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Introduction

Educational contexts, dilemmas and controversies in the face of new technologies

Editors of "Science" have recently developed questions, which in their opinion deserve special attention and are controversial. These questions relate to the problems of the world and human problems: local and global, biology and medicine, human environment and the future of our planet. The most frequently asked questions considered the issues of the relationship of genetic variability with the state of health, the mechanisms of memory and its evolution, causes of biodiversity, the availability of an effective vaccine against HIV, a real possibility of fatal consequences of global warming, cloning or genetically modified organisms.

There are also opinions on social transformation and new civilization of knowledge as the consequences of the technological revolution. Emerging predictions have both supporters and opponents, it is said that information technology supports many scientific fields and research progress is largely the result of the synergy work of scientists and technology. Opponents argue that information technology promotes pseudoscientific ideas and research. It acknowledges the importance of the ethical issues in science and commercialization of research results, which can limit the flow of scientific information and narrow scientific problems to projects applications.

Sociological moral dilemmas are related to issues of functioning and transformation of society, the processes leading to exclusion or social stigmatization to name just two.

One time, sociobiology which adopts, among others, that genes play a fundamental role in shaping human behavior and that there are insurmountable limitations in reducing features such as aggressiveness became a field of great scientific controversies in terms of religion and politics As bioethical problems there are to be considered such issues as artificial insemination, abortion, cloning, stem cells, genetic engineering, genetically modified foods, trade in tissues and organs for transplantation, euthanasia, environmental protection, ecological ethics, eugenics, prolonging life.

Particular controversies are connected with acts of intolerance, not accepting personal choices of man and forcing their views and the views of other people identified as sexism and racism. These last two are based on the belief of the superiority of one person over another, and supported by the pseudoscientific views promoted by the media can lead to phenomena which should not take place in the 21st century.

Much of the difficulties relate to contemporary education, and the future of young people. Consequently, we need to refer to the problem of teacher training.

That what is very important today is undertaking new solutions and reaching for a new philosophy of teaching and learning.

It is also connected with the functioning of young people in the face of these dilemmas. Roles, tasks and social decisions which are undertaken by the youth are often based on established patterns and relate to the information created by media. These issues also reveal new fields of research and present new directions for research. Another problem is the responsibility of scientific research and ethical research. This assessment in the first place belongs to the researcher and often confronts them with their own system of values and standards of research.

New volume of the Annales is an attempt of starting the debate about educational contexts, dilemmas and controversies in the face of new technologies. It applies to both: heritage and present day, social change and sustainability, formal education and informal education, new methods and new environments, inclusion and individualization. What is significant is the fact that the majority of scientists are naturalists – it means that they take into account special problems of the world and human problems in the 21st century. Recommendation refers to real world, as according to an American author, filmmaker, philosopher, cultural critic, essayist, and poet Suzy Kassem's words:

> Everybody has a little bit of the sun and moon in them. Everybody has a little bit of man, woman, and animal in them. Darks and lights in them. Everyone is part of a connected cosmic system. Part earth and sea, wind and fire, with some salt and dust swimming in them. We have a universe within ourselves that mimics the universe outside. None of us are just black or white, or never wrong and always right. No one. No one exists without polarities. Everybody has good and bad forces working with them, against them, and within them (Suzy Kassem, Rise Up and Salute the Sun: The Writings of Suzy Kassem).

Katarzyna Potyrała

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SCIENCE, CULTURE, SOCIETY – NEW CONTENTS AND EDUCATIONAL CONTEXTS

Barbara Krajewska, Dominika Pawcenis

Towards science-based conservation of objects of cultural heritage

The importance of cultural heritage

Cultural heritage is one of central constituents of human life and activity. It is the material and spiritual legacy inherited from previous generations, maintained at present for the benefit of future generations. This is done because it determines our culture and identity developed throughout the ages as a result of inter-human and human-environment interactions. Consequently, the heritage enables us to understand and appreciate the spirit, the thoughts, ideas, priorities, talents and sentiments of previous generations. This is possible because it has always been through art that people have expressed themselves, their daily life, its important events, emotions, feelings, joys and apprehensions, and importantly, religion and beliefs.

Degradation of objects of cultural heritage

Material cultural heritage encompasses both the outdoor and indoor art. Both are unavoidably exposed to the activity of the environment they are placed in or stored. Naturally, as soon as the work of art is produced, chemical reactions with environmental factors begin and the process of aging starts. This brings about degradation of the artworks. Oxygen in the air, light, changes in temperature and humidity, along with other climatic factors and natural causes are responsible for the inevitable degradation of art.

Today, this degradation of artworks through aging has been tremendously accelerated by pollution. Factors such as air pollutants produced by the burning of fossil fuels (sulphur and nitrogen oxides), also soot and dust in addition to microbiological danger (bacteria and fungi) speed up the degradation processes. For instance, the oxides of sulphur may severely wear away stone and metal monuments and sculptures, especially those found outdoors, e.g. resulting from the combination of sulphur oxide with moisture, acid rain when contacted with marble changes its crystalline calcium carbonate to a powdery, chalklike gypsum (calcium sulphate). Sulphides in the air, by contrast, react with pigments such as white lead to form lead sulphide, which results in the graying of white areas in paintings, while azurite blue ($Cu_3(CO_3)_2(OH)_2$) turns brown due to the formation of copper sulphide, etc.

Apart from the detrimental effects of environmental factors on the condition of artworks, their decay is now also accelerated by ever increasing tourism that, besides its intensity, now also includes the acts of vandalism as well as accidental damage.

Given these degradation processes, the objects of cultural heritage to be maintained need conservation. In some cases the degradation cannot be reversed, but art conservators always try to help slow down the process.

Art preservation, restoration and conservation

Although very much alike, the three practices applied to degrading art, that is preservation, restoration and conservation, have different goals (Donelly, Rivas, Nutile, 2010). Most commonly, preservation is seen as a specific chosen approach to the treatment of historic sites, art collections or given artworks/documents of special historical significance. Restoration by contrast, is the practice of restoring art, i.e. bringing it back to the original state or as close as possible. The art restorer normally cleans, repairs and typically reconstructs the work. Quite to the contrary, conservation is the practice of conserving art, i.e. maintaining the works normally by applying processes that stop the decay and prevent its further development. The art conservator examines the work, establishes the causes of decay, establishes methods of preservation and finally applies the necessary treatments with as little restoration as possible. To do the conservation the conservator must fully understand the structure of the artwork, its complexity, the extent of degradation of each part of the work, and make a forecast on further developments.

Given these goals, while typically art restorers are trained in artistic ways, the training of art conservators should be significantly more extensive to include natural sciences in addition to obvious art history and artistic training.

Studying art conservation

Typically and traditionally, art conservators get their education by studying arts and humanities at a university level, be it in art schools or at humanities faculties at universities. Today, however, a growing awareness among art conservators is observed that the traditional art-based conservation is not sufficient and in order to be truly effective, art conservation has to make use of natural sciences and their advanced techniques (Barański, 2008; Łojewski, 2010). Sciences, such as chemistry, physics, biology and materials engineering offer powerful tools that today's conservation cannot do without. Based on in-depth analyses, the tools allow for the identification of and, more importantly for applying counteraction to the detrimental chemical, physical or biological transformations that have occurred and can continue to occur in the objects.

Along with traditionally applied art- and history-based techniques, the sciences involved in art conservation have formed a new fascinating interdisciplinary approach to the historical materials. Among those sciences, chemistry seems to be a key science and as a result it has evolved to give rise to the formation of a new branch termed conservation (preservation) chemistry (Barański, 2008). The application of

chemical techniques allows for, among others, the determination of: (i) chemical composition of the objects, (ii) the origin of the materials used in the objects, and (iii) the technology used to produce the objects, obviously all of them done in the least invasive way. Very importantly, conservation chemistry also studies the mechanisms of aging/degradation processes, establishes the optimal conservation procedures to be applied, and searches for novel schemes of conservation.

Modern analytical techniques for the conservation of objects of cultural heritage – A postgraduate course of study at the Faculty of Chemistry of the Jagiellonian University

Remarkably, as of yet conservation chemistry has not become a regular course of study in the system of higher education in Poland. In this context, to respond to this new science-related challenge in art conservation, in 2005 the Faculty of Chemistry of the Jagiellonian University set up a postgraduate course of study in Modern analytical techniques for the conservation of the objects of cultural heritage (Łojewski, 2016). The course is addressed to art conservators, archeologists, museum curators, librarians, archivists, members of local governments in charge of historic sites, researchers, and everyone interested. Fig. 1 presents a poster advertising the course and announcing the admission for the year 2016/17.

The course combines chemistry and materials science with elements of physics and biology. The curriculum was designed to ensure that the graduates are able:

(i) to scientifically diagnose and cure the objects, i.e. to recognize both their state and the threats imposed by the conditions, study and analyze them,
(ii) to envisage the developments and above all to work out the optimal strategies to do the repair of the objects and ensure their longevity.

It is a one-year program (165 h) that consists of lectures and practical classes. The program is composed of the following three blocks of classes:

1) Principles of chemistry (16 h of lectures and 15 h of practical classes). The aims of the course are:
(i) to refresh the knowledge of chemistry, emphasizing the problems connected with the conservation science (degradation and preservation),
(ii) to actuate the language of chemistry for the description and interpretation of the observations and measurements made,
(iii) to actuate the chemistry thinking that connects the macroscopic world with the world of atoms and molecules,
(iv) to teach the laboratory skills, calculations and elaboration of the experimental results.
2) Modern analytical techniques to be applied in studies of the objects of cultural heritage (36 h of lectures and 58 h of practical classes).

The course includes: spectroscopies (FTIR, Raman, UV-vis), XRF, XRD, ICP-MS, chromatographies (GC, LC, SEC), microscopies (optical and SEM), LIBS, capillary electrophoresis, accelerated aging, mechanical studies, dating, color measurement, hyperspectral imaging and microbiological studies.

3) Natural sciences in conservation science (40 h of lectures).

Fig. 1. Poster advertising the postgraduate course of study in Modern analytical techniques for the conservation of the objects of cultural heritage

The course deals with materials from which the objects of cultural heritage are made, discusses the specific degradation processes, proposes the techniques for their investigations, as well as the protocols to minimize the degradation. The materials studied include: metals, dyes and pigments, paper, textiles, leather/parchment, wood, glass, stone, and ceramic building materials.

As teachers for both lectures and practical classes in our course serve specialists from our Faculty and importantly, from different centers across Poland, among others from Warsaw University, Warsaw University of Technology, Military University of

Technology in Warsaw, Nicolaus Copernicus University in Toruń, Central Laboratory for Conservation of Archival Records in Warsaw, Wrocław University, AGH University of Technology, Pontifical University of John Paul II, National Museum in Kraków, Institute of Forensic Research in Kraków and Institute of Catalysis and Surface Chemistry of the Polish Academy of Sciences in Kraków, Likewise, students of the course come from different cultural centers, museums, libraries and governmental offices from all over Poland and abroad.

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Towards science-based conservation of objects of cultural heritage

Abstract

Cultural heritage is one of central constituents of human life and activity. It is the material and spiritual legacy inherited from previous generations, maintained at present for the benefit of future generations. This is done because it determines our culture and identity developed throughout the ages as a result of inter-human and human-environment interactions. Exposed to degradation by aging, but now also accelerated by the pollution and ever increasing tourism, the artifacts of cultural heritage to be maintained need conservation. For the traditional conservation to be truly effective now it has to make use of sciences and their advanced analytical techniques. These allow the detrimental chemical and physical transformations that has occurred and can continue to occur in the objects to be identified and more importantly, to be counteracted. In this context, the Faculty of Chemistry of the Jagiellonian University has in its offer a postgraduate course of study in Modern analytical techniques for the conservation of the objects of cultural heritage. Addressed to conservators, archeologists, museum curators, librarians, archivists, members of local governments in charge of historic sites, researchers, and everyone interested, the course is a platform for interdisciplinary art conservation science.

Key words: cultural heritage, aging and degradation, art conservation, education of art conservators, conservation chemistry, postgraduate course of study

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Mixed methods research and its role in social and educational change

It looks like the controversies regarding methodologies of social research, especially those related to qualitative versus quantitative research have found some solution in the past two decades in the mixed method approach. In the present paper we describe Mixed Methods research and some of the dilemmas involved in it. Then we will discuss the transformative approach which strives for social change and social justice. We will demonstrate the approach through a study involving a network of schools whose vision is to promote educational values along with learning achievements. In our view it is important to discuss both the transformative mixed methods approach and the study as an example in the age of a technological revolution with the new dilemmas it entails regarding educational and social values. We will point out the contribution of such research to the educational change and to the empowerment of the participants responsible for generating it.

Two main approaches characterize the thinking and the development of Mixed Methods research: one is anchored in a pragmatic world view that deals with the best ways to understand social phenomena. and the other, the transformative, supports the active role of the research in advancing social change and responding to problems of injustice, discrimination and oppression that many of the world's population suffer from. Mixed methods in social research became known at the end of the 1980s and beginning of the 1990s with some publications on the topic, although some researchers proposed to combine qualitative methods in traditional quantitative studies already in the 1970s (Creswell, 2011). Interest in the approach increased with the publication of the first guide on the topic (Tashakkori & Teddlie, 2003) and later on the publication of the Journal of Mixed Methods Research in 2007.

In various discussions on mixed methods writers attempted to clarify the concepts: paradigm, world view, methodology and method and describe the differences between them. Paradigm represent a world view that reflects the philosophical tenets of the researcher regarding reality (ontology), knowledge (epistemology), methodology (Guba & Lincoln, 2005; Lincoln, Lynham & Guba, 2011) and also regarding values (axiology) (Mertens, 2012a). Methodological assumptions stem from the paradigms and according to them the researchers choose the research methods.

Thus, the concepts quantitative, qualitative and mixed methods represent methodologies and not paradigms (Mertens, 2012b; Biesta, 2010). Creswell (2014) suggests the concept "research approach" to characterize quantitative, qualitative and mixed methods and describes four world views influencing these approaches: the post-positivist guiding mainly traditional quantitative research, the constructivist-interpretive guiding qualitative research and the third one – the pragmatic, that for many researchers justifies mixing methods under the claim that it may enable to face each one of the methodologies' weaknesses. The fourth world view is the transformative, which influenced many qualitative as well as mixed methods studies.

The pragmatic approach relies on pragmatism which is a philosophical world view stemming from ideas of such thinkers as John Dewey and George Herbert Mead. Its main interest is actions, situations, outcomes and practical solutions to problems (Patton, 1990; Morgan, 2007; Creswell, 2014). According to this approach researchers need to focus on selecting research methods that will produce knowledge regarding the research problem from among the existing methods. They may consider various suppositions and also various methods of data collection and analysis. Writers from the pragmatic mixed method movement recommended basic and advanced models of mixed research designs and typologies of strategies to combine methods at various stages of the research process (Tashakkori & Teddlie, 2003; Johnson & Owengbuzie, 2004; Creswell, 2011; Creswell, 2014). The main argument against mixed methods is that qualitative and quantitative methods are anchored in paradigms that have clear boundaries and the gap between them is too substantial. This stance has been called the "incompatibility thesis" (Howe, 2004) and created much controversy among researchers. Today even pure qualitative researchers such as Guba and Lincoln (2005) and Denzin (2012) admit that one can combine in one study components of the different paradigm and it may even be productive to knowledge. Creswell (2011) and Teddlie & Tashakkori (2011) in a volume dedicated to qualitative research point out the crucial role qualitative methods play in mixed methods studies, since they offer thorough and valuable interpretations to results gained by means of quantitative tools.

Mixed methods purposes, designs and typologies

Writers offer the following purposes for mixing methods: **Triangulation** of data, **complementarily** of data and knowledge, **development** according to the research needs and its questions, **initiation** of new points of views, **expansion** of knowledge accumulated through various tools (Greene, 2007; Teddlie & Tashakkori, 2011). Among these purposes triangulation received most attention of researchers from the qualitative interpretive paradigm. At first, the concept referred to various forms of gathering data such as observations, interviews and narratives to create trustworthiness of the research claims. Denzin (2012) contends that the concept reflects attempts to ensure a deep understanding of the phenomenon being explored: "Objective reality can never be captured. We only know a thing through its representations" (Denzin 2012: 82). Triangulation in his view is not a tool or strategy for validity but an alternative to validity. Denzin proposes, following

Ellingson (2011) to expand the term triangulation to "crystallization" so as to reflect the richness of methods, approaches and possibilities that studies entail.

Over the years different types of mixed methods research designs have been offered, coming from varied fields like evaluation, nursing, public health and education and then were reduced to four main types: convergent, embedded, explanatory and exploratory (Creswell & Plano Clark, 2007). Later on, Creswell (2014) offered the following mixed methods research designs:

- **Convergent parallel design** in which the researcher combines throughout the research process quantitative and qualitative data to provide a comprehensive analysis of the research problem.
- **Explanatory sequential design** in which the first phase is usually a quantitative research followed by qualitative data gathering aiming to explain the quantitative outcomes.
- **Exploratory sequential design** in which the results of the first qualitative phase of the research assist in developing the second phase of a quantitative research which is usually the development of quantitative research instruments.
- **Embedded design** in which within one dominant approach one combines a set of data from the other approach.
- **Multi phase research design,** prevalent in evaluation studies and in program interventions, according to which one can collect data using a variety of tools at different stages of the study, either sequentially or parallel.

In a recent book Creswell added the transformative design as relying on a social justice perspective. In our view this is a philosophical point of view rather than a research design like the ones delineated above. However, transformative approach is a comprehensive theoretical framework for a variety of mixed methods designs. We will now present the approach which serves as a framework for describing our example of a mixed method study.

The transformative approach

The transformative approach includes a large variety of stands and theoretical perspectives dealing with underprivileged social groups and with problems of discrimination and injustice. This approach which is influenced by postmodernism and post structuralism (Denzin & Lincoln, 2011) mostly characterized the work of qualitative researchers who investigate gender, race and ethnic minority issues and who are involved in post colonial and indigenous research and research of different excluded communities (e.g. Kinchloe, McLaren & Steinberg, 2011; Olesen, 2011). Their main purpose is to grant research an active role in social change.

Regarding mixed methods the transformative approach is favored by researchers who are not satisfied with pragmatic justifications for mixing qualitative and quantitative methods (Morgan, 2007; Creswell, 2014) but hold the view that research has to have a political agenda against social oppression. Mertens (2009; 2010; 2012a) claims that such research may represent the complexity of social problems and offer solutions to continuing difficulties. She presents some core characteristics of the approach such as: the importance of studying life experiences

of members of marginalized communities; inequality based on gender, race, ethnicity, special needs, and socio-economic status whose results are asymmetrical power relations; relating social and political action to phenomena of inequality and the ways one can act to change this reality (Mertens, 2010; Creswell, 2014).

The transformative approach provides a philosophical framework focusing on values and supporting the use of mixed methods to give a voice to underprivileged populations and to help in improving the lives of citizens and communities. Two main roads are offered to fulfill the potential of mixed methods research in this respect. One, the researcher's responsibility is to produce new knowledge that not only discern social problems, but actively contributes to considering solutions and second, to collaborate with participants of the study and carry out the research in cooperation. Thus one deconstructs the monopoly on scientific knowledge in a way that contributes to democratization. Both the researchers and the members of the groups under investigation commonly create knowledge in a dialogical process (Marti & Mertens, 2014; Rodrigues de Mello, 2014; Alpert et al., 2009). Methodologically, the transformative approach is not imposing a specific research method, but it makes sense to believe that researchers will have to use both qualitative and quantitative methods, sometimes in a cyclical and multi-phase mode, in order to produce insights and recommendations for change (Mertens, 2012b).

Mixing methods for social change – a research example

Our main claim is that mixed methods have a vital and important role in leading change since this kind of research empowers the change agent. The mixed methods study moves between the personal and the public voice, between the social phenomenon which is represented by means of a study sample and between the authentic voices that connect the stakeholders in an unconditional manner to the human experience. The research moves between the object and the subject and enables a holistic view of the phenomenon. Moreover, in the case described herein one can notice a clear connection between a social-educational transformative project and a transformative research design. Our claim is that for a social-educational move aimed at inflicting change one needs a transformative research design, like a mirroring picture between the change and the research accompanying it. We will exemplify this approach through a sequential qualitative-quantitative research design according to which the results of the first stage of the study, the qualitative stage, assisted in developing the second, quantitative stage of the study.

From a school to an educational home – implementing change in schools

The study dealt with a network of schools consisting of 50 state religious secondary schools throughout Israel. The network set itself the goal of transforming the school into what was called by the network leaders "an educational home", that is, an institution in which education for values is imparted alongside education that targets academic achievement. This goal is based on a humanistic and holistic view of education (Paul-Binyamin & Gindi 2015). The goal of the evaluation research

was to examine the way the transfer from "a school" to "an educational home" was carried out and the extent of its implementation, to learn the views and perceptions of the educational staff members regarding the reform determined by the network's management, and also learn the practices used to implement the change. The schools' network management asked to evaluate the educational move in six schools by means of quantitative measures, but a discussion regarding the research design between the educational network representatives and the researchers led to choosing the mixed method design for the project.

We used the sequential design in which the first stage was qualitative-ethnographic and took place in two schools. Data gathering lasted for about six month and included open interviews with the administrative staff and the teachers, observations in the school site and in staff meetings and analysis of texts of school protocols. On the basis of this data analysis we developed a questionnaire for the teachers who participated in the change process in the six participating schools. The questionnaire was developed on the basis of the qualitative data so its items reflected authentically what was going on in the schools and enabled to examine the educational move from a critical multi-directional outlook: of the school staff, the researchers who studied the two schools as case studies and the commissioners of the research. Also the final version of the questionnaire was carried out through dialogue between the representatives of the educational network and the researchers who attempted to develop a final version agreed by all involved. Together with the evaluation focusing on the teachers and the administrative staff a need arose to develop a feedback questionnaire for the students in order to examine the school change from their point of view. The aim was to enable the students to express their voice regarding the change.

The transformation from school to an educational home is a continuous process over years in which the educational network sets up goals, but allows the schools autonomy to interpret these goals according to the their needs. Developing the questionnaire for the students allowed them to express themselves and the administrative pedagogical staff to take it into consideration while planning the school goals every year.

Methodological and ideological contributions of the research

On the basis of the qualitative data, quantitative research instruments were constructed – a questionnaire for the teachers and one for the students. The qualitative-ethnographic study enabled a direct acquaintance with the educational change toward an "educational home". The research design developed through a dialogue between the administrative and pedagogical managers of the school's network and the researchers. The commissioners of the research were flexible and agreed to deviate from the preferred quantitative research methodology towards the qualitative method that the researchers recommended. The researchers on their part understood the organizational and political need for quantitative knowledge base. The study eventually expressed the collaborative work carried out by the stakeholders and the researchers. This research design was not a compromise between the field's

needs and the research needs but rather expressed an equalitarian world view that perceives collaboration and symmetrical relations as important (Marti & Mertens, 2014; Kemmis & McTagart, 2005; Brydon-Miller et al., 2011). The research design and the work of the researchers and the management of the educational network was indeed developed in collaboration (Alpert et al., 2009). A research design that starts with qualitative data collection and analysis and continues with quantitative data collection and analysis was the result of cooperation between the commissioners of the study who were interested to present to the stakeholders (the network management and potential contributors) quantitative outcome of a large population of students and between the researchers. The quantitative research instruments, the questionnaires, enabled teachers, students and school principals to respond to the features of the "educational home" as were presented in the educational vision and the results of the questionnaires.

The qualitative study enabled the researchers to provide the educational staff a stage and legitimization to doubt the core existence of the "educational home" and to translate its general objectives to local needs. The will to lead a top-down change met with a complex reality, yet the research allowed the educators in the field to influence it from bottom-up. The qualitative research gave strength to the teachers to make changes in the network policy, to influence it, to express their world views and to give a local interpretation to the network new policy.

Thus, the mixed methods research expressed dialogical and equalitarian relationships between all participants. The data produced through the quantitative and qualitative tools enabled the network managers to move in zoom-in and zoom-out moves between the general and the personal voice and the teachers in the school to have their voice heard and thus construct a process of feedback until the consolidation of the educational process. After this research project the educational project expanded to include 50 schools while giving the schools autonomy to formulate the general mission according to local interpretations (Paul-Binyamin & Gindi, 2015).

Conclusions

The development of mixed methods research indicates that quantitative studies alone may miss explanations, insights and research directions without the depth that interpretive observations can provide. Past attempts to give qualitative approaches auxiliary role in mixing methods were rejected by researchers (e.g. Howe, 2004), claiming that the hegemony of the quantitative paradigm in social and educational research reduces the potential of research to technocratic goals of products and outcomes information gathering. Qualitative inquiry in its essence strives to understand and give voice to people, as subjects and actors and it is also democratic and equalitarian in its aim to facilitate a dialogue among researchers and the research participants.

It is thus unsurprising that the transformative direction that characterized some of the qualitative, post-structural paradigms such as the critical, feminist and post-colonialist, affected also the development of mixed methods research.

A social and educational change is a complex process affected by many stakeholders – some having ideological, others political, or economical interests. Research or evaluation that accompanies such projects is a necessary mean to both improve the change process and to obtain social, political and economical support in the project. Therefore, in order to get to know the complexity of a transformative social move, one needs a transformative research design combining methodologies. The importance of a transformative research design lies in its power stemming from a large and strong data base, from its ability to move between object and subject, between the personal and the general voice. Mixed methods that include a variety of research tools provide also cultural sensitivity and attention to equal power relationships between researchers and the research participants, thus making the research a meaningful and influential part of social change processes.

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Mixed methods research and its role in social and educational change

Abstract

The paper describes Mixed Methods research and some of the dilemmas involved in it. Two main approaches characterize the development of this kind of research: one anchored in

a pragmatic world view that deals with the best ways to understand social phenomena and the other – the transformative – which supports the active role of the research in advancing social change and responding to problems of injustice, discrimination and oppression. The paper demonstrates the approach through a study involving a network of schools whose vision is to promote educational values by changing the school into "an educational home". The study used a sequential mixed method design in which the first stage was qualitative-ethnographic and on its basis questionnaires were developed for the teachers and the students who participated in the change process. The study engaged all participants in dialogue and equalitarian relationships between them have been developed. The study demonstrates that for a social-educational transformative project aimed at inflicting change to be successful one needs a transformative research design that will accompany it.

Key words: mixed methods research, transformative approach, social and educational change

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Developing teaching competences of PhD students as future academics

Introduction

The quality of education depends on a significant number of factors, and one of the most important among them is qualified teaching staff. A qualified teacher is defined as the one who, in the specified conditions, fulfils their direct responsibilities with maximum efficiency – creates effective curricula and courses, provides updated materials for students, conducts effective and innovative research work. Such activity results in the high level of students' training, weighty percentage of graduates' employment, as well as high rating of the educational institution. Therefore, formation of the teaching staff and provision for their professional growth and improvement of professional competencies are the important prerequisites for successful functioning and competitive advantage of a higher educational institution in the national and international market of educational service. As the European Commission reports, the quality of teaching in higher educational institutions is crucial for the development of creativity and critical thinking in graduates and adapting them to the realities of the labour market, since they will shape our future (Report…, 2013).

At the same time, according to some foreign researchers, evaluation of the activities of a teacher on the basis of student's success is rather superficial and not always objective. A more fundamental approach focuses on the ability of higher educational institutions to improve the teaching staff abilities, their motivation for creative activity, introduction of organizational and pedagogical conditions for their professional development. It can be stated that the obligation of an educational institution to carry out professional development of scientific and pedagogical staff in order to ensure high-quality educational process is closely related to the task of guaranteeing successful learning outcomes (Onsman, 2011).

International experience in the development of teaching competences

International experience demonstrates the significant achievements of some countries regarding the detailed determination and approval of teaching requirements in the context of relevant educational programs at the state and university level. This step is regarded as the starting point for building a quality assurance system covering

the entire institution, from the supervisory board of the educational institution to the teachers, students and administration.

For example, more than 10 years ago, Estonia adopted the Strategy for Higher Education for 2006–2015. The main emphasis of the Strategy was on the development of teaching abilities, since the transition to the implementation of competency-based study programs requires special teacher training, focus on modern innovative methods of teaching and assessment of students' learning outcomes (Estonia…, Strategy, 2006–2015). During 2008–2014, with the support of the European Social Fund, the Ministry of Education and Science of Estonia implemented the program "Primus" aimed at ensuring the quality of higher education and increasing the competitiveness of graduates. Among the six main directions of this program, the most important was "Improving Teaching and Management Skills in Science and Education Personnel" (Primus…, Estonia…, Strategy, 2012). As one of the successful consequences of the implementation of this program was the middle position of the universities of Estonia in the World University Rankings (2016–2017). This is an important factor, taking into account the ratio of the population of Estonia and the number of universities in this country.

The experience of Spain is also worth mentioning. In 2015, the Spanish government initiated a state strategy for modernizing the university educational system. One of its main priorities was to ensure the quality of teaching through evaluation, certification and accreditation of national educational institutions, scientific and pedagogical personnel, as well as the programs for their training and retraining. A special agency was formed to realize this strategy – the Quality Assurance and Accreditation Agency (ANECA) (ACADEMIA national accreditation program…).

In 2012, in Ireland, the National Forum for Teaching and Learning Enhancement (The National Forum…) was established in order to promote the professional development of teachers. The functions of this organization include the development and implementation of tools to assist scientific and pedagogical staff in the way of improving their professional competence, in particular, organization and support of the national information platform for distance education, announcing calls for scholarships, internships, and awards.

The Belgian government provides for a special article in the state budget to allocate costs on improving the system of teaching. According to article 83 of the Bologna Declaration (2004), universities should spend at least 10% of the main state funding to improve teaching and establish appropriate centers at universities (Supérieur universitaire…).

Methodological excellence of scientific and pedagogical staff is one of the main goals of the National Higher Education Program 2011–2020 in Slovenia. In accordance with the recommendations set out in the Program, educational institutions should develop the practice of methodological teaching and support to their teaching staff in order to achieve teaching excellence. The mechanism for promoting methodological excellence should also include the establishment of centers of teaching competence (Republic of Slovenia, Ministry of Higher Education…).

Thus, the European educational policy formulated in the report of the working group of the European Commission on modernization of higher education is

primarily aimed at increasing the responsibility of the administration of educational institutions for providing permanent, well-funded support of universities in their efforts to improve the quality of teaching and learning (Report…, 2013: 23).

An important direction for the development of higher education, especially for the countries of Eastern European partnership, is the development and implementation of the strategies of state support and improvement of the quality of teaching and learning, as well as allocation of necessary human and financial resources to ensure the implementation of this task. As the European Commission reports, there is an urgent need to integrate this priority into the overall HEI mission and assess the quality of teaching similarly to the implementation of research (Report…, 2013: 27). A good example of such practice is the experience of the Norwegian Ministry of Education and Science in piloting the project at Oslo University in cooperation with the University of Tromco. The project deals with the organization of the first Center for Excellence in Education in Norway, by the example of the already existing Centers of Excellence in Research. The purpose of the newly formed Center was to develop new knowledge about teaching, learning and research in the programs of training and advanced training of scientific and pedagogical staff (ProTed – Center of Excellence…).

Similar centers operate successfully in most European and American universities. Their activities are also focused on the opportunities for doctoral students to develop as teachers, collaboration schemes with faculties that promote excellence in teaching and mentoring, and integrating blended learning into courses and seminars.

Experience of Polish universities in developing teaching competences of PhD students

Among the Polish universities, the Jagiellonian University has the most successful experience in organizing and running such centers aimed at improving teaching competences and support professional development of the academic staff and PhD students (Center of Excellence…). They offer the following main courses and workshops: Art of Presentation, Art of Communication, Course Design, Intercultural Competence, Master-student relationship: coaching-mentoring-tutoring, Problem Based Learning, Evaluation of student progress in the area of knowledge, skills and social competences, the practical use of PEGAZ learning platform, active methods of teaching and learning, etc.

The activities of the centers demonstrated their entire correspondence with the European policy in Higher Education. In particular, according to the direction of the Polish Ministry of Higher Education, PhD programs should include at least 5 ECTS of pedagogical courses, which aim to prepare PhD students for teaching activities, developing communicative skills, abilities to organize learning activities, competencies for reporting current, up-to-date knowledge and developing students' active life attitudes, talents and skills that employers look for.

In 2013, in accordance with this requirement, Wroclaw University of Environmental and Life Sciences introduced two pedagogical courses for PhD students – Pedagogy with the Basics of Didactic and Teaching Methods. Together with the

Centre of e-learning technologies in Wroclaw UELS a common search for the most efficient, innovative methods and techniques of organizing learning activities of PhD students was conducted. The use of IT has caused the need to study the best European and American practices of training future teachers and their introduction in Polish university of life sciences, taking into consideration the readiness of PhD students to develop teaching competencies. One of the latest trends in higher education is the use of e-learning or its elements in the academic process. It is vital that apart from technical training, a university teacher of today has specialized pedagogical, psychological and methodological training. This is what we focused on in our research.

There are various ways of improving teaching skills, such as psychological and pedagogical education, IT competences, deep knowledge of the subject, pronunciation improvement (rhetoric), the use of active methods, openness towards new experiences and criticism, positive attitude to teacher's activities, observing the colleagues' teaching style.

However, according to the results of the research carried out by American scientists, the most efficient technique is the analysis of video elements of one's own presentations in the class. As a result, while making a public speech, students are able to improve their non-verbal communication instantly and develop self-confidence (Laurillard, 2014).

The aim of the research

The purpose of our research has been to study the readiness of PhD students as future teachers to develop their teaching competences.

Methods and materials

The survey was conducted in the form of an online quiz which included 15 closed questions with multiple answers to choose from. Respondents: first year PhD students of Wroclaw University of Environmental and Life Sciences 2013–2014, 2014–2015, 2015–2016 (total of 156 people). The questionnaire was e-mailed to students after they have finishing the course on "Teaching Methods".

Results

After processing the responses, the following results were obtained.

About 90% of respondents recorded the elements of their lectures during the course on teaching methods. The rest of students (10%), who were reluctant to record the lectures, were proposed to choose the reason for their refusal from among the four provided. The results of the survey are presented in Table 1.

Tab. 1. Students' responses about the reason for their refusal to record the elements of their lectures

Answer	%
Distrust in the technical side concerning the compliance with authorship right	25
I do not like seeing myself on the video recordings	25
I do not want to present my teaching materials in the form of video	25
I have not attended the course on "Teaching methods"	25

The method proposed also included classes, where the students viewed the elements of their lectures, carried out self-analysis which was followed by group discussions. The majority of PhD students attended the classes where they discussed the previously recorded lectures. After analyzing their answers on self-evaluation of the recorded lectures, it was found out that two thirds of respondents evaluated their videos as good with some minor faults, whereas the percentage of respondents who believed that they looked better in the real classroom environment with students was 13% (Table 2).

Tab. 2. Students' answers about self evaluation of the recorded lectures

Answer	%
Very good	9
Good, but I can notice some minor faults	65
Average, since I did not get ready for recording	4
Bad, since I do not like seeing myself on the recordings	4
I believe that I look better in the real classroom with students	13
I have not participated in recording	4

Regarding the main teaching mistakes, the respondents mentioned the following: every fifth noticed their fast tempo of speech, the similar number of respondents did not have eye contact with the audience, 17% of students spoke in a quiet voice, 23% of students experienced stress and embarrassment and a fifth of respondents did not come to any conclusions (Table 3).

Tab. 3. Students' answers about the main teaching mistakes as noticed by themselves

Answer	%
I spoke too fast	20
I did not have eye contact with listeners	20
I spoke quietly	17
I felt embarrassed and stressed	23
Lack of conclusions	20

It was important to find out the opinion of respondents on what teaching skills they need to improve or develop. Obviously, the biggest percentage of respondents felt lack of competences in assessing students and involving them in class activities (Table 4).

Tab. 4. Students' answers about teaching skills students need to improve or develop

Answer	%
Communication with students and/or colleagues	13
Assessing students	23
Behavior in conflict situations	18
Ability to involve students in class activities	21
Technical skills (ICT)	13
Extended knowledge of the course	13

As for the personal opinion about new methods and techniques PhD students would apply after analyzing their videos, the answers were as follows: first and foremost is – the way of speaking (67%), the attitude to students during the class was noted as important by only 13% of respondents. They were mostly satisfied with teaching methods and facilities which they used during the recordings (Table 5).

Tab. 5. Students' answers about new methods and techniques they would apply

Answer	%
Teaching methods	8
Teaching facilities	8
Attitude to students during the class	17
Way of speaking	67

Conclusions

Professional development of scientific and pedagogical staff is a prerequisite for ensuring high-quality educational process, which is a priority task of a modern higher educational institution. The international experience demonstrates significant advancements in this area. In particular, the effectiveness of their activities in the direction of developing and improving teaching competences is shown by the Centers of Excellence in teaching and learning created in some European universities. In Poland, such Center successfully operates at the Jagiellonian University. Regarding Polish universities of life sciences, certain experience in preparing PhD students has been developed at Wroclaw University of Life and Environment Sciences. The research carried out at this institution allows us to conclude that PhD students as future teachers need to develop and deepen their teaching skills. Analysis of video-recordings contributes to developing teaching competences. There is need to persuade future teachers to provide free access to their didactic materials including video-recordings for their students. PhD students as future teachers are aware of their teaching shortcomings and can solve them effectively, particularly after doing the course on Teaching Methods.

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Developing teaching competences of PhD students as future academics

Abstract

Development and improvement of teaching competences is a crucial requirement for providing high quality education service. Centers of Excellence in teaching and learning, functioning successfully in many foreign universities, play a significant role in this process. There are various ways of improving teaching skills, such as psychological and pedagogical education, IT competences, deep knowledge of the subject, pronunciation improvement (rhetoric), the use of active methods, openness towards new experiences and criticism, positive attitude to teacher's activities, observing the colleagues' teaching style. The purpose of our research was to study the readiness of PhD students as future teachers to develop their teaching competences. The research was carried out at Wroclaw University of Life and Environmental Sciences during the 2013–2016 academic years when PhD students were doing a course on Teaching Methods at this educational institution. After completing the course, PhD students were offered to answer a questionnaire to determine their readiness to develop their teaching competences. The results of the study show that PhD students as future teachers are aware of their teaching shortcomings and can solve them effectively, particularly after doing the course on Teaching Methods. The results obtained prove the necessity to organize special centers in the structure of universities which will focus on improving teaching competences and support professional development of the academic staff and PhD students.

Key words: teaching competences, methodology of teaching, PhD students

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The use of media for educating the intellectually disabled – for and against

Introduction

Nowadays, much debate concerns the education of learners with severe disabilities, including those with moderate to profound levels of intellectual impairment, severe difficulties in communicating their needs to others, and those with potential concomitant physical, behavioral or sensory disabilities, as well as health issues (multiple disabilities). Lower intellectual fitness causes not only learning difficulties, but also the limitation of cognitive ability in terms of the surrounding world. While past perceptions questioned the ability of those with severe disabilities to learn, current perspectives support the notion that all individuals can, and do, learn (Downing, McFarland, 2010). Education is crucial for individuals with multiple disabilities, especially in family and peer-to-peer environments, and in broad social contacts, because it supports their ability to assume more typical adult roles upon graduation (Agran et al., 1999; Downing, MacFarland, 2010).

People with intellectual disabilities have their identity, self-esteem and dignity, they feel the need for respect and pride, are aware of their personality and strengths, and realize that they constitute a group that could be socially and politically influential (Schalock, Luckasson and Shogren, 2007).

Particular hope is invested in the development of new information and communication technologies (ICTs) that allow the individualization of education of people with special educational needs. While working with an intellectually deficient learner, digital devices along with specialized software serve to communicate with the teacher, effectively motivate learners who are suffering from cognitive impairment, improve their manual skills or perception, serve to increase focus, as well as address the important emotional and social needs of learners (Białek, 2013).

The aim of the study was to explore the possibilities of using modern information and communication technologies in the process of educating persons with a deeper level of intellectual disability. The intensity of involvement, ability to focus on a task, degree of autonomy, ingenuity, and interpersonal relations of 7 special school students aged 15 to 19 were observed. In teaching them, three concepts were used in the organization of classes, i.e. one using multimedia, one based on the multi-sensory

experience of the world, and blended learning (practical exercises combined with the use of ICT).

Educating persons with intellectual disabilities

According to DSM–5 TM (2013: 33), the term intellectual disability is defined as follows: "Intellectual disability (intellectual developmental disorder) is a disorder with onset during the developmental period that includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains".

According to the International Classification of Diseases ICD–10 WHO (2016: available on-line http://apps.who.int/classifications/icd10/browse/2016/en#/F70--F79), mental retardation is characterized as follows: "A condition of arrested or incomplete development of the mind, which is especially characterized by impairment of skills manifested during the developmental period, skills which contribute to the overall level of intelligence, i.e. cognitive, language, motor, and social abilities. Retardation can occur with or without any other mental or physical condition. Degrees of mental retardation are conventionally estimated by standardized intelligence tests. These can be supplemented by scales assessing social adaptation in a given environment. These measures provide an approximate indication of the degree of mental retardation. The diagnosis will also depend on the overall assessment of intellectual functioning by a skilled diagnostician".

The ICD-11 classification (2017: available on-line http://icd11ct.cloudapp.net/ct/icd11beta_jlmms/en/current#/), not yet approved by WHO, suggests changing the terminology used for neurological diseases (neurodevelopmental disorders) to "disorders of intellectual development, mild, moderate, severe, profound". The diseases are defined as follows: "Disorders of intellectual development are a group of aetiologically diverse conditions originating during the developmental period, characterized by significantly below average intellectual functioning and adaptive behavior that are approximately two or more standard deviations below the mean (approximately less than the 2.3rd percentile), based on appropriately normed, individually administered standardized tests. Where appropriately normed and standardized tests are not available, diagnosis of disorders of intellectual development requires greater reliance on clinical judgment based on appropriate assessment of comparable behavioral indicators".

According to the results of the National Census of Population and Housing in 2011, the total number of people with disabilities was about 4.7 million at the end of March 2011, representing 12.2% of the country's population (Demographic data… 2015) (Fig. 1).

It should be emphasized, however, that responding to disability questions was voluntary, due to the specificity and sensitivity of the topic. According to the information from the Chief Statistical Office, almost 1.5 million people refused to respond, which had an effect on the completeness of the information (Slany, 2014). Children under 16 represented 4.4% of the total population of legally disabled people. The percentage of children with mild, moderate and severe intellectual disabilities in primary school was 1.1% of the school population while, respectively, learners

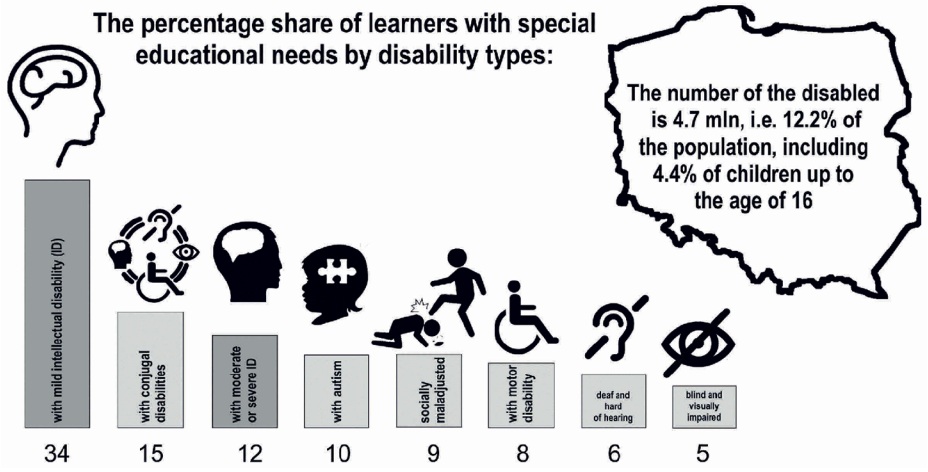
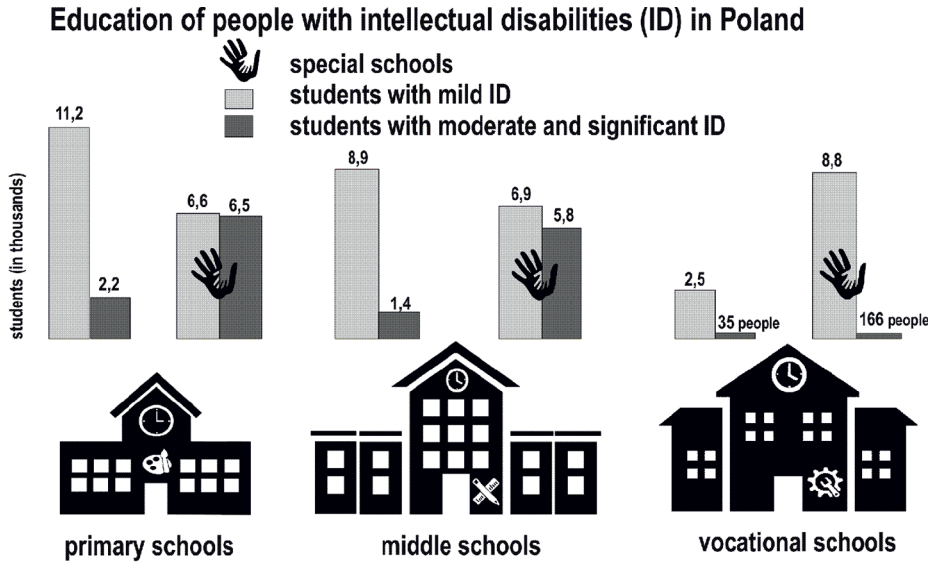


Fig. 1. The percentage share of learners with special educational needs by disability types.

with intellectual disabilities attending junior high school constituted 2.1% of the population of junior high school students, and 6.4% of the population of students attending vocational schools (Uczniowie i studenci… 2016; Oświata i wychowanie… 2016) (Fig. 2).



Source: Own elaboration based on data from the Office of the Government Plenipotentiary for Persons with Disabilities 1 Dec. 2016

Fig. 2. Education of people with intellectual disabilities (ID) in Poland.

Young people studying in special education schools, which accept learners with moderate or severe mental retardation and those with more than one disability,

constituted 1% of the population of young people learning in senior high schools (Uczniowie i studenci… 2016; Oświata i wychowanie… 2016). The inconsistency between the incidence rates of intellectual disabilities depending on the age of the study groups is due to the fact that many people with mild intellectual disabilities function relatively well upon completing their education.

In Poland, the main assumption made by the Ministry of National Education that the overriding aim of educating learners with intellectual disabilities is to enable them to participate in various forms of social life equally with other members of a given community still remains the most significant. Therefore, in educating people with intellectual disability, the use of multimedia as a means of communication combining different forms, such as text, sound, graphics, animation, and video, should be common. Interactive media devices such as smartphones, computers, interactive whiteboards should, as in the case of people without disabilities, serve as a tool for communication and education.

The reasons for the discrepancy between limited perceptual and cognitive abilities and "good" social functioning stem from factors other than intellectual ones, such as personality, motivation, emotion, family and peer environment (Kościelska, 1984, 1995). It is, therefore, possible to use these factors in ICT-based education. For it was argued that regardless of whether it be a game, a film, or a messenger, ICT methods enforce relationship-based activities to a much greater extent than traditional methods of work. The need to understand what is happening on the screen triggers a whole range of thought processes, from simple perception, inference, to empathy and creativity (Sobocha, Pietrzak, 2017).

Learners with intellectual disabilities are eager to work with ICT tools because it gives them the opportunity to get to know the consequences of their actions. Owing to this, upon becoming active, learners are more aware of consequences of their decisions. The development of autonomy of people with intellectual disabilities is important because of developing their ability to make choices in life, which promotes greater social inclusion (Kwiatkowska, Rola, 2015).

The use of information and communication technologies in education in Poland

The European Commission report on ICT in Education shows that Poland occupies a very low position in the ranking of digitally equipped schools (ICT in Education, 2013; Pietrzak, 2017). In Poland there are fewer computers available for learners of all grades than the EU average, and their provision is fairly consistent at all grades. In respect of this indicator, Poland ranks in the lower group of countries, with 8 learners per computer. With high numbers of learners per interactive whiteboard at all grades, Poland ranks in the lower group of countries, and the situation is similar as regards learners per data projector. Although in Poland the numbers of learners in schools without broadband are generally lower than the EU mean, there is a low percentage of schools with fast broadband.

The report on the study "Do teachers use information and communication technologies in education?" (2012) shows that the limited implementation of ICT in schools results from teachers' concerns related to the fear of losing authority, their lack

of computer skills, the time-consuming process of preparing classes, organizational and technical difficulties, the unavailability of ready materials compliant with the core curriculum, as well as the possible negative influence that computers and the Internet may have on students (Czy nauczyciele… 2012).

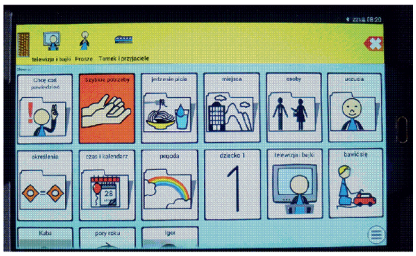
Studies conducted so far point to the numerous advantages of using ICT in work, including the report from the IBE's "Digital School" program run in 399 schools. In the 2013 report from 20 schools selected for detailed studies, it was stated that in revalidation classes and within psychological and pedagogical support activities, the computer became a link between the learner and the teacher, enlivened the atmosphere and, by stimulating mobilization to work in the classroom, helped in understanding reality, and allowed individual selection of speech therapy and therapeutic-correction-compensation programs. The report stated that for people with disabilities, the opportunity to improve communication skills through the use of a computer is especially important, because it contributes to maintaining concentration, improves motivation, and triggers curiosity (Białek, 2013).

Information and communication technologies dedicated to people with disabilities

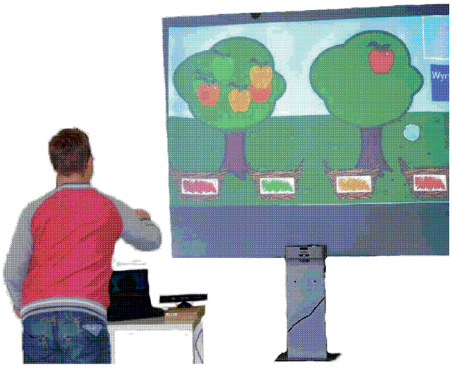
Currently, the market offers electronic equipment and numerous computer programs for people with motor, visual, auditory or speech impairments. Advanced technology and state-of-the-art software have made it possible to better diagnose disabled people and customize the equipment to suit their individual needs. The disabled can support themselves using wheelchairs, speech synthesizers, instant messengers, hearing aids, book players, "talking" TVs, touch screens and monitors. Here are some examples of ICT use (Fig. 3).

As part of the INOVATELL project, an innovative touchless computer control tool and a computer literacy training program for individuals with severe physical disabilities were developed (http://inovatell.reabilitacija.lt/index-en.html). The technologically advanced devices, called augmentative and alternative communication (AAC) devices, allow people with no speech or poor speech to overcome their communication problems. Descriptive video services (DVS), which provide narrative verbal descriptions of visual elements, help the blind or visually impaired to "read and watch images" (Hasselbring, Williams, 2010).

One of the most popular portals supporting the education of people with special needs is DrOmnibus (www.dromnibus.com). The DrOmnibus Edukacja Włączająca [DrOmnibus Inclusive Education] application includes over 5,000 tasks to practice skills such as recognizing colors, shapes, numbers, fruits, vegetables, animals, body parts, emotions and occupations; it also contains lesson plans, is equipped with a system of awards and hints, and generates reports on learning outcomes. Exercises help to train perception and visual analysis, differentiate between elements, recognize emotions, identify sounds, and classify and enhance communication skills. Another portal that develops the focus and recognition of objects as well as the identification of feelings and emotions is Prosta Edukacja [Simple Education] (www.prostaedukacja.org.pl).



Augmentative and Alternative Communication devices and equipment



RehabKinect – motion control game

Touch Screen

Fig. 3. Currently, the market offers electronic equipment and numerous computer programs for people with motor, visual, auditory or speech disabilities.

Valuable materials and tips for teachers, educators, trainers and tutors can be found through this unique pedagogical program on websites created under projects funded with support from the European Commission, e.g. Fascinating IT Tools for Persons with Intellectual Disability (http://disfit.eu), European Certification of ICT Skills for People with Mental Disabilities (http://www.easy-ict.nl/), Further Education for People with Intellectual Disabilities (https://www.includ-ed.eu/good-practice/further-education-people-intellectual-disabilities-fepid), Job Trainers for People with intellectual disabilities and Autism Spectrum Disorders (http://www.trainingforjob.eu/wp/), Disabled in Theatre and Music (http://grundtvig.org.pl/www.grundtvig.org.pl/galeria-projektow/projectsppg/621.html).

An interesting overview of the possibilities of using computer technology in the education of people with various disabilities is presented in an article by Hasselbring and Glaser (2010). The authors draw attention to the value of involving and individually tailored ICT-based education, but at the same time emphasize the lack of appropriate training for teachers and trainers, which is the main obstacle to the ease of operation of various devices and the use of specialized software. Studies of the role of ICT in providing services to adults with intellectual disabilities have shown its positive impact on social inclusion and greater participation in mainstream

life. The authors of the studies point out that the beliefs of staff members and the organizational culture of sites play a substantial role in how ICT is used (Parsons et al., 2008).

The software on offer for people with intellectual disabilities is poor and the applications are incomprehensible as a result of not taking into account complex ability deficits (Kwiatkowska, Rola, 2015).

For learners and other people with moderate or severe intellectual disabilities, the educational and ICT market does not offer practically any supportive software which would allow a special education teacher to tailor the program to a learner's individual needs (Kwiatkowska, Rola, 2015). Special education teachers often seek various ICT uses in education themselves and individualize programs to satisfy their learners' needs.

Teachers working with pupils with intellectual disabilities emphasize that these learners become bored very quickly, and that when they are given interesting tasks to do they should be allowed more time to respond and work creatively. The didactic experience of persons working in special schools recommends that, when formulating a message, one should focus on direct references to reality and introduce abstract elements later, and only if one recognizes that the learners are ready for that (Kondratowska, Wróbel, 2009).

Study material and methods

The idea of undertaking the research emerged during the co-operation between SOSW No. 3 in Krakow (Special School for Children with Disabilities) and the Jagiellonian University. The observations made during student practicum prompted the authors to use different educational methods in class and to conduct the study using the observation sheet. The participant method applied is typically used in qualitative research. Bogen James in the Encyclopedia of Philosophy (2017: https://plato.stanford.edu/entries/science-theory-observation/#HowObsEviMigTheLad) states that "observational evidence plays important and philosophically interesting roles in other areas including scientific discovery, the development of experimental tools and techniques, and the application of scientific theories to practical problems".

Due to the specific functioning of people with intellectual disabilities and the lack of standard ICT learning models for this group, the 'case study' method was used. In non-typical situations, it allows the best analysis of phenomena and their in-depth explanation (Babbie, 2007). As Earl Babbie states (2007: 320) "case studies may form a basis for the construction of more general nomothetic theories".

The study involved seven learners with moderate and severe intellectual disabilities from the Special School for Children with Disabilities No. 3 in Krakow. The study participants were junior high school pupils aged 15 to 19, two boys and five girls. Methodology course students from the Institute of Geography and Spatial Management of the Jagiellonian University were co-participants in the study. The classes were held at SOSW No. 3 and on the JU Campus (Institute of Geography and Spatial Management, Institute of Geology, Centre for Nature Education), under the supervision of five special education teachers.

The study was based on the self-developed questionnaire "Observation sheet for ICT classes taught to students with a deeper intellectual disability". The study was based on a questionnaire consisting of seven parts, each containing from 2 to 11 questions, which were answered by four pedagogues specializing in oligophrenopedagogy. We observed intensity of engagement, length of concentration on a task, degree of autonomy, ingenuity and interpersonal relations.

Observations took place during the educational classes taught between December 2016 and May 2017. In the process of education, three patterns for organizing classes were applied, i.e. with the use of multimedia, multi-sensory perception of the world, and blended learning (Fig. 4).

Fig. 4. In the process of education three patterns for organizing classes were applied: with the use of multimedia (a), multi-sensory perception of the world (b) and blended learning (c).

The purpose of the multimedia classes was for learners to become self-sufficient as far as their disability allows and to develop correct attitudes and behaviors so that they could respond to the needs of their lower-level classmates, such as the inclusion of a multimedia board, help with the performance of tasks, etc., in addition to stimulating them to engage in activity and collaboration, practicing self-presentation skills, triggering verbal, motivational, and artistic expression, as well as activating and motivating students to undertake joint actions in the classroom. Learners were supposed to cooperate with each other, aiming to create conditions for full integration in the peer group. Through acquiring the skills of operating modern equipment, learners were expected to undertake their own activity.

The aim of polysensory classes was to develop small motor functions, visual-motor coordination, and the recognition and making of models of objects encountered in the city. The learner was to shape and reproduce the terrain in colors (including hypsometric colors), and make a model of a knoll, hill or mountain chain according to their own concept. Using properly selected materials (sand, gravel, pebbles, boxes, sticks, bark, shells, cones, beans, moss, hair gel, colored paper, newspapers, sponges, beads), they made and put objects (hills, rivers, water bodies, beaches, buildings, roads, green areas, cars) in the right place on the model.

The aim of blended-learning classes was to combine direct observation with practical action, including the development of visual perception and spatial imagination. Learners were to observe the Vistula River valley and the limestone hills and urban development of Krakow from the observation deck of the Institute of Geography and Spatial Management at the Jagiellonian University Campus in order to raise their awareness and enable them to acquire new concepts. Visitors to the Centre for Natural Education were to observe specimens of butterflies and models of the moon and the solar system, while in the Institute of Geology, they looked at minerals and rocks. The purpose of the classes was to stimulate visual-motion associations: learners were to make a model of the terrain in the interactive sandbox, recognize sculpture forms, shape hills, mountains, valleys and flat areas on their own, and name them referring to field observations. During all classes, learners were to enrich their vocabulary. It was important for them to attempt to actively participate in the classes, reinforcing the concentration of attention.

Own research results

The collected data were analyzed and are presented in the table below.

Level of goal achievement:

	Multimedia classes	Sensory classes	Mixed classes
Targeted goals have been achieved	fully	partly	fully
Goals have been achieved with respect to learner abilities	tailored	too demanding	tailored

Achievement of goals, taking into account the individual capabilities of learners, is difficult and requires the knowledge of the level of functioning of a given learner. In all types of classes the goals were achieved, but in the case of sensory classes the obstacle was the later hours of their realization (the last two lessons in a day). It was observed that the level of activity of learners with intellectual disabilities is conditioned by the time of day. In mixed classes, the variety of activities and allowing plenty of time to get used to new places and get to know the activity helped to achieve our goals. Objectives tailored to the learner's abilities stimulated creativity and forced good orientation in the graphic program. However, attention should be paid to the degree of intellectual disability and goals should be modified in the course of classes so that each learner could attempt to perform the task on their own.

Efficiency of learning: Learners

	Multimedia classes	Sensory classes	Mixed classes
They understand the teacher's instructions	Yes	Yes	Yes
They are active in class	Yes	Yes	Yes, but they require constant motivation

They work and think on their own	learners received orders and instructions	learners received orders and instructions; a female learner demonstrates ingenuity;	the more stimuli, the higher the interest
They can collaborate with each other	they demonstrate teamwork skills; but there is no possibility of simultaneous activity of all learners		individual fascination
Do they show ingenuity (initiative)	Yes	Yes	Yes

During all classes the learners understood the instructions given by the teacher. It was helpful to use the elements of alternative communication, take into account the learners' interests in the selection of particular tasks. In turn, the number of functions used by the graphical program was dependent on the learner's ingenuity; it varied and was dependent on the degree of intellectual disability.

Each of the proposed activities stimulated the learners to be active, but in the course of multimedia activities the limitation is that only one person can work at the interactive whiteboard, while the other learners quickly lose interest. Sensory classes involved all the learners. They were interested, willing to take action. Mixed classes are equally attractive but require constant motivation, interest and support from an adult and the behaviors exhibited depend on the degree of disability and individual preference.

Learners received orders and instructions tailored to their capabilities. In individual cases, learners showed ingenuity. Mixed classes showed that the more stimuli there are, the more interested the learner is. An example is the sandbox which raised the highest interest. Action and independent thinking is conditioned by the degree of intellectual disability.

In the course of classes, learners demonstrate teamwork skills; however, there is no possibility of simultaneous activity of all learners in the case of the interactive whiteboard, for example. Individual fascination (individual preferences of a given person) is also noted. An example is the sandbox, which almost "mesmerized", and kinetic sand which encouraged the learners to have fun together.

The proposed activities allowed the learners to demonstrate their ingenuity (initiative) according to their own concept; they discovered new, different solutions without provided hints. The sandbox and the dynamics of colors on the sand aroused great interest, allowing them to independently form the relief of the terrain and recognize individual forms. One of the learners correctly associated sand coloring with the relief of the terrain.

Teaching quality: The educational space in the classroom was properly organized

	Multimedia classes	Sensory classes	Mixed classes
Were the methods and techniques properly selected	Yes	Yes	Yes
Was the technique of work clearly presented	Yes	Yes	Yes
Tasks tailored to individual needs and capabilities were assigned	Yes	Yes	Yes
Were all the learners involved (interested)	Yes (if each learner approached separately)	Yes	Yes

Interpersonal relationships:

	Multimedia classes	Sensory classes	Mixed classes
Alternative communication rules were used	Yes, for the needs of using the program	Not required	Not required
Positive reinforcement was applied	Yes	Yes	Yes
Did the learners inspire each other	To a large extent	Partly	To a small extent
Did the learners help each other?	Yes	Yes	Yes
Did the learners collaborate (work together)	Rather yes, it is affected by the degree of intellectual disability	Rather not because of individualized tasks	Rather yes, it is affected by the degree of intellectual disability
Does the learner undertake activity with the teacher's help	Rather yes, it is affected by the degree of intellectual disability	Yes	Yes

The use of positive reinforcements was an important element of individual classes. These were usually verbal praise, constant motivation, and in individual cases learners expected interest from the students participating in the project. Thanks to this, learners are more willing to undertake mutual help activities in terms of operating the equipment, the software and the program used; no conflicts.

The learners did not always inspire each other. Each of them wanted to create original work, one of the learners was constantly looking for confirmation of whether he was doing the job well from another classmate. Mutual inspiration depends on the activity or task being undertaken, e.g., the sandbox dynamics is so engaging and mesmerizing that the learner is focused on their own work, activity.

Shared work was dependent on the learner's individual abilities and the degree of intellectual disability. There are learners who need constant help, because it is only then that they undertake collaboration.

The impact of a didactic aid on the quality of education:

	Significant	Unimportant	With no impact
Interactive whiteboard	X not for everyone	x	
Kinetic sand	x		
Salt dough and other products	x		
Interactive sandbox	X not for everyone	x	
Plastic and natural materials	x		

Didactic aids have a large impact on the quality of education of learners with intellectual disabilities. The interactive whiteboard and sandbox are not good didactic aids for each learner because of the organization of classes. They do well in individual work with the learner. Undoubtedly, they are attractive tools and work best when used in mixed classes. It depends on individual preferences and the possibility of simultaneously involving more learners in the course of classes. Undoubtedly, natural plastic materials, salt dough and other products contribute to, and have a significant impact on the improvement of the quality of education, since their diversity and number caused great interest and stimulated involvement, willingness to act, and activity among the group. Learners with intellectual disabilities do not work well under the pressure of time during the last class of the day.

Conclusions on the use of ICT

1. The variety of software and technical solutions stimulates and motivates learners to engage in activities in class, reinforces their focus on the task, makes them involved in an activity, which results in a visible increase in their motivation for learning.
2. Simultaneous use of multimedia and practical activity enriches learning through experience, develops and strengthens collaboration skills.
3. The interactivity of software develops talents, ingenuity and self-reliance especially in learners with a moderate degree of intellectual disability.
4. The interactivity of applications does not provide learners with significant and deep intellectual disability with full autonomy.
5. The degree of intellectual disability enforces the involvement of a support person in the task.
6. The use of the multimedia board does not allow the simultaneous involvement of a team of learners, which results in a decrease in the activity and interest of all its non-users. The example of a sandbox shows that learners' simultaneous participation in an interactive venture maintains their interest and activity.

7. The range of ICT devices and software on offer dedicated to the intellectually disabled is unable to replace learning and acquiring new skills through practical activities.

Final remarks

Limiting the use of teaching resources in class only to multimedia would be possible if they were specifically dedicated to the intellectually disabled, i.e. if the programs provided an opportunity to work with a digital device simultaneously for several people and the program were characterized by rich software producing video, sound, motion, 3D images and dynamic interactions with the device user. Due to the lack of such programs, the idea of mixed activities is well proven and works at the moment.

It is not about creating a virtual world for people with intellectual disabilities, but about making it possible for them to function freely in a digital society. In order to improve the quality of functioning in society of people with intellectual disabilities, personal interaction and the opportunity to participate in social life are of particular importance, as confirmed by integration classes with students at the Centre for Natural Education, the Institute of Geology and the Institute of Geography and Spatial Management of the Jagiellonian University. The benefits were mutual, with the students becoming aware of the great cognitive abilities and social competences of persons with intellectual disabilities, as well as of the ability to collaborate and communicate actively with them. Learners with intellectual disabilities quickly established positive relationships with the students and willingly undertook tasks supported by them.

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The use of media for educating the intellectually disabled – for and against

Abstract

The aim of the study was to explore the possibilities of using advanced information and communication technologies in the process of educating individuals with moderate to profound levels of intellectual impairment. In the process of education three patterns for organizing classes were applied: with the use of multimedia, multi-sensory perception of the world and blended learning. The study was conducted with the participation of middle school students with moderate and severe intellectual disability from the Special School for Children with Disabilities. Co-participants in the study were students of the methodology course from the Jagiellonian University. We observed intensity of engagement, length of concentration on a task, degree of autonomy, ingenuity and interpersonal relations. We found that the diversity of syllabus and technical solutions stimulates and motivates students to take the initiative to become engaged in activities in class, it reinforces their concentration on a task, and it engages them in an activity, resulting in a visible increase in motivation to learn. The assortment of equipment and software dedicated to the intellectually disabled is not able to replace learning and acquiring new skills through practical activities.

Key words: intellectual disabilities, education, ICT, multimedia classes, sensory classes, blended-learning

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New society – diagnosis of knowledge about crucial ecosystem services – pollination

Nowadays nature protection requires many different solutions to be effective. Wide range of social engagement is needed as legal acts, such as bans are inefficient. The former nature conservation methods were focused on the social system – ecosystem relationship. Forms of protection of this kind are important, however, given the functioning of the real world, they cannot be fully effective. It is therefore necessary to argue in such a way as to convince farmers or entrepreneurs, for example, of a slightly different way of doing business and investing money in nature conservation (Manfredo, 2008, Żylicz, 2010). Degradation of the environment leads to many hazards, including food scarcity, extreme natural phenomena and, consequently, severe social tensions or even armed conflicts (Homer-Dixon and Blitt, 1998, Vince, 2003, Wagner, 2004). People need the resources and functions of nature – agricultural products, clean water and air, climate regulation, elemental circulation, etc. Environmental degradation leads to changes, the reversal of which is very expensive or even impossible. It is easy to specify the benefits provided by a well-functioning environment. Access to nature is one of important elements of quality of life and the determinant of human well-being (E. van den Berg, et al., 2010). It turns out that effective protection of nature should also include the relation of nature-social system interactivity consciousness and appreciation for natural values. That is the difference between society and 'new society' in context of protection of environment. New society is a group of people of different age who interact with one another and share similar characteristics: this kind of society is well educated, knowledge-based and aware of global problems and human impact on global environment.

Public support for environmental protection is needed as establishing protected areas has emerged as one of the key aims in global end European Union policy (Pietrzyk-Kaszyńska, et al., 2012). A good example is Natura 2000 – it is a network of rare and natural habitat types and breeding and resting sites for rare and threatened species. It stretches across most European countries, both on land and at sea. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats.

We need new society to make sustainable decisions about environment, from which we obtain a lot of benefits. To measure the benefits humankind receives from the environment, the ecosystem services concept (ES) is very helpful. Ecosystem services concept includes both socio-economic and conservation objectives, that is, all natural goods and processes that allow for various benefits (e.g. wild fruits, pollination, pest control). Many species that provide ES are associated with rural areas and depend largely on traditional, extensive land management. Consequently, as a result of intensive land use, the size of the population of many animal species and plants providing ecosystem services has been greatly reduced. There are examples that a high level of biodiversity positively affects agricultural production and enhances people's quality of life (Chapin, et al., 2000).

Pollination is one of the ecosystem services. The idea of ecosystem services combines economics and environmental protection. The concept of ecosystem services includes all natural goods and natural processes that exist and that we benefit from. Ecosystem services are involved in the provision of clean drinking water and decomposition of wastes. Ecosystem services are grouped into 4 broad categories:

1. Supporting services
2. Provisioning services
3. Regulating services
4. Cultural services

Provisioning services – they include clean drinking water obtained from ecosystems – freshwater supplies, food – plant species and wild animals, as well as pollination and mineral resources.

Supporting services – they include processes that are necessary for the existence of all other ecosystem services. They include: nutrient recycling, soil formation, photosynthesis, habitat formation and biodiversity.

Regulating services – they take part in climate regulation through carbon storage, purification of water and air, flooding control and waste decomposition.

Cultural services – nonmaterial benefits that people obtain from ecosystems through cognitive development (scientific discovery and education), recreation or aesthetic experience. Functioning of one group of ES influences another one.

For our study we chose pollination as it is a very important global process that is globally endangered. More than 200,000 species of animals are pollinators. 80% of plant species need pollination (Ollerton, 2011). Economic value of pollination is 100 billion dollars per year (Losey and Vaughan, 2006). Social awareness is very important in conservation of pollinators. The question is when in human life is the best, the most sensitive moment to educate about value and meaning of environmental protection. Many authors indicate that the best moment is at preschool and early school age (Davis, 1998, Hart, 2008). And what is more – schoolchildren can act as educators – they have indirect influence of environmental education on their parents and grandparents.

Material and methods

In years 2015–2016 we performed our study on 74 children aged 4–6 and 68 parents and 11 grandmothers. We constructed a questionnaire and tested the knowledge on pollination. We concentrated particularly on correct identification of pollinating insects and understanding of the process itself. We also checked what is the attitude towards pollinating insects.

Survey among children

The questionnaire survey covered children aged 4–6, who attend three pre-school institutions located in the center of Krakow. Ten children aged 4, 36 children aged 5 and 28 children aged 6 participated in the questionnaire, which gives a total of 74 respondents. Surveys among children were conducted by their parents or teachers in order to minimize the stress factor, which could significantly impair the credibility of the responses. The purpose of the questionnaire was to provide information on children knowledge on insects, with particular emphasis on pollinating insects. Choosing a pre-school age group allowed us to estimate the level of awareness of children before they became school-bound.

Questionnaires were designed to diagnose the interest of the subjects, their attitude towards pollinating insects, knowledge of the fauna of the local pollinators and their importance in nature. A part of the questionnaire was an open question, in response to which the children themselves formulated their answers. The other part of the questionnaire contained multiple-choice questions.

In the first task a child referred to the nine animal photos shown. Nine species were presented in the photos: honey bee, bumblebee, European peacock, trout, frog, red ants, spider, leather beetle, and Emperor Dragonfly. Then the child's task was to mark all the animals that are insect. Next two questions referred to pollinating insect species with flowering plants. Another question concerned the subject of books available for children in the home environment. The child determined whether the insects could be found in the literature available at home. If the answer was yes, they were asked to give the name of the animal. Then the child answered the question whether he/she reads books about insects. Next question was designed to diagnose the child's attitude towards insects by assessing their reaction toward the bee. In the last question, the child was supposed to determine whether the occurrence of insects in nature is needed and to justify their response. The analysis of the answers given to this question allowed us to assess the state of knowledge of children about the importance of pollinating insects.

The survey results were grouped into three categories according to questions. The first category includes identification of animals. The second category consists of questions that tested the knowledge about the ecological importance of insects in nature. Final group of questions making up the third category verifies the attitude of children towards insects.

Adult survey questionnaire

The questionnaire also included children's caregivers – parents of children aged 4–6 who attended three pre-school institutions located in the center of Krakow.

The survey was taken by 68 people: 51 mothers, 17 fathers. Parents were chosen as respondents because they are the main decision-makers in terms of books purchased for children.

The questionnaire was designed to assess the state of knowledge about insects and their importance in the environment, the attitude to insect pollinators, the knowledge of the local pollinating fauna. The questionnaire consisted of 10 questions of varied form. In the first question, the respondents were expected to declare their interest or lack thereof in entomological content. The answers given later in the questionnaire allowed us to assess the knowledge of adults about insects and their importance in nature. In the fifth point, the respondent was asked to determine the veracity of five sentences about pollinating insects. The sixth question was a multiple-choice question, in which the respondent should indicate the groups of insects involved in plant pollination. In the seventh point, the respondent was asked to link the species names with the pictures of the following insects: honeybee, bumblebee, hoverfly, butterfly (European peacock), wasp, beetle. The first five insects were selected for their high incidence in the environment, which increased the probability of being observed by the respondents. The beetle presented in the questionnaire is an insect that is less common. The next question verified the knowledge about insect morphology. Respondents were asked to list insect characteristics. The ninth question was determining the attitude of respondents towards pollinating insects. There were four answers, with one of them – "other" – giving the possibility of response that did not match any of the three suggested. In the last question, the respondents were asked to evaluate the importance of insects in nature by selecting one of the answers provided.

The results of the questionnaire were divided into three categories according to the questions. The first category (questions 5, 6, 7, 8 and 10), as in the case of the children survey, verifies adult ecological awareness of insects. Second category of questions (questions 1 and 9) defines the attitude of parents to pollinating insects.

Results

Knowledge and species identification – children

Out of nine animal species presented in the pictures, only one was named correctly by all respondents in the 4-, 5- and 6 years old group (Fig. 1). This animal was a frog. The second (in terms of correctness) identified animal was a butterfly. Almost all respondents of the examined age groups gave a correct systematic name for the insect of rank order. The exception was a 5-year-old who could not name the insect. The third species of animal that was identified by all 5- and 6-year-olds was a trout – identified as a fish. Only one 4-year-old gave the wrong name – "shark".

Another animal species most commonly identified by children was a spider. Identifying the spider was easy for all 4-year-olds (100% correct answers). Four-, five-, and six-year-olds identified ants with at least 90% accuracy. The correct answer was given as a general name. The most frequently used wrong name was a "worm". Older children did not specify wrong names for the ant, but they said "I do not know".

Different results were obtained in the case of a dragonfly. The best knowledge to identify dragonfly had 5-year-olds (94.5%), then 6- and 4-year-olds (71.5% and 60% respectively). The correct answer was given as systematic order name. Among wrong answers children described the dragonfly as a "worm" and once as a butterfly. The honey bee was identified by the group of 4-, 5- and 6-year-olds with a probability close to 60%. Most of the errors in the identification of this insect were committed by the youngest respondents – most frequently a honeybee was confused with a wasp.

The results indicate that the most difficult task for children was to identify two insects – the bumblebee and the beetle. Only one 5-year-old and one 6-year-old have identified the first as a bumblebee. The remaining respondents could not name the presented insects or gave incorrect answers. The most common incorrect answers were "bee", "wasp" or "fly". Only two 6-year-olds have correctly identified the insect as a beetle. The rest of the children surveyed gave the wrong answer, calling it "spider" or "bee". One 5-year-old considered the beetle a "crab".

Another task to verify the children's ability to identify the animals was to indicate insects from the nine species presented in the pictures (Fig. 1). None of the children classified frog or fish as an insect, while the indications were related to the spider (spider is not an insect). The majority of incorrect answers were provided by 6-year-olds (46.5%) and at 4-year-olds (20%) gave the least incorrect answers. At least 80% of 5-, and 6-year-olds correctly qualified the honeybee as an insect while only 40% of 4-year-olds did it appropriately. Bumblebee was classified as an insect by the 6- and 5-years-old group (82% and 78% respectively), and the least correctly among the 4-year-olds. Similar results were obtained with respect to a butterfly that was identified as an insect by 70% of 5-year-olds, 68% of 6-year-olds, and 60% of 4-year-olds. The most correct indication of the dragonfly species as an insect appeared in the group of 6-year-old children (78.5%), while in 5-years old it reached 69.5%. Fewer respondents answered correctly among the 4-year-olds, representing 40% of respondents in these age groups. The ants and beetle are characterized by a low number of correct indications. These animals have the highest number of correct answers among 6-year-olds (46.5%) and the lowest among 4-year-olds (20%).

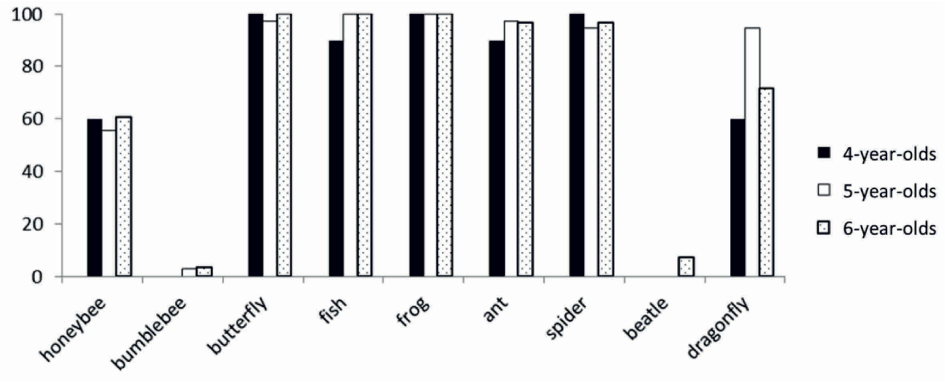

Fig. 1. Correctness (%) of species identification among pre-school children.

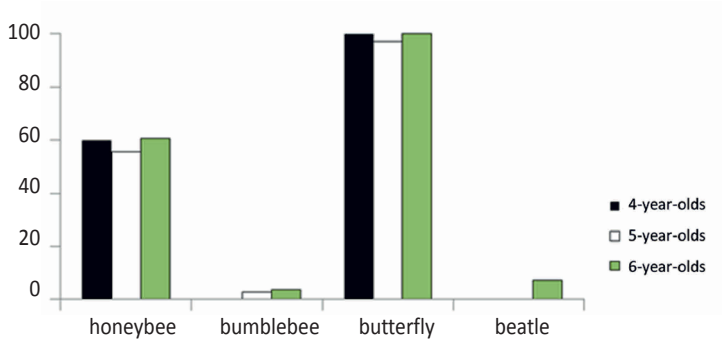

Fig. 2. Correctness (%) of insects qualification as pollinators among children.

Most commonly identified pollinators are honeybees and butterflies, while all insect groups presented in Fig. 2 are involved in pollination. We also wanted to verify if children correctly understand pollination as a process. The question was: "why do some insects sit on flowers?". Most children gave incomplete answers but with correct part including: pollen collecting, honey collecting, insects sit on flowers to pollinate them, that they help to develop new seeds, plants and flowers. All answers including correct example of interaction between plant and pollinator were considered as correct (Fig. 3).

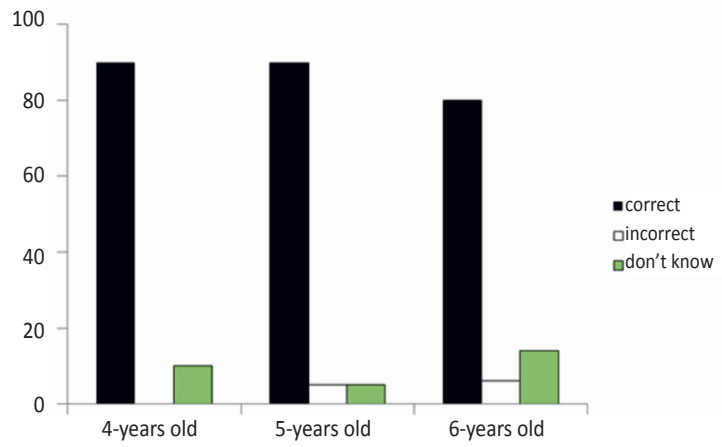

Fig. 3. Answers (%) explaining pollination process.

Attitude towards pollinating insects differs between children at different age (Fig. 4). Younger children are more afraid of bees. Most frequently, the attitude of children is negative or neutral. Answers classified as negative attitude included: -screaming, -shouting, -escaping and crying, -killing an insect. Answers classified as neutral attitude included: -standing still, -observing an insect, -behaving in a normal way, -informing an adult. Answers classified as positive attitude included: -observing an insect because it is doing is interesting, -opening window to let the insect go, -calling someone to catch a bee and let it go, -giving sugar/honey to a bee.

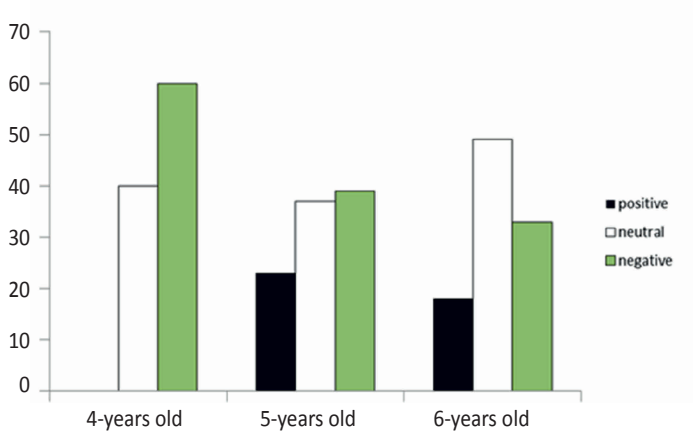

Fig. 4. Answers (%) to the question: How do you behave when you meet a bee?, reflecting children's attitude towards insects.

Knowledge and species identification – parents

Butterflies were the most frequently identified among mothers and fathers in the question of identifying groups of insects involved in pollinating plants (Fig. 5). The second most frequently indicated insects was a bee. The same number of fathers have distinguished fly (hoverfly) and beetle as insect pollinating flower plants. Relatively large proportion of interviewed mothers and fathers mistakenly identified dragonflies as pollinating insects (25.5%, 35% respectively). Only one out of all respondents qualified mantis to a group of pollinating insects.

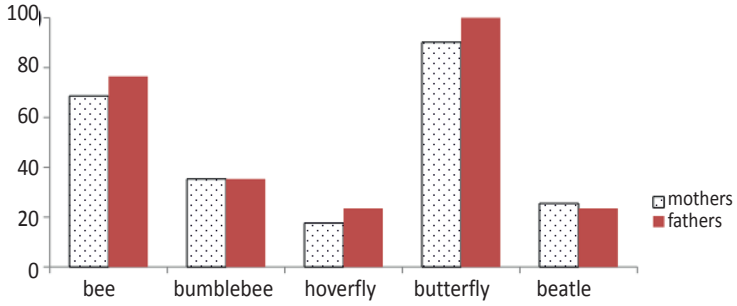

Fig. 5. Correctness (%) of insect qualification as pollinators among parents

To diagnose the level of knowledge about the process of pollination among parents we gave questions concerning the definition of pollination process. What we found is that most (over 80%) parents choose correct definition of pollination (Fig. 6). The answers to the question "Do pollinators play an important role in nature?" clearly indicate that most respondents consider insects to be important organisms. Almost all fathers who participated in the study declared that pollinating

insects definitely have important functions in nature (94%). The same answer was given by 88% of mothers.

However when parents were asked if pollination of plants has an impact on agricultural output – 48% of mothers chose wrong answer (Fig. 7).

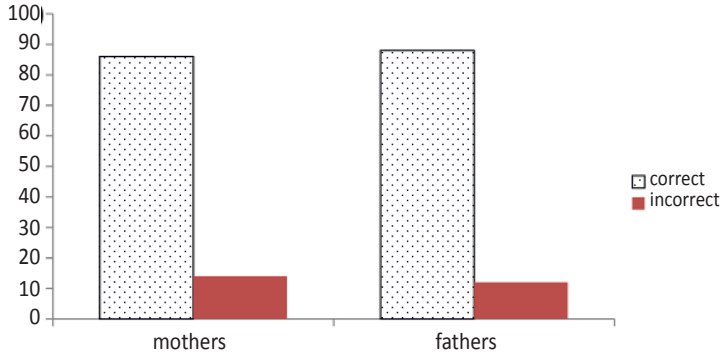

Fig. 6. Answers (%) explaining pollination process – parents

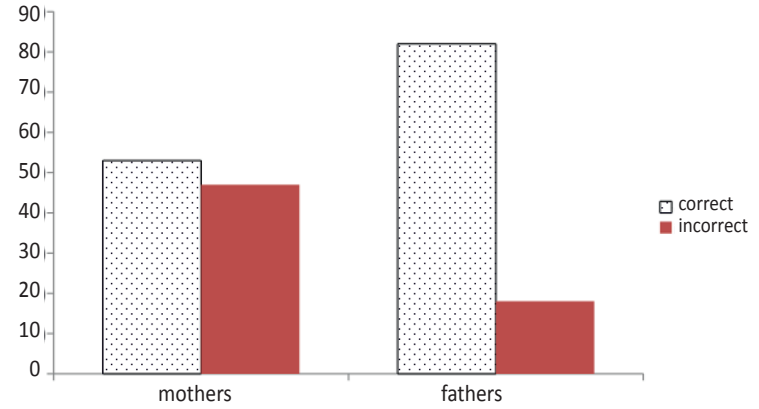

Fig. 7. Answers (%) to a question: does pollination of plants has an positive impact on agricultural output?

If it goes to parent attitude towards pollinators – most parents have positive attitude towards bees. The attitude of the respondents to insects was verified on the basis of the declared attitude towards the bee that flew into their apartment. A large majority of respondents indicated a positive attitude towards insects (Fig. 8). The answer "I help bees to get out" was most frequently found in the fathers group (88%), slightly less in the mothers group (86%). Neutral attitude in the given situation declared 8% of mothers and 12% of fathers. Negative attitude was declared only by mothers (6%). They argue that they are afraid of bees and wasps because of allergies and they prefer to run away or kill an insect. Three mothers did not response to an answer, and one of them admitted that she had never been in the situation.

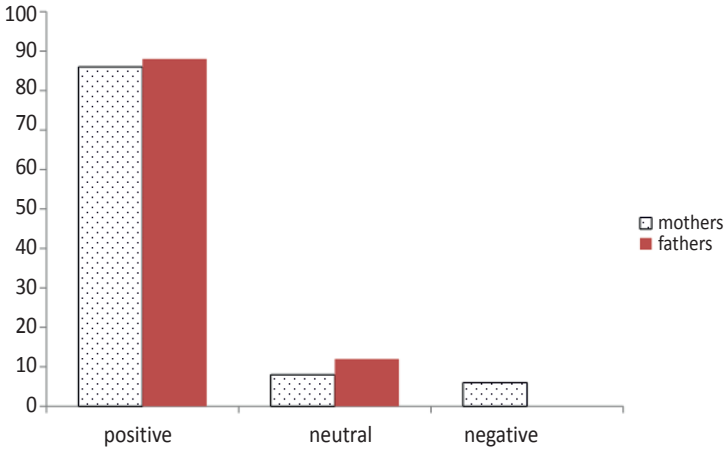

Fig. 8. Answers (%) to the question: How do you behave when you meet a bee?, reflecting parents' attitude towards insects.

Discussion

Insects are the largest group of animals living on Earth. Thus, they play many important functions in ecosystems. One of these is pollination. Most plant species, without pollinating insects, are doomed for extinction. The Earth's biodiversity is getting poorer as a result of human intensive exploitation of environment. Declining numbers also apply to pollinators, whose activity is included in ecosystem services and evaluated at €14.6 billion per year in the European Union. Efficient environmental protection is only possible with the participation of a conscious, pro-environmental society. The purpose of this work was to diagnose knowledge and attitudes towards pollinating insects among pre-school children and their parents.

Nowadays children's knowledge of biodiversity comes mainly from the media. Although many programs on the Internet or TV are dedicated to globally endangered species, they often create misleading images of biodiversity. They present the most spectacular organisms (elephants, lions, tigers), living in extreme conditions and usually in distant areas of the world. Consequently, viewers are unaware of local biodiversity problems, while they know in detail conservation issues considering few animal species living for example in Africa. Ballouard and co-authors (2011) surveyed a group of French students showing that children have a better ability to recognize in photographs exotic than local animals. In addition, the respondents' answers show that children are more likely to protect known species not found in their local environment. Their survey found that species needing protection (in children's opinion) are, among others, great panda and polar bear. On the other hand, common local animal species were recognized less or not at all. As a result, children very rarely identified them as species requiring immediate protective activities.

Our results indicate that older children have more frequently reported that insects play important role in the environment. A large proportion of children correctly justified why insects visit flowers. But most of them could not explain why plants need insects. The respondents were able to explain the relationship between insects and plants only from the perspective of insects. Explanation of our results can be what Buchcic (2014) stated about the inconsistency of the natural world in the child's perspective who initially consider its components unrelated. Children gradually realize that organisms are not independent but interdependent. Elements of the natural environment previously understood as separate, should create an increasingly coherent image, which goes with increasing interactions of the child with the environment.

Our results showed that the ability to identify pollinating insects among children is similar to the ability of their recognition by their parents. It was also found that ignorance of the local pollinator fauna contributes to negative attitudes of children and adults towards these invertebrates. Older children more often declared positive attitudes towards bees, which they also more frequently identified. Among parents, all respondents from this group stated that insects play an important role in nature. Reduced environmental awareness of parents may result from limited direct contact with nature, which is due to the rapid pace of life in big cities and development of technology.

Thematic villages, apiaries and educational gardens, educational paths and educational activities for organized groups are becoming more and more important in non-formal nature education. An important role is also played by information campaigns and projects (including "adopt a bee" by WWF). Events dedicated to pollinators allow participants to gain basic knowledge about these invertebrates and their importance in the environment. This is possible due to the presence of experienced educators and beekeepers. Many of these events are addressed mainly to children who, through play and physical activity, get to know the natural environment and shape positive attitudes. During educational workshops, both older and younger participants have a chance, for example to observe the behavior of bees, build a hotel for insects, learn the secrets of beekeeping and take part in collection of honey (Kadej and Smolis, 2015). These are valuable experiences, especially for city dwellers who usually do not have the opportunity to live close to nature.

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New society – diagnosis of knowledge about crucial ecosystem services – pollination

Abstract

Ecosystem services are natural processes that allow humankind to reap benefits. Ecosystem services are involved in the provision of clean drinking water and then decomposition of wastes. It includes also pollination and recreation benefits. Many ecosystem services are being assigned economic values as they provide or support processes, that otherwise would be costly. For effective protection of ecosystem services and environment of great importance are law regulations but also social awareness and appreciation of natural values.

Studies involving social understanding of natural processes and functioning of ecosystem services are uncommon. The level of social awareness of functioning ecological processes like pollination was newer studied before. This one-year study focused on the understanding of ecosystem services on the example of pollination. For this purpose entomological knowledge among pre-schoolers (4 to 6 years old) and their parents was studied. The aim of our study was to define the attitude towards pollinating insects and level of knowledge about ecological importance of pollinators among pre-schoolers and their parents. Children were engaged in solving the survey from questionnaire concerning different aspects of entomology, mainly pollinators. Tasks had different level of difficulty. They concerned, among others, the

recognition of insects on the basis of colored illustrations, justifying why pollinating insects can often be found on flowers, declaring how the children or parents behave when they meet a bee at their home. The study was performed on 74 pre-schoolers and their parents.
Findings indicate that pre-school children, regardless of their age, correctly classify from illustrations, representatives of insects, and differ it from other animal groups like fish or amphibians. More difficult for the 4-year-olds was to correctly name representatives of insects. Most recognizable was a honeybee, butterfly and an ant. Older children – five- and six-year-olds were most frequently correctly identifying more insect species than 4-years old. However, among pollinators, bumblebee was a species named incorrectly most frequently. In comparison – most parents identified correctly four out of six insects – including bumblebee. All parents agreed that pollinating insects play an important role in ecosystems, however when they were asked to choose insect orders engaged in pollination they all indicated butterflies, but only less than a half choose hymenoptera, that include bees. Our results indicate, that social awareness among pre-schoolers and their parents about pollination is incomplete. Majority of respondents agreed that pollination is important. However identification of main insect orders and species engaged in pollination is wrong as is the understanding of ecological meaning of the process.

Key words: ecological awareness, pre-school children, parents, entomology

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POPULARIZATION OF KNOWLEDGE – NEW EDUCATIONAL AND SOCIAL IMPLICATIONS

Wioleta Kopek-Putała, Małgorzata Nodzyńska, Martin Bílek

Challenges for teachers and special pedagogy teachers working with students with special educational needs

Introduction

Research conducted by M. Bogdanowicz (1995) showed that as much as 20% of the student population are children with special educational needs. This term refers to a group of students who, in comparison with their peers, have significantly more learning difficulties in the public school conditions. In order to continue learning in a regular school, they require additional pedagogical "treatment"[1] by the teachers (Kopek-Putała, 2015), for instance, special curriculum, as well as special teaching methods and forms. Sometimes they should also be taught by a specialist teaching staff under appropriate organizational conditions (Bogdanowicz, 1995). In such a situation, the teacher should seek support from a special pedagogy teachers whose interest lies in solving education and upbringing problems (Śliwerski, 2006: VIII).

Comprehensive preparation of special pedagogy teachers and supporting teachers for education of students with special educational needs (hereinafter referred to as SEN) is an extremely demanding and difficult task. During university studies, future teachers of the aforementioned specializations, in addition to the main subjects within pedagogy (including special pedagogy), also have a course on issues in the scope of humanities and social sciences, as regulated in the Annex to the Regulation of the Minister of Science and Higher Education of 4 November 2011 – Model Educational Results for the field of study of pedagogy, first cycle studies of the general academic profile (Journal of Laws). These effects include, among others, issues related to the student (including the SEN student) (Tab. 1).

Unfortunately, in this Annex, there is no information about the student's knowledge of mathematical and natural sciences, in which the specificity of teaching-learning (e.g. chemistry, cf. Nodzyńska, 2004) is significantly different from the specificity of work in the humanities subjects such as Polish or history. Introducing a block of mathematical and natural issues could help to understand the learning disabilities that the SEN student experiences in such classes. SEN students often

[1] Not every kind of child's disability classifies them for integrated education, inclusive education or special education. The decision of a psychological and pedagogical counseling center, and not the opinion of this center or medical certificate, entitles to it.

Tab. 1. Model Educational Results for the field of study of pedagogy, first cycle studies of the general academic profile

Graduate e.g.:
K_U02 can use basic theoretical knowledge of pedagogy and related disciplines to analyze and interpret educational, (...) and supporting problems (...), K_U10 can use basic theoretical approaches to analyze, interpret, and design pedagogical strategies, generate solutions to specific pedagogical problems and predict the course of their solution, as well as predict the effects of planned actions, K_U11 can animate work on the development of participants of pedagogical processes and support their autonomy in gaining knowledge, as well as inspire them to work towards lifelong learning, K_K02 (...) uses the knowledge gained to design a career path, K_K03 is convinced of the sense, value and the need to undertake pedagogical activities in a social setting, is ready to tackle professional challenges, demonstrates activity, takes up the effort and is characterized by perseverance in the realization of individual and team professional activities in the field of pedagogy, K_K08 responsibly prepares for their work, designs and performs pedagogical activities.

need multidisciplinary support in the teaching-learning process. This leads to the necessity for supporting teachers or educators to have quite a diverse and extensive knowledge. A graduate of special pedagogy should have interdisciplinary knowledge, among others, related to broadly understood development. They should also posses the knowledge and methodological skills in designing and conducting educational, rehabilitative and social reintegration activities in special education and use this knowledge in practical situations (cf. graduate profile).

The above-presented description shows how the special education graduate should be prepared in theory – but is it really so? In many scientific and educational centers (e.g. Cardinal Wyszyński University in Warsaw, The University of Humanities and Economics in Lodz, Postgraduate Education Center in Lodz, Educational Center for Teachers w Poznan or Education Development Center in Warsaw), one can find an offer of postgraduate studies, courses, and trainings on support of teachers and educators working with children with SEN. Such an offer of professional development may indicate that there is a need to deepen the scope of competence by teachers and educators. It also demonstrates that the problem of adequate education of SEN students exists and is still up to date. There is also a rich subject literature, which deals with the issue of working with children with SEN (e.g. Klaczak, Majewicz, 2006, Grzywniak, 2012, Thompson, 2013, Olechowska, 2016, Cytowska, 2017, Improving the effectiveness of education MEN). However, in the subject literature, it is difficult to find research on the subjective assessment by graduates of their competence in this topic. Thus, the question arises: Do "teachers-specialists" actually feel prepared for interdisciplinary support of the development of SEN students in humanities and natural sciences subjects in public schools?

Research methodology

The research carried out was a continuation of a comprehensive research conducted in the years 2012–2015 (e.g. Kopek-Putała, 2012, 2016; Kopek-Putała, Nodzyńska, 2015; Kopek-Putała, Bílek, 2017). The research involved working with

a student with generalized learning difficulties diagnosed by a psychological and pedagogical counseling center. The study was preceded by an analysis, among others, of available opinions and decisions regarding the student, and the collection of information from teachers of various subjects teaching this student, including the school pedagogue, using the questionnaire. In the course of the research, it turned out that teachers and educators working with the student also notice their learning difficulties and learning outcomes, which are well below the average. This led to a research question: What is the preparation of supporting teachers to work with students with specific learning disabilities?

H_0 (resulting from Model Educational Results for the field of study of pedagogy) Special pedagogy teachers are well prepared to perform tasks related to the education of students with SEN.

H_1 Special pedagogy teachers do not feel well prepared to perform tasks related to the education of students with SEN.

The study was conducted in 2016 among 78 students in the second year of special pedagogy at one of the universities in Poland.

Methods, techniques and tools

The method employed in the study was a diagnostic survey using a questionnaire technique. As a research tool, a questionnaire prepared using the Google Docs was applied (eg. Paśko, Nodzyńska, 2008; Nodzyńska, et al., 2013). It consisted of 30 questions: 11 open (short or long answer) and 19 closed (one choice). For this analysis, 5 questions (3 closed and 2 open) were chosen, which show the students' opinions and feelings on the learning of the student with SEN. All respondents answered the questions discussed. Other questions from the questionnaire are planned to be discussed in subsequent publications.

Results

The first of the questions discussed concerned the opinion of the respondents and it was phrased as follows: *Do you think that the teachers of specific subjects feel the need for teaching support from the school pedagogue and psychologist?* This was a single-choice closed question with two answers.

About two thirds (53) of respondents believe that teachers of specific subjects feel the need for teaching support from the school pedagogue and psychologist, while one third (25) of respondents think that support is not needed for teachers. Since many of the respondents will probably work as supporting teachers or school pedagogue (whom teachers will ask for help) – the result seems to be at least weird. It is important to consider whether the respondents representing such opinions properly chose their field of studies and their future life path.

The second question asked was: *Do you feel competent to provide support for a teacher as part of the SEN student education?* This was a single-choice closed question with six answers. The questionnaire answers were prepared according to the modified Likert scale, removing the most neutral statement from the questionnaire and adding the most extreme statements (excellent and unprepared).

The analysis of the results obtained indicates that none of the students surveyed feels very well prepared to support the teacher in educating students with SEN. Only three respondents assess their preparation as very good, one fourth (20) think it is good, 34 respondents think they are prepared poorly, 15 respondents consider their preparation as very poor, and 6 do not feel prepared to meet this challenge. The results of the study show that nearly half of the respondents evaluate their competence as low. This result should be regarded as disturbing. If the special pedagogy teacher is not convinced of their competences in working with SEN students, who can the subject teacher expect specialized help from while working every day at school?

In order to estimate the results, the answers to this question were grouped into two categories:

- category I: **competent**, including answers: excellent, very good or good preparation – about one third of respondents (23),
- category II: **incompetent**, including answers: poor, very poor or lack ofpreparation – about two thirds of respondents (55).

Such a grouping of answers indicates that twice as many people feel incompetent to provide support for a teacher as part of the SEN student education as those who feel competent. The students' responses to this question are adequate to the answer to the first question – students may actually feel incompetent (answer to question two) because they do not know what future work requirements will be, that is, supporting other teachers in the teaching process (answer to question one).

The next question was about the opinions of the respondents and it was an open question phrased as follows: *What do you think the expectations of the teachers in terms of support of the educational process of SEN students by the educator are?* Many different answers were given that have been classified into seven categories for analysis purposes.

The answers to the question are as follows: seven respondents believe that teachers expect close cooperation and consultation with the educator (hereinafter referred to as consultation), about one fifth (15) respondents believe that they need an effective diagnosis and guidelines for work (hereinafter referred to as diagnosis and guidelines), 28 respondents believe that teachers expect methodological assistance – the development of appropriate methods, forms or teaching resources, and 13 respondents think that the teachers expect alignment of the students' learning gaps, among others, through corrective and compensatory work, as well as assistance for teacher in working with such a student (hereinafter referred to as alignment of learning gaps). Only eight respondents do not know what teachers can expect, and only four respondents believe that they expect assistance in behavior oriented matters (hereinafter referred to as assistance at student's behavior), whereas the remaining three respondents gave vague answers unrelated to the categories mentioned above (hereinafter referred to as other).

After grouping responses into three categories, the following results were obtained:

- Category I: **theoretical information support**, including answers: consultation, diagnosis and guidelines – 22 respondents,

- Category II: **practical assistance** including answers: methodological and behavioral assistance, alignment of learning gaps – 45 respondents,
- Category III: **unspecified**, including answers: "I do not know" and other – 11 respondents.

Students' responses show that most of them are aware that the subject teacher primarily expects practical help. A teacher with passion and commitment can find theoretical information in the literature themselves.

The next question was about the feelings of the respondents and was phrased as follows: *Do you feel equipped not only with the theoretical knowledge of the didactic process of students with SEN but also with practical solutions to support the teacher in working with such students?* This was a single-choice closed question with four answers. In this question, the Likert scale was again modified to 4 points – removing the neutral response.

The answers to the question are as follows: 56 respondents believe that they are prepared theoretically and practically for the didactic process of students with SEN to a slight extent, while 12 respondents believe that they are prepared for it to a large extent. 5 people perceive their preparation positively (answer "yes"), and the same number of respondents feel unprepared theoretically and practically (answer "no") for the process of educating students with SEN.

After grouping responses into two categories, the following results were obtained:

- Category I: **prepared**, including answers: "yes" and "to a large extent" – 17 respondents,
- Category II: **unprepared**, including answers: "no" and "to a slight extent" – 61 respondents.

It can therefore be stated that the number of students unprepared is more than 3 times higher than that of those who are prepared. Student responses are again adequate to the answers to the question 1 – they may in fact feel insufficiently competent to meet one of the major challenges they will face in the future work.

The last of the questions analyzed was an open question and concerned *the expectations of the students on the education of students with SEN when they started their studies.* A variety of responses were provided, which for the purposes of analysis were preliminarily classified into seven categories. One half (41) of respondents expected transferring the theoretical knowledge into practical solutions (hereinafter referred to as theory to practice), 11 future teachers expected case studies and demonstration of an alternative model to traditional SEN student teaching (hereinafter referred to as case studies and alternative), and 6 respondents expected more practical exercises at school (hereinafter referred to as school practice). Nine respondents could not specify their expectations or did not have them (hereinafter referred to as "I do not know"), six respondents had expectations classified into the category other, three respondents thought that teaching SEN students was easier (simple), whereas two people described their expectations as high.

Subsequently, responses were grouped into the following categories:

- Category I: **theory**, including answers: case studies and alternative – 11 respondents,

- Category II: **practical skills**, including answers: school practice and theory to practice – 47 respondents,
- Category III: **unspecified**, including answers: "I do not know" and other – 15 respondents,
- Category IV: **description of feelings**, including answers: simple and high – 5 respondents.

Responses are again adequate to the answers to question three – the practical skills of educators are most expected in the education of SEN students.

Conclusions

The students surveyed (mostly) are aware of the need for cooperation and support of school teachers in the education of SEN students. Respondents provide a wide range of support that subject teachers may expect from them, however, they do not believe that they have the necessary competences (especially practical) to identify the SEN students' needs and help those teachers. More than half of the surveyed students starting the studies expect academic and school teachers to transfer their theoretical knowledge into concrete practical solutions needed to work with this type of youth.

Implications

Regarding the presented results, conducting a study among the first year students can be considered: with what expectations (adequate or not) and attitude students start the pedagogical studies with respect to the model educational results. Awareness of the feelings that students have may be an additional driving force to consider the need to partially update the curriculum of pedagogical studies. It is true that science and education centers have a number of additional training programs for teachers and educators preparing them for work at school (including work with students with different educational needs), but this requires changes in higher education programs (…) (Child with disabilities). The recommended updating should focus on the specificity of teaching mathematical and natural sciences as well as practical issues in working with SEN students. Education programs for future educators should include a greater number of practical activities (Practical Student Preparation Recommendations) and examples. It is also important to consider the reverse action, that is enriching the teacher's studies within particular subjects with a series of classes devoted to working with a student with developmental deficits of varying degrees of severity. An interesting solution would be creating a study profile that would enable the education of a teacher having two majors whose primary field of study would be complemented with specialization in the teaching of students with SEN. Possessing such a broad competence by the principal teacher could help in effective collaboration with the school educator and overcoming educational barriers among students with SEN.

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Challenges for teachers and special pedagogy teachers working with students with special educational needs

Abstract

The first part of the article explains the essence of the concept of special educational needs (and relates it to the educators) whose interest is focused on these kinds of problems. The second part discusses the results of the study on the perceptions and opinions of special pedagogy students about the education of learners with specific learning disabilities and describes the conclusions of the study. The study has shown that special pedagogy students believe that they do not have sufficient (especially practical) knowledge to teach students with specific learning disabilities and to cooperate with teachers working in public schools and educating such students.

Key words: specific learning disabilities, special pedagogy, subject teacher, pedagogue, research

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Increase in attractivity of natural sciences in primary education

Introduction

The Czech Republic has been solving a long term issue concerning decreasing interest in the study of natural sciences. Causes of the problem are being identified, but more importantly, the ways leading towards the increase in attractivity of this field. The causes of disinterest followed by the orientation towards humanities are possible to identify as early as in the initial years of compulsory school attendance. The first cause is noncritical adhesion to curriculum systematization related to the structure of the actual field; other causes which contribute to the loss of interest and motivation to study are: premature mathematization, excessive and early emphasis on symbolization, overuse of traditional teaching methods, formal character of lessons without corresponding applicability in practice, insufficient use of ICT tools, or even the restriction of ICT usage to avoid its misuse during lessons, etc.

Compulsory School Attendance

The phenomenon called compulsory school attendance is to blame. Yet, it all started rather differently to what it entails nowadays. Maria Theresa issued the General School Rules which included a statement recommending parents to send their children aged 6–12 to schools. However, it was a mere recommendation, as the truly "compulsory" school attendance (only for boys at that time) was introduced 30 years later by Francis II, the grandson of Marie Theresa, sometimes also referred to as Francis I (Žena, 2017). Nevertheless, the aim of the present paper is not to map the history of compulsory school attendance, hence its contribution to the literacy in our environment is undeniable, but to analyze the actual implication and the word "compulsory".

The term "compulsory" is derived from the expression of obligation, meaning a specific moral relationship and ethical norm defining the **necessity** of an action, or a moral obligation to respect and follow the given norm (Říman, 1987). In the context of schooling, the term imposes seemingly positive character, as well as signifies that to acquire all possible literacy means is a significant contribution to foundations of individuals' education. Furthermore, for a young person it manifests

a springboard to the process of further self-perfection. However, the question is whether a young person thinks equally. From an ontogenetic perspective, pupils undergoing compulsory schooling are to a large extent located in the period called "autonomous". Considering it is the school (and puberty) age, the autonomous period is characterized not only by increasing behavioral awareness, but, according to Janiš, Kraus, and Vacek (2008), it is necessary to take into consideration gradually increasing criticism, manifestations of resistance, and the disagreement on the educated side, and considerable patience of the side of the educating ones. The above-mentioned analysis leads to a series of conclusions signifying a considerable connection with the results of educational activities. The aim should be to seek such forms, methods and approaches to education which would result in the elimination of the aforementioned behavior, including the increased criticism, or the manifestations of resistance and disagreement.

One of the possible discussable themes in this context is the traditional curriculum (in this case most importantly Chemistry lessons). Firstly, the used format is characterized by the inclusion of the themes that are highly logical and that demand operational thinking. In other words, we speak of mathematization of lessons or their excessive symbolization. However, according to Piaget, operational thinking is developed later and a number of students experience great difficulties when facing the above-mentioned curriculum, which results in the loss of motivation to study. We believe that this age group should be presented such curricula which are motivating and provide students with satisfaction in the form of applicability and simple utility in everyday practice. Such themes can be found sufficiently in Chemistry, yet they usually do not conform to the traditional system. The primary issue is thus the motivation of students, while the curriculum can be adjusted later during the course of secondary school lessons.

Ways to Motivational Chemistry Lessons

Contemporary education is accompanied by many changes predominantly connected with curricular restructuring. The aim of the restructuring is above all the support of more complex approaches to educational content realization, including the possibility of its interconnection. It further presupposes the choice of various educational approaches, various methods and forms, and the utilization of all supporting elements in concordance with students' individual needs.

However, it means that the support of education (especially its material aspects) closely corresponding with creation of particular projection structures connected with positive motivation of students and safeguarding applicable aspect of teaching, is necessary to be sought also outside of schooling, school offices and premises, e.g. in institutions that are being created for such purposes. Among such institutions can be listed museums, experimentaria, science centers, or similarly aimed institutions. These share aspects of various collections of experimentation objects or aids, often incorporating historical aspects and signifying often insufficiently used gnoseological potential.

Aquarium as a Motivational Tool to Teach Natural Sciences

Almost every child (from our perspective a subject being educated) in a certain stage of their development longs to have a piece of nature at home. Mostly this deep interest suddenly kindles and sometimes also quickly extinguishes. Children are testing what attracts them. They are gaining information concerning their prospective jobs. Each test, successful or failed, plays a role in their development. We must not even unintentionally contribute to the unsuccessful experience. The reason can be the issue concerning our lack of time. We miss patience and empathy with children so we cannot learn and experience their successes and failures with them. If children are not supported by parents, they can lose interest after initial failures (Plecitý, 2008). Plecitý sees parents' role in child development process as non-substitutable, and sees their significant potential also in children's education. However, it is commonly known that parents must meet predominantly economic demands of the family, and an aquarium in this sense becomes a costly and redundant investment. The solution is provided again by Plecitý: I consider group Aquaristics as the most effective element while bringing up children. Aquaristics enables the feelings of joy from one's labor and the ability to communicate life problems. Noble activities of a child focused on further understanding of the laws of nature simplifies and expands communication in group by including nonverbal elements, and brings relaxation from everyday routine and stress. Aquaristics can be inspiring for children to meaningfully spend free time by revealing their own abilities and expanding their skill repertoire (Plecitý, 2008).

A clear signal for building an aquarium at school, setting up an interest group which would via its leader integrate schooling into practice. The subjects could then be within the School Educational Program called "Applied Chemistry", "Applied Physics", "Applied Biology", Geography, etc. Philosophizing over the aquarist perspectives in the context of education can be supported again by Plecitý. Creativity is considered as one of the most significant human needs, which is being greatly neglected nowadays. Children have few creative hobbies; they are consumers passively waiting to be entertained by somebody else. They do not sufficiently realize their identity. They do not enjoy themselves a lot. Especially for children and young adults, creative process is a natural means to express their feelings and attitudes towards the world and themselves – it is a means of self-knowledge. This natural human expression applied in Aquaristics surpasses the natural giftedness or learned skillfulness to provide floor for children's fantasy, the adventure of getting to know something new, and encouragement for creative self-expression (Plecitý, 2008).

It is therefore thoroughly logical that Aquaristics is a supporting tool for teaching Biology. It enables getting to know exotic plants and animals, but mainly their own environment, life manifestations including procreation in conditions of dynamic balance of a created system, and other life-characterizing requisites, such as illnesses and their treatment, intra- and interspecies social relationships, etc.

The methodology of education in given conditions has been already elaborated on, and observations and demonstrations are applied, as described by Bílek (2009). Objects of phenomena we observe must often be described. It is necessary to lead

pupils and students to close observation followed by the expression of the observed so that the description is neither elemental nor mentioning only most striking aspects, which could be insignificant. To avoid superficial descriptions, students must be guided to detailed observations to notice inconspicuous feature escaping the first look. One of such teaching methods can be identified in Fig. 1, where a group of students from Siam observes sea creatures in an 83 m long submarine tunnel (E-akvárium, 2017).

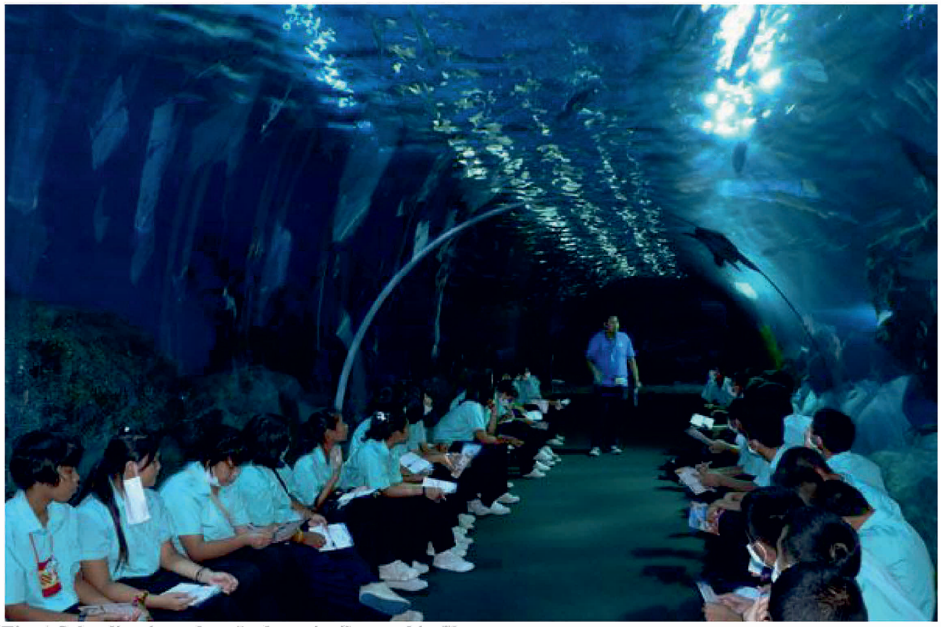

Fig. 1. Schooling in a glass "submarine" tunnel in Siam.
(Photo: Roman Slaboch) (E-akvárium, 2017)

To put it simply, aquarium and Biology are connected. It is, however, less known that the same can be said about aquarium and Chemistry. Hieronymus (2010) posits that the changing of water is often forgotten to be dangerous in certain ways. Besides the damage to fish mucosa as result of changing too large amount of water, another danger is ammonia poisoning. The ammonia poisoning appears when changing of water has been long time postponed. The pH value of aquarium water often naturally drops. During proteolysis ammonia NH_3, respectively ammonium cation NH_4^+ is created. If the pH of aquarium water drops lower than 7, the aquarium contains almost exclusively nontoxic ammonium cation. At pH higher than 7, the ammonium cation partly changes to highly toxic ammonium; the more alkaline water, the more toxic ammonium. Some fish death loss after changing water are not caused by toxic elements from water pipe, but from the created ammonium. Therefore, especially in large fish tanks with high amount of fish it is suitable to measure pH before changing water. If pH is higher than 7, its value after changing should be adjusted to around 7 (Hieronymus, 2010). The passage suggests than Aquaristics is hence Chemistry (yet

for many Aquarists it is still Alchemy). There is no surprise that many companies producing aquaristic technology provide the market with interactive filters which besides filtration of mechanical particles include measuring systems for continuous measurement of temperature, conductivity and pH of aquarium water. Such filters are very close to research activities or virtual laboratories, whose basis will be an aquarium with the measuring system.

The similar laboratory is also mentioned by Bílek (2009): digital or virtual information access concerning collection or conservation of objects, historical techniques, technologies, period procedures or conservation and restoration methods of both lay and professional public is above all a tool for advertisement of culture, cultural institutions and their collections to support research, educational activities and tourism development. It is insignificant if we speak about the "Project Aquarium" or the teaching of Applied Chemistry; what matters is to let students see the principles of dynamic processes, such as nitrogen circulation in an enclosed bio system, monitoring the influence of nitrogen compound on the growth of plants while setting an aquarium, the health of fish inhabitants, monitoring the transformation of nitrogen compounds while setting of an aquarium, etc.

The Support of Quick-Process Experiments via ICT

It is generally known that a chemical experiment is one of the basic tools of knowledge in Chemistry. It is because for the educated subject the experiment is the source of information necessary for active perception, which is required as a necessary part of educational process.

Although chemical experiments are frequent themes of research, the interpretation of results concerning the efficiency of experiment inclusion in teaching appears still and unsolved and even a never-ending issue. At present, there are significant perspectives offered by processes connected with digitalization of obtained data; these would, nevertheless, require possible use of several non-standardized processes and most importantly, a different concept of used technical systems.

A large majority of experiment records done by ICT are nowadays only in a digital form. This format of record expands the possibility of its utilization in class. From the perspective of quick-process experiments, elemental and crucial appears the function to set the digital record of an experiment in individual frames. Such frame analysis can be executed using video-recording freeware, such as VirtualDub, Pinnacle, etc.

One second of a regular recording results in 25 chronologically sorted frames; using a high-speed recording the number of frames is significantly higher (e.g. 400). Such a recording of quick-process activities has a significant impact on the analysis of the interpreted experiment, the understanding of the actual process which results in the creation of the insight in the realized process and enables the following interpretation of the experiment. The advantage of such a methodology is the ability of direct engagement of pupils in the process of the experiment evaluation, including their own technological devices (tablets or smartphones).

A suitable experiment for such a recording we chose a model process of an ignition engine. A transparent plastic cylinder was filled with petrol steam and

covered with a light lid. After the initiation of the steam by a spark the steam was ignited and the lid "fired" (see Fig. 2).

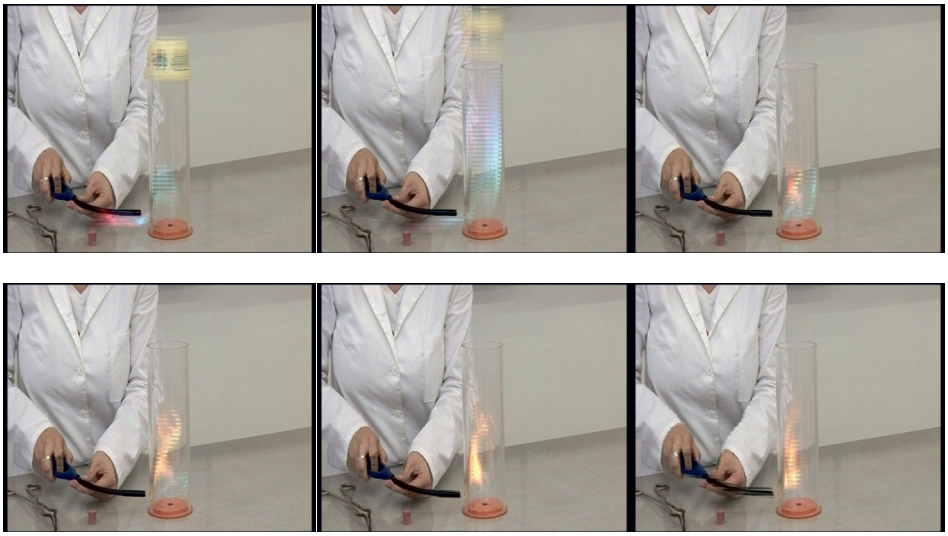

Fig. 2. Frame analysis of a quick process (Photo: the authors)

After the recording analysis the input parameters of experiment can be adjusted. In our particular case, e.g. changing the fuel compound, the type of steam initiation (electric spark, flame, etc.). Consequently, another recording can be made and both versions then compared, using even detailed frame comparison of the given crucial experiment moments.

The video-recording and its potential analysis can be saved or shared for another use – self-study, revision, etc. Nowadays, we commonly experience and support sharing of experiment recordings in laboratory exercises on social networks.

If we want to ensure the increase in experiment efficiency and students' interest, direct engagement of students in the creation and recording of the experiments is a good idea.

Conclusions

Via deeply understood scientific knowledge, we can reach freeing ourselves from the manacles of narrow-mindedness and selfishness, reach spiritualization of our worldview, and cultivate our mutual relationship between ourselves and both animate and inanimate nature.

When a young man sets out on a journey of knowledge, they know almost nothing. They have an open mind and a heart longing to understand everything. Then the whole life they stroll the bank of the ocean of unknown collecting fragments of knowledge (Ullman, 2010).

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Increase in Attractivity of Natural Sciences in Primary Education

Abstract

The Czech Republic has been solving a long term issue concerning decreasing interest in the study of natural sciences. Causes of the problem are being identified, but more importantly, the ways leading towards the increase in attractivity of this field. The causes of disinterest followed by the orientation towards humanities are possible to identify as early as in initial years of **compulsory** school attendance. Noncritical adhesion to curriculum systematization related to the structure of the actual field, premature mathematization, excessive and early emphasis on symbolization contribute to the loss of interest and motivation to study. The authors of the contributions present some traditional as well as non-traditional solutions to the complex issue.

Key words: natural sciences, compulsory school attendance, motivational Chemistry lessons, quick-process experiments analysis

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Eyetracking or a piece of paper in didactic research

Introduction

Problems of control and assessment is one of the most important fields of didactic knowledge as it is an immanent element of every single process of education. Responsible organization of teaching and learning is an obligation to become interested in effects, which means checking the knowledge and skills of students that would allow to state their progress and deficiencies and to make tools that would motivate students for further work.

Verification of knowledge

All methods that verify students' achievements should be used consciously by teachers. They can differ depending on the specifics of a subject taught, teacher's preferences, students' abilities, and limitation of space and time of the process of teaching. Teachers usually use traditional methods of verifying knowledge, which are oral, written, and practical tests. A written test may require the students to do the task, give answers to the questions or to complete a test. According to many didactics the didactic assessment which uses school-based tests is objective, accurate and reliable. This system of testing students' progress eliminates, to some extent, subjective feelings in a man-to-man relation. Nevertheless, the discussion if an objective grade can be set based on a test is still up-to-date and open. Professor Bogdan Śliwiński, a member of a Committee of Pedagogical Sciences of the Polish Academy of Sciences, states that tests do not measure the depth of knowledge and its range but only the superficial skills and competences. According to the professor, school does not teach skills connected with critical thinking, making analyses in a cause and effect categories or making conclusions anymore [http://wiadomosci.onet.pl/kraj/prof-boguslaw-sliwerski-zmierzamy-ku-edukacyjnej-katastrofie/7emqc].

It needs to be stated here that, despite the fact that using the above-mentioned methods is easy they are burdened with a high dose of subjectivism, being often "intuitive". Contrary to popular beliefs classical methods also have limited possibilities of making the assessment of school achievement. As Adolf Dygasiński stated in one of his works: "During all kinds of exams and tests teachers willing to understand the

level of intellectual developments of a student will not seek for what the student does not know, but they will base their assessment on what the student has really learnt" (Dygasiński, 1882).

Another approach to testing a student's knowledge – eyetracking

Means of verifying knowledge that were used so far checked only what the student could do and what one learnt and did not allow for tracking the student's way of thinking or attempts of solving the problem. Therefore they need to be constantly modernized, improved and adjusted not only to didactic requirements, but also to the requirements set by the environment, civilization and technology.

Due to dynamic development of electronics and IT tools new, non-invasive methods of monitoring psycho-physical parameters appeared, one of them being eyetracking which enables registering, measuring and analyzing data of position and movement of eyeballs. According to the assumption defined by the "mind-eye" hypothesis (Nielsen & Pernice, 2010) people usually think about things they are looking at and concentrate their attention on them. Since it is possible to recreate the path of a student's eyesight after they were asked questions in order to assign the answer out of a given set of answers, it is equivalent to the possibility of describing the cognitive process, studying the mechanism of this process as the eyes movement is a reflection of an operation that takes places in a student's mind.

In measuring devices that are used at present – eyetrackers – a camera detects the position of eyeballs, which are illuminated with an infra-red light invisible for a person. The infra-red rays reflected from the cornea can be seen as reflections (also known as Purkinje's reflections), and, among others, on this basis the 'x' and 'y' co-ordinates of the eye position are determined. At present there are two types of eyetrackers: mobile (headset or spectacle type) and stationary ones (that is a device integrated with a computer monitor, free-standing, whose location can be manipulated by the researcher, or a fully stationary system which also allows stabilization of a person that undergoes the analysis towards the measuring system). Mobile eyetrackers allow for conducting research in a natural environment of the object, for example in shops or objects of public services. Stationary eyetrackers are mainly used when it is sufficient to register the eyeballs movements while watching materials (visual scenes) presented on a computer screen (Stolińska, 2016).

Due to the development of computer technology, moderate price of eyetrackers which are compatible with free, open source Ogama software (http://www.ogama.net), studies using eyetrackers gained popularity and are used in a wide range of studies. Using eyetracking in educational studies is the latest trend among the existing usages, which is dynamically developing. At present eyetracking is seen as a precise reflection of interaction between the cognitive processes and outer visual stimulus. Some researchers claim that eyetracking is a kind of a window to one's mind, thoughts and feeling (Holm, 2007; Glimcher, 2003). While analyzing the eyes movement, it is possible to conclude the student's strategy of thinking while solving the problem. The results of verification of a student's knowledge that are seen on a piece of paper show a given range of knowledge that has been mastered by the student, yet rarely

do we learn about the total time needed to give the answer. Eyetracking enables to track the path of solving the task which allows a precise analysis of a way of reaching given results by the student.

Eyetracking research

In order to find an answer to the question of how students solve problem questions concerning natural sciences, research among students of a 6th grade of primary school was performed, using eyetracker – ET1000 – The Eye Tribe Tracker. The research was conducted in a classroom.

During the research, the students' task was to match in an adapted computer program created by Jan Rajmund Paśko and Andrzej Kamisiński (Paśko & Kamisiński, 2011), data presented as pictures, words or figures that were placed in a library situated above the panel, to proper charts. The data was collected by dragging them with the mouse from the library to the chosen field. The same data could be collected many times. The picture below presents the board of the task which required the students taking the test to match the model of the structure of water corresponding to a given state of matter (Fig. 1).

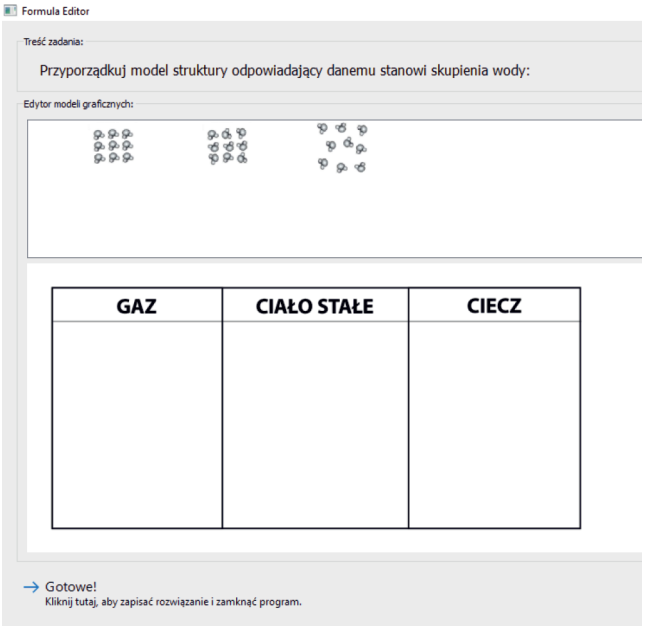

Fig. 1. The board of the task.

From registered in time of performing the eyetracking research we receive several dozen parameters. For example, it is possible to check thoroughly how the student's eyesight moved while doing the task. The easiest way is to review the animation and, at the same time, the movement of eyes which is recorded in a file with 'avi' extension. The blue color of the line illustrates the path of eyesight of the tested person (Fig. 2). The picture below shows that the respondent did not spend

even one second on reading the content of the task doing it completely intuitively. Red color of circles corresponds to the fixations – places of holding the eyesight. The size of the fixation point corresponds to the length of staying focused on a given element. The tested student was mainly focused on the model of the structure of water corresponding to the gas state of matter. The research of Renshaw and others (2004) indicates that the extension of the fixation time is an evidence of problems with assimilation of the information.

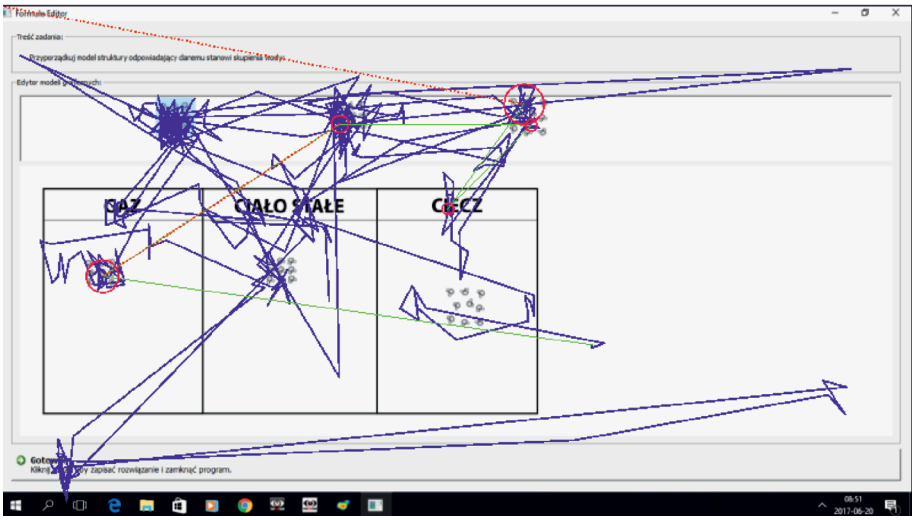

Fig. 2. The record of the results of study of the path of eyesight of the tested person.

There also exists a possibility of a number analysis of the fields. In order to do so the field of interest needs to be matched (Fig. 3) and then the exact comment of counting needs to be given.

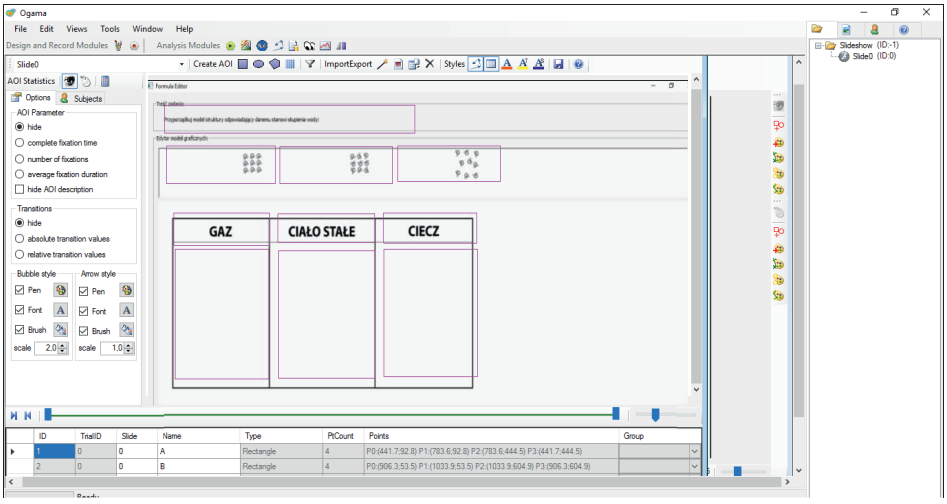

Fig. 3. A board of Ogama software.

For example, the order (Fig. 4) and the duration of specific fixations are of great help in defining the thought processes. The analyzed case shows that the student focused their eyesight on the wrongly matched model for the longest time, which is as much as 1017 ms (774 ms + 243 ms) (Fig. 5).

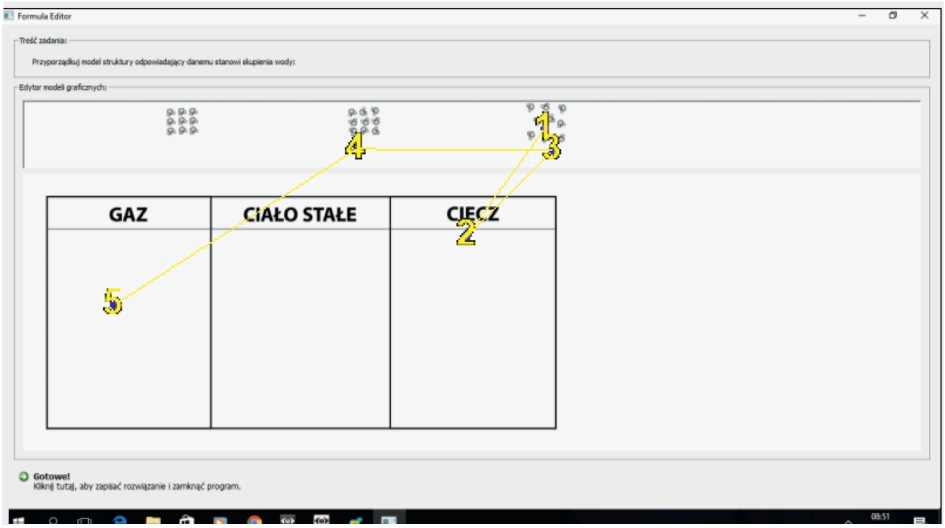

Fig. 4. The record of order of given fixations.

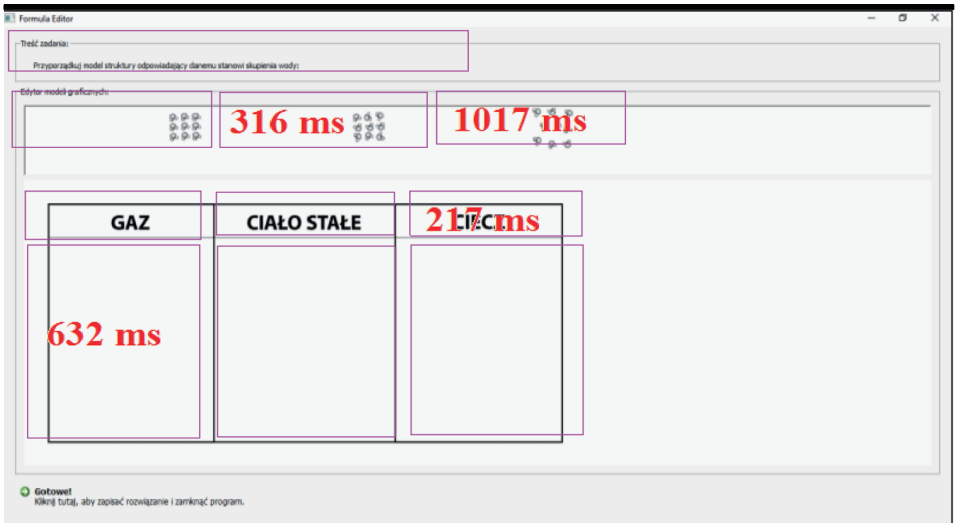

Fig. 5. The record of time of given fixations.

One can read the total time of solving given tasks with a mathematical precision. In the considered example the total time of solving the task was 19 s and 450 ms. Basing on the obtained data maps of eyes activities can be generated (so-called heat map) for the students. Blue color matches the shortest and red color matches the longest times of eyes concentration on a specific field of the monitor screen (Fig. 6).

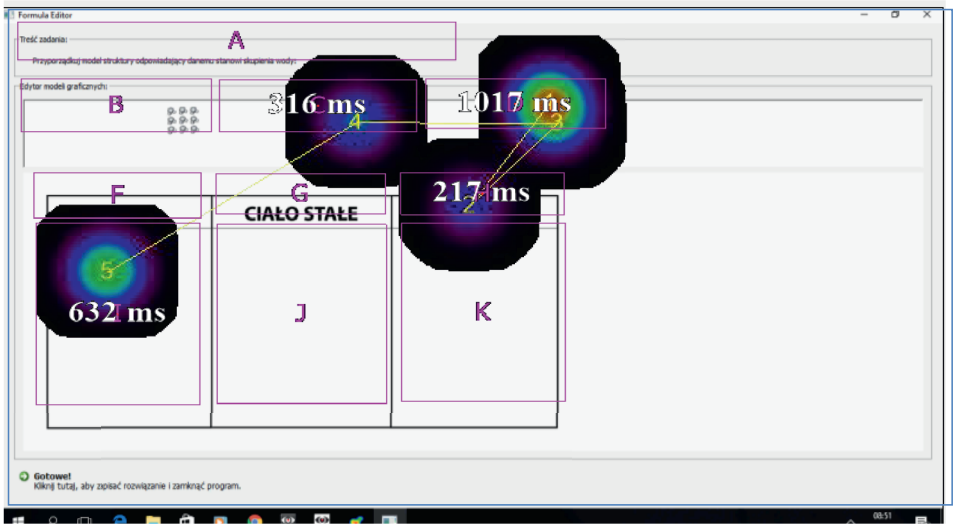

Fig. 6. The record of the research results – heat map.

Conclusion of the study

The above presented data may lead to a conclusion that the tested student has not read the description of the task as he immediately started assigning proper states of concentrations. He also did not return to the description while solving the task. Without a second thought he matched the model of the structure of water corresponding to the solid. He had no doubts concerning the correctness of the answer. It is possible to judge that he had serious "dilemmas" while matching the other two models of the structure of water. He pondered on one for a shorter time and longer on the other. Eventually the answers were wrongly matched. Hasten could be reason of a bad answer, which is backed by a very short period of solving the task (in comparison with other pupils). Furthermore, the student's final grade in science was "very good", as it was learnt during the study. The results of studies done with the eyetracker confirm that it is an ideal tool to use while positioning the way of solving of task, which is particularly interesting in the case of students whose result were unsatisfactory.

All the above mentioned information concerning students thinking while doing a specific task by a specific student cannot be obtained while using a traditional test (a short test or a class test) or even during an oral answer.

Conclusions

One of the mistakes of a present-day system of education is checking how well the knowledge was mastered by a student as the competences tests show. Their analysis gives information on the percentage of students who did a given task correctly. In the case of too few number of correct answers a teacher is obliged to prepare a recovery plan. However, the basis of the plan is not known as the teacher does not know why the students gave wrong answers (which the teacher does not even see). Yet, to prepare a recovery plan the reasons of a student's failure need to be known. According to Paśko and Rosiek (2004) one of the major mistakes of a present-day system of chemistry education is too great a focus on the importance of checking students' achievements. The difficulties which students face while doing a given task are too rarely taken into consideration. That is why the ways of students' thinking should be studied through tracking their eyesight while doing the task. Only eyetracking studies allow us to optimize the process of learning, especially the individualization of the process.

Ending

Eyetracking enables tracking and recording a way of analysis of tasks, diagrams, strategies of choosing answers while doing tasks and searching for typical mistakes made. Methods used so far only gave the possibility to state if the answer is correct and if the student did not exceed the given time limit which was set due to a key that was usually not very clear. This new technique of studying is very easy to perform and the results achieved satisfy even high expectations of the researchers. These measurements allow justifying the reason of a wrong analysis that takes place in a student's brain while doing a problematic task. They also give the possibility to set the time limit needed to solve a given task. Due to these studies it is possible to state how many times a student returns to the same place on a displayed board. Both the dynamic and the static images, as well as tasks in which a student needs to relocate given elements, can be the subject of the analysis.

However, to be able to use the opportunities of eyetracking to the full extent, special software needs to be prepared. One example can be a teaching-checking computer program of writing equations of chemical reactions (Paśko & Jyż, 2007).

Eyetracker is especially useful in didactic research concerning the natural sciences instead of a piece of paper. Therefore it can be stated that eyetracking is the future of didactic research especially in the field of natural sciences.

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Eyetracking or a piece of paper in didactic research

Abstract

The topic of control and assessment is one of the most important fields of didactic knowledge. Teachers usually use traditional methods of verifying knowledge, which are oral, written, and practical tests. Despite the fact that using the above-mentioned methods is easy, they are burdened with a high dose of subjectivism, being often "intuitive". Contrary to popular beliefs classical methods also have limited possibilities of making the assessment of school achievement. Due to dynamic development of electronics and IT tools new, non-invasive methods of monitoring psycho-physical parameters appeared, that is eyetracking, which enables to track the path of solving the task which allows a precise analysis of a way of reaching given results by the student. The difficulties which students face while doing a given task are too rarely taken into consideration. That is why the ways of students' thinking should be studied through tracking their eyesight while doing the task. Only eyetracking studies allow us to optimize the process of learning, especially the individualization of the process.

Key words: eyetracking, instructing, verification of knowledge, didactic research

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Sustainable development in terms of health education as a part of students-future teachers training

Introduction

Culture, technology, environment, media, economy and ideological beliefs have an influence on shaping world's trends in the field of health promotion and health education. Formal education serves to gain knowledge, skills and values necessary to achieve a sustainable life, also in the area of health. Educational activities play a great part in transmitting principles of sustainable development to the public. They enable students' community to solve their health issues (Davis & Gibson, 2006; Fleming et al., 2009; Frumkin & McMichael, 2008; Nutbeam, 2000).

Modern education is associated with a significant tendency of changing approach to the school programs and social knowledge. One of the elements of this knowledge is developing the responsibility for the health of an individual and other people (Potyrała, 2011).

Health is recognized as a fundamental concept in education and 65% of adult Poles list it as a condition of a happy life (Woynarowska, 2007). In this context, the importance of "health literacy" is crucial and one of the greatest social challenges is sustainable development in the field of health education. Human health is associated with environment condition and economy, as well as educational and pedagogical activities (Upton & Thirlaway, 2010; WHO, 2002). The details are presented in the Figure 1.

The Convention on the Rights of the Child, adopted by the UN in 1989 established health education as the fundamental right for all children. Promoting appropriate behaviors is a global health idea. Around the world, efforts are aimed at protecting and improving health. The family is responsible for this process as well as the education system and society as a whole (Resolution of the Council of the European Community, 2009; Callcott et al., 2012; Glanz et al., 2015).

Engaging students in activities promoting health increases the level of their health condition and integrates health education with pursuit of a sustainable world (Davis & Cooke, 2007; Orme & Dooris, 2010). Since 1992, "Health promoting schools" have been operating in Poland. This idea assumes that the main purpose of health education is to supply students with knowledge and motivation in order to take appropriate activities to promote health in the community.

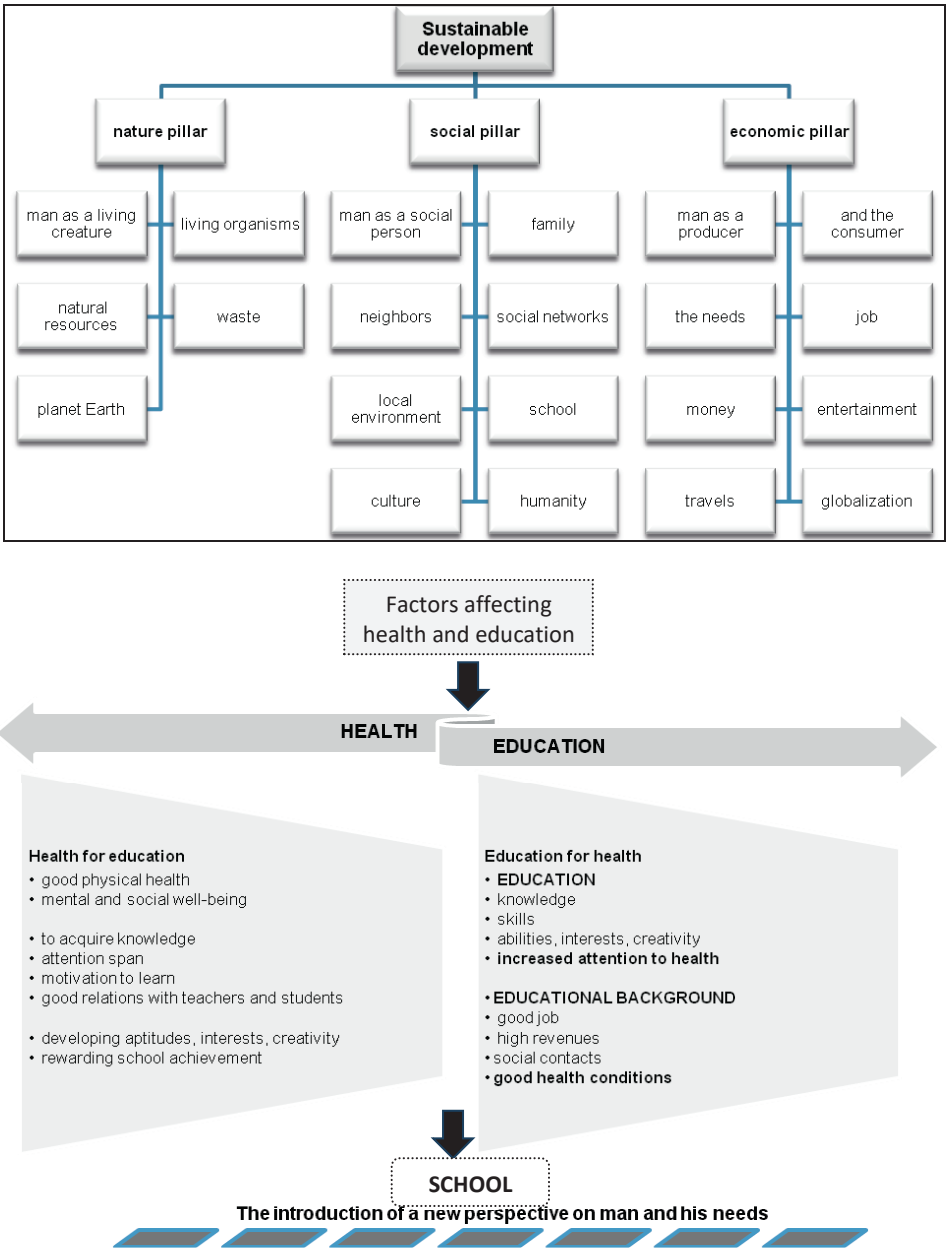

Fig. 1. Health education as the component of social pillar, economic and natural environment for sustainable development (own study based on: McKeown et al., 2002; Woynarowska, 2011).

The ESD strategy is reflected in the records of the Polish curriculum of general education of 23 December 2008 (as amended) in the form of the inventory. It was necessary to meet the issues and students' competences shaped by the level of education. ESD takes place not only during biology lessons, but also in the daily functioning of the students in the school environment by representing the appropriate behavior and participating in school activities that promote the idea of sustainable development. Furthermore, new media have a large educational impact on public health. It shapes knowledge and foundations of pro-health attitudes. In this field the most important are: Internet, social campaigns, commercials and TV shows, outdoor advertising (Turbiarz et al., 2010; Diagnoza społeczna, 2011; Purchałka & Czerwiec, 2013).

Methodology of research

The main aims were: 1) diagnosis of the degree of realization of the idea of sustainable development in the field of health in schools / implementation of the principles of health education by the schools; 2) analysis of the health behaviors of junior-high and high school students.

Pedagogical observation was carried out by 150 biology students (teachers-to-be) from the Pedagogical University during the course of professional practice of teaching. Including the element of pedagogical practice connected with carried out research was related to developing students' competencies in the area of selected aspects of the observations.

It included 105 schools (75 junior high schools and 30 high schools) in Krakow and smaller towns of Małopolska and Podkarpackie regions.

The observers prior to the start of research are adequately trained and provided with instructions and observation sheet, prepared on the basis of the literature (Angrosino, 2010). The observation sheet was divided into 6 areas: 1) hygiene and health of members of the local community, 2) nutrition, 3) physical activity, 4) relationships between members of the school community, 5) school management and organization of the school, 6) the local environment. It was found that observers in each school have made a compact record of events observed in each area for 5 days during the so-called long break and for 20 minutes after lessons. The observers obtained some of the information necessary to complete the worksheet during discussions with members of the school community. The comparative analysis was made within the areas of observation between the various types of schools. Separated analysis was carried out for the junior high schools and for the secondary schools. In addition, apart from the observations, also carried out were analyses of curricula and education implemented in the surveyed schools. In total, 10 programs were analyzed – 6 programs for junior high and 4 for high school. The study was carried out in accordance with a unified guide program analysis. There was searching for keywords like: ecological and health-related topics, human rights, combating inequality in various spheres of life. On the basis of supplemented programs for each school, the frequencies of the appearance of the general and specific terms were counted.

For the purposes of this study, there were selected, from all areas of observation and analyzed curricula, only those aspects of SD associated with health protection.

Results

Analysis of curricula

The most often appearing questions about health, both in junior high schools and high schools, were the issues connected with pro-health attitudes, health hygiene, nutrition and physical education, as well as prevention of diseases and human genetic diseases. The issue of physical activity is accomplished only on a basic level (the meaning of physical activity and recreational exercise for students). Young people are insufficiently educated about the dangers of cigarettes, drugs and alcohol and its influence on physical and mental health, as well as long-term health harm because of addictions (Fig. 2).

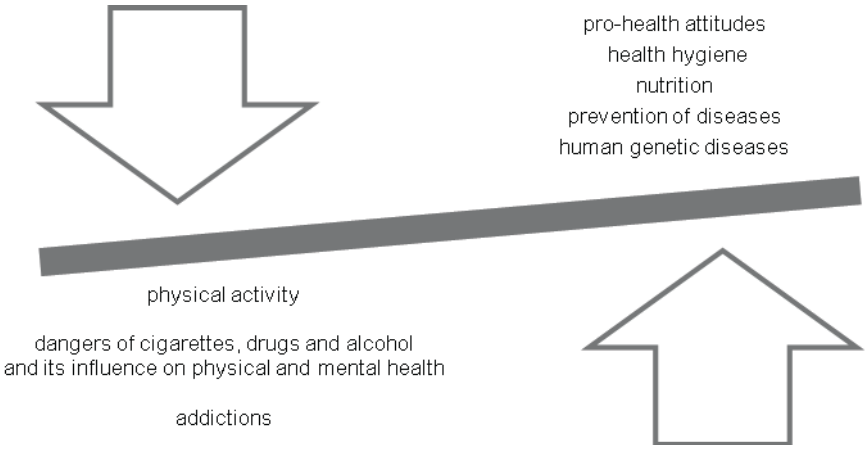

Fig. 2. Issues realized in both junior high schools and high schools.

There is more information about nutrition, varied diet and modern health hazard at junior high school than high school (balanced diet, the energy value of essential nutrients, civilization diseases, mental and physical health, emotions and resistance to stress). On the other hand in high school it is more discussed about influence of viruses, bacteria, fungi and protists on human health (Fig. 3).

Polish curricula strongly promote the use of ICT in the implementation of sustainable development in the area of health promotion issues. The implementation of these contents is based on using new media in search of information about health, diseases and their treatment, medicines, active lifestyle, stress and addictions on the Internet. Students should know how to search for information using search engines, specialized services of health, medical discussion groups or forums; as well as they should use ICT to create pro-health projects by themselves.

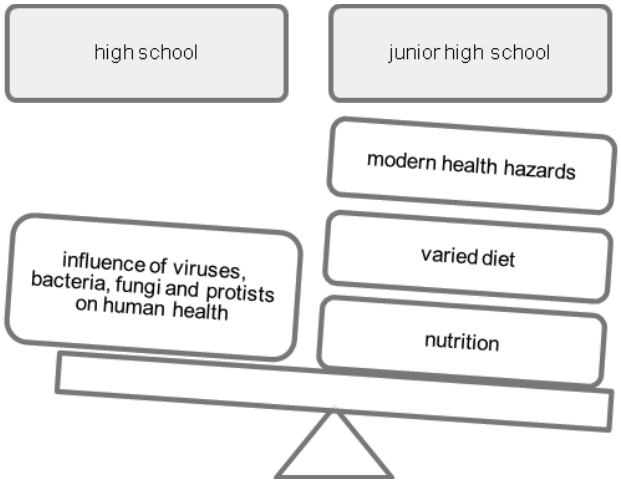

Fig. 3. The differences between the degree of implementation of issues on health in junior high schools and high schools.

Pedagogical observation at schools

Tables 1–4 present some actions taken by the junior high schools and high schools in health issues.

Teachers on duty on school corridors watch over students' safety (100% of schools). Unfortunately, incidents of smoking outside the schools occur sometimes. Students (70% in junior high school and 85% in high school) wear backpacks on one shoulder. Fortunately, teachers in each school pay attention to the wrong way of wearing backpacks and the position in which students sit in classrooms. The list of actions are included in Table 1.

Table 1. Actions/phenomena connected with health and pro-health behaviors in junior high schools and high schools – health & hygiene.

The observed phenomenon	% of schools/students	
	junior high school	high school
The duration of breaks: 5 to 20 minutes depended on the time of the day.	100	100
Teachers take care of pupils on the corridors during breaks.	100	95
Pupils sit in a wrong way at their desks (they swing on the chairs).	80	80
Pupils wear their backpacks only on one shoulder.	70	85
The problem of pupils smoking.	30	30
Toilets well-equipped (access to soap and towels).	95	85

Students have the opportunity to buy healthy food (80% junior high schools, 80% high schools) and unhealthy (30% junior high schools, 80% high schools) in school shops. Most schools have a canteen serving healthy lunches (80% junior high and 90% high schools). In each junior high school are cases of overweight and obesity (10% of students), malnutrition (5%) and anorexia (1%). In high schools few cases of overweight have been noted. A detailed list of actions is presented in Table 2. The crucial fact is that the Polish government in 2015 (a few months after the students' observations) introduced a bill prohibiting the sale of junk food in all school shops.

Table 2. Actions/phenomena connected with health and pro-health behaviors in junior high schools and high schools – nourishment.

The observed phenomenon	% of schools/students	
	junior high school	high school
Breakfast (sandwiches) eaten in the corridor.	90	40
Lunch break after 12:00 p.m.	100	100
Free meals for eligible students.	80	–
School canteens.	80	70
School shops with healthy food: fruit, water.	80	80
School shops with unhealthy food: chips, cookies, candy bars, sweet fizzy drinks*	95	80
Water coolers in the corridors.	30	–
Pupils obesity.	10	10

* the observations were introduced before the entry into force of the Regulation on groups of foodstuffs for sale to children and the youth in the units of the education system and the requirements to be met by foodstuffs used in the context of public nutrition of children and the youth in those units (Dz.U. z 2015 r. poz. 1256)

Schools are equipped with gyms (90% of junior high and 95% of high schools), school playgrounds (100%), gyms and small fitness (40%), climbing walls and halls for martial arts (20%). They also have access to the pools (40% of junior high and 80% of high schools). Each school organizes competitions and extracurricular sport activities. Sick notes from physical education classes among students (mostly girls) occur in 40% of junior high and high schools. Details are presented in Table 3.

Table 3. Actions/phenomena connected with health and pro-health behaviors in junior high schools and high schools – sport & physical activity.

The observed phenomenon	% of schools/students	
	junior high school	high school
Big, well-equipped gyms.	90	95
School playgrounds available for pupils in the summer.	100	100
Gyms available only during physical education lessons.	80	70

Varied exercises during physical education classes.	20	20
Swimming.	40	80
Sports competitions organized by school.	100	100
Sports special interest groups.	100	100
Fitness, zumba, aerobics in the way of extra-curricular activities.	40	10
Climbing walls and halls for martial arts in the way of extra-curricular activities.	20	–
Sick notes from physical education classes.	40	40
Pupils come to school by public transport.	no data	60
Pupils come to school on bikes.		10
Pupils come to school by cars.		30

Pro-health issues were discussed in small number of schools during form periods/homeroom hours. All of health protection issues are discussed during biology lessons. In small number of schools there were some meetings about healthy eating with doctors and dietitians. At all schools there are posters and flyers about unsafe behaviors connected with addictions and their bad influence on human health. At some schools there are non-smoking signs (Table 4).

Table 4. Pro-health actions in junior high schools and high schools.

Activities	% of schools	
	junior high school	high school
Notice boards/bulletin boards and posters in the school corridors		
Education in the anti-smoking and anti-alcohol prevention	100	60
Promote healthy eating	100	30
Form periods/homeroom hours		
about health protection	–	30
meetings with dietitians and doctors about healthy eating	10	20

Observation and analysis of curriculum were supplemented with a discussion, with the observers participating in the study. It describes the current situation of sustainable development in the area of health protection. On this basis, there were established proposals for action to increase pupils' awareness in this area, e.g.: pay more attention to the effects of various diseases, involve schools in social activities and increase awareness of health-friendly students, create projects and receive grants from organizations that promote health behavior actions (Table 5). Students emphasized that such activities were developed at schools through using ICT by teachers. Teachers often implement pro-health contents based on WebQuest – pupils create health-promoting projects based on instructions posted on websites.

Table 5. Proposals for raising pupils' awareness of sustainable development in the field of health protection

Problem: Realization of health education in Polish schools		
How it is? • The lack of consistency in the school activities (no imposed penalties for breaking the rules, eg. smoking). • Insufficient funds (poor equipment of schools, too many pupils in classes). • Health-related posters and leaflets hanging on the walls for too long so they do not fulfill their educational purpose. • Applicable (broad) curriculum must be implemented, thus teachers "have no time" to deepen the contents dealing with health. • Not paying attention to eating healthy meals in appropriate conditions. • Lack of in-depth presentation of the harmfulness of drugs (cigarettes, alcohol) and knowledge of the diet in terms of risks, rules of use of dietary supplements, weight loss and encourage the growth of muscle mass.	**How should it be?** • Pay more attention to the effects of various diseases and addictions. • Involve schools in social activities and increase pupils awareness of pro-health behaviors. • Only healthy food in the school shops and canteens in affordable prices. • School playgrounds available not only during physical education classes. • Sick notes from physical education classes should be verified by school. • Increase the awareness of preventive medical examinations for health.	**Why is it not as it should be?** • Pupils cannot choose health education issues they are interested in. Sometimes contents are boring for them. • Scant involvement of the authorities in efforts of health promotion. • Many teachers and parents are not interested in shaping pupils awareness about consequences of unhealthy behaviors. • Teachers have not enough knowledge about health protection. • Insufficient promotion of health behaviors during breaks, lessons, school trips. • Adults often force pupils to particular way of life (not always good for their interests) without the plurality of alternatives, eg. physical activity.
Conclusions		
• Involving pupils in the promotion of healthy lifestyles (eg. long-term projects). • Discussions about health care during form period (more meetings with doctors, nutritionists, fitness instructors) – realization of issues connected with pupils' interests and needs. • Creating projects and receiving grants from organizations that promote health behavior actions. • Promoting health education by celebrities (actors, singers). • Removing machines with sweets and sweet drinks; implementing machines with water and fruit. • Good relations between school, teachers, parents, pupils and local community.		

Conclusions

The acquisition of habits with consciously attaining the idea of sustainable development is related to the educational activities of a school, the local community and non-formal education institutions. Their scope of activity includes the development of students' beliefs that the functioning of the human body depends on the actions taken by the man to influence the improvement of their health and well-being.

The ESD is permanent education, which should be started at the lowest level of education. Certainly, a school (due to the range of influence) is the main area of the ESD implementation by developing awareness and competence of the students in the context of taking pro-health actions at the level of the local community, national and global.

Particularly important is the cooperation between school, local community and parents, who should continue and complete teachers' tasks in the area of children's health education by traditional educational activities, as well as using ICT.

Recommendations

The changes in health education are aimed at the development of educational standards, introduction of which ato the various stages of education will improve the quality of health of the Polish society. It is necessary to provide conditions in which knowledge and skills gained from the school will be used in everyday life. In particular, it is also important to emphasize the need of shaping proper attitudes to maintain health (proper nutrition, physical activity, avoidance of drugs, preventive examinations, etc.) and their gradual consolidation.

In the last few years, many new solutions have been introduced in this area. However, to be able to speak about full success, its implementers (teachers) should be allowed to acquire the relevant professional competence. Reflection of students, on the need to change the curriculum of biology and activities of schools aimed at raising pupils' awareness of health, indicates the need to include a permanent thematic observations to the course of practice. Verification of competence, in the practice means giving the future teachers a conscious self-evaluation tool: the verification of educational goals and educational evaluation of the effectiveness of educational activities, planning and searching for new solutions.

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Sustainable development in terms of health education as a part of students-future teachers training

Abstract

Health education and health-promoting behaviors are significant elements of the social pillar, economic and natural sustainability. The results of pedagogical observation of pupils' health behaviors, as well as conclusions related to accomplishment of the principles of health education at 75 junior high schools and 30 high schools are presented in the paper. The analysis of observations and curricula were supplemented by interviews with the 150 second year master degree biology students who had participated in this study as observers. On that basis the diagnosis of the current situation and proposals for action to raise awareness of students in the field of sustainable development were made. Results of the research showed that community, parents and non-formal education institutions should develop students' beliefs that the functioning of the human body depends on the actions taken by the man to influence the improvement of their health, and school is the main area of the ESD implementation.

Key words: education for sustainable development, formal and non-formal education, health education

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Restorative justice in school mediation

"Justice in punishment, not severity, sanctifies the power of law"

Montesquieu

Introduction – Justice

Since the dawn of time people have shown a great need to be treated fairly, worthy and "according to merit". Throughout various artifacts of the past, works of literature, monuments of culture and also science, history of mankind shows that man manifested a huge awareness in the field of justice and the need of reparation or compensation.

In different cultural circles it manifested itself in different ways. Ancient Christian "eye for an eye, tooth for a tooth", Hammurabi's Law, classic Vendetta or payment in gold were compensation for harm done.

The notion of justice itself has many meanings and they are used in different contexts, and its sense is extremely subjective. What is (or should be) fair may be dependent on the social norms applicable in a given culture, generally accepted principles of social co-existence, but also universal values. A. Lewicka-Zelent (2015) thinks that: "justice should be understood as a timeless value that is unlimited by cultural, gender and space-time barriers, etc. and that is largely associated with human behavior. The sense of justice, however, expresses the subjective feelings of a human being about it". The special need of justice arises in a conflict or harm situation. Then, the implementation of justice involves a punishment that should be commensurate with guilt.

Retributive justice

The administration of justice along with the system of punishments from the tribal times evolved in parallel to the ages, adapting ever newer ideas, until the time when reconciliation became a value. However, it is very difficult to achieve and requires work and involvement of all parties of conflict. An additional difficulty on the way to it, is the demanding attitude and deep victimization. "Traditional reaction of society to the fact of committing a crime is to punish the perpetrator with the punishment that is proportional to the guilt and social harmfulness of the act. The need for punishment according to the assumptions of classical criminology results from the requirements of the principle of retrieval justice. However, for

several years in academic debates there has been a growing articulation of the need to use a differentiated remedial (retaliatory) method of reaction to crime, namely conciliation, which could result in the perpetrator remedying the crime" (Ciepły, 2009). Implementation of retaliatory justice does not bring such positive effects in comparison with restorative justice, because, as mentioned earlier, the sense of justice is strongly dependent on subjective impressions. The penalty appointed arbitrarily, imposed, does not always bring relief to the harmed person. What is considered in restorative justice as "a punishment", should be a consequence of the agreement between the parties to mediation.

In situation, where perpetrator can independently draw conclusions and propose real solutions for implementation and acceptance, the educational process begins as well.

Restorative justice

The beginnings of restorative justice (RJ) go back to criminal law. However, it is currently used in various dimensions in many types of mediation. It is of the greatest importance in penal mediation, where relations between victim and perpetrator are particularly critical. This does not mean, however, that it is not important in the other types of mediation.

Retribution at school usually dominated over other restorative methods in terms of the victims, as well as the perpetrators. It is precisely on this canvas that restorative justice has found its application also in school mediations with particular emphasis on peer mediation. The reason for this is that the RJ is associated with morality, education, values and attitudes towards other people. It generates positive attitudes, thanks to which the perpetrator understands the act, assesses the degree of caused damage on the basis of the victim's report (and maximum positive interaction with him/her), and then works independently on compensation.

Writing the form of "payment" in the form of a settlement for the harm done is an important motivating, but also a controlling element, on the basis of which the consequences are obtained in the event of unjustified partial withdrawal or complete resignation from repair or compensation. It can be said that the RJ is a process by which a positive change in the way of thinking and acting takes place. This promotes building a sense of security and respect. "People involved in a conflict should not experience dehumanization from other people, but should trigger mutual trust and intensify cooperation" (Lewicka-Zelent, 2015). In the case of young people, who are often lost and are looking for corresponding values and attitudes, who are in a difficult situation related to the conflict, the idea of restorative justice can be used as a "training" of responsibility for their actions. "It is emphasized that the great advantage of the idea of restorative justice is the possibility of the victim actively participating in his/her own case, what is to help him/her out of the personal crisis caused by the crime" (Ciepły, 2009). At the core of the RJ stands "seeking to remedy the wrongs or crimes committed. The essence of restorative justice programs and practices is involvement and cooperation of all persons in whose interest is solving a given problem" (2017: http://www.mediacja.com/index.php/

Sprawiedliwosa-naprawcza.html). A. Lewicka-Zelent (2015) defines RJ in a similar way: "The essence of restorative justice is the process of satisfaction, in which the harmed party can get a part of compensation in a financially-material (e.g. giving back someone else's property) or immaterial form (apologizing to someone, help in performing a certain act). Also, the side of conflict may commit to a particular behavior, work, study, treatment or therapy, or social work".

Mediators take actions to ensure that all participants in the dispute can concentrate on the feelings, needs and expectations of the harmed person, including the possibility of the perpetrator of the damage.

Applying the principle of restorative justice to students during mediation

In mediation, RJ may be independent initiative of the parties. The proposal for compensation and creation of solutions should be made voluntarily by the perpetrator, which makes that this principle can be considered as a creative and developing element of mediation. However, it should be remembered, that all "promises" connected with RJ have to be equally accepted by both sides of the conflict. In the case of teenagers, a mediator should pay special attention to the parties for possible consequences resulting from the implementation of the idea of restorative justice. What is more, looking through the prism of the whole process, the advantage of mediation is, above all, that it can lead to understanding by the underage the essence of evil, and that his behavior has caused a lot of suffering, loss, and even ruined life to someone very concrete. Harmed person – whereas – may find out why he/she became a victim, what motives guided the minors when choosing him/her as a subject of attack, which may weaken his/her fear and restore faith in people. The system's response to violations of criminal law will be more rational and at the same time understandable not only for the perpetrator and his social environment, but also for the aggrieved party and people in his circle. Undoubtedly, it has significant impact on the increase in the level of trust for the system, and also – what is very important – has an educational value (Bieńkowska, 2011).

Describing advantages and disadvantages of restorative justice in school practice, the following advantages and disadvantages may be indicated:

I) advantages

1. Learning the responsibility for decisions and actions.
2. Gocusing on the other person (victim).
3. Independent compensation.
4. Help the victim out of the crisis.
5. Prevention of future undesirable behavior (and/or conflicts).
6. Focus on the problem, needs, feelings and interests, not on the punishment itself.
7. Emphasizing the parties' initiative.

II) disadvantages

8. Strong connotations with criminal law.
9. Terminology related to the identification of a conflict with a crime.
10. Frequent involuntary stigmatization "victim", "perpetrator".

In addition to many pluses, there were some remarkable remarks in minus. First of all – historical-mediational feature of restorative justice, which is connected with criminal law. From this comes another negative premise, which in criminology connects with the phenomenon of victimization. "pigeonholing", classifying is a human reflex, which may be very harmful not only for a perpetrator, but also for a victim. Another disadvantage turns out to be terminology. In mediations, it is common to understand two concepts – crime and conflict – in the same way. "However, it seems that identifying a crime with the concept of "conflict" in a signaled context is a fundamental mistake" (Ciepły, 2009).

Although, despite individual remarks, the application of the idea or the principle of restorative justice in school mediation can – potentially – bring more good than evil, the more so that terminological problems are less important for young people. In the conciliation process their personal feelings, needs and interests are much more valuable for them.

Before the idea of restorative justice "hit the roofs" of Polish schools, many undertakings were organized to promote it in the mediation, court and educational environment, according to the assumption "first education". Following this, in 2002, one of the largest campaigns promoting both mediation and restorative justice was organized. Coordinator of the campaign were members of Polish Mediation Centre. As part of it, a competition "I solve disputes without violence, or what I know about restorative justice in Poland" was prepared. "The competition was also intended to counter violence at school. It was run in 12 Polish middle schools. 3500 people (students, parents and teachers) took part in the competition took part 3500. The first stage of the competition was directed to parents and teachers. During meetings in this group, organizers talked about how conflicts can be solved without violence, what restorative justice is and what is the difference between restorative justice and retributive justice. At that time, children wrote an essay on a personally experienced or imagined conflict. The second stage of the competition (preceded by training on communication without violence, active listening, forms of resolving conflicts, mediation – its principles and benefits), children resolved the test and prepared visual works illustrating the benefits mediation can bring. At the end students answered the question: "What can I do to reduce mental and physical violence in my school?". Many children taking part in the competition postulated that a permanent mediator should be employed at their school. They noticed that in school conflicts are usually resolved in a forceful manner (Staszewska, 2002).

Since then, the "mediator at school" is a very common postulate, but so far, the right measures at school have not yet received adequate legal and financial support from legislators.

Restorative justice conferences as a form of social mediation at school

"Simple", but also one of many ways to achieve restorative justice at school are so-called restorative justice conferences (RJC). Over the years since their introduction in Poland, as a form of solving conflicts and other difficult situations, they have evolved greatly by generating different types/styles of organization. Since

2005[1], restorative justice conferences gain more and more recognition above all among social workers (Grudziewska, 2015), social pedagogues and teachers, mainly because of efficiency, speed and quality of undertaken activities. It is worth to refer to three types of education in the situation of interpersonal conflict. These types include two basic paradigms: behavioral and humanistic (Olubiński, 2015). These types are:

1. Conflict-destructive education – "stick".
2. Collision-free education – "carrot" (otherwise static-conservative).
3. Conflict-constructive education, so-called dialogue (subject-emancipation).

Restorative justice conferences are included in the idea of dialogical education, which is why in the conciliation process they constitute a special form of striving for satisfaction and reconciliation. Anyone, who can influence a positive solution of a difficult situation, can offer real help and those who have appropriate legal means to help, can be invited to a conference. In RJC those should also be attended by people, who are every day responsible for education of a minor. They can therefore be:

a) parents or legal guardian,
b) relatives taking part in education, e.g. grandparents or adult siblings,
c) pedagogue/psychologist,
d) teachers,
e) social worker,
f) family assistant,
g) schools superintendent,
h) neighbors or other close people.

The meeting is led by a moderator/mediator (an impartial neutral person in a dispute), who, above all, cares for the order of meetings, equality of parties and is a clarifier of solutions. He/She is responsible for building the climate, atmosphere of trust and safety. During the meeting, participants agree on solutions and a restorative action plan. Any proposed actions should correspond to the SMART principle. In restorative conferences, the most important are a process of drawing conclusions that are important both from the perspective of the perpetrator and of the victim, and also the stage of implementation of the provisions of the settlement in the process of satisfaction. Restorative justice conferences[2] are organized when the problem that we should deal with is coupled – it affects many aspects of a child's life and it is necessary to involve other institutions to help.

Another way to achieve restorative justice are mediations. In this context there is the possibility of, without including a third party, finding a way to joint activities, that bring the parties closer together, which in the future may prevent re-conflict between them. Here appears also the thread about situations, when there was damage to property (e.g. student's items), which would result in costs of repair or repurchase.

[1] This year, mediations have been entered into civil law as an alternative, out-of-court dispute resolution method, definitely going beyond the area of criminal law. First restorative justice conferences in Poland were tested by members of Polish Mediation Centre.

[2] We are only talking about a certain dimension of the restorative justice conference regarding the school environment. They have many more varieties and uses.

Then, parents are also invited to mediations, and the form of compensation is discussed – mediated also with their participation.

Another model of realization of restorative justice at school which is noteworthy is the so-called Method of Shared Concern, which is most clearly described by E. Czerniowska-Koruba. "The Method of Shared Concern was developed by Anatol Pikas, a Swedish psychologist from the Department of Education at the University of Uppsala. It is particularly recommended in situations where a group of students is using violence against one or several colleagues. The Method of Shared Concern focuses on finding a solution to the problem; it does not explain the details of the situation of violence, it does not deal with the investigation of the truth or fixing the guilty party, nor does it assume the creation of friendly relations between the students. Its purpose is to put in practice basic rules allowing students to stay in the same school – without harming others" (Czerniowska-Koruba, 2017).

Conflict – educational situation

When organizing restorative justice conferences, it should be kept in mind, that conflict does not have to be destructive, just the opposite. Well managed, it can become an ideal educational situation. Considering the scientific discourse, which in its essence is a substantive conflict of arguments, it could be said that conflicts are natural situations, which everybody meets in life. In order to implement the principle of restorative justice at school, the mediator should therefore remember the positive functions of the conflict and not focus on its negative aspects. This is a condition that support building a sense of justice among the parties.

Analyzing the positive functions of the conflict, we can distinguish the following:

- motivational functions – conflict at school leads to action, reduces stagnation, makes you solve problems,
- innovative functions – conflict at school forces managers to search for alternative solutions, beneficial to more than one party (…), forces to better define the views on a given topic,
- information functions – conflicts help to get to know new facts, aspects of problems not previously noticed by the parties, correctly solved they can improve vertical and horizontal communication, they also increase interest and lead to self-discovery of the group,
- exploratory functions – thanks to a conflict, the management and superiors can take into account all the assumptions hidden so far, data giving rise to doubts and other facts pertaining to the matter and the whole functioning of the school (Błachnio, 2015).

For restorative justice to be of an educational nature, to become a value in the mediation process, the student must be faced with a conflict situation or other difficult situation, such as with a task to be solved. Therefore, the mediator will be re-evaluating the conflict in the developmental and problem situation. Such a necessity before mediator or teacher puts not only the desire to bring reconciliation but also dynamic changes taking place both in society and in the education system. "If a student at school has to learn how to learn, he is to be put in new, problematic

situations for him, demanding to get the information and use it to solve the problem, and thus acquire the appropriate skills and attitude. Therefore, the education process requires reversing the order, first the student has a problem situation and is looking for information to solve it, and does not absorb information that later may be useful for solving problems" (Zimny, 2015).

Striving to implement restorative justice at school can be used as part of democratic education. Conflict situations allow to shape different types of attitudes "from anti-creative and submissive, through destructive-aggressive to creative-emancipation. (…) What kind of attitude will eventually be shaped in a conflict situation depends on its type and dynamics as well, and the level of pedagogical awareness of people, groups or communities in which such situations take place" (Olubiński, 2015). These attitudes directly translate into social relations and the expressed views. By creating a worldview discourse at school, students are brought up *de facto* in a conflictual (problematic) situation and learn to argue their choices. An important aspect in a mediation process is initiative and creativity of conflicting parties. Usually it is reflected in the efforts of the parties to independently create solutions and individual conditions for a settlement that can be implemented. Thanks to the involvement of both parties (students) in solving the conflict, special attention is paid to positive and creative solutions that are much more valuable than those which, as in the case of ordinary punishment, are imposed, often inadequate to the needs of the victim and real in relation to the possibility of the perpetrator. "Individually solving the conflict, through discussion and communication is equally important for teachers who can benefit from the creative imagination of young people and its specific ideas" (List Rzecznika Praw Dziecka, 2011). School is special place for building interpersonal relations. Relationships from school often last and they connect people for a long time after completing formal education. Therefore, conciliatory solution of conflicts, learning dialogue rather than aggressive way of dealing with difficult situations should be organized with the effects on the future in mind – how young people will someday manage in relationships with loved ones, at work, in different situations and social contexts. This is emphasized, among others, by Cz. Banach who writes: "The tasks of education in the field of human functioning should be considered in its relations to society, people, work and culture" (Banach, 2007).

Education for justice

Using conflict as a learning situation is not only appropriate for building social relations in the classroom, at school, and later in family and the workplace. Striving for justice in a conflict situation, not retaliation but reconstruction, supports a balanced social development of the individual and is an important element of peace building in the future. Mediations, arbitration, restorative justice conferences or another alternative methods of solving conflicts are conducted with respect for human rights, the right to follow people's own internalized values in life, expressing views consistent with people's own conscience and experiencing emotions in an atmosphere of security, which gives space to the parties to

express their emotions and feelings and what could be related to the development of the conflict. Therefore, mediations and restorative justice conferences are methods which support education for justice. "Education for justice is educating in the conviction that human rights are connected with his duties and even they result from them. The right to life results from the duty to protect it, the right to property from the duty of own development, the right to freedom of speech from the duty to care for the truth. Therefore, in order to teach people how to respect human rights, it is first and foremost important to show the duties that lie at the root of them. These rights, separated from the duties that guarantee them, can become something that develops exasperate individualism, breaks down society and destroys the common good" (2017: https://dzielodlapokoju.wordpress.com/wychowanie-do-pokoju/wychowanie-do-sprawiedliwosci/). Restorative justice is realized by setting a clear course of action, a way of repairing the harm done, and thus by taking on a responsibility, a duty by the perpetrator (e.g. I will help with homework in mathematics, I will clear the written walls, I will take an active part in the charity campaign for the animal shelter, etc.). Certain obligations may also be assumed by the victim (e.g. I will not be more accosted, I will support a colleague in the organization of a charity event, etc.). Education for justice is a long process, but it has a guarantee of peace for the future.

Summary

The idea of restorative justice has much wider application than its original meaning. Although its purpose is to improve the situation in a satisfactory way, striving to get the improvement in the difficult situation can be developing and much more efficient than a straightforward punishment.

As in the literature on the subject, in the studies and relations of mediators known from their own professional practice, restorative justice aroused many emotions. This is an interesting, but also difficult subject, because of the connotations with criminal matters from which the idea of restorative justice has started its life. Many mediators adapt it according to the environmental conditions and the type of affairs they deal with, present this idea with delight in various articles, others keep distance and caution.

Important from the point of view of upbringing, the advantages of mediation are noticed by the Ombudsman for Children who writes: "in mediation young person has the opportunity to learn the constructive thinking about the dispute and respect for the other person, as well as tolerance, i.e. openness to the views of others. Thanks to mediation, the child learns the necessity of recognizing and understanding the existing situation – which is very important – from the perspective of the other party" (List Rzecznika Praw Dziecka, 2011).

However, it should be remembered that restorative justice is not something that is given, but it must be constantly pursued. It is difficult to achieve and unfortunately not always possible, but it should be combined with the system of punishing and rewarding as well. "(…) restorative justice assumes cooperation of the perpetrator, which – as you know – is not always possible. If there is no reconciliation and

compensation for damage, it may be necessary to apply other consequences to the perpetrator. Therefore, in an effective school system, the restorative approach will be integrated with the disciplinary response to breaking school norms and students should know that they have a choice between being subjected to disciplinary sanctions and taking responsibility for their behavior and satisfaction" (Czerniowska-Koruba, 2017). The teacher, the educator, and the mediator should make every effort not to cease in the effort to achieve restorative justice, because it is obvious that "punishment alone is not enough to improve a man"[3]. Sometimes the way he must go to get reconciliation and regain his own honor is much more important.

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[3] Polish saying

Restorative justice in school mediation

Abstract

The article presents the importance of restorative justice in school mediation. Corrective justice appears to be an educational model that can be used in conflict situations. It allows on the one hand to give the victim a sense of security, and on the other – the perpetrator is not just a passive recipient of punishment imposed by a teacher, educator, teacher, but he takes an active part in repairing damage and compensation. The article contains the answer to the key questions regarding retributive justice and corrective justice.

Key words: mediation, education, justice, retribution, victimization, compensation

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FORMAL AND NON-FORMAL EDUCATION – NEW ENVIRONMENTS AND CONDITIONS

Małgorzata Krzeczkowska, Barbara Krajewska

Non-formal education and soft competences – from personal experience

Introduction

Education is a complex process that takes place parallel in three different settings: formal at school, non-formal as an organized educational activity outside school, and informal as attitudes, values, skills and knowledge acquired in one's own environment (Okoń, 1992). The symbiosis of these three types of education should warrant full development of a young man that encompasses his/her knowledge, attitudes and competences. The latter ones include hard and soft competences. While hard competences are typically learned at schools and from books, soft competences include personal abilities, behavioral traits and personal motivators.

Soft competences have now been fully recognized as an indispensable element of education. This is because they help prepare young people for their future professional carriers and importantly, for active participation in the life of society. In Poland the soft competences make part of core curricula of all school subjects. From among the competences the following three: the skill of efficient and meaningful communication in all types of situations, the skill of efficient cooperation in a group, and the skill of resolving problems in a creative way, are of crucial importance from the point of view of future employers. Table 1 presents characterization of these competences along the Recommendation of the European Parliament and of the Council of the European Union, OJEC L 394 of 30.12.2006 (EU, 2006).

In this context, in this article we present an example of teaching-learning activity that belongs to non-formal education and we discuss the soft competences resulting thereof.

Good practice in non-formal education – personal experience

Within a 10-year long cooperation with the Children University Foundation we prepared and carried out, among others, five series of thematic workshops and two series of lectures. When preparing a workshop for children, one can exploit on the one hand, within children's perception potential, their natural curiosity, readiness to ask questions, as well as the knowledge they have acquired so far, and on the other hand, the underlying concept of a given series of workshops, as well as the elements

of work based on individual discovery of knowledge (scientific inquiry). In the case of a series of workshops named Discovery (age group 6–7 year-olds), whose motto was: We discover the world, we play and experiment, the classes are effectively "*a gate to a scientific adventure that is experienced in a friendly, safe and innovative manner*". By contrast, in the case of a series of workshops named Inspirations (age group 8–9 year-olds), whose motto was: Let's learn the richness of the world of science, the classes "*will inspire children to action and creative thinking*".

Table 1. Characterizations of competences of importance for future employers

Competence	Learning outcomes	Additional description
The skill of efficient and meaningful communication in all types of situations.	A student should know how to express thoughts precisely; obtain feedback information which should be understood accurately.	Interpersonal communication plays an important role in living and functioning in the society.
The skill of efficient cooperation in a group.	A student should know how to cooperate in a group, be responsible for fulfilling a task, pursue a common goal.	Modern man cooperates with others more and more (at home, in family, at work). Independently of the task he/ she has to perform, he/she is obliged to cooperate with different people. Modern man must be prepared to play a certain function/role in society and, at the same time, to change his/ her roles: of a leader, a partner, a subordinate.
The skill of solving problems in a creative way.	A student should be able to notice unusual matters, problems and search for non-typical, creative solutions.	Modern labor market requires creative people who are able to solve problems and act effectively in unusual situations.

In the academic year 2016/17, in April and May 2017 we ran 18 workshops for children in the Discovery series. Approximately 360 young students, enthusiasts of natural sciences, participated in the workshops. Each workshop lasted 45 min. The idea of each class was to have children work within 4-people groups. Each group worked at its own lab bench under the care of an assistant. As assistants worked students and PhD students of our Faculty, as well as in some cases, high school students, all of them instructed how to work with children.

Below we present a report on the workshop, prepared by Children University (Uniwersytet Dzieci, 2016) and the workshop's full program together with selected teaching aids.

Foaming, hissing and dancing bubbles are a disco on the tongue or a chemical phenomenon?

Fizzy drinks are full of gas bubbles that refresh and delicately tingle our palate. Are they present in a small, hard, effervescent tablet? In class the children will learn how these bubbles are produced and why when dropped into water the tablets bring about foaming accompanied by a characteristic sound. They will also check what parameters affect the dissolution of substances.

A pre-class task:
Consider if you would rather get a medicine in the tablet or syrup form. Which is easier to swallow? In which form does the medicine act more quickly?

The plan of the workshop:

1. Welcome, presentation of the main teacher and assistants – the children are seated in groups of four at their lab benches.
2. Presentation of the safety rules in the laboratory – what should be done to warrant the safe work? What must not be done? How should we work so that we do not disturb each other? – a talk with children.
3. A story about Winnie-the-Pooh – introduction to the subject matter with elements of engagement:
   Winnie-the-Pooh fell sick. He has a sore throat and a fever… How can we help him?
   The children were asked if they know what happens when they are sick. How can they be helped? What do their parents do to speed up their recovery? What formulations of medicine do they know – tablets, ointments, syrups, jelly beans?
4. Effervescent tablets – what do we already know about them? – a talk.
   In the talk the children were asked if they like effervescent tablets and why. Next, it was discussed if every tablet is effervescent.
5. Studying the rate of dissolution of an effervescent tablet – experimental work in groups preceded by a talk (brainstorming) and finished by filling in a worksheet.
   As a starting point to the experimental work the children were asked: Do you prefer to swallow medicine in the form of a traditional or an effervescent tablet? Which tablet acts in a quicker manner – effervescent or classic? Which parameters do you think affect the rate of dissolution of an effervescent tablet? Is the size of the tablet of importance? How many tablets will we use? Will we drop the tablet into water in one piece or in small pieces? Is the size of the pieces significant? What solvent can we use – water, mineral water, milk, oil, juice? What is the temperature of the solvent used? Cold water, warm water, hot water? How much solvent will we use for dissolving the tablet? Which effervescent tablet will we use? What type of medicine? The research groups in the class were given different subjects concerning the above effects (see the list below) for which they were expected to propose the appropriate experiments. The children presented their proposals by formulating their hypotheses and describing the experiments.

The choice of subjects:

- Degree of fragmentation (the whole tablet, ground and powdered)
- Temperature of the solvent (ca. 20°C, ca. 50°C, ca. 90°C)
- Type of the solvent (water, juice, milk, oil, sparkling water)
- Type of the tablet (pharmaceutical preparation)
- Number of the tablets used

Proposed hypotheses:

If I drop a tablet to a hot solvent, it will dissolve more quickly.
If I grind a tablet, it will dissolve more quickly.
One tablet will dissolve in a given amount of solvent more quickly than two tablets.
A tablet will dissolve in juice more easily than in the same amount of water.

In the course of experiments the children collected the data in the worksheets. The experimental part was summarized in an open discussion of the results – each group presented its experiment while the other participants completed the worksheets.

6. How could it be explained that some tablets effervesce when dissolving? – clarification of the effervescence.

What happens when an effervescent tablet dissolves? What do we see? What do we hear? What does it remind us of – hissing, whirring, foaming, fizzing, bubbling? Once in a solvent (water, juice, milk), the tablet first dissolves and the appearing bubbles contain produced gas. The gas, i.e. carbon (IV) oxide is a product of the chemical reaction taking place between the components of the solution.

7. Conclusion of the workshop – a talk with children where the data are presented in a graph. The task given to children is to find an error in the graph and correct it.

Results and conclusions

The objective of the workshops was to answer the following questions: Does the participation of children in this type of teaching-learning activity that takes place outside school, warrants the development of their abilities, attitudes and competences? Is this an easy task for the teachers responsible for these classes? Are children willing to participate in the classes?

Table 2 offers an analysis of the individual parts of the workshop in respect of their objectives and intended development of children's competences.

Table 2. Detailed objectives and competences developed in individual parts of the workshop

Part of workshop	Objectives and developed competences
1	Objective: integration of the group Competence: ability to find his/her place in the newly formed group
2	Objective: analysis of children's readiness and easiness to express themselves Competence: ability to formulate personal opinions and to present them in public
3	Objective: analysis of children's interest in the subject and of their positive emotional involvement Competence: ability to formulate personal opinions and to present them in public
4	Objective: evaluation of children's level of knowledge on the use of effervescent tablets in daily life Competence: ability to formulate personal opinions and to present them in public
5	Objective: development of inquisitive attitudes, e.g. through understanding a problem to be studied Competence: ability to work in a team, e.g. through assuming an appropriate role, abilities to discuss problems, to formulate hypotheses, to plan and carry out experiments, and to make observations and to formulate conclusions
6	Objective: assessment of the understanding of effervescence Competence: ability to analyze the situation based on intensive analytical thinking
7	Objective: verification of the proposed solution of the research problem through the ability to find an error in the graph summarizing the research, done in order to demonstrate that knowledge has a practical significance and is needed in daily life Competence: ability to carry out independent problem-solving

In order to assess the effectiveness of the workshop in achieving the objectives, i.e. the extent of the development of children's competences, opinions of the assistants (N=17) were collected. Below are presented two selected questions addressed to the assistants:

1. Is this type of teaching-learning activity an easy task? What did you find most difficult in this activity?
2. What do you think children have learned from our workshops?

About 90% of respondents pointed out that the major difficulty at the beginning of each class was the lack of effective communication with children. By contrast, about 50% of respondents said that they were not aware how much attention must be given to what you say to children and how you talk with them; they also emphasized the role of intonation, i.e. your voice can neither be too loud nor too quiet, neither too sharp nor too soft, etc. Selected interesting opinions are presented below:

- *Sometimes children's questions were "off the subject" and this could be a serious distraction in class.*
- *What I found most difficult was the work with the children who disturbed the class. At times I seemed to be running out of patience.*

About 80% of respondents ascertained that during the workshops the children learned the basic rules of the work in a laboratory. Additionally, they learned how to formulate hypotheses and draw conclusions. They also learned teamwork and the bases of preparing a research plan. Selected opinions in that respect are presented below:

- *I think that above all the children learned how to formulate questions on what they were interested.*
- *Certainly, the children learned how to approach problems in a self-reliant and logical manner, as well as how to be creative and original.*
- *The children understood that they should not be afraid of experiments in discovering new things.* ☺

The results of the workshops and the collected opinions and comments presented above, prove that the proposed workshops are a successful effort in teaching children soft competences, crucial for their future activities, as early as at the age of 6–7. Based on these results, the successful cooperation of the Faculty of Chemistry of the Jagiellonian University with Children University will certainly be continued.

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Non-formal education and soft competences – from personal experience

Abstract

It is generally recognized that to be fully successful, education has to be performed parallel in three formats: formal, non-formal, and informal. While formal education is principally about knowledge, the other two are largely about soft competences. Soft competences include personal abilities, behavioral traits and personal motivators and to achieve them young people have to perfect abilities such as problem-solving, decision-making, teamwork, and interpersonal skills necessary to both team and individual performance. It is in this context that the Faculty of Chemistry of the Jagiellonian University in cooperation with Children University offers children (age groups 6–7 and 8–9) chemical workshops, a teaching-learning activity typical of non-formal education. The objective of the workshops is to practice soft competences while performing chemical experiments. Herein we describe the workshops with successful experiments on effervescence.

Key words: non-formal education, soft competences, chemical workshops for Children University

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Małgorzata Nodzyńska

The use of new media in the process of learning and teaching in higher and highest education

Introduction

Teaching and learning are two separate processes. In the process of education both methods must meet each other as the effectiveness of education depends on it. If the process of learning and teaching is to be effective, there must be good communication between the teacher and the student. In education it is important to be able to:

- establish contact,
- support contact,
- give feedback,
- receive feedback.

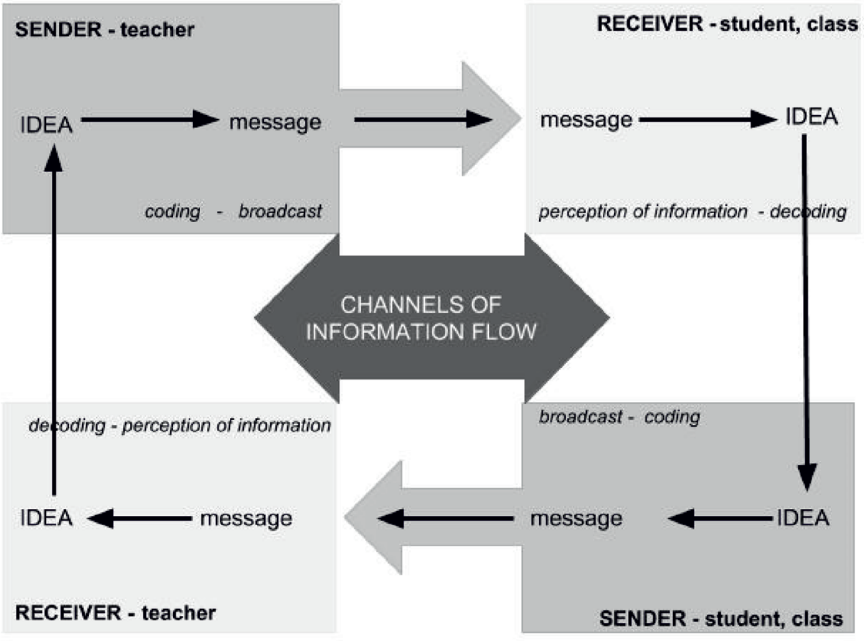

Fig. 1. Scheme of teacher – student communication (source: Fornalski, 2011).

During the typical lesson or lecture, the activities of the teacher and student are different. Mostly the teacher is active and the student is passive. This means that the teacher: encodes the information and sends this information to the student. The student should receive this information and decode it. However, at this stage of the learning process, the teacher does not know what the student is doing. The student may:

- not listen to the teacher (not receive information),
- not think (not decode the information).

The information given by the teacher to the student is encoded but also distorted. Therefore, the further decoding of information (by the student) causes that the teacher's idea may not to be identical with the student's ideas.

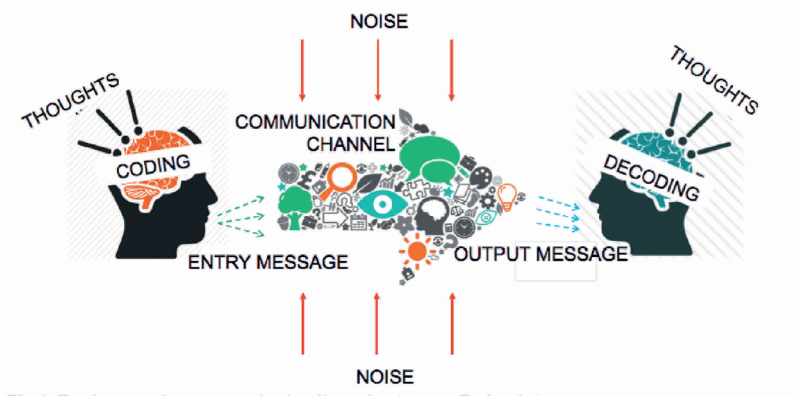

Fig. 2. Teacher – student communication disruption (source: Zychowicz, 2012)

During typical lesson or lectures there is no place and no time for the student to give feedback to the teacher. Therefore, the teacher does not know what information has reached the student and what ideas have made their way into his mind (wrong or correct). We can say that the processes described in the lower half of Figure 1 do not work during a typical lesson or lecture.

Tab 1. The table shows the teacher and student activities during a typical lesson or lecture.

Teacher:	**Student:**
• speaks • explains • displays presentations / writes on the blackboard • asks students – rhetorical questions	• listens • sometimes asks questions
• can use the whole time of the lesson or lecture, • devotes his time to students.	• has as much time as the teacher devotes to him, • must share that time with other students[1]
• does not know what the students understood	• there is no way/time for student to reaffirm his understanding of the subject

[1] Typical lesson has 45 minutes, if we have 20 students it means about 2 minutes for each student!

During a typical lesson or lecture, there is no time and place for feedback: from student to teacher. Therefore, it was decided to change the course of typical lectures/ lessons and apply new media and computer technology for communication between teacher and learner.

Background

In the past 2 years, the typical plan of lectures has been modified – by introducing new technologies to communicate teacher with students. These changes were possible due to the decrease in the number of students so each student had access to his or her computer. These modifications have been introduced, among others, in lectures on "general chemistry" – for students of biology with teaching chemistry and of geography with teaching science. The following article will discuss the research results for geography students.

It was decided to investigate whether the new form of teaching is attractive to students and whether it is effective (whether it affects the level of learning).

Changes to lesson plan

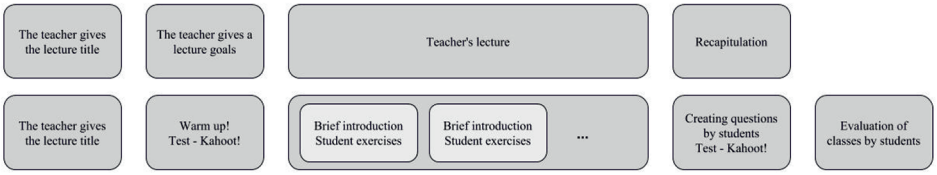

Fig. 3. Changed lecture plan: at the top typical lecture plan (passive students), at the bottom: lecture plan after the change (active students – they give feedback to the teacher).

GOALS

First changed "introduction to the lecture", i.e. the purpose of the course. In a traditional lecture, the teacher gives the students what the objectives of the lesson or lecture are, but this is not always motivating and the student may not identify with these goals. In the changed lecture we changed this part to "warm up". During this warm-up, the students solved a short on-line test (on a computer or mobile phone). For this purpose Kahoot![2] tool was used. The test results allow you to determine what students already know about a topic and what else they should know.

This exchange brings advantages for the teacher:

- quick feedback on how many students can answer a question and how many cannot,
- swift assessment:

[2] Kahoot! is a free game-based learning platform, as educational technology. Kahoot! is now played by over 50 million people in 180 countries. Created for use in classrooms and other learning environments, Kahoot!'s learning games ("kahoots") are multiple-choice quizzes that can be created by anyone and are not restricted as to age level or subject matter. As Kahoot may be played using any device, desktop, laptop or mobile phone with a web browser, it is popular in classes with "bring your own device" policies.

– what students already know,
– what are the shortcomings.

After answering the questions, the teacher briefly explains why this answer should be chosen and not different answer. As a result, there are no "misconceptions" in the students' minds.

In addition, during the lecture the teacher can:

- deduct and make up for the shortcomings of students from lower education degrees,
- skip those elements that students already know,
- spend more time on information that pupils do not know.

We can say that the student finds internal motivation to learn.

This exchange also brings advantages for the student:

- after answering each question, he gets a feedback whether he answered correctly or not,
- what is the scope of the material for that particular lesson or lecture,
- what do I know and what do I need to learn,
- element of play/competition.

LECTURE – main part

In this part of the traditional lesson only the teacher is active – he/she gives the lecture. This changed to 2–3 learning objects (depending on the length of classes: 90 or 135 minutes). Each of these elements consists of 2 parts: short theoretical introduction and on-line exercises.

Short theoretical introduction include lectures, screenings, films or animations. On-line exercises[3] for students are divided into 3 groups of tasks:

1. basic level – average,
2. difficulty level from medium to hard,
3. apps in life, extension, trivia.

Looking at what level the student solves the task the teacher immediately sees at what level the given student is.

Students work independently, each student solves as many tasks as he/she can, everyone solves at his/her own pace. The advantages, of this solution for students is that they have immediate feedback from the application whether their answer is CORRECT or WRONG.

Students can communicate with each other and seek help from other students and also they can communicate with the teacher and seek help from him.

The teacher does not need to check the work of all students (because the correctness of resolved tasks is examined by the computer software). So he has the possibility to help those who need it, for example talented pupils or students who have difficulties with completing assignments. We can say that individualization of teaching is present because there is direct communication with students who need it – more time for them!

[3] On-line exercises are prepared using the tools of Learning-Apps, Hot-Potatoes, Moodle platform tools, Google Forms.

Recapitulation

Recapitulation of the lecture consists of 2 parts.

In the first part students on the basis of the presentation (presented in short theoretical introduction[4]) create a database of questions for the lecture. Each student must write 10 questions to the lecture[5]. The teacher constantly checks the correctness of the students' questions, discusses errors.

For a teacher, this approach has the advantage of a quick feedback – students can choose the most important information from the lecture. Whereas advantages for the student are the opportunity to review the lecture again – immediately after the exercise, to think about what is most important – to organize information. In addition, after the lesson, the teacher can analyze questions, to consider whether the most important elements of the lecture are sufficiently emphasized in the presentation. He has the answer to the question: *Do students understand them well?*

The second part of the recapitulation is an on-line test. It contains of similar questions as the initial test (other tasks but the same type).

After students choose an answer for each question, the teacher once again explains, why they should choose that particular one and not any other answer. Again, student's misconceptions are indicated.

This solution has two advantages for students:

- after answering each question they get a reply whether they answered correctly or not,
- they know whether they have learned or not – and what he still has to practice.

The advantage of this solution for the teacher is quick feedback on how many students can answer a question and how many cannot. After the lectures (at home) teacher can compare results in detail and he see what students have learned (increased their knowledge) and what they did not!

Evaluation

The last part of lecture is evaluation. It also consists of two parts. The first part of the recapitulation is included in the on-line test. Kahoot contains 4 closed questions:

- how do you rate the lesson (scale 1–5),
- did you learn something new (yes/no),
- do you recommend lessons to other students (yes/no),
- how are you feeling (scale 1–3).

The second part of the recapitulation is prepared in Google Forms and contains seven open questions:

- The **hardest thing** for me in the classroom…
- The **easiest** for me in the class…
- In class I **liked** the most…
- In class I **disliked** the most…
- I rate my activities in class as…

[4] Prepared in Prezi or Google Slides (each student had a presentation available – he could use it on his own computer).

[5] To do this, we use Google Sheets (all students worked together on the same file in the cloud).

- The pace of work in class was…
- The amount of exercise in the class was…

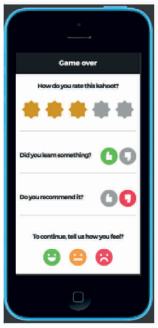

Fig. 4. Evaluation included in Kahoot

Evaluation of each activity allows students to anonymously evaluate both lecture and teacher. Advantages for the teacher is the ability to modify activities to the preferences of a group.

Research methods & Results

At the end of a series of lectures we conducted a test that evaluated the new method of teaching. 72 students of geography took part in the on-line test – the lecture covered the basics of chemistry. The test was conducted between 2015/2016 and 2016/2017 and it was attended by students of full-time and part-time studies. On-line test was prepared in Google Forms and contains nine questions, six closed questions (Likert's scale) and three open question.

The first closed question was about the level of the class:

The classes were for me…

too easy	1	2	3	4	5	too difficult

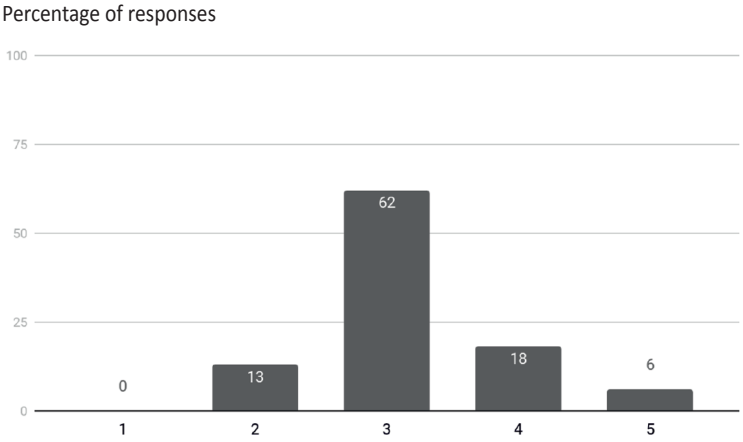

Fig. 5. Percentage of students' answers to the first question

It can therefore be concluded that the difficulty of the course was appropriate to the level of students.

The second question concerned the pace of the lectures:

The classes were for me…

too fast	1	2	3	4	5	too slow

Percentage of responses

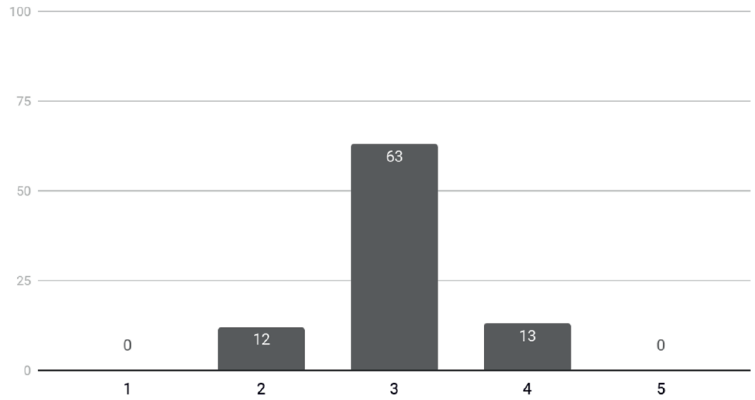

Fig. 6. Percentage of students' answers to the second question

A decisive majority of students (over 60%) believe that the classes were at the right pace.

The third question was whether the lecture was understandable for students.

The classes were for me…

I did not understand anything	1	2	3	4	5	I understood everything

Percentage of responses

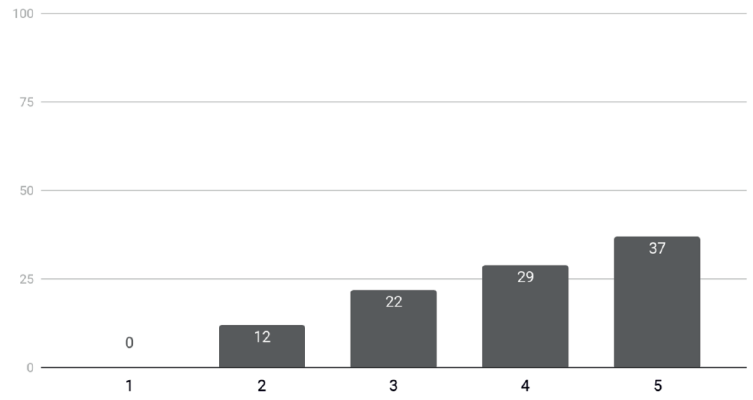

Fig. 7. Percentage of students' answers to the third question

The chart shows that more than 35 percent of respondents said "I understood everything". None of the respondents answered "I did not understand anything".

We can therefore assume that this form of teaching is appropriate and students understand the content transferred.

The fifth and sixth questions concerned the comparison of the traditional lecture to the modernized lecture.

The fifth question was:

Applying activation techniques (Learning Apps, Hot potatoes, Kahoot!...) in lectures:

I do not like it at all	1	2	3	4	5	I like it very much

Percentage of responses

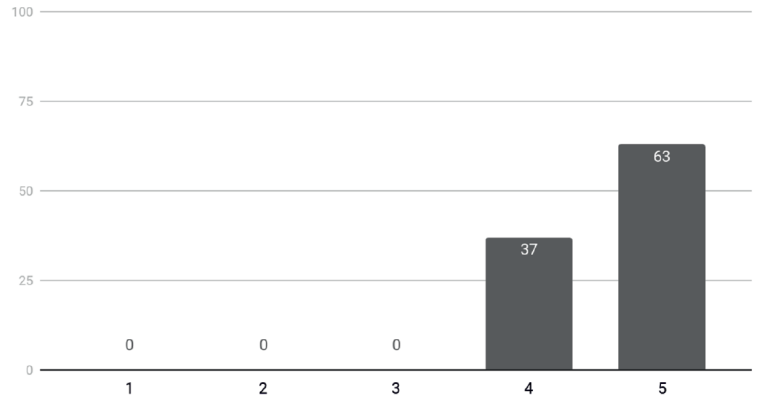

Fig. 8. Percentage of students' answers to the fourth question

The results show that all respondents liked the use of activation methods during the lecture.

The sixth question was:

I prefer classic lectures rather than activation techniques

I do not agree with this statement	1	2	3	4	5	I agree with this statement

Percentage of responses

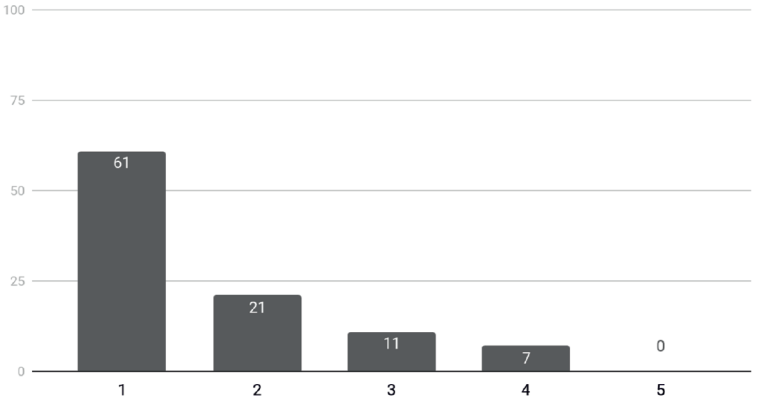

Fig. 9. Percentage of students' answers to the fifth question

The majority of respondents (over 80%) prefer a lecture with activating elements.

Lectures received high marks from students (in question seven). On a scale of 5 gradual overall assessment of the lectures is 4.25.

The last three questions were open questions. Students did not have to answer these questions.

They answer the question: *In the classes I liked the most...* the students wrote:

- Learning through fun, fun approach – 12%,
- Simulations! – 9%,
- Modern and surprising approach to learning – 8%,
- It was that we were able to keep up with what we were talking about – 33%,
- Explanation, based on examples from everyday life – 16%
- Good attitude to the student and nice atmosphere, pleasant atmosphere – 13%,
- Feeling that we can ask about everything without any problems – 9%.

These answers can be grouped into 4 categories:

- learning through games and fun – 29%,
- the ability to practice theories – 33%,
- examples from everyday life – 16%,
- atmosphere in the classroom – 22%.

For the respondents the most important thing was the possibility of exercising the acquired competences "at once", i.e. during the lecture. It is assumed that the ability to check in practice whether the theory is understood, coupled with the ability to ask the teacher has caused the minds of students not to form false ideas (misconceptions).

It can be assumed that point 4 (atmosphere in the classroom) at least partially depends on points 1 and 3 and not just on the personality of the lecturer.

They answer the question: *In the classes I disliked the most...* the students wrote:

- Speed of the lectures (too fast) – 12%,
- Where are the notes? – 13%,
- What will be on the exam? I know we write questions ourselves, but we do not even know what to ask – 24%,
- I liked everything – 51%.

The results are very good: as much as 50% of respondents have no reservations about the new method of lecturing. 37% of respondents were not sure whether *this form of teaching would be effective*. They were worried about the results of the final exam (it turned out that the fears were unfounded).

The last question is: What are your *own suggestions on how to conduct classes...* Only 24% of students answered this question. They found that: *As is currently being conducted this suits me very well*. It is therefore possible to think that such a form of lecturing is appropriate for students

Conclusions and implications

Based on the results of the questionnaire, it can be said that the way of lecturing was liked by students. However, the basic task of the lectures is to prepare students for the exam. This goal was achieved, all students who took part in lectures using

activating techniques, passed the exam. In the previous years (when traditional lectures were used) 10–15% of students did not. Also, the final exam grades (with upgraded lectures) were higher – on average by 0.75 degree.

Summary

The use of new media in the traditional lecture gives us:

- Individualization of teaching,
- Immediate feedback for students,
- Better communication between teacher and student,
- More time for teachers to work with students,
- Information that teacher can use to assess his occupation.

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The use of new media in the process of learning and teaching in higher & highest education

Abstract

The article describes the innovative use of new media in the teaching of students. The difference between traditional lectures and lectures using new media has been described. The activities of the teacher and students were compared during traditional lectures and "modern" lectures. The level of students' satisfaction with lectures in which modern media were used was examined.

Key words: new media, teaching, highest education

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Supervision (not)needed. Professional experiences of day-care room pedagogues

Introduction

Research of the phenomenon of stress in the context of professional burnout in social professions such as a teacher, a pedagogue or a tutor allowed to isolate four main reasons of frustration, decrease of activity and reluctance towards "professional daily life". These reasons are: inappropriate behavior of pupils and helplessness towards it; pressure of time and change as the source of difficulties; dissatisfaction with work, lack of emotional and financial satisfaction; difficulties in relationships at work (Woźniak-Krakowian, 2013). The aim of this article is to present supervision as a method enabling not only the prevention of appearance of professional burnout syndrome, but also as an opportunity for development. Conducted pilot studies focused at exploration of the issue of supervision in the direction of further, intensified research, and conclusions and recommendations are intended for dissemination of supervision in pedagogical work. Care and educational pedagogues working in school, care and educational, social and socio-therapeutic day-care rooms in Krakow have participated in the research.

Work of a pedagogue in a day-care room

Pedagogical work in day-care rooms is governed by the Education Law Act (2017). It describes in basic terms the types of day-care rooms and their functioning. Article 105 is dedicated to school day-care rooms, which aim at providing care for pupils who stay at school after obligatory lessons.

> *§2. Day-care room provides day-care room's activities which include educational and developmental needs of children and teenagers, and also their psychophysical possibilities, especially activities that develop pupils' interests, activities providing appropriate physical development and doing homework.* (Dz. U. z 2017 r., poz. 59 i 949)

The main tasks of a pedagogue working in each type of day-care rooms are the following:

1. Organization of help with learning and creation of the conditions for self study of pupils and preparing for independent mental work.

2. Organization of motion games and plays and the other forms of physical culture, including indoors and outdoors activities in the purpose of providing appropriate physical development of the child.
3. Discovery and development of interests, fondness and talents of pupils by organization of appropriate activities in this regard.
4. Creation of conditions for participating in culture, organization of cultural entertainment and shaping the habits of daily life culture.
5. Development of self-management and social activity of students.
6. Cooperation with parents and teachers of pupils, and – as needed – also with institutions for the promotion of culture, sport and recreation and other institutions and associations operating in the environment.
7. Creation of situations for satisfying the need for friendship and contact with peers (Rogińska, 2016).

This multitude of tasks, but encapsulated in 7 points, should be done in conditions that create a sense of security and trust. Moreover, a pedagogue is also obliged to individualize work with each of the charges so as to optimize the process of help, care and education, while fulfilling the mission of the institution.

The pedagogue, such as a teacher and a tutor, lives in the situation of "permanent change" and his/her activity and commitment to work (not only professional, but also work on his/her development) are conditioned by a sense of security, sense of accomplishment, experience of the connection between the effort put into action and the achieved result (Łukasik, 2016).

Supervision of pedagogues in day-care rooms

In Polish literature there are not clear and specific definition of supervision, although all of them point to a specific relationship between a supervisor and a supervised person in the process that heads to solve difficulties resulting from professional tasks and focuses on development of the labor and personal potential. According to Finnish Supervisors Association (STORY – FSA) "supervision is a process of transformative teaching, that takes place during the interaction between the supervisor and the supervised (individual interaction and in the group as well) and where content and emphasis, length and breaks, context and approach to problems are jointly agreed, in line with the objectives that also were jointly agreed" (2013: http://www.wspkorczak.eu/download/zrefleksje_nt._superwizji_cke_20.02.2013.pdf, page 5.). The given definition draws attention to the relationship between the supervisor and the supervised. These relationships should be equal, partnership, trust-based, co-operative and mutual understanding of needs, but – at the same time – not friendship. Cooperation during the supervisory session should have freedom and liberty so that the supervisor and the supervised (person or people) could feel satisfaction of being together and jointly solving difficult situations and problems.

Slow but effective popularization of the idea of supervision takes place in social work. In legislation, the legislator even recognized it as a necessity in view of the increasing threat of the emergence of occupational burnout and work with a high

emotional burden. Although supervision practice has its origins in the trade industry, it also adapts well in other areas. For many years psychologists and therapists have benefited from this form of support for their own development and the simultaneous "filtration" of experiences and experiences related to their affairs.

Supervision tasks

Because supervision usually involves activities that are undertaken by people whose work is to assist and support others, clear boundaries between work and personal life must be defined and attained. To maintain cooperation, participants of supervision should respect the principles of open and honest communication, be authentic, empathetic, and actively listen.

Supervision tasks are realized in the course of meetings, during which work is focused on improving the quality of work of those who support and help, that is who are mentally and emotionally overwhelmed. The specific goals and topics of the supervisory sessions are determined by the participants of supervision and related to what support and assistance they need, but there are several "groups" of tasks:

1) Tasks related to the supervised direct work with clients or wards[1], especially when therapeutic or educational actions do not bring the assumed effects or are ineffective. Supervisory meetings help to find the source of the problem and consider the necessary changes in the process of working with the client. "Sometimes it turns out that the source of the problem we considered to be substantive lies deeper in our emotions or convictions" (2017: http://www.psychologia.edu.pl/czytelnia/63-terapia-uzalenienia-i-wspouzaleznienia/331-po-co-nam-superwizja.html), that should be revealed, experienced again and emotionally reacted to. Emotions are often difficult, and convictions necessary to reformulate, that is why – and it should be stressed again – the atmosphere of safety, support and kindness is so important during supervision;
2) Tasks related to solving organizational or administrative difficulties that arise in an organization focused on supporting others (e.g. solving the problem of fundraising or daily support activities);
3) Tasks involving good interpersonal relationships in the supervised team (or, if individual supervision is concerned, the psychological well-being of a person), which promotes positive behavior without undue stress and additional psychological stress, especially in the event of conflict. Supervision (of the team) is when all of the difficulties or conflicts between the members of team should be revealed and explained so that relationships could be "clear" – do not include insinuations or misunderstandings;

[1] Individual supervisor work may remind of or be associated with tutoring, but keep in mind that these are not identical forms. Tutoring focuses on development of qualities, talents of a person in cooperation with tutor, who is "an expert" in some field. In supervision it is a secondary, supporting thread in the whole process. More about tutoring in pedagogical work can be found in publication edited by Czekierda P., Fingas B., Szala M., *Tutoring. Teoria i praktyka, studia przypadków*, Wolters Kluwer, Warszawa 2015.

4) Tasks connected with the ability to work on personal problems, if they interfere with effective work.

What is more, the supervisor and the supervised should focus on solving the emerging problems and planning activities aimed at improving the situation (appearing in work with clients or wards, as well as the one that is related to relationships in the team) and at evaluation of achievements.

Other classifications of supervisory tasks, such as the trio of assignments by authors such as Inskipp and Proctor (Henderson, et al., 2014) (normative, developing and strengthening tasks), and J. Rogers (three-level supervisory concept designed by J. Hay) (Rogers, 2014) are also worth noticing.

Jenny Rogers presents three-level supervisory concept designed by J. Hay. The concept lists three steps in professional supervision:

1. Normative supervision – for beginners, where the role of supervisor is to reference to professional standards and evaluation of the supervised progress;
2. Formative supervision – an offer for the intermediate, advisory and based on dramatic methods and direct feedback;
3. Supportive supervision – for advanced people, based on the exchange of experiences and reflections related to the discussed situations. This stage is closely related to work experience (Rogers, 2014).

Attempting to maintain a high quality of supervision (and also its effectiveness), the supervisor is required to professionally approach the problem resolved and to respect the process and care for its ethical dimension. Just as any other method of working with another person, the process of supervision is also prone to the emergence of difficulties. As noted by the authors of *"Supervision in practice"*, "in many professional situations, supervision is experienced as an inspection, control or «just chattering», and it is therefore perceived as a process that is avoided and arousing resistance" (Henderson, et al., 2014). Although goals and tasks are clearly defined, participants of supervision often feel anxious that others (supervisors, other participants in the meeting) will watch their work and – perhaps – negatively evaluate it or that supervision will be received as a situation where a teacher, pedagogue or educator uses the psychologist's help in solving their own problems, which is associated with a sense of shame (Szymański, et al., 2013). Supervision is also seen as specialist help, and therefore participants are exposed to negative feedback from colleagues and clients. It can be accompanied by the same phenomenon of social ostracism as with teachers, pedagogues, etc. benefiting from therapy. During supervision emotions – positive or negative – connected with work with a client or a ward or related to relationships in a team can be revealed. Being aware of them, especially the unpleasant ones, is often painful and cause suffering. The difficulty is to make a decision of revealing, watching and working through them, and next to give them the proper meaning and possible change (2016: http://www.psychologia.edu.pl/czytelnia/63-terapia-uzalenienia-i-wspouzalenienia/331-po-co-nam-superwizja.html). However, in consequence, watching difficult situations, coping with painful emotions makes work easier, and often our behaviors and behavior of the client, ward

or teammate are more understandable, and therapeutic or educational influences are effective.

P. Henderson, J. Holloway and A. Millar present the trio of basic supervisory tasks, that were defined by Inskipp and Proctor (Henderson, et al., 2014). There are normative, developing and strengthening tasks. The first ones are related to the duties and standards governing work during supervision and include, among other things, the standards of work, the methods of evaluation and monitoring of supervisory work and the appeal procedure. Developing, formative tasks include care for professional development of the supervised. "The process of supervision allows to reflect on what works, where, when, and what errors happen, by encouraging supervisors to analyze, think, and formulate their own judgments, thanks to that they can develop their own craftsmanship and professionalism. The main emphasis is on practice-based learning, so as to integrate experience with theory" (Henderson, et al., 2014). While strengthening tasks make supervisors more likely to acquire more self-awareness and professional resistance without treating supervision as a form of therapy or cumbersome interrogation (Henderson, et al., 2014).

Problems in supervision

Like therapy or psychological-pedagogical intervention, supervision often can be seen by society as the consequence of weakness or disorders. However, it involves little knowledge of these processes. It is not that supervision is free of obstacles and limitations. It may not be easy to (or rather to be able to) verify personal views. During the session, often difficult or inquisitive questions are asked to find out why someone applied the method in the workplace or did it in another way. In the course of conversations it may turn out that beliefs very close to the participant need to be changed.

Effects of supervision in pedagogical work

Although supervision is a process that requires effort and commitment (primarily internal, emotional) from the participants, it also brings important benefits. One of them is significant improvement in the quality of work. Sometimes, thanks to an ordinary conversation with "people in the industry", who are not directly involved in the relationship with client or ward, the solution of difficult situation can be found. As stated by R. Zuba, "the obvious professional benefit we receive from supervision is to gain, through a re-analysis of other people's experience, a better insight into the causes of the difficulties that arise in our work. The result of this analysis is to gain a new, broader perspective on the problem. It gives an opportunity of making more accurate diagnosis and adopting a better therapeutic strategy" (2016: http://www.psychologia.edu.pl/czytelnia/63-terapia-uzalenienia-i-wspouzalenienia/331-po-co-nam-superwizja.html). It is also very useful to exchange experiences (including difficult ones) and good practices. In case of exchanging difficult experiences people may see that a pedagogue or teacher is not alone in the difficult therapeutic or educational work and that other people also cope with troubles. When one succeeds

in defeating one another, the sense of incompetence, helplessness and insecurity decreases, and self-esteem and rationality grow. Supervision teaches optimism or positive attitude to difficult situations (Seligman, 2007).

Supervision supports pedagogues and teachers' development, that brings measurable, observable effects:

- greater knowledge, skills and adequate sense of competence,
- increase of self esteem based on realistic evaluation of one's own abilities,
- increase of sense of agency, belief that through your own actions you can influence what is happening in your environment,
- increase of motivation for decision-making, planning and accomplishment of goals,
- increase of internal motivation, strengthening of self-esteem,
- development of self-awareness, own potential,
- increase the importance of the presence of other people in human life (Łukasik, 2016).

Pedagogues' experiences related to participation in supervision

The study was a pilot study and could contribute to wider and more detailed research into supervision. It is not a permanent practice in pedagogical institutions, in various types of state (public) and private education centers. The generic impulse for undertaking research in this field was "natural" observation of supervision process and some, although positive, feedback that appeared in lobby (sic!) during pedagogical meetings, seminars and conferences, as well as information appearing in the media (mainly online).

The group consisted of 49 people and in gender terms it was definitely homogeneous: 47 women and 2 men, therefore the process of analysis excluded this variable as significant.

In the study were involved 19 pedagogues employed in school day-care rooms, 17 in social day-care rooms, 8 in socio-therapeutic day-care rooms and 5 in care and educational day-care rooms.

The view of the research group and the number of the institution are shown in chart 1.

In supervision participated 23 of 49 pedagogues. It turns out that such practice is more popular in Krakow socio-therapeutic, social and care and educational day-care rooms than in school day-care rooms. The reason is probably the mode of organization of the work of day-care room and the employment system. These factors may also be relevant for the duration of individual supervision sessions. The interviewed pedagogues were asked about how long the supervisory meetings, in which they participated, were held. It is assumed that meeting less than 15 minutes is not a supervision, and it can be treated as a simple check-in or just meeting.

Taking into account the respondents' answers about the length of individual meetings, two tendencies are noted. First of them is the duration of meetings that takes 45 minutes, as 48% of answers indicate. Second noted tendency shows that the length of meeting is connected with a type of day-care room. School day-care rooms, by the way of organization of work of the institution and often two-shift nature of

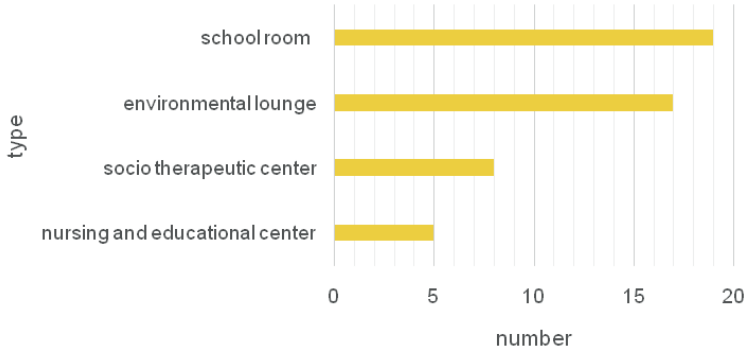

Chart 1. Diversification of the research group by place of employment – type of day-care room.

Source: Own study based on the analysis of own research results

employment, force the organization of supervision as 15–30 minutes meetings, while other types of day-care rooms which usually work in the afternoons, organizing care and extracurricular activities for children and youth, more often organize supervision lasting even over 1.5 hours. In Krakow day-care rooms longer supervision sessions do not take place in the experiences of the investigators.

From the perspective of organization of the process, an implementation of short- and long-term goals defined in the process of supervision and for its efficient course completed by the effective solution of the difficult situation, or the achievement of goals, it is important who initiates and conducts the meetings.

Participants of supervision were asked about initiators of the meetings and who led them eventually as well. It turns out that in the day-care rooms work interior supervisors (chosen from a team, in which they work, sometimes they are leaders of a group or headmasters) and exterior supervisors (experts of leading the process, outsourcers, people not employed in day-care rooms). The choice of supervisor is dictated by two determinants: human resources [i.e., whether the person in the group is trustworthy and competent (not necessarily qualified) and financial resources [the budget for employing the external supervisor and sometimes the motivational allowance or bonus for an employee in a given institution (although this is probably not the norm)].

The research shows that in the vast majority of cases (82.6%), the respondents used the services of an internal supervisor, who were: the headmaster/manager of the room (57.89%), a colleague (31.57%), colleague from outside the team (10.52%). Of all the participants in the supervision of their work, only 17% of the respondents benefited from external assistance.

Conjecture reappears that it is related to the organization and specificity of the work of the whole school, as well as to the multitude of tasks, functions and roles of school educators in day-care rooms.

The basis of effectiveness of supervision – on the one hand – subjective feelings associated with improving the quality of work, sense of justice and better coping

with difficult situations, and thus the decline of stress and dissatisfaction with the profession of pedagogue and – on the other hand – observed by other changes in the way of work and achievement of better results in working with others.

Pedagogues of day-care rooms were asked about their achieved results in the process of supervision both in professional and personal spheres. The results of supervisions that were indicated by participants of the process are presented in chart 2. Respondents were able to indicate more than one answer.

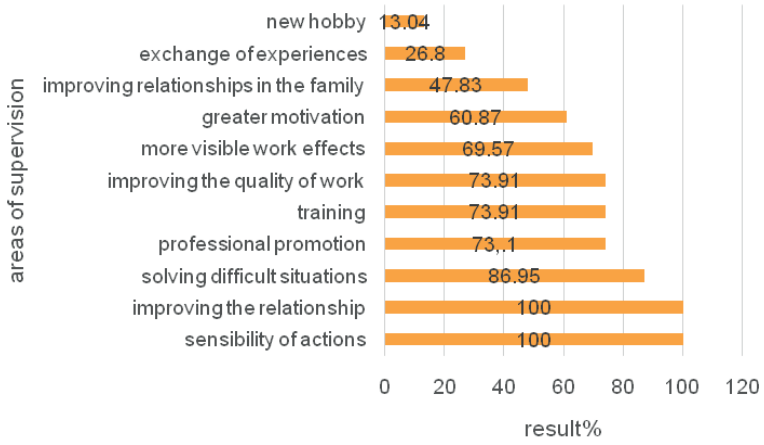

Chart 2. Effects of supervision process (N = 23)

Source: Own study based on the analysis of own research results

According to the opinion of all the respondents, supervision significantly improved the quality of their work by feeling the meaning of the tasks undertaken, and also by improving employee relations. These results have become more visible, which may mean that the effectiveness of the actions taken has also improved. What is more, for some participants (26.8%) supervision meetings have become the area of exchanging experiences, and thus sharing the so-called good practice. 13% of respondents indicated that thanks to participation in the supervision they found new interests, took up a new hobby. Among interviewed pedagogues who experienced supervision nobody indicated that supervision brings nothing to him/her or he/she did not benefit from the process.

Conclusions

In Krakow day-care rooms supervision is usually carried out by a member of the staff, in most cases a headmaster or manager of a day-care room. Supervision is difficult to implement not for organizational reasons, but for emotional reasons as well. It the process, thus, pedagogues have to share their failure. That is why it is necessary to build awareness of support for development and help for educators and also to promote knowledge about functions of supervision. It is the trustworthy method for those pedagogues who had the possibility of being a beneficent of it.

They observe positive changes of their work, especially in terms of effectiveness of activities and building relations with others.

It is certain that the research should be extended and deepened in the future, as they merely contributed to the subject in the Polish educational discourse. It may be interesting to see how durable are the achieved effects and what goals (short or long term) are achieved with this method. In the future it is also worth to consider the supervisor and the techniques he uses.

Supervision in Poland, especially in education, only increases both in theory and practice. Not all Western solutions in the area of supervision are possible to faithfully transfer to our culture, including the so-called corporate culture that manifests itself both in human resource management systems and employee behavior in the industry. Conducted reconnaissance and supervisory experiences in social work show that supervision can also be rooted in pedagogical awareness as one of the methods that support teacher development and prophylaxis of professional burnout.

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Supervision (not)needed. Professional experiences of day-care room pedagogues

Abstract

Authors have carried out research among educators working in social, care and educational and socio-therapeutic day-care rooms. Such research is just a contribution to take into consideration the introduction of supervision into the daily pedagogical practice. The aim of the study was an initial diagnosis of state of supervision in pedagogical work and also personal experiences of pedagogues connected with participation in supervision.

Key words: supervision, work experience, daily life, pedagogue/educator, motivation, professional development

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The fourth-year university student future professional career: career management competency, study influence and work values aspects

Introduction

Future specialist professional career questions are actual both in the university study process itself, and in a perspective meaning, the latter joining the labor market. University study period is not only about the acquisition of professional qualification and corresponding competence. It is also a consistent step to the heights of the future profession. Thus, it is undoubtedly important, that the students evaluate the emerging possibilities as early as possible, purposefully prepare for professional activity after graduating the university. From the first days of the studies, it is necessary for the students to start planning their career, to analyze career questions that worry them. Besides, it is also important to analyze professional competence development, value formation demands of the future specialists. It is obvious, that employee competence remains one of the most important factors that can have influence on organization competitiveness, their activity effectiveness (Čiutienė, Šarkiūnaitė, 2004). On the other hand, a tendency is observed that expectations and demands of the people starting their working career are much bigger than possibilities, abilities, etc. Very often, dream work (activity) is imagined as a place, where a good payment and corresponding social guarantees are ensured.

It is understandable, that people differ in their abilities, demands, values, interests, personality traits and other. Speaking about future educators, it is important to emphasize that the choice of this profession is closely related to the person's value system. Person's life, from the social and/or economic point of view, becomes more constructive and more adequate if career is coordinated with personal and/or work values. In Lithuania, comparatively not much research have been carried out, related to student work value choice and successful career changes. Student professional calling and value links have been analyzed (Tolutienė, 2014), when it was stated that calling and values arise one from another, exist not separately but together, complement each other and depend on personality traits. Value of cognitive level peculiarities of the future social workers were investigated, stating that students consider social and humanistic values and economic/work values the most important value spheres (Verbylė, 2012). The problem is highlighted that when planning career young people do not pay necessary attention to work values and do not relate them

to the choice of profession (Liobikienė, Bukauskienė, 2014). Work value structure research was carried out in which university first course students participated. It was stated that the most significant factor is *Responsible activity values.* This factor consists of three work values: truthfulness, conscientiousness, dutifulness. These work values are the most important for students realizing their professional activity and seeking successful career. Also, it was revealed, that reward values (good job salary, high position, comfort) and activity style values (autonomy, altruism, evaluation of efforts) have lower evaluation. Social status values (prestige activity, social prestige, status, achievements high position) have the lowest evaluation. Also, the main differences were ascertained between female and male work value structure. Responsible activity values, active work values and harmony values are more important for female students than for male (Lamanauskas, Augienė, 2017).

Various research were carried out in foreign countries. The research carried out in Malaysia showed that pre-service teachers prefer quality supervisory relationships, good working environment/surroundings, and quality co-workers relationships, whereas achievement, security, and intrinsic work values are of secondary importance (Sock Leea, Kee Mui Hungb, Cheng Lingc, 2012). The research conducted in the Philippines showed that the majority of students have high to very high work values. Achievement was regarded by the respondents as the most dominant value while comfort as the least dominant (Torres, Ballado, 2014). In any case, values are the key characteristics of a true teacher (Lim, 2014).

L. Harvey (2000) marks, that higher education only does not guarantee students' successful integration in the labor market, because not only acquired knowledge and abilities influence integration but also other important factors, such as personal student traits and labor market changing demand in the region at national and international levels. Higher schools provide professional qualification, prepare for professional activity, however, insufficient attention is paid to career education. Effective career realization requires extra knowledge, ability and skills. Over the last decade, university graduate employability raises a big concern. Therefore, universities have to be especially interested to ensure student career management competitiveness education in the study process – students have to learn to identify personal improvement possibilities and limits, to know their value, knowledge and ability determined career planning possibilities and to foresee successful career decision making and realization perspectives.

Research object is the fourth year university student position on the question of the future professional career.

Research aim is to analyze by quantitative analysis the evaluation of student work value and ability importance in professional activity and also the evaluation of study influence on further professional activity.

Methodology of Research

General Research Characteristics

The carried out research Successful career factors is grounded in mixed methodology (quantitative and qualitative research approaches are applied). Research

type is survey. This is a research of limited amount, not seeking to apply the obtained results for the whole Lithuanian university student population. Research is focused on social and humanitarian study field. However, it is hoped, that the conducted research will allow to prepare and carry out an exhaustive all-student population research. The research was carried out between January and May, 2016.

Research Sample

Bachelor study students of three Lithuanian universities: (Šiauliai – ŠU, Lithuanian University of Educational sciences – LEU, and Klaipėda – KU) participated in the research. The sampling contained pre-service primary school, physical education and sport, music, ethics teachers and speech therapists and kinesiotherapists, health education specialists. 200 questionnaires were prepared. On the whole, 185 questionnaires were acknowledged as acceptable. Reversibility quota is 92%. Sampling was structured applying a consecutive "bunch" system. Research sample is considered sufficiently representative according to the chosen research amount.

Research Instrument

The authors' prepared questionnaire which was comprised of closed and open questions to be used in the research. The respondents were asked to evaluate the statements about career, to evaluate work values and competencies, and also to evaluate study influence on future professional career. Four open questions were also presented in the research instrument. The results obtained from the presented answers have been analyzed and published (Lamanauskas, Augienė, 2014). In this article, the results are presented giving the evaluation of the fourth course student work values, competence/ability and study influence on career.

Ranking scale was applied in the instrument: *agree/important, partly agree/important, do not agree/not important.* The questionnaire also included a demographical part (respondent sex, course, study program). Research content validity was checked by two independent experts.

Data Analysis

In order to analyze research data, measures of descriptive statistics are applied (absolute and relative frequencies). To identify differences between variables, non-parametric chi-square (χ^2) criterion is applied. Every analyzed statement/parameter is given popularity (significance) index ($0 \leq PI/SI \leq 1$). Therefore, the ranking scale was transformed to relationship scale. The closer the PI/SI value is to 1, the more important, more significant is the statement to the respondent, or the respondent better approves of it.

Results of Research

The evaluation of the importance of work values to professional career has been analyzed (Fig. 1). It can be seen, that basically all values are considered significant.

The research revealed that the most important work values for students are: *evaluation for efforts* (SI=0.94, SD=0.17), *interesting activity* (SI=0.92, SD=0.19), *dutifulness* (SI=0.92, SD=0.18), conscientiousness (SI=0.91, SD=0.19), *truthfulness*

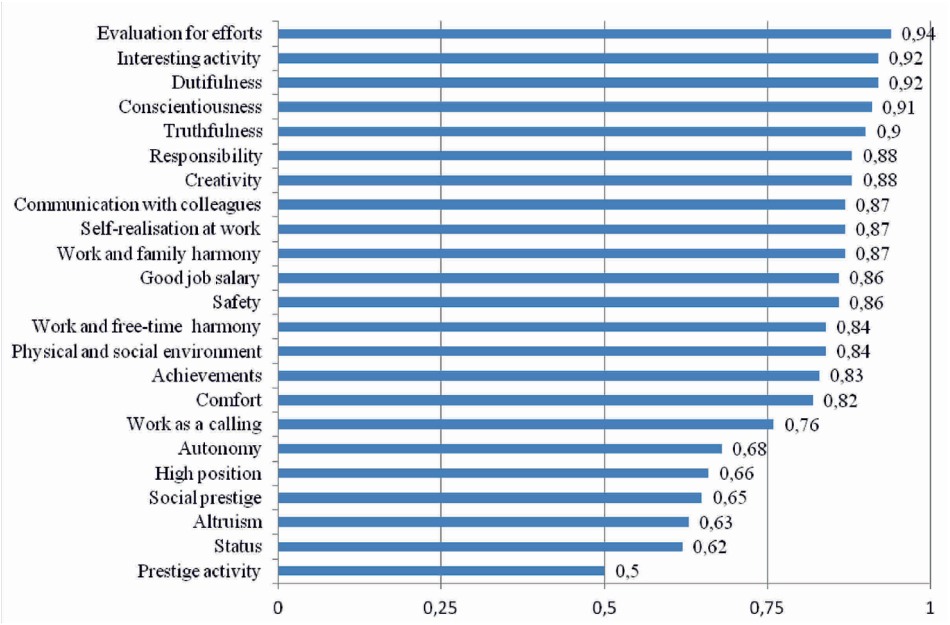

Fig. 1. The importance of work values to professional career (SI).

(SI=0.90, SD=0.21), *responsibility* (SI=0.88, SD=0.24). One can assert that these work values reflect the moral side of professional career and demonstrate high standards raised by the students for professional career and responsibility for their activity.

In students' opinion values such as *creativity* (SI=0.88, SD=0.22), *collaboration with colleagues* (SI=0.87, SD=0.23), *self-realization at work* (SI=0.87, SD=0.24), *work and family harmony* (SI=0.87, SD=0.25), *good job salary* (SI=0.86, SD=0.23), *safety* (SI=0.86, SD=0.25), *work and free-time harmony* (SI=0.84, SD=0.28) occupy a high position in professional activity. These values demonstrate students' modern attitude to career, in which harmony prevails among various life spheres and demands of a person.

The least important for successful professional career, in students' opinion, are *high position* (SI=0.66, SD=0.29), *social prestige* (SI=0.65, SD=0.33), *altruism* (SI=0.63, SD=0.31), *status* (SI=0.62, SD=0.31), *prestige activity* (SI=0.50, SD=0.35). These work values reveal person's occupied position in society, i.e. social status. Social and humanitarian sphere activities are not considered prestige in society, do not guarantee a high social status and a good payment. It is obvious that students choosing to study social and humanitarian sciences, realize their values and social status values are not the most important for them.

After analyzing students' opinion about the importance of work values for their professional career some significant differences regarding sex were defined (Table 1).

Table 1. Value differences according to sex (N (%)).

Value	Evaluation level	Sex		Total	Chi-square criterion application result
		Woman	*Man*		
Interesting activity	*Important*	126 (90.0)	33 (73.3)	159 (85.9)	χ^2=7.85, df=2, p=0.020
	Partly important	13 (9.3)	11 (24.4)	24 (13.0)	
	Not important	1 (0.7)	1 (2.2)	2 (1.1)	
Responsibility	*Important*	116 (82.9)	32 (71.1)	148 (80.0)	χ^2=11.97, df=2, p=0.003
	Partly important	23 (16.4)	8 (17.8)	31 (16.8)	
	Not important	1 (0.7	5 (11.1)	6 (3.2	
Communication with colleagues	*Important*	115 (82.1)	27 (60.0)	142 (76.8)	χ^2=10.44, df=2, p=0.005
	Partly important	24 (17.1)	16 (35.6)	40 (21.6)	
	Not important	1 (0.7)	2 (4.4)	3 (1.6)	
Work as a calling	*Important*	93 (66.4)	17 (37.8)	110 (59.5)	χ^2=11.72, df=2, p<0.003
	Partly important	39 (27.9)	24 (53.3)	63 (34.1)	
	Not important	8 (5.7)	4 (8.9)	12 (6.5)	
Self-realization at work	*Important*	116 (82.9)	26 (57.8)	142 (76.8)	χ^2=12.78, df=2, p<0.002
	Partly important	22 (15.7)	16 (35.6)	38 (20.5)	
	Not important	2 (1.4)	3 (6.7)	5 (2.7)	
Work and free-time harmony	*Important*	112 (80.0)	22 (48.9)	134 (72.4)	χ^2=17.33, df=2, p<0.000
	Partly important	22 (15.7)	20 (44.4)	42 (22.7)	
	Not important	6 (4.3)	3 (6.7)	9 (4.9)	
Work and family harmony	*Important*	122 (87.1)	24 (53.3)	146 (78.9)	χ^2=23.45, df=2, p<0.000
	Partly important	15 (10.7)	18 (40.0)	33 (17.8)	
	Not important	3 (2.1)	3 (6.7)	6 (3.2)	
Status	*Important*	42 (30.0)	24 (53.3)	66 (35.7)	χ^2=8.22, df=2, p=0.016
	Partly important	83 (59.3)	17 (37.8)	100 (54.1)	
	Not important	15 (10.7)	4 (8.9)	19 (10.3)	
Truthfulness	*Important*	124 (88.6)	28 (62.2)	152 (82.2)	χ^2=16.54, df=2, p<0.000
	Partly important	15 (10.7)	15 (33.3)	30 (16.2)	
	Not important	1 (0.7)	2 (4.4)	3 (1.6)	

The research revealed that work values such as *work and family harmony, work and free-time harmony* are much more important for females than for males. One can assert that this reveals female traditional attitude to family. It is important for female to coordinate career with family demands, to have enough free time. W*ork as a calling, truthfulness, self-realization at work* are much more important for females than for males in professional activity. However, for males a much more important work value than for females is *status*. A person's status is often determined by their professional activity, occupied position, carried out functions, given responsibility, management, leadership. It is obvious that for males all this is more important than for females.

Ability importance in seeking successful career has been analyzed (Fig. 2).

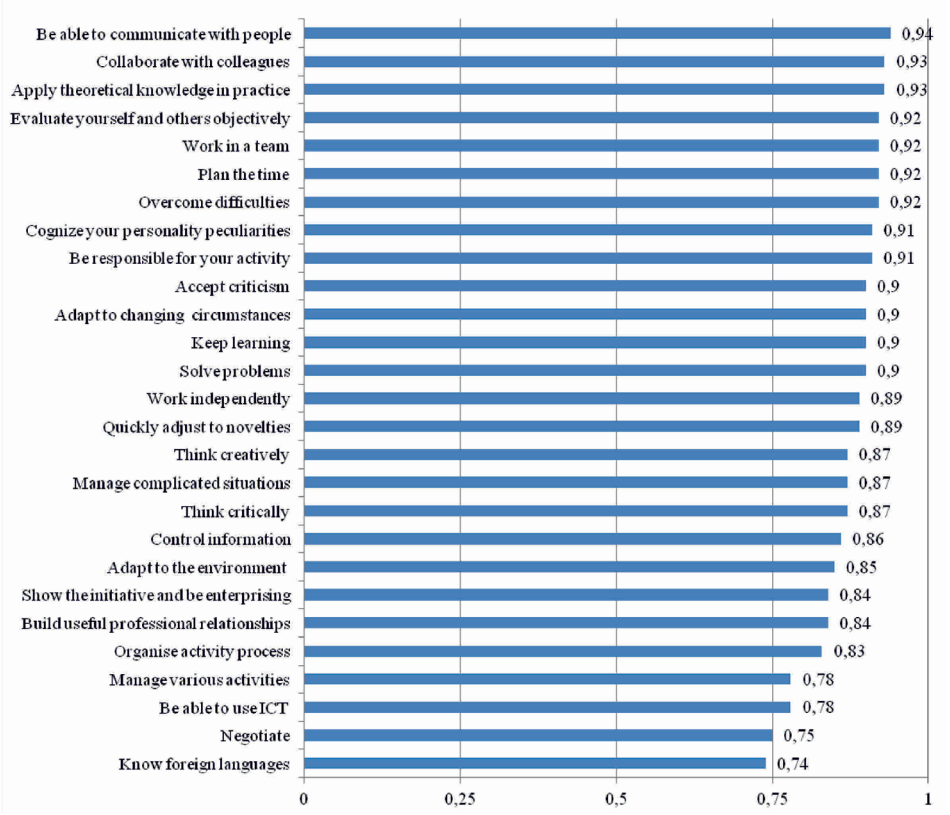

Fig. 2. Ability importance in seeking successful career (SI).

The most important for successful professional career, in students' opinion, are abilities related to human relations: *be able to communicate with people* (SI=0.94, SD=0.18) and *collaborate with colleagues* (SI=0.93, SD=0.17). It is obvious that students, having chosen social and humanitarian sphere activities, which are usually referred to as professions "person to person", understand, that human relations are the basis for their successful career.

Students value very highly theoretical and practical preparation for professional career [ability *to apply theoretical knowledge in practice* (SI=0.93, SD=0.19)].

Students also value very highly such abilities, which can influence successful career: *value yourself and others objectively* (SI=0.92, SD=0.18), *work in a team* (SI=0.92, SD=0.18), *plan the time* (SI=0.92, SD=0.17), *overcome difficulties* (SI=0.92, SD=0.18).

Highly valued abilities, which can influence successful career development, such as: *accept criticism* (SI=0.90, SD=0.21), *adapt to changing circumstances* (SI=0.90, SD=0.20), *keep learning* (SI=0.90, SD=0.20), *solve problems* (SI=0.90, SD=0.22), *work independently* (SI=0.89, SD=0.21), *quickly adjust to novelties* (SI=0.89, SD=0.22), *think creatively* (SI=0.87, SD=0.24), *manage complicated situations* (SI=0.87, SD=0.23),

think critically (SI=0.87, SD=0.22) show that students have formed modern attitude to career and understand social transformation impact on career changes.

The least important abilities for successful career, in students' opinion, are *manage various activities* (SI=0.78, SD=0.27), *be able to use ICT* (SI=0.78, SD=0.27), *negotiate* (SI=0.75, SD=0.29), *know foreign languages* (SI=0.74, SD=0.29). These data allow for the assumption that the majority of students plan their career in Lithuania and manager's position and functions are of no interest to them.

After analyzing students' opinion about ability importance for successful professional career, some significant differences regarding sex were defined (Table 2).

Table 2. Evaluation of ability importance in seeking successful career according to sex (N (%)).

Ability	Evaluation level	Sex		Total	Chi-square criterion application result
		Female	*Male*		
Accept criticism	*Important*	119 (85.0)	31 (68.9)	150 (81.1)	χ^2=9.91, df=2, p=0.007
	Partly important	21 (15.0)	12 (26.7)	33 (17.8)	
	Not important	0 (0.0)	2 (4.4)	2 (1.1)	
Evaluate yourself and others objectively	*Important*	128 (91.4)	30 (66.7)	158 (85.4)	χ^2=18.49, df=2, p=0.0001
	Partly important	11 (7.9)	15 (33.3)	26 (14.1)	
	Not important	1 (0.7)	0 (0.0)	1 (0.5)	
Keep learning	*Important*	124 (88.6)	28 (62.2)	152 (82.2)	χ^2=17.45, df=2, p=0.0001
	Partly important	16 (11.4)	16 (35.6)	32 (17.3)	
	Not important	0 (0.0)	1 (2.2)	1 (0.5)	
Think critically	*Important*	116 (82.9)	27 (60.0)	143 (77.3)	χ^2=10.26, df=2, p=0.006
	Partly important	22 (15.7)	16 (35.6)	38 (20.5)	
	Not important	2 (1.4)	2 (4.4)	4 (2.2)	
Solve problems	*Important*	125 (89.3)	31 (68.9)	156 (84.3)	χ^2=11.16, df=2, p=0.004
	Partly important	13 (9.3)	11 (24.4)	24 (13.0)	
	Not important	2 (1.4)	3 (6.7)	5 (2.7)	
Be responsible for your activity	*Important*	124 (88.6)	30 (66.7)	154 (83.2)	χ^2=13.21, df=2, p=0.001
	Partly important	16 (11.4)	14 (31.1)	30 (16.2)	
	Not important	0 (0.0)	1 (2.2)	1 (0.5)	
Be able to use ICT	*Important*	96 (68.6)	19 (42.2)	115 (62.2)	χ^2=10.07, df=2, p=0.006
	Partly important	41 (29.3)	24 (53.3)	65 (35.1)	
	Not important	3 (2.1)	2 (4.4)	5 (2.7)	

The biggest difference regarding sex when assessing ability importance for successful career development is *keep learning, be able to use ICT, evaluate yourself and others objectively, think critically.* Females value the importance of these abilities for successful career much higher than males. Females also higher than male value the ability *be responsible for your activity, solve problems*. These results show that females value more the abilities that are necessary to manage career change, understand the importance of those abilities in professional activity. This allows for the assumption that females have chosen a study program more successfully than males and are preparing for professional career more responsibly. Attention has to be paid that females traditionally more often than males choose to study social

and humanitarian sciences, therefore also possible is the influence of accident, inappropriate professional decision, which could influence the evaluation of the abilities important for successful professional career.

Evaluation of study influence on future career has been analyzed (Figure 3).

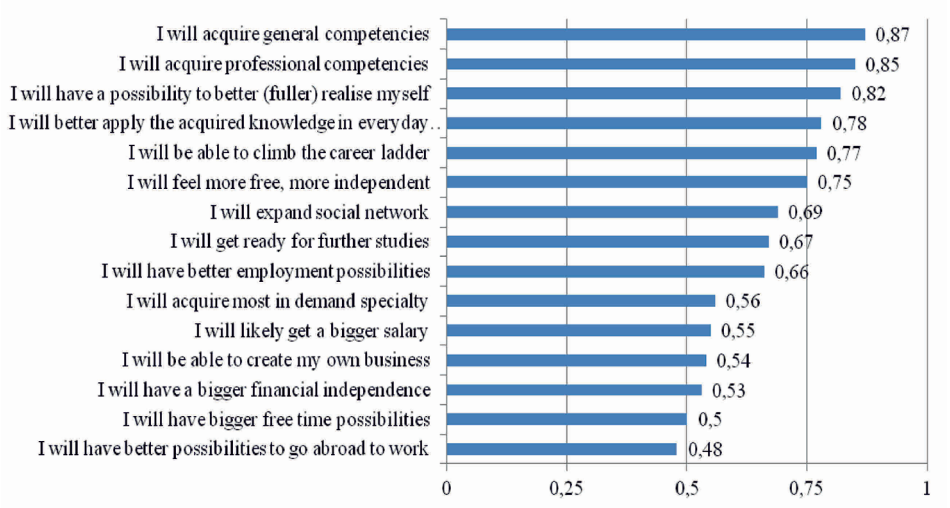

Fig. 3. Study influence on future career evaluation.

In students' opinion, studies have the biggest influence on acquiring necessary competencies for future professional career [*I will acquire general competencies* (SI=0.87, SD=0.21), *I will acquire special (professional) competencies* (SI=0.85, SD=0.23)]. Students think that studies will create the possibility for self-expression [*I will have a possibility to better (fuller) realize myself* (SI=0.82, SD=0.25), *I will better apply the acquired knowledge in everyday activity* (SI=0.78, SD=0.28)].

Studies, in students' opinion, open new career and improvement possibilities [*I will be able to climb the career ladder* (SI=0.77, SD=0.28), *I will feel more free, more independent* (SI=0.75, SD=0.29), *I will expand social network* (SI=0.69, SD=0.34), *I will get ready for further studies* (SI=0.67, SD=0.32), *I will have better employment possibilities* (SI=0.66, SD=0.35), *I will acquire most in demand specialty* (SI=0.56, SD=0.34)].

Some of the students think that studies will improve their financial possibilities [*I will likely get a bigger salary* (SI=0.55, SD=0.37), *I will be able to create my own business* (SI=0.54, SD=0.32), *I will have bigger financial independence* (SI=0.53, SD=0.36)], the students hope the least, that studies will provide them with *bigger free time possibilities* (SI=0.50, SD=0.37), that they will have *better possibilities to go abroad to work* (SI=0.48, SD=0.35).

After analyzing students' opinion about study influence on future career, some significant differences regarding sex were defined (Table 3).

More females than males think that studies will influence their better position on the labor market (*I will have better employment possibilities*) and will create

better possibilities for self-expression [I will have a possibility to better (fuller) realize myself]. More males than females think that studies will influence their better position on the labor market, because they will acquire a perspective specialty (I will acquire most in demand specialty) and will expand their social network.

Table 3. Evaluation of study influence on future career according to sex (N (%)).

Influence factor	Evaluation level	Sex		Total	Chi-square criterion application result
		Female	*Male*		
I will have a possibility to better (fuller) realize myself	*Agree*	106 (75.7)	26 (57.8)	132 (71.4)	χ^2=7.64, df=2, p=0.022
	Partly agree	34 (24.3)	18 (40.0)	52 (28.1)	
	Do not agree	0 (0.0)	1 (2.2)	1 (0.5)	
I will expand social network	*Agree*	41 (29.3)	22 (48.9)	63 (34.1)	χ^2=8.60, df=2, p=0.014
	Partly agree	62 (44.3)	19 (42.2)	81 (43.8)	
	Do not agree	37 (26.4)	4 (8.9)	41 (22.2)	
I will have better employment possibilities	*Agree*	91 (65.0)	18 (40.0)	109 (58.9)	χ^2=9.11, df=2, p=0.011
	Partly agree	44 (31.4)	25 (55.6)	69 (37.3)	
	Do not agree	5 (3.6)	2 (4.4)	7 (3.8)	
I will acquire most in demand specialty	*Agree*	26 (18.6)	18 (40.0)	44 (23.8)	χ^2=12.42, df=2, p=0.002
	Partly agree	68 (48.6)	22 (48.9)	90 (48.6)	
	Do not agree	46 (32.9)	5 (11.1)	51 (27.6)	

Conclusions

The research revealed that the most important work values for students are those reflecting the moral side of professional career (*evaluation for efforts*, *interesting activity*, *dutifulness*, *conscientiousness*, *truthfulness*, *responsibility*). High position, in students' opinion, occupy work values which demonstrate students' modern attitude to career (*creativity*, *collaboration with colleagues*, *self-realization at work*, and other) and harmony among various person's life spheres and demands (*work and family harmony, work and free time harmony*).

The research revealed, that the least important for successful professional career, in students' opinion, are the values related to social position in society: *high position*, *social prestige*, *status*, *prestige activity*.

The research highlighted some work value importance for professional career differences regarding sex: for females much more important are work values such as *work and family harmony, work and free-time harmony*, for males – *social status*.

During research it was found that the most important abilities in professional career, in students' opinion, are related to human relations: *ability to communicate with people* and *to collaborate with colleagues.* Students very highly value theoretical and practical preparation for professional career (ability to apply theoretical knowledge in practice).

The research results revealed that students have formed a modern attitude to career and highly value the abilities which can influence successful career development: *accept criticism*, *adapt to changing circumstances*, *keep learning*,

solve problems, *work independently*, *quickly adjust to novelties*, *think creatively*, *control complicated situations*, *think critically*. The least important abilities for successful career, in students' opinion, are *manage various activities*, *be able to use ICT*, *negotiate*, *know foreign languages*.

The research highlighted some ability importance for successful career development evaluation differences regarding sex. For females more than for males, more important are the abilities *keep learning, be able to use ICT, evaluate yourself and others objectively, think critically, be responsible for your activity, solve problems.*

The research results allow for asserting that studies, in students' opinion, have the biggest influence on acquiring needed general and special competencies necessary for successful professional career, open new career and improvement possibilities. Only some students think that studies will improve their financial possibilities.

The research revealed different female and male attitude to studies influence on their future career. Females point out that studies will provide better conditions for employment and to better (fuller) realize oneself, and males think that studies will help to acquire a perspective specialty and expand their social network.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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The fourth-year university student future professional career: career management competency, study influence and work values aspects

Abstract

Career management as a lifelong lasting process becomes very actual in modern society due to numerous reasons. In a general sense, the environment becomes turbulent; therefore it is natural that career environment is chaotic as well. Nevertheless, career for many people is, undoubtedly, very important as it is directly related to life quality. Professional activity satisfies almost all human needs: physiological, safety, social, attainment, self-realization, independence, autonomy, and other. The efficiency of the mentioned activity and the ability of the person to construct their career are closely related things.

Individual's career process studies have become especially popular recently, because deeper career perception helps to understand the most important relations between man and work, career management and constant learning, helps not only to know person's abilities, but also the abilities to give oneself to modern environment, to understand career projection possibilities, to plan one's professional future.

Seeking to analyze final-year university student position regarding career questions, a written survey was carried out. The research was carried out between September 2015 and March 2016. The research sample (185) was structured applying a consecutive "bunch" system. The respondents from three Lithuanian universities – Klaipėda, Vilnius and Šiauliai – were selected in the sample. Professional career parameters were evaluated: career management competency, study influence and work values. The research is grounded in a mixed strategy, with quantitative and qualitative research approaches combined. The obtained results, based on qualitative analysis, are presented in this research.

Key words: career management, quantitative analysis, professional career, work values, university students

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Contents

FORMAL AND NON-FORMAL EDUCATION – NEW ENVIRONMENTS AND CONDITIONS