Switala, 2010, 2011, 2012 a, b, c; Gedžūne, G. *et al*., 2011; Kapenieks & Salīte, 2012; Badjanova, Iliško, & Drelinga, 2013; Kravale, Iliško, & Oļehnoviča, 2013; Pipere, Veisson, & Salīte, 2015; Gedžūne, G., 2015; Gedžūne, I., 2015; Briede, 2015; Switala, 2015; Zariņa, Drelinga, Iliško, & Krastiņa, 2016), with the focus on the recognition of action research complex nonlinear nature and attempts to get rid of the complicated approach, which often dominates in the current action research within scientific research.

In the experience of the FEM and ISE action research participants, there is the belief that the present research type has benefits if it entails a long-term participation of its stakeholders. There is also the assumption that action research is organically open to cyclic nature, which does not work in the traditional education research approach that uses a "piecemeal approach" or other type of approach (Bechtel & Callebaut, 1993; Nersessian, 2012).

This article aims at reflecting the beginning of action research by creating an open transdisciplinary research framework and a strategic vision for developing continuing education programs in the participatory action research that will help reorient continuing education to sustainable development. According to the aim of the article, we attempted to evaluate the action research experience by synthesising the actual experiences, theoretical ideas and approaches identified in the research that were intertwined with the ones tested in practice. Therefore, the present article provides an overview of scientific development, integration and well-known Anthropocene phenomenon that through the inter-

action and development of these phenomena affect sustainable / unsustainable quality at different levels. Development of unsustainability phenomenon reinforces the need for new approaches (e.g., *resilience approach*) (Zolli & Healy, 2012), which makes it necessary to respond to the consequences and look for new solutions that are created as a myriad of concepts. Thus, several new concepts appear, such as *systemic resilience* and *systemic risks*, and research theme of *resilience synergistic quality* (Millington & Millington, Marini, 2015) emerges in the participatory action research. However, there is also an opportunity to move to a *pre-emptive approach*, at the beginning mitigating the effects of the *aftermath approach* and gradually reducing the dominance of this approach in scientific research in the broadest sense, when the scientific research in a single science is based on the pre-emptive approach (Salīte, 1993).

In the context of sustainable development, the issue of the transition from the aftermath approach to the pre-emptive one is at the same time the issue of several phenomena that take over the unsustainability features that have already been affecting the scientific development as well as understanding integration and unsustainability of the Anthropocene.

Science Development, Integration and Anthropocene Phenomena for Establishing Open Transdisciplinary Research Framework in the Context of Education for Sustainable Development

It is not possible to approach "sustainability from the transdisciplinary perspective" mentioned in the title of the article, if we do not investigate the nature of complex phenomena and do not explore essential relationships that may appear to be sustainable or unsustainable and, as a result, influence the transition of education, society and science towards sustainable or unsustainable development. Thus, the issue of *quality* arises, which subsequently becomes recognisable as education, science and society development quality, for the understanding and explanation of which it is important to shed light on the issues of attitudes and relationships that help comprehend the nature of complex processes.

Evaluating our experience gained in reorienting teacher education towards sustainability, it is possible to identify a number of problems, which are of the value in the context of participatory action research. In the phenomenon of science development, one should admit the idea that in the science development process it is important to address the issue of application of knowledge structure and classification approach that is related to the internal or external contexts affecting science development. Classification is not something dead or mechanical; it is important for research activity. If we consider the issue of science classification, it has recently been emphasised that it reflects the classification system of branches of science, like chemical elements, and the classification may also reflect a certain theoretical procedure (Margolis & Laurence, 1999; Szostak, 2007).

Classification is used to identify the strengths and weaknesses of various sciences and the potential for integration among various sciences. In broader terms, when addressing the issue of classification of sciences, the diversity can be identified and according to Ziman (2000), researchers in communication recognise each other by the way they look at the issue.

In the experience of teacher education reorientation developed since 2000, an invaluable influence was exerted by Kedrov (1983), whose interpretation of scientific development process served as a model for many research participants enabling them to consider the development of science in the form, which was not in conflict with the existing development trends of science. It should be noted that his proposal has not lost its strategic potential, and has not yet come in conflict with the ongoing development trends of science. What is more, the current events taking place in the context of science transdisciplinary approach and research development coincides with the vision of scientific development perspective proposed by Kedrov in the early 1980s.

The application of Kedrov's model in teacher education reorientation towards sustainability has been valuable as it suggests considering phenomena at a greater distance, at which it is possible to distinguish significant constituents of the process, its evolution and openness necessary for the development of science. In the action research process, the gained experience enabled the research participants to find answers to questions that were sometimes not examined from the perspective of the resilience theory. As an example, we can mention theories of prototype and wicked problems that we frequently face, when we distinguish something that could be conditionally called the issues related to the theory of *units of analysis*. Looking at the popularity of the above-mentioned theories at a greater distance, we can find that they were popular from the 1970s to the early 1990s (Margolis & Laurence, 1999; Kalko, 2012; Brown & Harris, 2010; Cabrera & Cabrera, 2015; Wilber & Watkins, 2015; Adam, 2016).

Examining the current application of these theories, at least in the perspective of our experience, we have found out that the popularity of these theories has diminished because their openness, dynamism of the phenomena used in the evolutionary explanation and the very theories, evolving nature and complexity have not been revealed in the perspective of a complex approach. It has mainly been explained and understood from the perspective of a complicated approach. Action research experience enabled some participants to reveal a number of problems often untouched in educational research, the causes of which were identified as non-recognition and unreasonable use of a complicated and complex approach. In theory, the issue of application of the two approaches in education and educational research has been recognised and is nothing new (Savio, 2010; Wells, 2012; Salīte, 2015) but a problem that affects the development of scientific research and educational research.

Recalling the influence of Kedrov's (1983) visual model in the theoretical perspective, it should be admitted that the power of its historical perspective and generalisation affects researchers in the way as it enables them to see the essential elements of the development of science. Explaining his model, the scholar maintains that in the development and classification of science, there are infinitely many opportunities to turn away from the essential issues and lose the nature of continuity and transformation by focusing on details and not observing the structure of the development process, which needs historical context, current trends and future prospects (Fig. 1).

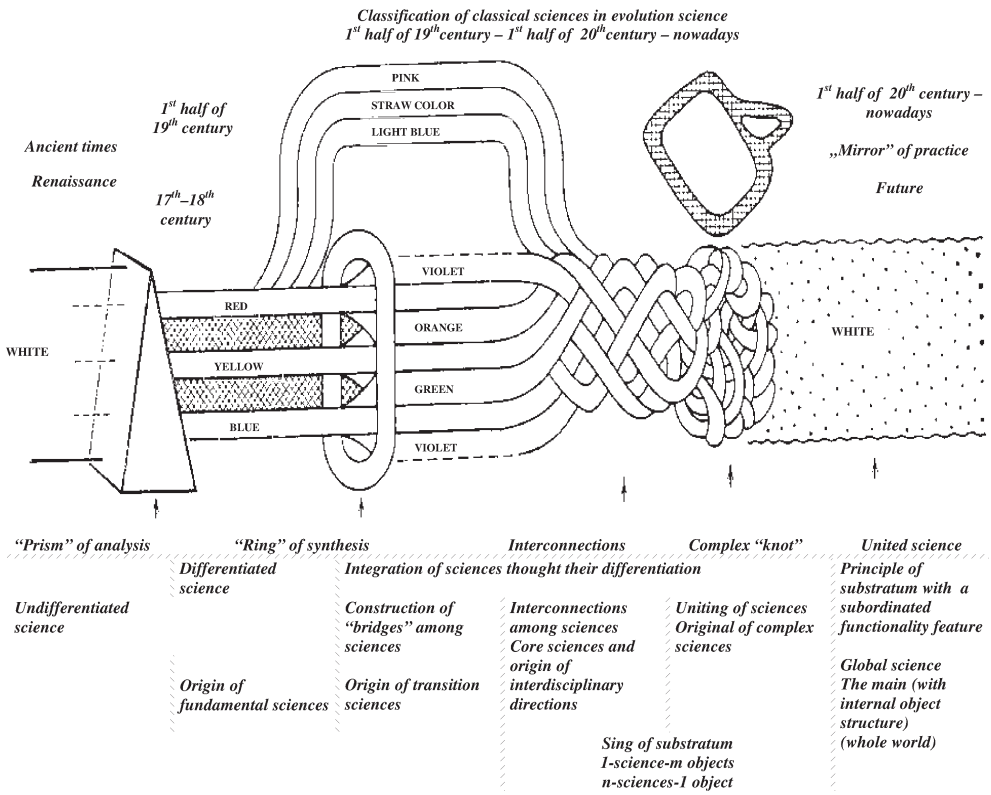

Figure 1. Classification of sciences according to Kedrov (1983)

In his model, the author intends to understand the progress of science in order to maintain its evolutionary scene. In the evolution of science, the author distinguishes three scientific cognition transition stages in the development of science towards the future science. Details disappear when an attempt is made to view the scientific cognitive development historically, as trends in the change of science structure become apparent. Figure 1 demonstrates the three stages: (1) the ancient science – cognition is still undifferentiated, undivided; parts are not distinguished. It is a single science, which includes seeds of the future sciences; (2) an intermediate stage, stage of science differentiation, the Renaissance; (3) integration of sciences and appearance of many stages.

The author made a forecast of the future development of science if knowledge differentiation would disappear and structure of science recover, dominated by the general issues over the individual ones. Kedrov knew that some scientists in those days saw the way in which a narrow specialisation would develop determining the differentiation of sciences and individual dominance over the joint one. He saw the integration of natural and social sciences; however, he left open the question of whether they would connect through technical sciences.

The use of this theoretical point of view in the action research devoted to teacher education reorientation (1) made it possible to discern a deeper relationship among the development, integration and differentiation of science, as well as reveal changes in the

relationship between analysis and synthesis, and (2) served as an open holistic framework, despite the fact that the author at that time did not use a holistic approach. On the basis of this theoretical study, DU conducted the applied research on the use of integrated approaches in primary school as well as introduced a number of courses within which the integration theme was related to the use of different types of integration. Following Kedrov's approach, it became apparent that integration was a process interweaving the development of science. Within its internal structural changes, the development of science should be evaluated and adapted taking into account the application of appropriate integration type framework at each stage in order to organise research and teaching activities. In scientific research, unsustainability finds its way through the relationships that appear through the choice of integration type in research, which is not in full compliance with the situation related to the current development of science. At a time when the science is aware of the complex nature of man, society and social phenomena, it is necessary to consider the integration from the perspective of a complex approach as well as recognise that it should be linked to the development of the theory of wicked problems that requires the complex and transdisciplinary approaches to the study of the integration. The question then arises: Are the specific sciences and some researchers allowed not to observe in their research the compliance of approach choice to the need of science to develop recommendations for solving wicked problems? Perhaps, they can do so, but how should we look at it in situations when the science has vividly reoriented to the aftermath approach, which implies seeking solutions that are mainly aimed at resilience, eliminating prior recommendations or "innovation consequences"?

On the basis of the synthesis of the model of scientific development proposed by Kedrov (1983) and our experience, we can found out that it has changed our direct and indirect ability to see that many problems in educational research and educational practice have affected too slow integration of social sciences, natural sciences and humanities. Investigating this issue, we can realise that often in the scientific research and especially in the education practice, the use of a complicated approach dominates. Complex approach began to develop in the boom years of environmental and ecological education (1990s), but the pressure of traditional sciences and the gap between the development of science and the society limited the immersing of science into (1) the issue of responsible choice of the integration approaches and (2) the ontological and epistemological (development) basic relationships, studying and learning contemporary complex phenomena (Adam, 2016; Salīte, 2015).

In 2006, in Paris, the UNESCO organised a global colloquium on research and higher education "Universities as Centres of Research and Knowledge Creation: Endangered Species?" It initiated a fruitful discussion on dynamic relations between the society and the science, the need for contextual science, creation of the conditions for healthy production of social knowledge, as well as the necessity of urgent networking and cooperation development (Nowotny, Scott and Gibbons, 2001). It is likely that DU trust in action research and faith in science progress towards its unity have been strengthened. Directly and indirectly the action research in teacher education has diverted the attention of participants, in our view, to the three major themes, which gradually have become topical in recent years and are further investigated in the action research that has been launched as an open transdisciplinary participatory research within the university. These are the issues about the need to see and deal with the fact that (1) the com-plex approach,

during the development and formation of complex sciences, should be linked to the use of complex approach in the transdisciplinary scientific research and ESD research; (2) research and learning approach still needs to be in agreement with choice of the *units of analysis* (Babbie, 2016); (3) under the condition of united science, it is important to have understanding of a research object of united science. In this respect, Rozov's (2012) approach is suitable for the action research since, in his point of view, an object of scientific research is the way we deal with the world, interacting with it through our diverse life actions.

Thus, looking at our previous action experience from a distance, taking into account a holistic perspective, we have identified three previously mentioned questions, and by combing them with the three, in our opinion, important phenomena (science development, integration and Anthropocene) and perspective, which forms as a result of the interaction of these phenomena, we have found the relation between our action research experience and the theoretical ideas "intergrown" in the experience, around which the framework of a new participatory action research has been established.

Characteristics of Research Design Framework

Participatory action research: started within the GAP phase (2015–2020), focusing on the implementation of GAP objectives, proposed to the entire institution (university) and its graduates for gradual establishment of open evolutionary partnerships with the aim of influencing the reorientation of continuing education towards sustainability.

Research design: created to achieve the long-term and short-term goals of the participatory action research (see 137–138 and 136 pages). Open dynamic framework within which stakeholder partnerships are organised by exploring sustainability phenomenon and achieving synergistic quality of cooperation. The establishment of open evolutionary continuing education programmes for the development of public awareness and cooperation in search of sustainable development areas.

Stakeholder approach: the research promotes cooperation among parties of various action experiences who get engaged in examining and addressing complex problems related to sustainability phenomena: (1) teachers, academic staff members and researchers who represent areas of different disciplines and scientific research; (2) graduates who obtained diplomas of different levels from different programmes and at different times as well as gained experience in various professional fields, who work within the university region, across the country and abroad.

Transdisciplinary approach: through the cooperation it is possible to open a *holistic potential* for transdisciplinary research. The choice and application of transdisciplinary approach envisaged as ***the strategic and methodological use of action research with the aim of finding out in the action research***:

(1) a deeper theoretical explanation of the nature of the mentioned approach as in the theoretical literature on a transdisciplinary approach there are different explanations in the scientific perspective. It is expected that it will not be possible to address this process without investigating the recognition ability of interdisciplinary and transdisciplinary approaches because the understanding and application of both approaches is an issue in which diversity is manifested, and there are cases when interdisciplinary and transdisciplinary approaches are described in a similar manner;

(2) the nature of transdisciplinary approach when partnership development between the university and graduates can reach the state (heterogeneous partnership unit), the synergistic quality of which proves the quality of this partnership as an indivisible unit. Such an ideal perspective opens up the opportunity within the framework of the research to foresee and use a holistic perspective, in which researchers can look for the achieved highest attitudes and relationships and open space for the achievement of ideal, expectation-related relations;
(3) the application of transdisciplinary *collective thinking* method, where over time the use of the method as a separate dialogue opening method turns into the nature of participatory action research and it assumes a new nature, which becomes the integral supportive element of this research process, when the research acts as an indivisible unit that certifies certain quality, in which the partnership forms among different actors.

Therefore, a transdisciplinary approach, search for its more general meaning, has been used in the action research in the context of scientific development and integration diversity, and from the perspective of ontological development of its various types with a tendency to promote the use of pre-emptive approach to the synthesis of science and social practice. The outcome of the action research in terms of transdisciplinary approach recognition will involve participants' professional identity, disciplinary specialisation and realities in the synthesis of complex nature of experiences.

At the first stages of research, in order to establish a deeper awareness, the cooperation is first directed to the exploration of complicated operation of sustainability phenomenon that has initiated the process and will become the core of cyclical process of the action research around which it will be possible to develop the synthesis of participants' experience and understanding of the complex nature of sustainability, and it will also be used for deeper evaluation and analysis of participants' disciplinary affiliation and professional activities that can help change the existing situation.

Transdisciplinary dialogue maintenance: maintenance of natural synergistic partnership potential through (1) belonging to the university, (2) the participation in the examination of sustainability phenomena and involvement in continuing education course establishment, as well as (3) engagement in the search of transdisciplinary solutions of sustainability phenomenon for implementation of social innovations.

Use of complex nature of action research: if sustainability is studied as a wicked problem, there is no other way than to understand and explain the action research (1) as a unique complex phenomenon and interaction of complex processes; (2) as a strategic approach to research and learning integration at different levels; (3) as an action research method that can contribute to research participants' transition from "*the piecemeal approach*" to an approach of *systemic collective thinking*, which is in good agreement with the participatory action research cases and the goals of the undertaken research.

Participatory Action Research Stakeholders, Activities and Description of Results of Three Activities at the Initial Stage of the Research

The first activity. At the initial stage of the action research, the first activity took place in June 2016 within the framework of the project "Local Research and Education Hubs – Key for Sustainability Education" supported by the Council of the Baltic Sea States as the first workshop of Daugavpils University "Graduate Research and Education

Centre for Sustainable Education", which was set up to identify sustainability phenomenon, understand its deeper meaning and promote one's own awareness. Participants engaging in dialogue were looking for answers to the questions "What is sustainability and how is it manifested?", "What is unsustainability?"

Participants of the first activity workshop set up at the initial stage of action research: (1) onsite participants – 4 heads of institutions, 4 teachers, 4 students, 4 representatives of municipalities, 1 businessman, 5 lecturers at Daugavpils University (n=22); (2) distance participants who got engaged in the discussions through the e-media (n=33).

General education teachers, DU graduates working in public administration bodies and other areas of public interest discussed problems in education and jointly sought the ways of sustainable education resilience and development maintenance in the current circumstances. During discussions, unsustainability features in the society were distinguished, the quality of educational process was considered, access to education and social environment in educational institutions were addressed, the role of cooperation in the EDS was emphasised, as well as challenges faced by the teaching staff and society in relation to unsustainability overcoming process were discussed. Organisation of activities in the first workshop was focused on the participants' belonging to the university, which for the participants who responded to the first call turned out into a personally important context and willingness to use the opportunity to engage in the establishment and work of "DU Graduate Research and Education Centre for Sustainable Education". In the workshop discussion, the collective thinking method was used, in which the transdisciplinary framework was created in response to the unifying DU *graduate* status.

The results (experiences and ideas identified): a conclusion that there are problems which are unsolvable: *the transition to a market economy that promotes competition, the pursuit of profit. Unsustainability problems have also been detected that are classified as a pretext, to which solutions, working together, could also be sought, for example: "... there is no continuation of the analysis of the obtained result", "... irrational use of resources", "… inconsistency in methods and learning content". Sustainability is based on: "... awareness of one's own mission and work", "... family and country stability", "...long-term, short-term plans verifiable through activities".*

The second activity. At the initial stage of the action research, the second activity took place on 16–17 August 2016 as discussions within DU workshop "Graduate Research and Education Centre for Sustainable Education".

Participants of the second activity at the initial stage of action research: (1) onsite participants – 1 psychologist, 2 heads of institutions, 1 businessman, 2 teachers, 7 lecturers from Daugavpils University (n=13), of the total number of participants, 4 participated for the first time; (2) distance participants who got engaged in the discussion through the e-media (n=13).

During discussions participants raised questions related to the ESD complex nature, for example: "How can our cooperation minimise the effect of unsolvable problems on sustainable development?", "How is exactly the same problem treated by representatives of different generations, different ages, and different professions?" Participants shared their experience, and their opinion was ranked by importance.

Organisation of activities in the second workshop was focused on the participants' belonging to the university. In the workshop discussion, the collective thinking method

was also used, in which the transdisciplinary framework was created in response to the unifying DU *graduate* status.

The results (experiences and ideas identified): DU graduates of different generations and from different fields assessed the sustainability phenomenon from their own experience, actualised their personally important reference systems and from their perspective qualitatively analysed data obtained from motivational letters, in which applicants explained their desire to engage in the networking of DU UNESCO/UNITWIN Chair "DU Graduate Research and Education Centre for Sustainable Education". Participation in the creation of social innovations and responsibility for their implementation emerged as an opportunity and a common basis for research development of DU Graduate Centre.

Participants concluded, *that over the last 25 years the Latvian society rapidly marched into the market economy, which brought about unsustainability. On the one hand, it was and is the struggle for power in the form of unpredictability, freedom and centralisation: "... increased bureaucracy", "... standardisation that limits creativity", "... entrepreneurs cannot afford to invest in innovations that will pay off in several years". Material assets and profit of employers on the one hand and "...overall low remuneration" of employees on the other hand. This leads to social problems: "... a lack of jobs in rural areas", "... the departure of youth from rural to urban areas", "… migration", "... the closure of educational institutions and neglecting closed schools", "... aging population". Competition, lack of information and ill-considered planning leads to: "... either overproduction of specialists or shortage of labour", "... scientists engage in fundamental rather than applied research because applied research in Latvia does not promote academic career development".*

On the other hand, *there was a desire to maintain the comfort zone that is reflected in the form of manoeuvring, irresponsibility "... people's anti-ecological attitude and environmental pollution", of self-defence and pretext "... lack of time daily and haste", of campaign-type education that somewhat mitigates "... fear of the unknown". To minimise unsustainability, the participants proposed "...taking personal responsibility for work and learning outcomes", "... learning by doing together", "... contributing to value-based education development", "... ensuring close connection of education with future, practical life", "... promoting education for sustainable development".*

The most important conclusions of the second activity have emphasised the complex nature of sustainability phenomenon determined by the fact that (1) it is not possible to solve sustainability problems at once, they are continuously solved through a participatory process, and (2) those who engage in a variety of life processes should take responsibility for the choice of solutions. Actors' choice also makes the process sustainable or reduces its sustainability. Discussion became a personally important platform, which opened and deepened exchange of views on the concept of DU Graduate Research and Education Centre for Sustainable Education.

The third activity. At the initial stage of the action research, the third activity took place on 4–5 October 2016.

Participants of the third activity at the initial stage of action research: (1) onsite participants – lecturers and students at Daugavpils University, teachers and senior managers of institutions (n=45). Participants of the second activity at the initial stage of action research: 30 % of the participants took part in any of the previously organised activities; (2) distance participants who engaged in the discussion through the e-media (n=8).

Within the third activity, a focus group discussion was held, in which 3 representatives of municipalities, 1 businesswoman, 1 fund manager, 1 artist, 1 mother of many children participated as invited persons. In the age group up to 30 years – 1 participant, of 30–45 – 3 participants, over the age of 45 – 2 participants. Focus group discussion was focused on the life experience of the invited persons, searching for answers to the question "How did public figures solve unsustainability problems at different stages of their life?", from the discussion participants' point of view forming the basis for reflection in order to identify something that could be learnt by each of them.

Organisation of activities in the third workshop was focused on the participants' belonging to the university and belonging to the networking of "*DU Graduate Research and Education Centre for Sustainable Education*", which had already become recognisable as an interest-oriented open network. In the networking discussion, the collective thinking method was also used, in which the transdisciplinary framework was created in response to the unifying DU *graduate status as well as belonging to the Centre networking*.

The results (experiences and ideas identified): Focus group participants represented their life stories in the longitudinal context, emphasising reflection on what they thought, what they did and felt over the past 25 years, 12 years, 5 years and now. Which problems did they encounter and how did they deal with them? What did sustainability mean to them? During the third activity in small groups, participants analysed the information they heard and compared it with their experiences. The most important results of the third activity were associated *with self-cognition and the importance of acquaintance with other participants that would promote the ability to adequately assess themselves and others, build a strong team, in which on the one hand each participant was responsible for the tasks most suitable to him/her, on the other hand, the team evaluated each participant's opportunities and entrusted the most appropriate responsibilities to him/her*.

Discussion and Conclusion

Considering our experience gained in reorienting teacher education towards sustainability, a broader perspective has been recognised, which has been revealed in the action research process as (1) the complex interaction of the three phenomena, namely, interdependence of science development, integration and Anthropocene phenomena. It can be viewed as a unit of complex interacting phenomena, which demonstrate the complex process of progress towards the goal of sustainable development or unsustainable development. The current Anthropocene era indicates that *the attitude towards the scientific development and integration phenomena and the relationship between their formation as well as the changes are the basis and also the cause of gradual Anthropocene development*. The detachment of science from the real processes of society and from anthropocentrism impact on the global system is an issue that should be addressed in the transdisciplinary perspective, in which the interest of disciplines and various human activities are associated with complex issues that need to be taken into account addressing specific issues.

In the action research, which was initiated at DU Graduate Research and Education Centre for Sustainable Education, a survey was conducted that was more complex in terms of the diversity of its participants (heterogeneous). At the same time, the relationship

of participants is more natural, because it is based on experience acquired at the university, which is a unifying structure that is characterised not only by experiences and contexts of epistemological nature, but also by historic contexts, contexts related to the development of the institutional and individual experience, which within the framework of the institution leave lasting traces with changing participants over time. These are experiences that make institutions and related people exist, which confirms the development of qualitative changes of this undivided unit. However, this undivided unit can be expanded and its quality can be seen in the context of wider cooperation unit, when graduates apply their practical working experience, complex social life and topical scientific problems to develop a new partnership layer (new relationships), at which through partnership there is a possibility of gradual learning to deal with contemporary problems and, thus, to create a new vision for the development of continuing education programmes.

The action research approach with openness towards systemic collective thinking is the environment that may contribute to the development of continuing education and reorientation towards sustainable development. At the initial stage of the action research, a number of questions have been addressed by the participants through the synthesis and analysis of their experiences with a focus on sustainability and Anthropocene phenomena. The content of ideas and the strategic vision for future activities have been developed: exploration of the complex nature of sustainability, the search for sustainability wicked problems through the action.

The idea of political ecology has been identified and supported, which enables one to search for local content, experience synthesis, which could become a unifying framework for continuing education programme content that is feasible in the context of complex transdisciplinary approaches. This would promote partnerships, build various stakeholders' trust and confidence that experience found through the activities (evolutionary and adaptive research process) would allow finding the necessary wisdom for the local resilience to make people by doing change first of all their own attitude and experience, later also other persons' engagement that is out of scope of personal interests and needs. It is envisaged that through attitudes and relationship establishment contributing to the common expectation, it will be possible to achieve actor's synergistic quality changes that will reduce Anthropocene "power" and increase the synergistic partnership quality.

A number of research questions have been crystallised, which identify the areas of future research, for example: "self" changes (different identities, false "self", mimicry) in the context of sustainability / unsustainability; the need to integrate in the research contemplative methods for the ESD needs.

Cooperation has been started (currently at its initial stage) to identify the content of political ecology, which may be valuable at the local level as well as for the promotion of partnerships among universities / graduates / regions towards social innovations for sustainable resilience living.

Having conducted the activities of the initial stage of the action research, it can be stated that action research is a challenge that promises participants a new perspective and opportunity to explore the sustainability phenomenon in a broader cooperation and partnership unit, which will require a holistic (transdisciplinary) perspective relating to the development of complex phenomena and their interaction in the modern world.

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