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Introduction

Animation of science culture as one of top priorities in contemporary education

Formal and informal education is vital for the society. It is the means to realizing the need for human development emphasized by contemporary psychology, civilization transformations and the necessity to acquire new qualifications and competencies. Adapting to the ever-changing reality, broadening one's knowledge and mastering skills, developing one's character and finally understanding culture and the needs of society are all factors contributing to the development of global society. All of the elements mentioned are connected to constant and life-long education allowing to fill any gaps in knowledge, as well as to perceive science and its popularization as values by both students (throughout their education) and adults. Teachers, educators of informal education and cultural animators take active part in the process. Therefore, the demand for educating specialists in this particular field is a key notion of current didactics.

The first volume is concerned with transformations within the didactics of biology understood as a subdiscipline of pedagogy and part of nature studies. The second volume deals with educational models promoting the notion of biodiversity. The third volume includes articles on "health literacy" – knowledge and skills in health issues that every member of knowledge-based society should posses. The fourth volume focuses on one of the key tasks of didactics of biology, that is life-long education in terms of interdisciplinary understanding of balanced development and, in particular, environmental protection.

The topic of the fifth issue of the Annales is animation of nature culture as a way of influencing formal and informal education, education through culture and for culture, as well as supporting balanced development of knowledge-based society. The theory of pedagogy of culture animation is connected to cultural socialization of young people and to cultural education through getting them involved in creating, mastering and popularizing knowledge. The authors of the present issue deal with issues such as: teachers' competencies necessary for realizing integrational

education; sense of responsibility; universalism and cultural identity; responsibility for nature; the use of information and communication technologies; identifying global and local character of processes surrounding a person in the modern world. What is also of great importance is the necessity of realizing the needs of children, teenagers and adults in the area of increasing their involvement in science, culture and social life.

Popularization of knowledge is connected with the search for forms of proper sharing of the latest scientific and academic achievements to various recipients. The ability to present information in an attractive form that catches attention is of vital importance. Also important is enabling participation in various interdisciplinary projects aimed at promoting cultural events, as well as solving global and local environmental issues by involving creativity, motivation and emotions of the audience.

Culture encompasses knowledge, understanding, skills, relations, and convergence of different forms of reality – everything that facilitates human thinking and evaluation. One of cultural activity enabling reflection upon and transmission of knowledge based on the above-mentioned criteria is writing and interpreting literature, as well as creating or taking part in scientific theatre. All of those activities inspire and solidify academic interests. Furthermore, they encourage social activities in cultural sphere.

People live in the world of values constituting their personalities and surroundings, influencing development of identity, culture, history, activity, physical and psychological well-being, and various types of relationships. One of such values is nature, promotion of which calls for the involvement of numerous institutions and organizations of formal and informal education which popularize knowledge through various projects, such as museums, festivals, contests, campaigns, social work, trips, field work, publishing periodicals. Those are manifestations of integration and collective management of development of natural and cultural heritage both on a local and global scale.

Global education is based, among other things, on living by certain values, interdependence, challenges, and scientific and cultural correlations. The task of societies is devising strategies to solve problems of the modern world. This is accomplished through school programs aimed at educating students about proper approach to scientific knowledge, as well as cultural, religious, social and ethnic differences between countries. The purpose is to teach them proper forms of communication with people from all over the world, to shape individual attitudes, and to make students aware of multiculuralism and interculturalism. It is necessary to use such techniques and methods of teaching which facilitate solving socio-emotional problems through students' democratic communication with cultural community and social organizations.

Everything that constitutes nature culture can influence human activity and have a key role in shaping people's attitude to the world of science and art.

An interesting encounter with a given branch of science, even though at times occasional or onetime, can spark the emergence of hidden potential of a given person. Therefore, the animator of science culture is given a key role. Such a person should co-operate with different social groups in a competent way in order to responsibly promote knowledge and art through "academic debate" based on cognitive systems, correcting errors in the audience's existing knowledge, using proper forms of communication.

Promoting integrational education is another key issue. Such integration can be implemented in the case of children with developmental disorders such as Asperger's Syndrome whose symptoms include difficulties in establishing relations with other people and in adapting to the reality present. Therefore, creating opportunities of overcoming such difficulties is yet another task of science culture animation. This is accomplished, among other things, through "therapy" making use of the richness of the world of science, as well as knowledge in the areas of psychology and pedagogy.

One of the elements influencing the formation of proper relations between people thus improving sharing knowledge and scientific dialogue is recognizing people as social beings. This in fact is what drives them to search for new information and share it in the process of socialization.

Self-organization, self-development, linguistic correctness, a form of educational coaching, awareness of technological innovations, monitoring the outcomes of scientific, academic and educational researches, giving feedback are all components necessary for the development of animators of science culture. They in turn contribute to the development of institutions of formal and informal education. Connected to the issue is the debate on teachers' training and methods used in the process (both theoretical and practical). Those should enable the development of professional competencies of future educators.

The increasing interest in events oriented at popularizing knowledge, interactive mueums, exhibitions, etc creates the need for equipping future scientists not only with theoretical knowledge, but also with the skill of sharing said information with different audiences and with the skill of shaping proper social attitudes towards the environment, nature and one's own health. Meeting the expectations of future employers should be realized at university level through introducing new subjects and fields of study. That is why, in the academic year 2014/2015, the Pedagogical University of Cracow introduced a new scpecialization field: "Animation of science culture". It was dedicated to students with Bachelor's Degrees in Biology and Environmental Protection. The University of Burgundy served as the example. Based on their already tested and verified methodology, the Cracow's university developed their own curricula of the specialization. The French model of teaching science culture animators was adapted to the Polish reality. It was also emphasized that an animator of science culture should not only be fluent in the sciences but should also posses certain traits of character and social skills.

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FOLIA 197

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SCIENCE, CULTURE, SOCIETY – NEW APPROACHES FOR EDUCATION

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Global education and shaping appropriate attitudes in the didactic process

Global education is understood as a functioning trend of philosophical experience. It is deeply embedded in the process of world globalization associated with various fields, encompassing business, economic, social, educational, and political issues.

One of the most important element in global education is the unity of the human species, which considers its essential values. It seeks to make people aware of the existence of diverse phenomena, which also involve interdependences associating people and places with the purpose of preparing the public to face various challenges for the whole of humanity. Therefore, 'global education' refers to common correlations and penetrations of cultural systems.

"Global Education is education that opens people's eyes and minds to the realities of the world, and awakens them to bring about a world of greater justice, equity and human rights for all. Global Education is understood to encompass Development Education, Human Rights Education, Education for Sustainability, Education for Peace and Conflict Prevention, and Intercultural Education; being the global dimensions of Education for Citizenship" (Report On Study About Development Education Aspects In Social Sciences, 2013).

Every society develops concepts which show solutions of difficult problems of the modern world, e.g. solutions regarding such issues as unemployment, poverty, terrorism and violence, helplessness, dealing with difficult situations. For that reason, and due to the initiation of global education Polish schools will face numerous challenges.

In Poland, global education is defined in the following way: "Global education is part of civic education and upbringing; it broadens [children's] scope by raising awareness of the existence of global phenomena and interdependencies. Its main objective is to prepare learners to face the challenges faced by all humanity. Global education puts special emphasis on:

– explaining the reasons and consequences of the described phenomena,

– presenting the perspective of the Global South,
– presenting the world as a complex and dynamically changing system,
– shaping critical thinking and initiating a change in attitudes,
– eliminating existing stereotypes and prejudices,
– demonstrating the influence an individual can exert on global processes, and the influence of global processes exerted on the individual" (Report On Study About Development Education Aspects In Social Sciences, 2013).

Ideas of global education should be implemented as early as kindergarten, during classes, and during all sorts of educational workshops and competitions/ contexts. It aims to make students/ children aware of the differences between countries/cultures.

This kind of education gives teachers the opportunity to develop appropriate awareness and skills in the behaviours of students so as to create a so-called sense of responsibility for both themselves and for others.

More and more frequently, one can observe the occurrence of relations between civilizations, religions, cultures, countries and people in the range of educational programmes.

The main intention of global education is to develop global consciousness among the younger generation, which should include:
– communicating the belief that people from all over the world are connected by their so-called biological 'status', history, psychological needs,
– shaping individual perception and the perception of the whole world,
– developing the skills of getting to know yourself personally and getting to know social groups,
– developing appropriate skills as a product of the capacity of the whole human race,
– making people aware of the fact that people live in various cultures and every human being perceives the meaning of the world in a different way.

The main elements of the educational ideal contained in the process of education, focused on the world involve:
– intercultural dialogue,
– awareness of global changes,
– anticipation, namely, the ability to anticipate trends and to create alternatives – the skill of consistent thinking,
– contribution to and participation in solving problems (Melosik, 1996).

The idea of dialogue is also included in education and requires from all users trust, kindness, understanding and, in particular, a sense of responsibility for shaping appropriate attitudes, common goals, rules and norms.

The so-called negotiation dialogue appears to of most significantce in the process of global education. Such a dialogue contains principles of and attitudes towards tolerance and meeting others' needs; moreover, it emphasizes the role of

those who have different points of view but who seek mutual understanding (Pilch, 2003).

Global education helps to develop key competencies for the human system in the modern world. Such competences include: critical thinking, the possibility of argumentation in terms of personal views, creative use of acquired information in the decision-making process, empathy, and cooperation at local, national and international levels.

One can draw attention to the increasing interest in global issues among children, especially in primary schools and middle schools, since they now appear in the media, on the Internet, in everyday experiences, etc. Therefore, it can be stated that classes covering the issue of global education have been becoming more and more interesting and attractive.

In addition, the general education curriculum and its bases involve elements of global education which some consider should be introduced as compulsory issues.

Global education itself is not only based on statistics dealing with global issues. There are numerous studies conducted in Europe that prove it to be effective and, moreover, confirm that it puts special emphasis on:

- explaining the causes and consequences of described phenomena – people start to understand described phenomena and are able to use acquired knowledge,
- showing the impact of an individual on global processes and the impact of global processes on the individual, namely, the problems of consumption and international trade in association with the concepts of ordinary people involved in them,
- rejecting and challenging existing stereotypes, as well as eliminating and challenging prejudices, i.e. a confrontation between the common image of the world and reality,
- demonstrating the perspective of the 'Global South' – it is crucial to show and develop critical thinking,
- shaping critical thinking and changing attitudes – this is associated not only with recently acquired knowledge, but also with skills that young people have and which will allow them to gradually change their attitudes in order to make them responsible for the world around them.

In some schools in Europe global education is offered as an additional course: "The content of the course is integrated with global education, making it possible for students to understand the reasons for and effects of globalisation and to become active citizens by knowing the main international development goals and principles of sustainable human development" (Report On Study About Development Education Aspects In Social Sciences, 2013). Therefore, global education in the educational process is connected with the phenomenon of globalization.

The concept of globalization is related to the word *globe*, which indicates the global dimension of the issue. It defines the phenomenon with references to economics, the economy, society and politics, and includes many nations.

Globalization as a process is characterized by intensity and deepness of reach. Unfortunately, it is also difficult to stop. Moreover, it has been developing due to modern techniques and technologies and as a result of people's activities, which aim at better life.

The concept of globalization was first mentioned by Roland Robertson in 1985. He said that "globalization as a concept refers both to the compression of the world and the intensification of consciousness of the world as a whole. The processes and actions to which the concept of globalization now refers have been proceeding, with some interruptions, for many centuries, but the main focus of the discussion of globalization is on relatively recent times" (Robertson, 1992). The idea of multidimensionality of such a process is manifested in its intensity and ongoing changes (Cynarski, 2003).

McGrew shows, however, that globalization is understood as "the multiplicity of linkages and interconnections between the states and societies which make up the modern world system", as well as "the process (whereby what happens) in one part of the world can come to have significant consequences for individuals and communities in quite distant parts of the world" (McGrew, 1992).

Furthermore, Held and McGrew specify yet more indications of the phenomenon of global flows, namely, "globalization has been variously conceived as action at a distance (whereby the actions of social agents in one locale can come to have significant consequences for 'distant others'); time-space compression (referring to the way in which instantaneous electronic communication erodes the constraints of distance and time on social organization and interaction); accelerating interdependence (understood as the intensification of enmeshment among national economies and societies such that events in one country impact directly on others); a shrinking world (the erosion of borders and geographical barriers to socio-economic activity); and, among other concepts, global integration, the reordering of interregional power relations, consciousness of the global condition and the intensification of interregional interconnectedness" (Held and McGrew, in: Held et. al. 1999).

According to McGrew, it is also believed that the process of globalization has connotations of two kinds, firstly when considering its range (variety) and intensity (depth), which allow it to cover a great part of the globe. On the other hand, globalization reinforces the mutual dependences and co-operation between all countries and societies (Zaorska, 2002).

Consistent with Held, "globalisation can be thought of as a process (or set of processes) which embodies a transformation in the spatial organization of social relations and transactions – assessed in terms of their extensity, intensity, velocity and impact – generating transcontinental or interregional flows, and networks of activity, interaction, and the exercise of power". He also specifies that "the following dimensions determine globalisation; extensity, that is the spatial/geographical reach; intensity, that is the number and quantity of flows; velocity, that is the speed

of movement of flows across space; and impact, that is the overall effects on society and the economy" (Held et al., 1999).

In addition, 'partnership' and 'commitment' are values which people should be guided by in their lives. Therefore, they should also be aware of the fact that they must show understanding of and respect for others, since people live together on the same planet. For that reason, people have to be fully aware of their personal impact on the modern world. Consequently, it is also worth paying attention to other cultures and the natural environment.

Considering the aforementioned factors, globalisation appears to be present in all existing spheres of life, since the modern world is under the influence of the processes of globalisation. Moreover, it has a certain impact on the economic condition of the country and its society, as well as on the quality of life. Undoubtedly, it results in both opportunities and threats for those who participate in the process of globalisation (Polak, 2009).

Consequently, issues of globalization are involved in the content of global education. For that reason, during classes involving particular aspects of global education, teachers can cover the following topics: climate change, international trade, international relations/foreign affairs, consumption, poverty, natural resources, conflict, and human rights.

Mirosław Czerny identifies four dimensions of globalisation:

1. Globalisation as a process of internationalization – the act and phenomenon of bringing something under international control (trade).
2. Globalisation as a process of liberalization – eliminating (removing) barriers.
3. Globalisation as a process of universalism – Cultural Relativism, the so-called 'penetration' and synthesis of cultures.
4. Globalisation as a process of Westernization, understood as the assimilation of Western culture, namely, the social process of becoming familiar with, or converting to, its customs and practices, in this case American lifestyle (Czerny, 2005).

Nevertheless, globalisation can be also perceived as a group of processes leading to the growing interdependence and integration of countries, societies, economies and cultures, which result in the creation of something similar to one world for a global society (Kempny, 1998).

Zygmunt Bauman refers to globalisation in a very critical way, since he believes that it is an integral element of post-modernity which, paradoxically, contributes to decentralization and social divisions.

According to him, globalisation introduces new dependencies and creates a new kind of the reality which is, at the same time, incomprehensible and foreign. He trusts that those people who are dominated are also dominant in the broadly understood virtual world (Bauman, 2000).

Consequently, the main challenges for education are to develop cooperation and the ability to create scientific workshops, which would allow people to act wisely in the fields of education and systematic training.

It has been considered that the essence of the process of globalisation is best described by the following definition: globalisation of the world economy is a process of widening and deepening the interdependence between countries and regions, as a result of which international flows and the activities of transnational corporations are growing; moreover, it is a process which leads to a qualitatively new relationship between companies, markets and economies. Consequently, "in its simplest sense globalisation refers to the widening, deepening and speeding up of global interconnectedness" (Held et al., 1999).

Therefore, the processes of globalisation take place to variable degrees in many areas of the world economy and the economies of individual countries. All of them take place at the same time (on micro and macro scales) and are interconnected; such a situation leads to the increasing interdependence of national economies. Moreover, globalisation tends to be a dynamic process, not a state; consequently, the course and degree of globalisation may vary in different areas.

For that reason, children of the 21st century should be rational, able to distinguish and properly analyze the phenomenon and processes around them, as well as able to cooperate with others. Furthermore, they should be sensitive harm done to their relatives, they should take care of the environment and everything around them (Kupisiewicz, 1999).

The social aspects of globalisation consist of changes to the social and professional structures of the world; globalisation involves all kinds of negligence, e.g. among staff and workers, which could result in increasing the number of private companies.

Additionally, undoubtedly the Internet seems to be, one of the most important elements of globalisation. This is due to the fact that the Internet encourages people to make contact with communities in other cities, regions or countries. People can also send messages, images and/or photos quickly. This used to be impossible, but now the Internet reduces distances and eliminates the barriers between people and peoples (Kołodko, 2001).

When discussing issues of globalisation and global education, one should also pay attention to intercultural education which is extremely important. Intercultural education, though, consists of two subject matters, namely, culture and education. Nevertheless, numerous scholars from various fields of science are interested in education and culture, which together are understood as the surrounding reality, which provides people with examples from everyday life.

C. Kupisiewicz believes that education is the gathering together of processes, educational procedures and establishments, all of which are mostly intended, as well as some that occur occasionally. They all aim at providing students with knowledge and skills, but also with the development of their personalities in accordance with

the accepted values of a particular society and educational ideal. This is due to the fact that education constitutes a very important aspect of life (Kupisiewicz, 2009).

According to J. Nikitorowicz, culture, however, defines a certain perspective which can hide one's consciousness, but it can also be characterized by openness to distinctiveness and can thus develop due to the act of borrowing from other cultures. He assumes that culture can and should support each individual and group of people in the creation of a dialectical process of intercultural identity formation.

Accordingly, he detects that culture involves the challenge of shaping awareness in the sphere of human solidarity by:

- inspiring exchange of experiences in the range of implementing educational programmes, as well as social and institutional activities,
- implementing the act of acknowledging others, i.e. the development of sensitivity and the ability to cooperate,
- overcoming the problem of the tendency of an individual to isolate oneself in the field of one's own values and cultural sphere in order to become open to others, as well as to understand others,
- acquiring knowledge and understanding of personal feelings and actions, as well as individual culture and the individual world (Nikitorowicz, 2004).

In the literature, intercultural education is often referred to as multicultural education, intercultural pedagogy or multicultural and intercultural upbringing.

According to J. Nikitorowicz, intercultural education constitutes a form of discipline which not only reestablishes and preserves a spirit of the cooperation and balance, but also restores and creates mechanisms for cooperation.

Cz. Kupisiewicz interprets this concept somewhat differently. In his opinion, it is a concept relating to the education of children, youths and adults in light of understanding and tolerance for different cultures, races, religions, and customs.

His understanding of the concept of intercultural education should be adopted by all people, since intercultural education should not only be aimed at children and young people, but also take into account all adults.

Intercultural education is based on certain objectives, such as:

a) implementing it in order to recognize differences, to become sensitive to otherness,

b) referring to the experiences of students and parents,

c) shaping awareness in the range of equal treatment of all cultures,

d) shaping attitudes to acknowledge the needs of the continuous crossing of borders of individual cultures,

e) developing a sense of tolerance and autonomy, as well as a sense of culture.

Educational activities can be observed in diverse forms depending on one's way of referring to the cultural differences between the communities to which they are addressed. In general, they are related to the educational problems of cultural minorities (immigrants, national minorities, indigenous ethnicity and cultures).

Considering the ways of referring to cultural difference, the following approaches can be distinguished:

- assimilation approach, which involves the need for minor representatives to adapt,
- isolation approach, which involves the employment of separate educational projects for different cultures,
- intercultural education, which aims at developing new models of relationships between cultures.

The aim of intercultural education is the mutual enrichment of cultures in the majority and the minority, they should not exist next to one another, they should coexist.

This so-called 'meeting of cultures' can be perceived as 'pedagogy'. It is perceptive and is best described by the following question: what can I learn from other cultures and what people from other cultures can learn from me?

It is proposed that the most important source of such a canon is associated with the direct personal and particular experiences gained from everyday life, rather than from written texts.

The main goals of intercultural education are as follows:

- global communication between people of different races, religions, traditions and lifestyles, using different languages,
- engagement in favour of peace, equality, justice and security in individual countries and around the world,
- getting rid of all kinds of prejudice and stereotypes,
- fighting against all forms of xenophobia, discrimination, racism and hostility towards minorities.

Intercultural pedagogy is therefore perceived as the 'courage of utopia', so as to articulate disagreements with the existing world, which can be connected to a specific order, referring to everyday activities to realize such a vision.

All things considered, globalisation promotes development due to technological progress that allows the world to gain profits, although not always in the same way. Nowadays, companies are forced to improve the quality of their products and services. However, such process sometimes can influence the world in a negative way, e.g. by the degradation of nature as a result of all kinds of pollution.

It can be observed that, on the one hand, lifestyles based on consumption promote the development of the world, but on the other hand, they also destroy the world.

Therefore, we accept that, in some way, globalisation influences our behaviours, attitudes and/or the views of our personal lives and this cannot be avoided. Moreover, we also consider the fact that, due to globalisation, we can also see an image of the world through the prism of so-called foreign cultures.

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Global education and shaping appropriate attitudes in the didactic process

Abstract

In this article the authors consider the problem of global education related to developing and shaping attitudes of children, students, and/or adult population in the range of, among others, acquiring ecological knowledge together with the aspects of sustainable development in the teaching process.

Global education is understood as a functioning trend of philosophical experience. It is deeply embedded in the process of world globalisation associated with various fields, including business, economic, social, educational and political ones. Its assumptions should

be implemented as early as kindergarten, during classes, and during all sorts of educational workshops and competitions/contexts. It aims to make students/children aware of the differences between countries/cultures.
Global education gives teachers the opportunity to develop in students appropriate awareness and skills in the behaviours of students so as to create a so-called sense of responsibility for themselves and for others in the surrounding environment. The idea of dialogue is also included in education and requires trust, kindness, understanding and, in particular, a sense of responsibility for shaping appropriate attitudes, common goals, rules and norms from all users.
Global education helps to develop key competencies for the human system in the modern world; such competences include: critical thinking; possibility of argumentation in the range of personal views; creative use of acquired information to make right decisions; empathy; cooperation at local, national and international levels.
Therefore, we should also be aware of the fact that we must show understanding of and respect for others, since people live together on the same planet. For that reason, people have to be shown the possibility of their personal impact on modern world. Consequently, it is also worth paying attention to other cultures and natural environment.
For that reason, during classes involving particular aspects of global education, teachers can cover the following topics: climate change, international trade, international relations/ foreign affairs, consumption, poverty, natural resources, conflict, and human rights.
Children of the 21st century should be rational, able to distinguish and properly analyze the phenomenon and processes around them, as well as to be able to cooperate with others. Furthermore, they should be sensitive to harm done to their relatives, they should take care of the environment and everything around them.

Key words: global education, attitudes, children, students, society, teachers, educators, globalization, environmental education, sustainable development, teaching process.

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FOLIA 197

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Elżbieta Buchcic

Nature as a value promoted among adults

"Values are foundation which not only decide about life,
but also defines the lines of conduct and strategies which build life in society.
It cannot separate personal and social values"
Jan Pawel II

Values play a huge role in the human life and all of its aspects, because even the smallest human activities have source in regard of the fundamental things. Values of our lives are multidimensional and have many categories. The world of values is an important part of the culture in which people live, with reality being a reference point. Values stimulate and shape awareness; motivate to activity; determine objectives of the actions, integrate people and merge the society; stimulate, orient and stabilize development (Dyczewski, 2001). People live in a world of values which are part of their personality and surround them, but our personal attitudes towards values varies. This is one of the fundamental problems of human existence, which evolves throughout history and cultures.

Values are dealt with by different areas of science, therefore, they are defined in many ways. Philosophy may serve as an example. According to it, "a value is something that is valuable, and more precisely, that is worth something in the attributes of the entity data". In terms of psychology the definitions are closer to man, more understandable and useful. Milton Rokeach – theoretician and practitioner in the field of values - defines value as "a persistent belief that the conduct or the ultimate goal of life is individually and socially more attractive than other ways of behaving and other life goals" (Lipiec, 2001). The most practical statement is: "values are the norms and the rules of conduct, which enable human development and let him achieve satisfaction in life" (Dziewięcki, 1998). Thus, the definition of value is not easy to state. It is generally accepted that the concept of value is the primary category of axiology (the science of values), and according to Łobocki (1993) that means "all that is considered important, valuable and desirable for the individual and society is combined with positive experiences and is also the goal of human desires". Everything that is an object resulting from the needs hopes and aspirations of man, which is the object of his desire can be called value. All three components are found in them, just like in the attitudes: cognitive, emotional and

impulsive. Values provide mainly an incentive for action, as people want to achieve them. They become the basis of norms and arouse emotions. They generate and select ways of behaviour. People know what they want to achieve, they are hoping for it, become angry, sad and they also enjoy. They wonder what they aspire to is socially approved, as well as make various efforts to achieve a certain value.

A person as a rational and conscious being is striving for specific values, which include and regulate all dimensions of life. They refer to physical, mental, spiritual and social spheres. They provide criteria for attitudes and decisions in all of those spheres which enable integral development and the realization of people's aspirations in life. Values define our attitudes towards people and things thus they interfere with emotional states and affect self-esteem.

Tomaszewski (1984) writes that "values are implemented so that and individual can achieve "the fullness of existence", "physical and psychological well-being". The value becomes what is needed for human life, physical comfort and mental health, development of activity, a sense of "being needed and happy". This is also everything that defines human identity and place in the surrounding world". Values are a factor in shaping human personality. Exploration and pursuit of values makes human existence better. Living by values makes life good and reasonable. They regulate social life, affecting relationships between people, as well as between people and the environment. They are an important part of culture, which is their co-creator defining their character, influencing the direction of development. Life without values is impossible because they are the criteria for making all decisions.

We primarily follow the values we learn at home, but we should talk about them and put them into practice also in kindergarten and in school. Koźmińska and Olszewska (2007) argue that schools teach us construction of arthropods and do not teach how to be a decent human being, make the right choices and build good relationships with people. There is something significantly distinguishing teaching values from education in other fields: the most important element of this study is an example of adults. What appeals to young people and children the most is not theory, but the behaviour of parents and teachers, their system of values in action. We have to be very attentive to make the values practiced by us in our daily lives, which young people see and infallibly interprete, consistent with those we preach.

One might ask whether a world without moral values would work normally and if life could have turned out without hindrance? The increasingly acute shortage of values in society can be noticed. There are more and more violations of moral norms in the contemporary world and social acquiescence of such behaviour at the same time. Betrayals and divorces, corruption, theft, violence, addictions, drug trafficking, promiscuity, etc. They are frequent topics in the media and subject of discussions at home. Some people speak about relativism of values and chaos in the sphere of values. It is difficult for children to figure out what is good and what is bad, as even adults lose themselves in that.

The only completely effective way to control a human is self-control. Only a strong internal system of moral values is capable of persuading a person to act morally in all circumstances. Therefore, you should propagate and teach moral values from the earliest years, because a lack of them constitute a threat to the world. They uphold life and its quality. They are needed not only in social dimension: they bring unquestionable personal benefits to those who practice them. They:

- give life a meaning, which is the source of our happiness and self-fulfillment,
- build relations with people and are an important part of good interpersonal communication,
- facilitate making the right decisions and facilitate achieving success,
- prevent immoral behaviour,
- protect from external demoralizing influences,
- build harmony in life (Koźmińska, Olszewska, 2007).

Moral values lead us to behaviours which are good for everyone and does not hurt anyone.

One of the values that occur in human life is nature. It constitute the biological, contemplative, social, political and economic value for people. These values correspond to the fields of the human relationships with nature: symbiosis, work, contemplation (Ślipko, 1988).

It is really hard to determine its place in the hierarchy of values of a certain person. Many people say that they appreciate nature and what it entails, but is it enough to put it higher than career, money or even friendship? In the age of technological progress, rapid development and modernization one may be tempted to separate such place for the nature-ecological values. Consideration of such values in the current reality is justified by dominance of technical achievements which detach people from their natural environment and also create threats through their actions.

People break laws of nature since their very first days on this planet. Equipped with reason and free will they transform the world around them and change themselves as well. People have to make choices imposed by the force of social, technical and scientific progress. They want to have authority over the world and impact on reality. They ignore the nature (Potyrała, Kornaś, 2013).

Under the presence of contaminants devastating wildlife and posing threat to the survival of many species of plants, fungi, animals and other organisms which play significant roles in the functioning of various ecosystems, treating environment as a cherished object becomes a necessity. Measures to support the nature must be therefore considered as an anti-values of action that destroy it. One should cherish all the elements (subjects) which co-create animate and inanimate nature, and also all activities for its protection, support, prevention of its destruction and pollution. These values are effectuated by the messages and experiences, which are widely understood socialization.

The most significant effects of socialization are those occurring in the early stages of life, which are the task of parents, grandparents and other family members. Socialization must be continued throughout a person's life. It should rely on promoting natural values. This task is given primarily to adults, so that young people and children would be able to appreciate what is most important.

Active roles in promoting environmental protection require the investment of considerable finance. Poland, as a member of the European Union has the opportunity to use Community funds, which added to national funds provide big opportunities of action. Thanks to the activities of various institutions and non-governmental organizations there are numerous ongoing projects related to conservation of nature, preservation and enrichment of biodiversity, or environmental education, and still new ones are created. So what actions are being taken to enhance the "value" of nature? Looking at the activities of adults, there are noteworthy projects, such as:

- festivals: e.g derenia in Baletraszyce, garden festival, apple festival,
- creation of Natural Museums, natural monuments, nature reserves and parks,
- organization of: World Day of Water, Day Forest, Days of Biodiversity, the World Day of Environmental Protection, Open-Air Painting, Open Air Photography which show the beauty and uniqueness of nature, and also Day of Fauna, Flora and Natural Habitats, the European Car Free Day, Day of the Sea, the World Birds Day, European Day of Protest Against GMO and many others,
- organization of competitions and events promoting nature not only among children but also among adults,
- participation in community service, for example afforestation and floweriness of green areas, care for gardens, animal feeding provided even by Forest Service and Hunting clubs, afforestation, lawn care, design of flowerbeds, organization of parks and every works on behalf of protecting nature which shows how nature is important for us and how valuable is it,
- organisation of trips of Kielce and other cities on trails covering most important natural urban places - nature which reveals a value of variety of biotic and abiotic nature,
- participation in research in the field,
- publishing nature journals, for example: Aura, Focus, Animal land, Flowerbed, gardening and any other articles about changes in environment published in daily press,
- science education of adults - the aims of this education is to increase knowledge of proper waste management and prevention of its production, selective waste collection and recycling, as trash is an anti-value in relation to nature,
- efficient management of such organizations as: Nature Conservation League, Polish Ecological Club, Green Federation, Society of Conservation of Nature 'Salamander',

– organizing programs, projects, workshops, actions, competitions and many other undertakings.

Our lives are a process of realization of values. People are free to choose them on their own. They choose what is most important and valuable for them, what is worth sacrificing, what will be their goal. A person's own value system impacts on their personality and adds meaning to their existence. By forming a proper system of values, a person takes a step in the direction of being a better human being. During evaluation of one's own value system a person should renounce superficial values and turn to higher values. One of them is nature. There is a huge interest in a variety of nature-related issues. In spite of the present situation of the world and human influence on environment, nature is still an important value for all people.

There is a number of activities which give opportunity to expose the unparalleled treasure of nature. This promotion is related to: ecology, environmental protection, morphology of the terrain, flora, fauna, water relations and climatic conditions. In recent years or even months, we can see clear progress in this area and an increase in environmental awareness of adults. All activities which aimed at keeping natural beauty of the environment show that nature could be a value on its own.

Environmental protection at the local and global dimension is becoming a sphere of human action and activity which is connected with European construction - integration which was created as a result of necessity for common management of cultural and natural heritage. These issues started to be more important because of knowledge and community sensitivity to ecological concerns in the context of progressive degradation of environment.

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Nature as a value promoted among adults

Abstract

Nature is an integral part of every human life and is valuable to them. Every human being has influence on their development and because of that the protection of people is one of the most important priorities of environmental development. Nature as a value was appreciated by economy, politics, development and popularized in education. The value of nature in life is becoming more and more conscious. People more often undertake environmental activities, which is the best expression of efficiency of promotion of nature among adults.

Key words: nature, values, people

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Scientific theatre as a form of popularizing knowledge of natural sciences

I was dostrzegłem, o dumni badacze (I noticed you too, the proud researchers),
Gdy wami burza jak śmieciem pomiata (When the storm casteth you as trash),
Zamknięci w sobie, jak w konchy ślimacze (Locked in itself, as in snail's conch),
Chcieliście, mali, obejrzeć krąg świata (You, miserable, wanted to watch the circle of the world).
Adam Mickiewicz, *Rozum i wiara*, 1832

There is a common perception that the former scientist worked alone, in recollection, silence and seclusion. He was above the unworthy of him world and he never lowered to its level (Fig. 1). It is a false belief – scientists, from the beginning of science, searched not only for knowledge but also sought the sources of funds. Therefore they organized various demonstrations for potential sponsors. In Middle Ages those took place mostly at royal or aristocratic manors (Fig. 2).

Fig. 1. The common belief – Silent work of former researcher in the laboratory – The Alchemist Discovering Phosphorus.

Source: https://upload.wikimedia.org/wikipedia/commons/thumb/9/97/JosephWright-Alchemist.jpg/270px-JosephWright-Alchemist.jpg [access: 07.12.2015]

Fig. 2. Show of Sedziwoj in Prague with the participation of the Emperor Rudolf II. The alchemist made famous transmutation, which was commemorated by the emperor. He ordered a marble plaque to be placed on a wall of the room where Sedziwoj carried out the show. There was an inscription on the plaque: "Faciat hoc quod fecit quispiam alius Sendivogius Polonus"(Let someone else do what the Pole Sedziwoj did)

Source: https://pl.wikipedia.org/wiki/Micha%C5%82_S%C4%99dziw%C3%B3j#/media/File:Alchemik_Sedziwoj_Matejko.JPG [access: 07.12.2015]

Public scientific demonstratios became fashionable especially in the 17th century – they were aimed at raising funds for further research from a wide audience interested in science. Fig. 3 presents the public lesson of anatomy. The work was created as a commemoration of the autopsy carried out in public – one of those which was held every year in Amsterdam. Such demonstrations were at that time popular throughout Europe and gathered people involved with medicine, as well as many adventurous people. The Canvas presented autopsy of a thief Adriaan Arish conducted by Dr. Nicolaes Tulp.

Another example of such performances is a public experiment conducted by physicist and mayor of Magdeburg, Otto von Guericke in the 1650s (Fig. 4.) commemorated on a post stamp.

As a result of some scientific demonstrations available for a wide range of recipients there were also humorous applications presented in satirical drawings in illustrated magazines (Fig. 5).

Fig. 3. Public lesson of anatomy

Source: https://upload.wikimedia.org/wikipedia/commons/thumb/8/8c/The_Anatomy_Lesson.jpg/1024px-The_Anatomy_Lesson.jpg [access: 07.12.2015]

Fig. 4. Experiment conducted in public in the 17th century

Source: https://upload.wikimedia.org/wikipedia/commons/thumb/a/aa/Stamps_of_Germany_%28DDR%29_1969%2C_MiNr_1514.jpg/1280px-Stamps_of_Germany_%28DDR%29_1969%2C_MiNr_1514.jpg [access: 07.12.2015]

Scientific events also Based on the perfomances there were also

Fig. 5. Pictures presenting experiments in pneumatics (left) and a satirical cartoon with prescription for scolding wives (right)

Source: https://upload.wikimedia.org/wikipedia/commons/7/79/Laughing_gas_Rumford_Davy.jpg; https://upload.wikimedia.org/wikipedia/commons/b/b2/Royal_Institution_-_Humphry_Davy.jpg [access: 07.12.2015]

Currently, researchers are still looking for sponsors and media interest in their work but their role and the role of the teacher has slightly changed. The scientist should not only conduct scientific research and look for funding but should also be an animator and a popularizer of knowledge. This applies to teachers as well. The examples presented in figures 6 and 7 may serve as exemplifications of the above presented statement.

Figure 6 presents Debby Heerkens, a biology teacher who became famous on the Internet after the publication of a film of her lessons. She presented the human body by using her own as an example. She removed her clothes and appeared in costumes presenting muscles, bones and veins. This unusual teaching technique not only drew the attention of the media from around the world, but also the students – they probably will remember this event for a lifetime. There is no denying that this form of teaching has more in common with theater and role playing, than with the traditionally understood role of the teacher. Figure 7 presents a chemistry teacher who demonstrates an experiment. It can be observed that the border between lesson and theatrical show is very thin.

'Theatricality' of learning is exhibited by both the Polish projects, as well as by foreign ones. For example in Poland there was a project realized by the Copernicus Science Centre - Singing Wikipedia. Well known guests were asked to sing various entries from Wikipedia without prior preparation (Fig. 8).

Fig. 6. Biology teacher Debby Heerkens during the lesson

Source: http://i.iplsc.com/foto-groene-hart-scholen/0004QHQZNS1SUX4Q-C122-F4.jpg [access: 07.12.2015].

Fig. 7. Chemistry teacher during the lesson/show

Source: http://filing.pl/wp-content/uploads/2015/03/filing_images_ea061f009f99.jpg [access: 07.12.2015]

Fig. 8. A screenshot from the performance of Ewelina Flinta in the Singing Wikipedia project – the definition of the term alcohol

Source: https://www.youtube.com/watch?v=XsVJjxmnMwA [access: 07.12.2015]

Fig. 9. A screenshot from the lecture of Ramsey Musallam

Source: http://www.ted.com/talks/ramsey_musallam_3_rules_to_spark_learning [access: 07.12.2015]

Therefore, it seems that college students in addition to the professional knowledge should gain the skills of popularizing science, for example through theatrical performances. These skills will be useful when playing with children, teaching them at universities of children (Fig. 10), when preparing popularizing

events such as science festivals (Fig. 11), charity events (Fig. 12), open days and other activities, etc.

Fig. 10. Lecture and performances at the Pedagogical University of Cracow as part of the University of Children and Parents. Fot. M. Pasternak

Source: http://www.dzieci.up.krakow.pl/?page_id=4954)

Fig. 11. Charity performance in the Aula of the Pedagogical University of Cracow. The spectacle was prepared by students of biology and chemistry

Fig. 12. Show at the Main Market Square in Kraków, The performance was part of The Festival of Science – prepared by students of third year Chemistry UP (V 2012)

In frames of the classes "Scientific theatre" and "ICT and new forms of social communication" realised as a part of the project "Animation of nature culture (Animacja kultury przyrodniczej)" undertaken were activities connected with providing the new scientists not only with wide tematic knowledge, but also with skills of transfering that knowledge to various groups of recipients. This was realized through theatrical scenes. The task of the student was to prepare a play based on

chemical experiments and to record it with a camera and finally to put together a movie using dedicated software (Raichvarg, Potyrała, Di Scala-Fouchereau, 2015).

The question arises: What is the educational effect of such actions?

Hard competences are mainly concerned with specialistic knowledge. Students must be able to choose among these chemical experiments, which are suitable for show (on the one hand experiment must be impressive and on the other hand safe). They familiarize themselves with the characteristics of chemicals used by reading "Safety data sheets". They must do it more thoroughly than in other situations. To ensure that the experience comes off on stage students must perform it several times in many variations of experimental conditions. Moreover students practice skills of using computer software for image and video processing, as well as art skills by preparing suitable decorations.

Soft competences are rarely the basic aim of academic education. They concern the psychophysical and social skills, focus on human behavior, their attitudes, way of living. They relate primarily to the management of a person's own world, motivation and interpersonal skills.

In frames of the classes students practiced the following soft competences:

- cooperation within a group,
- ability to act on a broad forum, which leads to the skills of delivering speeches and other public performances,
- communication skills,
- dynamism of action,
- creativity,
- resistance to stress,
- time management,
- body language,
- sense of humor and ability to laugh with each other,
- emotional intelligence.

It seems that the benefits of this type of activities should cause that they should be compulsory at all higher studies. A scientist now cannot be withdrawn and silent and should carry the torch of education to the nation.

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Scientific theatre as a form of popularizing knowledge of natural sciences

Abstract

The article shows how the role of the scientist as a popularizer of science changed over the centuries. On this basis the role of the classes with students on educating their competences of animator of natural culture is shown. The classess "scientific theatre" and "ICT and new forms of social communication" were realised as a part of the project "Animation of nature culture (Animacja kultury przyrodniczej)".

Key words: scientific theatre, popularization of science, animation of nature culture

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SCIENCE, CULTURE, SOCIETY –
INNOVATIONS FOR EDUCATION AND TEACHER(S) TRAINING

Emmanuella Di Scala, Philippe Ricaud

Representations of scientific culture among future teachers of science

Introduction

Setting the issue

The issue studied in this paper focuses on the evolution of representations: Does an art initiation modify the teachers' view on scientific culture? Such investigation presumes a reflexion about the fundamental notions that it entails. Because if, concerning scientific culture, a large consensus is established around declarations of principle, things are less clear once one goes into detail with the definitions. Yet, as we will see, there is no consensus on how to understand scientific culture. Thus, this paper is divided in two parts: first, a definition of the notion of scientific culture is suggested, then the report of an experiment conducted within the university setting is presented.

Clarifying the notion of scientific culture seems ambitious as the word "culture" is hazardous because of its conceptual fragility. Moreover, if the adjective "scientific" is added to it, confusion increases. In order not to give an arbitrary or *ad hoc* definition, an overview of different representations is needed. In the present case, the nature of the link between science and arts (or, if preferred, science and culture) is at the heart of the matter. That is why our review will deal with the relations' angle (unproven or refused) between science on one hand and the arts on the other hand (literature, visual arts, cinema, etc.). Scientific culture will thus be approached in terms of separation, mutual influence and pooling rather than in terms of diffusion. Our goal is not to set a definition capable of reaching a consensus but to revise the most common meanings and to consider their implications. This will be done with the intention to legitimize a conception that opens up science to arts, a theoretic founding necessary to the experimentation that will follow. Thus, secondly, we will relate the first results of an action led on future teachers who intend to teach sciences in secondary schools. By means of questionnaires we measured the evolution of representations' before and after an initiation to the writing of poetry and plays.

Let us remember that studying the representations is a relevant topic within the didactic questions as they guide (mostly not consciously) the teaching or learning methods.

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I

Attempt at definition of scientific culture

It is easily noticeable, when literature on scientific culture is consulted, that the authors do not have the same definitions. Let us see a first draft of propositions. They all adopt the principle of separation science from culture: science must be separated from non-science, which means that the scientific culture is to be distinguished (even shunned) from culture. The scientific culture can only construct itself regardless of culture. It is gnosiological, i.e. constituted of knowledge. This defines a first school of thinking. The general tone is pessimistic.

Scientific culture as a "minimal scientific luggage"

One of the most commonly heard meaning is – not suprisingly – a gathering of fundamental knowledge that a person simply cultured (and not an expert) "must" possess. For example, a "mathematics culture" consists of knowing what a prime number is, resolving a second degree equation, and so on and so forth.

Scientific culture as knowledge on sciences

It is however a general belief that scientific culture cannot limit itself to knowledge *in* sciences (plural form). It must rely as well on knowledge *on* sciences. There are three:

- *historical knowledge*: for instance, scientists' biographies, knowing that the parthenogenesis was discovered by Bataillon, and other information based on the same topics,
- *methodological knowledge*: how researchers work, reason, set a problematic, formulate or validate a hypothesis,
- *social knowledge*: on the men of sciences, which cannot be distinguished from the category above: the models developed in science sociology (Merton, 1942; Bourdieu, 2001; Latour, Wodgar, 1979) approach the scientific culture as a scientists' culture.

Scientific culture thought through the literary culture's model

This separation between science and culture was favoured by the division set by Dilthey (1942) in the knowledge field between two schools of discipline, each of them having its methods and autonomous ends:

– the "sciences of spirit" (i.e. the science of men, the human sciences, formerly the "humanities"),
– and the "sciences of nature" that separate themselves from the knowledge field and are formed in a specific field.

The result is an analogy between literary field and scientific field. Each of them gives rise to a specific culture. Hence the parallel between what "must" be known of Shakespeare and what must be known of the 2nd law of thermodynamics or the mass notions or acceleration. But is this parallel not misleading?

A lamentation speech

This concept of culture fears above all the falsification of knowledge (e.g.: before Galileo, people thought that the Earth was flat, cloning allows to reproduce identically the same person etc.). What is more, the inquiries show that the scientific culture is not shared enough despite tremendous and expensive efforts. As a result, pessimism is often linked to that school of thought. Most of the time, the tone of the speech is based on lamentation.

In this first school of thought, a divorce between science and culture is wished. The second school of thought, on the contrary, sees that separation as a tragedy. It regrets that science and culture are separated that much. Once again, pessimism is used, though for other reasons.

Another difference is that the scientific culture is not characterised by knowledge but by a state of mind, an attitude towards the world, the society and life.

Science is unfortunately separated from culture

There are two leading authors. The first one is Charles Snow who declared at a conference in 1959 that there is no common culture (Snow, 1959), but two cultures which cannot communicate anymore. According to Snow, this "*schism of culture*" is specific of the Western world and got worse while spreading.

The other one is Jean-Marc Lévy-Leblond. He traced back the process of separation. Until the 17th century, there was no separation (Lévy-Leblond, 2004), science was integrated with cultural world. In the 18th century, a progressive autonomisation of science began. It was highlighted by the creation of the academy of sciences and the academies of the belles-lettres and fine arts. The separation was consecrated with the *Encyclopédie* by Diderot and D'Alembert (supervising literature/philosophy and sciences respectively). In the 19th century, science increased in power. Big universities – built on the model of Berlin's university (founded by Humboldt) – became a place of knowledge production with its own laboratories. Science was coupled with technology and industry and was financed by the state. Nowadays, the divorce between science and culture is consummated.

This situation is disastrous for culture and science

According to Snow, the lack of communication between both cultures leads to a general creativity crisis (Snow, 1959). Thus, the intellectual life and life itself are put in jeopardy: we misinterpret the past, misjudge the present and lose faith in the future.

As for Jean-Marc Lévy-Leblond, he supports the iconoclast thesis of the disappearance of a scientific culture among scientists: there is no culture to share or to diffuse anymore. Scientists forget too much about the history of their field because in sciences, there is a tendency to forget the mistakes of the past and the expired knowledge (Lévy-Leblond, 2004). However, science is like other branches of culture dependent on its past. And, in order to assume it, it must know it.

The call for a change of direction

It is urgent to reconcile science and culture and make them "talk" together. Snow thinks this call is addressed to the intellectual elite: for a mutual enrichment, scientists should read literature and the literati need knowledge in sciences.

Jean-Marc Lévy-Leblond aims for a larger change: we need to "put science back into culture" which means bring science and culture closer. The matter is urgent: Jean-Marc Lévy-Leblond wondered whether it was too late or not (Lévy-Leblond, 2008). Pessimism is here at its height.

Our positioning will be based on this second school of thought. It is unfortunate to observe this wide separation. As a reminder, science has known its development inside a cultural context that has been favourable. It was Alexandre Koyré's conviction (Koyré, 1973), the great historian of sciences. It is thus prejudicial to separate science from its cultural roots.

However, this separation does not appear so radical neither so hopeless. Mutual influences survive provided that the scientific culture is looked at through the cultural productions inspired by science. Nothing forbids us to speak about a scientific culture just as we would speak about a religious culture: an intellectual elaboration that produced over the centuries a certain sensibility, literature, architecture, painting, statuary etc. Yet, the influence that science has on culture takes no doubt. Two examples come to our minds. The first one is from literature – science helped with the birth of new genres: the "scientific novel", science fiction, cyberpunk. The other example is futurism. It is an artistic movement (and not scientific) directly inspired by sciences. Initiated by a poet and developed by painters, it breaks off with academicism (the former aesthetic cannons) in order to echo the contribution of science in the society.

If previously science was separated from what it is not, we are now naturally linking science to arts, literature, and cinema. In this sense, science is a part of culture and there are no distinguishable cultures (as Charles Snow thought). If you still go along with our point of view, it is difficult to understand the meaning of "putting

science into culture" as it is constituent to culture (without of course, being reduced to it).

Our conviction is that there is much to gain by considering the scientific culture as a mix of science and non-science, just like the fertilization of cultural fields by science. This speaks in favour of an anthropological approach (i.e. cultural, historical, social, artistic) of the scientific culture.

We started from a purist conception of the scientific culture (principle of separation of science and non-science) to get to a mixed and open conception: a mix of science and humanist culture, places of influence and mutual improvements between two fields of activity of the human intellect.

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II

Experimental approach

This anthropological approach of the scientific culture justifies the experimentation which is to follow.

Representation of science culture

While some authors see the scientific culture as a vector helping the rise of a new knowledge relation (Jacobi, Schiele, 1988), Jean-Marc Lévy-Leblond (2010) also cast light on the role of scientific culture such as the art as a vector questioning our knowledge relation. This scientific knowledge relation is described as a state of mind, a deep reflexion related to the origin of knowledge, its role in the society, as well as a critical vision of its own limits and its real status in the society (Canguilhem, 1961; Giordan & Pellaud, 2009).

We thus decided to interrogate the representations of teachers – to be thanks to two precise cultural scientific actions: scientific poem and play. The aim is to identify, through a study case and a research-action, if the actions on scientific culture influence the future teachers' representations of their approach on scientific culture.

Methodology

Surveyed sample

Our study focuses on two groups: group A of 20 teachers-to-be (with a first initiation to scientific culture) and group B of 28 future teachers (without a scientific culture) in their Masters preparing for their teacher's biology exam or young teachers of biology. Data were gathered, thanks to a diagnosis evaluation, by collecting initial representations before the activities and training on scientific

culture. Initial representations (Q1) were collected from open questions on scientific poem and scientific play such as "According to you, what is the purpose of studying and writing a scientific poem? Would you like to study and write a scientific poem with your pupils? According to you, what is the purpose of studying and performing a scientific play? Would you like to study and perform a scientific play with your pupils?"

A second collection of representations (Q2) on these topics were realised after an initiation and production of scientific poem and scientific play a few months later on group A.

Data processing

The results are gathered in four charts indicating the results for students with a first initiation (Q1-A) in Chart 1, for those without an initiation in Chart 2 (Q1-B), for students with an initiation at the scientific poem and play a few months later in Chart 3 (Q2-A), and then a comparison between promotion A-Q1 and A-Q2. For all of them, the number of future teachers is mentioned and indicates in each case whether they found an interest (yes or not) in studying and writing a scientific poem or play. Also, the percent of students indicates whether they would like to write and study a scientific poem and play with their pupils.

Results

Students who have been initiated at scientific culture but never at scientific poem or scientific play: group A (Q1)

Chart 1: Students with a first initiation at scientific culture (A-Q1), in % of students, n = 20

Poem				Play			
Interest		To write with pupils		Interest		To write with pupils	
yes	no	yes	no	yes	no	yes	no
80	20	48	52	95	5	59	41

Purpose of the scientific poem and scientific play according to prospective teachers

Most of the students with an initiation at scientific culture found, an interest for scientific poem (80%) and scientific play (95%).

A scientific poem could, according to them, match science under another view, could develop creativity, could change the approach on sciences and could help to associate words and concepts. A scientific play brings, according to them, another point of view, allows the learning of science history and finally systematizes knowledge.

For the students, who think that the scientific poem is not interesting, the arguments are different: it seems very difficult to organize because the educational system does not give time for that, poems are very difficult to write and it is a linguistic exercise more than a scientific exercise. Few students think they do not have the abilities to write a scientific poem. As for the students who think that a play is not interesting, they seem to believe that a lot of work is produced only for little knowledge and the interest is only, according to them, cultural and not scientific. Moreover, the lack of time during training sequence does not allow for this type of work to be done.

Staging a scientific poem and scientific play with pupils according to future teachers

About half of the students (48%) would suggest to write a scientific poem with their pupils and a little more than half of them (59%) would suggest to write a scientific play with their pupils. The scientific poem seems easier to tackle during a lesson because of its short duration. Moreover, imagination is developed. The scientific play takes up more time so it could be interesting to work on it as an interdisciplinary project. Future teachers who do not prefer to write a poem or a play, explained that a poem requires too much precisions and a play is too long to write during a lesson.

Students who have not been initiated at scientific culture: group B (Q1)

Chart 2: Students without an initiation at scientific culture (B-Q1), in % of students, n = 28

Poem				Play			
Interest		To write with pupils		Interest		To write with pupils	
yes	no	yes	no	yes	no	yes	no
25	75	11	89	82	18	36	64

Purpose of scientific poem and scientific play according to students

Students without an initiation at scientific culture naturally have an interest for scientific plays (82%) but not for scientific poems (25%).

The scientific poem is unknown for most of them. It seems too difficult to understand. They think they do not have the abilities to write a poem. Some of them have a bad representation of poetry from their scholar curriculum. Most of them think that poetry is only a literary exercise. Only a few who are interested in scientific poems think it could bring another point of view to understand sciences.

Students who are not interested in scientific plays (just a few of them, 18%) point to the lack of time and the lack of efficiency to understand scientific concepts. Most of them think that theatre is a good way to wind down. Theatre can introduce scientific historic facts and could bring another point of view on sciences.

Staging a scientific poem and scientific play with pupils according to prospective teachers

89% of students without an initiation at scientific culture would not suggest to write a scientific poem and 64% would not suggest to write and perform a scientific play. In these two cases, the students explained that these exercises are too long during a training sequence. Moreover, poems are too difficult to write with pupils and the latter would be destabilised by this work so it would not even be efficient.

Students who have been initiated at scientific poem and play: group A (Q2)

Chart 3: Students with an initiation at scientific poem and play (A-Q2), in % of students

Poem				Play			
Interest		To write with pupils		Interest		To write with pupils	
yes	no	yes	no	yes	no	yes	no
89	11	68	32	95	5	77	23

Chart 4: Comparison between group A-Q1 and A-Q2, in % of increase or decrease in function of A-Q1

Poem				Play			
Interest		To write with pupils		Interest		To write with pupils	
yes	no	yes	no	yes	no	yes	no
+9	-9	+20	-20	0	0	+18	-18

Purpose of scientific poem and scientific play according to students

Those students who had already been initiated to the scientific culture and confronted with the writing of a scientific poem or play clearly exhibit an interest (Chart 3) in the study of a scientific poem (89%) and the writing of a scientific play (95%). The main arguments did not change compared with the Q1 phase. However, it appeared that the main arguments developed by the students who positively changed their mind about working on a scientific poem (+9%, Chart 4) are that it brings creativity and allows another approach to sciences. No students (0%, Chart 4) have changed their minds about the positive interest of writing and staging a scientific play for they are still 95% to have a positive image of theatre.

Staging a scientific poem and play with pupils according to future teachers

The main modifications of the students' representations towards scientific culture seem to be the consequence of their will to write scientific poems and plays with their pupils (Chart 3). Indeed, 68% of the students are ready to write a scientific poem and 77% are willing to write and stage a scientific play with their pupils. 20% of the students (Chart 4) have clearly and positively changed their view

on writing a scientific poem and 18% of them (Chart 4) also have positively changed their approach to their pupils' writing a play.

It also appeared that it is the same students who changed their representations on scientific poems and plays.

The main argument developed concerning the writing of a scientific poem and a play is that it is possible to find links and organize an interdisciplinary project.

Discussion

This study case put into light an obvious difference of the prospective teachers' representations according to their initiation or not to the scientific culture in general. Indeed, it revealed that initiated students see a personal cultural interest in the analysis and the writing of a scientific poem and play.

Non initiated student exhibit very little interest (25%) in studying and writing poems for they think such an activity is a purely literary exercise that has no link with sciences and is not easy for a person who is not a wordsmith himself. Yet, a scientific play seems more interesting and understandable for them (82%). Thus, the initiation to a scientific culture and most of all, an initiated reflexion on the scientific culture as a space for reflexion on knowledge (Jacobi & Schiele, 1988) modified the students' relation to the interest of scientific cultural activities such as a poem or play. Indeed, for these activities, the initiated students found an obvious interest in studying a scientific poem (80%) or a scientific play (95%). Initiated students found an obvious interest in studying a scientific poem (80%) or a scientific play (95%).The cultural reflexion seems to have enable them to apprehend these cultural activities in a new and different dimension with the task being "an exercise that allows the development of creativity and to look at sciences from a different angle" and with a play "brings a different reflexion and a history of sciences". Indeed, as Giordan and Pellaud indicated in 2009, the scientific culture is most of all a state of mind, a way to question the world, a way of thinking, seeing, analysing. These dimensions seem to be developed throughout a formation of scientific culture.

It is also interesting to see that those same initiated students have developed, thanks to the studying and writing of a scientific poem and play afterwards, a new relation to the scientific knowledge. Indeed, 9% of them now define scientific poems as a source of creativity development while they did not think that after a first initiation to scientific culture. It appeared, as Canguilhem quoted (1961), that in the end, it is the convergence of the different forms of scientific culture that constitutes this new relation dimension to the scientific knowledge, as in fact, for these students, it is the action connected to the initiation to scientific culture and coupled with concrete actions that allowed the develop a new reflexive dimension among prospective teachers.

On the other hand, this study showed that, for the most part, non-initiated students do not plan to initiate and develop these aspects of scientific culture with their pupils, as 89% do not intend to study and write scientific poems and as for

the scientific plays the number is 64% of them. As for the initiated students, they are reserved when it comes to this approach, for 48% plan on studying-writing a poem and 59% intend to study-write a play. It is surprising that initiated or non-initiated students with a positive representation of the theatre do not intend to do it with their own pupils, even though this statement is stronger with non--initiated students. It seems that the real obstacle for such activities are institutional constraints. Indeed, the students do not see when they would be able to organise such activities because of their busy school programs. They do not seem motivated enough to set up measures that would allow their pupils to practice such activities, even though they are aware of their interests.

However, one can notice that the implication of the initiated prospective teachers in the study-writing of a scientific poem or play has modified, for some of them, their representation on the pupils' implication during this kind of activity.

Indeed, 20% of them would eventually be ready to suggest this type of activity to their pupils by organising an interdisciplinary project in order to develop these activities that they found good for the pupils' creativity and allow to put scientific knowledge in perspective.

Conclusion

This study showed that an introduction to the scientific culture changes the scientific culture's representations the future teachers have. It confirmed that the convergence of different forms actually supplies this dimension of knowledge relation. Indeed, an introduction to a scientific culture coupled with concrete cultural actions such as writing of scientific poems and plays, seems to awaken or strengthen the interest to initiate their own pupils to an open and mixed scientific culture.

It appeared that every scientific teaching cannot skip a deep reflexion, as well as knowledge transmission, correlated to the origin of knowledge, their roles in the society, and a critical vision of their own limits and their real place in this society (Canguilhem, 1961). That is why culture (scientific or not) must include knowledge, comprehension and association faculties at the same time, that allow us to think, and allow to the spirit to bear fruit (Raichvarg & Jacques, 1991).

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Representations of scientific culture among future teachers of science

Abstract

There is no consensus on how to understand scientific culture. Thus this paper is divided in two parts: First, a definition of the notion of scientific culture is suggested, then the report of an experiment conducted within the university setting is presented.
This analysis is concerned with the evolution of representations of scientific culture among future teachers: Does art initiation modify the teachers' view on scientific culture?
This work has highlighted that a training to scientific culture changes the representation on scientific culture that future teachers have especially when underlining its role as a vector of creativity.

Key words: communication, scientific culture, representation

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The impact of professional development of research and teaching staff on the implementation of innovate learning technologies

Introduction

Modern higher education meets the challenge of the undergoing integration processes in the world solving the spectrum of extraordinary tasks that might involve a wide range of educational activities. Choosing them is impossible without changes in higher education management. Any changes are introduced in search of optimal decisions to support the educational systems and educational institutes management under the conditions of an unstable developing society.

Ukrainian and foreign scientists such as: V. Afanasiev (Afanasiev et al., 1988), B. Gershunskii (Gershunskii, 1998), D. Dzvinchuk (Dzvinchuk, 2007), K. Korsak (Korsak, 2006), O. Navrotskii (Navrotsky, 2006), V. Jadov (Afanasiev et al., 1988) view any higher educational establishment as a society entity that, in a changeable environment, has to constantly develop in order to ensure its vital capacity, as well as its functional stability. D. Dzvinchuk (Dzvinchuk, 2007) noticed that from the philosophical point of view the depth and ever-changing character of the world tendencies and phenomena that stimulate the representatives of all spheres of knowledge intensify their analytical and theoretical activity, as paradigms, canons, presentations and claims of the 20th century, in most aspects, lose their heuristic value and practical applicability.

It is generally acknowledged that professional development is a key requirement of the contemporary times (Borova, 2011; Gershunskii, 1998; Levin, 2003; Yelnykova et al., 2009). Professional activity in an information society is substantiated by its scientific and technical development and the evolving telecommunication facilities. In the last decade the question of wide information and communication technologies implementation in education has drawn the attention of both pedagogical science experts and practitioners.

In view of it, as was pointed out by D. Dzvinchuk (Dzvinchuk, 2007), K. Korsak (Korsak, 2006) and O. Navrotskii (Navrotsky, 2006) the requirements for educationalists are expected to become stricter, especially for research and teaching staff in higher education institution who prepare future professionals in all fields of

economy. Thus, modernization of education is impossible without constant analysis of the activities of the participants' involved in the educational process which, to a great extent, reflects the level of their professional development. Hence, the issues of research and teaching staff effective professional skills formation and updating remain of interest. Considering the above-mentioned facts, it is reasonable to study general characteristics of professional academic staff activity, English language teachers in particular, to specify some key factors of their development.

One of the aims of learning foreign languages is to help students develop general and professional communicative language competences in order for them to effectively communicate in both academic and professional sphere. It is obvious that to become an effective communicator it is necessary to create certain real life situations and a student-friendly environment. In order to achieve these aims it is necessary to involve students in discussions and various problem solving tasks. The best way to do it is to use the most powerful student learning tool – the computer, since e-learning is not only a modern technology, but also an integral part of students' life.

Despite a wide range of research works, this problem remains scantily studied, in terms of using certain professional development models for higher school staff, proficiency of foreign languages teachers in particular, specifically under modern conditions of e-society development.

The article is dedicated to the analysis of both theoretical and practical aspects of the issue of present-day adaptive management and evaluation of the professional development of research and teaching staff. Theoretical grounds of coaching in the system of adaptive management were determined. The presented model is theoretically grounded and experimentally verified. The model is aimed at maximum revealing and implementing intellectual, cultural and creative potential of faculty members, as well as at ensuring competitiveness between research and teaching staff, by using adaptive management techniques under information society development conditions. It has been proved that adaptive management of higher school research and teaching staff is realized by way of applying a directed self-organization mechanism, which is initiated by educational coaching, based on the directed self-organization principles, their objective being to support the professional development of research and teaching staff. Educational coaching procedures were carried out on the basis of educational monitoring that stipulated a permanent feedback, thus speeding up the process of professional and self-development. The scope of teaching innovations included e-learning models and tools used in the learning process. The reliability of research findings has been verified throught a qualimetric model. Certain student-friendly results of e-learning technology implementation in teaching English to non-linguistic major higher school students have been obtained.

The tasks of the work are to define and distinguish adaptive management of professional development of research and teaching staff in higher education

institutions, models and techniques for ESP teaching under modern conditions of society's development, to describe the results of e-learning techniques implementation in teaching English to higher school students not majoring in linguistics.

Research findings

The authors focused on the period of the Ukrainian society's shift to knowledge (or "informative") one as well as the search of the prospects planning, organizing and secure and successful functioning of the education system transformations (Dzvinchuk, 2007). D. Dzvinchuk underlined the necessity to give advantage to the indirect methods of management, to delegation of responsibility and to the increase of autonomy of higher education institutions autonomy.

Such an approach will give an opportunity to present the work of any higher education institution on the new level of management that will open up the possibility to implement modern tasks set by the society.

Nevertheless, not only do innovative processes lead to changes in the system structure, but also the system itself can develop in a permanent one therefore it needs a permanent management with consideration of current requirements, both external and internal. V. Afanasiev, D. Guschin, V. Kelle, V. Yadov, and others, researching the dialectics approach to explaining community development processes, tend to analyze society as an integral, open system that is capable of self-regulation, self-organization and self-development (Afanasiev et al., 1988).

Thus, the function and progress mechanisms are generated by the society itself and exist in it (Afanasiev et al., 1988). The above mentioned authors determine that any society as a gathering of people's relations is the necessary form of existence of the latter (Afanasiev et al., 1988). Any phenomenon becomes public only when it is brought into the system of public relations. Any society is simultaneously the subject and product of its own efforts (Afanasiev et al., 1988). The functioning and development of socio-economic structures transitioning from one structure to another, more progressive one, constitute the essence of public life dialectics.

The system approach gives an opportunity to consider this process from the view point of the society dialectics, when it is regarded as a separate organism, accompanied by the death of the old and formation of new systems (Afanasiev et al., 1988). Thus, education as a society frame possesses the same internal and external social relations as any other public system (Blauberg & Yudin, 1972; Gigch, 1981). Similar laws govern its functioning and development as was determined. The educational system is a constituent of any social system for it plays an essential part in the society development, possessing its own internal features.

T. Parsons distinguished the basic functional requirements to any society frame, without which it cannot exist, such as the capacity for adaptation, the possibility of being rationally organized, the ability to distribute internal resources. Apart from that it has to be goal-oriented, able to determine the primary purposes and tasks

facilitating the process of their achievement; it must keep certain sustainability, based on the same generally accepted norms and values adopted by its members, as well as those that take off tension in the system; it must have a certain capacity for integration in order to be successfully incorporated in the new generations' system. The more sequentially effective the functional division of activity at the level of institutes and social roles is, the more stable is the society itself (Parsons, 2000).

We believe that it is necessary to pay special attention to the system-forming and system-preserving constituents stipulating the entire system development, as it takes place most unevenly. Thus, adaptive management becomes central to the situational management of these systems in certain unstable situations.

Therefore, we presume that an administrative factor is of special essence in the personality formation, as it takes into account both individual vital needs, as well as social requirements. Adaptive management is a key factor in developing common interests of the individual and the society as it brings about a certain balance and ensures the interpenetration of both personal and social needs.

In a transitional period, with its peculiar changes and transformations in all spheres of social life, any individual is supposed to quickly react or adapt to them. Hence, a relevant administrative system is required. H. Yelnykova stresses that it is the application of adaptive organizational patterns, adaptive management, as well as the creation of producer (student) friendly adaptive environment, with the peculiarities of production (education), that makes modern organization management more flexible and mobile in mind (Yelnykova et al., 2009).

The increase in the quality of newly emerged education services reflects the changes in the system of higher education. Central to the process of providing a two-way interactive communication between education environment and the subjects of education is their dialogue. To be effective and successful the education process has to become dialogue-bound. The ability to carry on a dialogue and the dialogue-bound quality of the education process are the two basic principles of adaptive management (Yelnykova et al., 2009).

Modern approaches to the individual professional and self-development as well as self-realization are by far more descriptive than technological. In literature little attention is paid to technologies helping an individual to develop, in particular, administrative education technologies are not mentioned. This question has not been discussed in terms of determining coaching as a mechanism of goal-oriented self-realization. That is why the concept of educational coaching comes to focus. In view of the above, the analysis of this concept is fairly topical as coaching has turned out to be an effective goal-oriented self-realizing technology that influences an increase in one's proficiency while switching over from one stage of development to another.

As above-mentioned, the concept of adaptive management is related to dialogic adaptation and conformity of activities of managers to those of performers. Besides, H. Yelnykova pinpoints that adaptive management directs

the activity of any individual at self-realization. According to her, the adaptive management has the following characteristics: contents, organizational structure, and certain technologies (Yelnykova et al., 2009). She determines the algorithm of transformation of adaptive management system, stressing that it consists of seven consecutive processes. The first three of them represent the collective procedure of setting a realistic goal. (Turning up of some stimulating irritants-activators and the system response of them; collection and analysis of the received information to estimate the situation, the realization of the necessity to coordinate the action, mutual working out of a certain realistic goal, it being further transformed into an inner-motivated one, creation of variant models of activity, when the leading organs provide general system parameters and criteria to estimate the activity, while the performers are responsible for adapting the activity to local conditions and procedural peculiarities). The fourth process represents the activity design, the fifth discusses co-operation and self-orientation, the sixth represents self-control of the process, as well as monitoring the results, the seventh comprises the prognostication on the basis of the result analysis.

If coaching is determined from the view point of the above presented algorithm of adaptive management, some procedural similarities between the two concepts become evident. Coaching appears to have a similar stage unfolding to that in adaptive management algorithm. Basic coaching processes include: clarifying needs, setting goals, working out an action plan, with definite situation, in mind as well as monitoring and controlling the tasks carried out, and prognosis of further steps to be taken, based on the analysis of the result. If we proceed from the assumption that coaching contains the same elements as those included in the algorithm of the adaptive management, they are bound to have a common functional basis aimed at revealing a personalized potential of a person.

Coaching procedures determine that the inner state of an individual is a changeable category. The three basic fundamentals of coaching are: beliefs, values, and goals (Zeus & Skiffington, 2007). Coaching is both goal and result-oriented. It prompts a person to become aware of their own values and to strive at achieving the final goal. It stipulates one's proficiency growth due to realistic goal-setting and the accomplishment of set tasks.

Thus, for the sake of providing conditions for individual development and further increasing one's proficiency level, it is of paramount importance to work out a certain mechanism to ensure dynamic successful progress of an individual, which can, at the same time, sustain one's progress. We believe that coaching proves to be the very mechanism that analyses the changes and transformations of the individual and their skills. It also studies the limits of one's proficiency growth limits achieving; generation of certain behavioral changes of those for whom it is difficult to adapt to a new environment and accept new ideas (O' Connor & Lages, 2004). Coaching is action-oriented, with special emphasis placed on result and estimation.

Coaching spreads quickly because of social trends that fuelled this growth. Those include: corporate uncertainty, the need for innovation, lack of time to fulfill the tasks (increasing time pressure), the need for professional development, the need to learn new skills fast, etc.

Timothy Gellwey proposed to focus coaching on «developing a capacity to give objective feedback to themselves» (Gallwey, 1986). Therefore, departmental teaching is actively based on coaching. Coaching is activity oriented. The learning cycle introduced by D. Kolb appeared to be one effective coaching model, its aim being to inspire one's professional development. It was the basis of teaching adults through experience. This model was introduced in 1984 (Kolb, 1984).

Upon analyzing basic models and definitions of coaching we determined our view of it. We believe that coaching is a concept, comprising a system of measures to be taken to ensure a dialogue of the participants of the educational process to achieve the mutually set goal, including not only one's proficiency growth, but also improving the learning standards, which, in turn, fuels the educational and professional efficiency level and competitiveness of any higher education institutions. Basic principles of educational coaching are as follows: humanistic principle of continuous education, partnership, principle of maintaining positive attitude to an individual, stressing the uniqueness of any person, that of adaptivity, a constant search of proficiency growth, that of monitoring, partnership, the one of dialogic interaction, mutual forecasting of further development, with end-results in mind, as well as that of openness. The interaction between the participants of educational process is central to educational coaching. This interaction is, without any doubt, of dialogic nature, that is why we proceed from the information psychological view on educational coaching. Its foundation is the theory of information storing and processing, with emphasis on individual cognitive style of activity, as well as mental actions recording. The following steps are to be analyzed by any scientific and educational workers: comparison, analysis, synthesis, generalization, classification, as well as the use of instruments of deduction and interconceptual links fixing. It is assumed that the starting point of any cognitive strategy of development is goal-oriented and action-based. Due to this, communication is viewed as a specific relational type, with its functions of informing, interacting, exchanging ideas.

Thus, we can conclude that educational coaching centers around one's constant professional development and knowledge base upgrading through learning, self-education and training. The end goal of educational coaching – any professional self-development – is leading to self-sufficiency and self-realization. Application of the mechanism of directed self-development, which is the foundation of educational coaching, will, without doubt, ensure one's natural development, providing an opportunity to upgrade one's intellectual resources. The concept of educational coaching was discussed in terms of scientific and pedagogical workers' activity adaptive management model. The implementation of educational coaching in this context allows not only to distinguish the elements of the scientific and pedagogical

workers' activity adaptive management model, but also to single out one modern technology (coaching) used in adaptive management of individual professional development.

The following principles have become fundamental to the discussed model (adaptive management in professional development of research and teaching staff in higher education institutions), namely by: activity principle, that of proficiency development, synergical, communicative, informative-psychological. Research findings of the theory of adaptive management, as well as the concept of directed self-development and that of educational coaching have also furnished the base of the model of adaptive management of professional development of research and teaching staff in higher education institutions. The conceived model was in agreement with the principles of synergy.

The offered adaptive model has an open and a constantly developing systemic character, the goal of its creation being a successful, productive integration of both a leader and a scientific-educational worker's activity for the sake of an increase in effectiveness of educational services provision. The introduced model ensures the discerning of a set of higher education burning tasks, such as: to provide lasting cooperation of the institution subsystems to enhance the quality of educational services granted; to work out the institution system of control based on principles of evolution synergic paradigm; to ensure adaptation of the institutional departments and subsystems in the ever changing socio-cultural environment; to bring about the integration and uniformity of research activity of higher education institutions; to provide a definite continuity of education, as well as education programs interdependence.

Consequently, our model contains the following components: a conceptually-methodological one, which includes the aim, process peculiarities, principles of professional development of scientific and pedagogical workers based on the adaptive management, activity direction-oriented selection of professional development of scientific and pedagogical workers competence foundation; an organizational one, to provide conditions to ensure goal-oriented self-organization of the teaching staff; the technologically-procedural one, which embraces various technologies, as well as technologies of adaptive management coaching and monitoring, that are interrelated in the process of coaching procedures, while monitoring provides their current control to determine further coaching based decisions. Monitoring is also the basis of evaluation-effective constituent of the process that performs a summative function, evaluating the system activity at this stage. The expected results of research are a certain increase of the level of professional development of scientific and pedagogical worker and some positive dynamics, resulting from a directed self-organization of leaders and scientific and pedagogical workers. We believe that to in order to stabilize the system it is necessary to take into account those factors that constantly affect it. Those are as follows: the necessities and

requirements of the society, the emergence of innovative educational environment, as well as changes in the style of work leaders.

The present model is of integral nature. Its uniformity is one of its peculiarities. The entire model has some new characteristics and properties not inherent to its separate constituents but which tend to appear as the result of coordination of separate parts under a certain system of interconnection. In view of the above, it is worthwhile to discuss these constituents in detail. The first one is a conceptual and methodological component. We proceeded from the assumption that higher education scientific and pedagogical worker's proficiency development becomes the end result of adaptive management of their activity. That is why this point became the objective of our research. The study highlighted some peculiarities of this methodology, singled out by H. Yelnykova, that was further adapted to the system of higher education institutions. The sum of the principles of adaptive management comprises the following ones: the principle determining the priority of human development, with emphasis on its natural character; the principle of continuous development, the principle of management through self-managing; principles of resonance, motivation, as well as that of constant growth of one's proficiency; the principle of a directed self-organization, the principle of dialogic cooperation; principles of coaching, feedback and monitoring; as well as a qualimetric principle applied in adaptive management of staff. Moreover, it is worth noting that the semantic component of the model includes elements such as analysis and correction of personalized professional needs of scientific and pedagogical workers, as well as setting goals and tasks in order to ensure their professional development.

The necessary collection of information on the functioning of the system and the direction of its activity is investigated with the help of the discussed constituents.

We would like to stress that the effectiveness of tasks performance and completion is, to a great extent, dependent on the quality of cooperation of any leader and worker. If these two communicate in terms of dialogue, they will definitely maintain some collaboration on adaptive principles.

The leaders of the study functioned in a coach-like manner. That is why, under leader-coach supervision participants of a scientific and pedagogical project appeared to be far more interested in teaching and the end results of the experiment, with the efficiency quality being ensured. Questioning, feedback questionnaires, as well as personal reflection, evaluation of co-working help to reveal the professional needs and goals of the personnel.

With the above-mentioned aspects in mind, we have distinguished the following constituents of the notion of professional development of scientific-educational staff in a higher education institution. We follow the view that this competence-based professional activity was unfolding along the following lines: a) a subject-research oriented specialization, b) scientific-pedagogical oriented specialization, c) a foreign country awareness oriented specialization.

The foundation conditions of the individual directed professional self-organization are discussed. This appears to be a three dimensional process. Economic conditions substantiating the motivational sphere, providing the necessary system of material encouragement and rewards with a scientific and pedagogical worker individual rating are the first dimension. The second dimension is a socio-professional one, the objective of which is to create an innovative educational environment, stipulating both one's vertical and horizontal career growth. The third dimension specifies the development of scientific and pedagogical worker's individual cultural awareness.

A technological-procedural judicial component includes technologies of adaptive management: those of coaching and monitoring, that are inter dependant in the process of application of coaching procedures with monitoring carrying out their current control, thus which form the basis of further discussion making. Monitoring itself is the basis of evaluative constituent that performs a summarizing function at this stage.

Practical implementation of innovations brings about changes in the process of education and self-organization of scientific and educational staff's and students' activities. The latter stipulate development. It has been highlighted in the model that development is always associated with the changes in the living human system itself, and these changes are, by no means, chance events. Rather than that, they are successive and they constitute the necessary consequence of the previous events in one's life, they are related to certain periods of one's life; these changes are, beyond doubt, progressive as they describe the dynamic movement of one's life from lower to higher levels of life maintenance, determining one's life structural transformation and perfection (Encyclopedia of Education, 2008).

The model substantiates the definition of development of pedagogical mastery and scientific achievements of a scientific-pedagogical worker. Its character is cyclic, helping to form urgent professional questions. It is used with the aim of rapid administrative reacting and eliminating emerging problems with the implementation of coaching and monitoring procedures. This model has a bilateral character, for it can be applied by both scientific-pedagogical workers and leaders, for example, by a department manager. This being taken as the basis, it is possible to form at every stage the programs of the professional development of the constituents, according to which the process is organized, controlled, evaluated and adjusted which, in turn, makes the further process of development by far more ordered (Borova, 2011). The level of one's professional competence development can be evaluated by both scientific-pedagogical workers and department managers. At some stages, it is worth to consider the opinion of students while evaluating the work of a given scientific-pedagogical worker.

It is necessary to stress that the process of a scientific-pedagogical worker development is of sequential nature. An American researcher B. Bell, for example, studied one's professional development in unity with individual self-development in

the context of social one (Bell, Gilbert, 2004). Each element appears to have its levels of development, such as reproductive, structural, and creative; each one is interacting with the others on both vertical and horizontal planes. Another American scientist B. Levin, analyzing the models of teachers' professional development suggests that not only dimensions of their professional and personal development should be viewed as essential areas, but also those of students' proficiency level attainment and their interest in the specialization area (Levin, 2003). The research results of our follow scientist N. Guzii have also been taken into account. They relate to the teacher's individual professionalism in terms of pedagogic culture (Guzii, 2004). We share the opinion of the above mentioned scientists, that one's professional development, as well as personal and social ones can not be discussed separately, as all three components form the foundation of professional motivation to act. However, here arises the question of making teacher any more active and efficient in their work, arises as well as the necessity to make them more change-tolerant. Of interest is the part played by their leader in this context, taking into consideration the role of a present-day shift from an authoritarian type to a new generation leader. Without any doubt, in order to effectively introduce and implement any innovation, the strive for continuous change, development and self-organization on the part of the managers themselves is of prime importance.

Thus, we consider learning the principles governing the development of interrelations between the participants of higher education institutions and educational process administering at all stages, to be of essence. Partner relations, as well as interactive cooperation of a scientific-pedagogical worker and his/her administration is in our opinion central to the analyzed process and thus has been determined in our work. Besides, we believe that the above-mentioned partner relations between the described process participants ensure a certain multidimensional flexibility of the higher educational institution administration process (Borova, 2011). Thus, a two-way leader↔scientific↔pedagogical worker mutual adaptability, as well as streamlining of their goals, based on flexible models of activity are the manifestations of an adaptive management model characterizing the process of interaccommodation of the leader and his/her subordinate on a dia/polylogic foundation. The attainment of set goals is accomplished by combining the leader–subordinate joined efforts and certain self-organizing steps, aimed at the above goal reaching (Yelnykova et al., 2009).

In our view, it is necessary to pay attention to the fine-tuning of the systems which can greatly influence the efficiency of educational process at a higher education institution. It is the leader (scientific-pedagogical worker) student interaction that stipulates the quality of educational process. In the context of adaptive management of the professional development of scientific and educational staff, if it is worthwhile analyzing the submodel, which emphasizes a certain connection between a scientific-pedagogical worker development and the level of students' mastering their specialization area subjects and the required skills growth. It specified the

connection between the former and the latter. This model has been worked out by T. Guskey, ours being its adaptation to the environment of a higher education institution (Guskey, 1986). The discussed submodel contains three levels of evaluation of the scientific and pedagogical workers attitudes to work in the process of their professional development: in-class lesson delivery, variations of the level of students' mastering of their subjects, motivational/attitudinal changes to the work essence, as well as in their beliefs.

This model is of cyclic nature, its basis being formed by the educational objective, which is embedded in its content, environment characteristics, as well as the educational process variation. A scientific-pedagogical worker's awareness in the positive impact of content, technologies and teaching methods on the enhancement of students learning quality serves as the foundation of any scientific and educational worker proficiency dynamics and one's professional competence growth. The discussed submodel proceeds from the assumption that the initial stage of any professional development urgency, at first, stems from one's awareness that the educational status quo is irrelevant and needs to be changed, as well as one's readiness for these changes. Changes in work attitudes prove to be the end outcome of one's awareness. The planning of the actions to be taken is priority-oriented. They reflect a scientific and pedagogical worker's views and attitudes to his professional activity, prior to its commencement and a view program or a set of innovations introducted. A scientific and pedagogical worker themselves may become involved in such planning or an action planning review of one's own accord, thus highly enhancing work motivation, for there appears to be a definite degree of trust on the leader's side. Presented interrelational submodel of a scientific and pedagogical worker's professional development ↔ the quality of students' learning, comprises several stages, acquiring the following form: a) changes in practical classes/lectures delivery, b) research work innovations, c) changes in one's estimates of teachers' and students' professional achievements, d) shifts in teachers' view of and attitudes to work.

It is worth to notice such an element of the model of adaptive management of higher education institution scientific and educational staff professional development as any leader's work style, since it has an immediate effect on the efficiency of scientific and pedagogical workers' professional development. In this research, we adhere to a leader-coach professional style. According to a number of research workers, a coach is a partner in accomplishing one's professional and personal goals (Champathes, 2006; O'Connor, Lages, 2004; Whitmore, 1996; Yelnykova et al., 2009). The leader-coach is a like-minded person in the process of innovative changes introduction and aspirations for the better. He/she is a communication skills trainer, a sure helper in decision-making, a true motivator in case certain decisive actions are due, a tutor in one's professional development, a partner in any project creation, as well as a true supporter in realizing everything that is of essence in a scientific and pedagogical worker's professional life.

Any leader-coach has to study their true individual ability to start up coaching activity. Some of the professional characteristics of a coach are as follows: a coach acts in a variety of situations and contexts; the coach-teacher relations are central in their work; coaches provide an external impact on the scientific and pedagogical worker's activity, they inspire teachers, develop their inner motivation, thus making them work more efficiently.

We believe that one's values constitute a key interpersonal element of any leader-coach and scientific and pedagogical worker relationship. It is generally acknowledged (O'Connor, Lages, 2004; Whitmore, 1996; Zeus, Skiffington, 2007) that during a coaching process the leader-coach is ethically obliged to be non-intrusive, not imposing their individual values on the participants. Of prime importance is an open pre-discussion of the role of values in coaching relations.

A proficient leader-coach tends to coordinate and balance the goals of the teacher with the objectives of a given higher education institution, by asking questions or in any other way. The increase of the effectiveness of work is the main objective in coaching.

The monitoring procedures seem to be no less effective when applied for adaptive management of scientific and educational staff development at higher education institutions.

While forming certain fundamental scientific-pedagogical worker's competences, with the account taken of coaching technologies, of great importance is to do constant feedback, the aim of which is continuous supervision of said worker's activity to form a new set of quality in professional characteristics. In this context, monitoring research turns up to be a reliable instrument that allows to effectively study, watch over changes introduction and their consequences, as well as various aspects of the educational process.

Therefore, monitoring can be regarded as one of the technologies of adaptive management that watches over the dynamics of changes in the activity of the educational system subjects to inspire this system guided development and the achievement of specified results. As reported (Borova, 2011; Yelnykova et al., 2009), monitoring technology is widespread in this process forming the basis of decision-making related to quality of learning and teaching. It is very effective in inspiring people to achieve a certain positive result, which, in its turn, provides a feasible stimulus to quality changes and, therefore, self-development.

To act effectively it is necessary to constantly analyze and improve the unfolding of the activity. Monitoring is a productive technology to achieve these aims. It appears to be a reliable instrument of the holistic educational process analysis too.

Monitoring is related to the evaluation of goals, as well as to realization of plans. Its basic task is to reduce the gap between the standard and the current level of individuals' activity development. Monitoring proves to reveal certain deviations from the set standard, thus forming the basis for reflection. Reflection is the personality characteristic that affects one's proficiency and assists with

successful implementation of any activity, directing, organizing and managing one's inner mental process. The system of research and teaching staff professional activity evaluation monitoring contains such elements as: standard establishment, as well as standard operationalization determination; working out the criteria, according to which we can make a judgment on the standard achieved; proper data acquisition, as well as results and actions assessment, related to the compliance of the appropriate measures, the implemented results evaluation in accordance with the existing standards.

The monitoring process consists of the following stages: a) determining the aims (pinpointing what is necessary to achieve), b) measuring the program realization effectiveness (determining why everything takes place in a given way and what can happen in the future), c) correcting the program (highlighting what can be changed). While applying the monitoring procedure, the tools implementing qualimetric measuring, are essential. Qualimetry is a science that combines various methods of quality quantitative evaluation of products (Borova, 2011). Diagnostic goal setting determines the application of certain qualimetric tools. The factor-criterion models furnish the base of the realization of educational monitoring.

Considering the above-mentioned, we have implemented the system of research and teaching staff professional activity evaluation. The qualimetric model of evaluation of professional activity of reasearch and teaching staff in higher education institutions includes components such as: analysis of needs of research and teaching staff according to their functions; determination of their professional development goals on the basis of certain activity content; an activity study, according to set goals, designing an action plan in relation to teachers' professional development, research and pedagogical activity; and the evaluation of effectiveness of attained results (Borova, 2011).

Let us consider a fragment of the table describing the qualimetric model of evaluation of professional activity of research and teaching staff in a higher education institution (table 1).

Let us analyze the process of working with the qualimetric model of evaluation of professional activity of research and teaching staff in a higher education institution (Borova, 2011). According to the qualimetric model, its components were specified as the factors of this model, that were indicated as F_i, i = 1,...,6, while the value of these factors were indicated as f_i, i = 1,...,6: F_1 – research and teaching staff needs analysis according to their functions, f_1 = 0.15; F_2 – their professional development goals determination on the basis of one's activity content, f_2 = 0.2; F_3 – one's study according to the set goals (in F_2), f_3 = 0.15; F_4 – actions plan design in relation to teachers professional development, f_4 = 0.15; F_5 – research and pedagogical activity, f_5 = 0.2; F_6– result effectiveness, f_6 = 0.15.

Tab. 1. The Qualimetric Model of Evaluation of Professional Activity of Research and Teaching Staff in a Higher Education Institution (fragment)

Factor – F	value – m	Criteria content	value – v	conformance index–K	conformance index value	Partial criteria assess-ment	Partial factors assess-ment
...							
5.Pedagogical and research activity	0,20	21. Teaching activity	0,30	K21		0,00	0,00
		22. Methodology activity	0,20	K22		0,00	
		23. Research activity	0,30	K23		0,00	
		24. Organizational activity	0,20	K24		0,00	
....							
Total assessment	1,00						0,00
in unit parts							

The above mentioned factors and their values are given in the first two columns (table 2). As an example, let us consider factor F_1. Five criteria pertaining to this factor are presented in the second line and the third column (table 2).

Tab. 2. The Qualimetric Model of Evaluation of Professional Activity of Research and Teaching Staff in a Higher Education Institution

Factor F_1	Factor' value f_i	Criteria content	confor-mance index m_i	conformance index value k_i	criteria assessment	factors assessment
F_1– research and teaching staff needs analysis according to their func-tions	f_1=0.15	1. Goal setting 2. Planning 3. Organization 4. Control and Analysis 5.Correction & summarizing	m_1=0.2 m_2=0.2 m_3=0.2 m_4=0.2 m_5=0.2	0.75 0.5 0.75 0.75 0.75	0.15 0.1 0.15 0.15 0.15	F_1=0.105

The criteria values are defined by the experts and determined as m_i, mi = 0.2, i = 1,...,5. The second factor – F_2 – comprises five criteria, the third one F_3 – includes seven, the fourth one F_4 – comprises three, the fifth factor F_6 – includes four criteria and the sixth one F_6 – three criteria. Altogether there are 27 criteria. The criterion with index i from the third column corresponds to value m_i з with the same i from the fourth column.

The teacher, who evaluates his/her activity with the help of this qualimetric model, has to assess their activity according to all 27 criteria. A conformance index value is k_i for criterion *i*.

The experts suggest to give k_i the following value: 0.00 – a teacher does not conform to a certain level; 0.25 – a teacher conforms to a certain level in about 0% to 40% of the requirements; 0.50 – a teacher conforms to this level in about 40% – 60% of requirements; 0.75 – a teacher meets this level of requirements in about 61% – 75%; 1.00 – a teacher conforms to this level in about 76%–100% of requirements.

After a teacher has completed the table by putting their mark in the fifth column *i*, with the conformance index value k_i, i = 1,...,27 the factors assessment is to be calculated. The factors assessment corresponds to the numbers that characterize the level to which a teacher has met defined factors, these numbers are given the same letters F_i, i = 1,...,6, as the factors are calculated using the formulas:

$$F_1 = f_1\sum_{i=1}^{5} k_i m_i \quad , \quad F_2 = f_2\sum_{i=6}^{10} k_i m_i \quad , \quad F_3 = f_3\sum_{i=11}^{17} k_i m_i \quad , \quad F_4 = f_4\sum_{i=18}^{20} k_i m_i \quad ,$$

$$F_5 = f_5\sum_{i=21}^{24} k_i m_i \quad , \quad F_6 = f_6\sum_{i=25}^{27} k_i m_i \quad .$$

Therefore, the factor value F_i , i = 1,...,6, is the sum of this factor value f_i, i = 1,...,6, on the paired sum of the total value sum of its criteria, as well as on their conformance index value.

If the sum of every criteria conformance index value is 1, the factor index is less or equal to the factor value.

$$F_1 \geq f_1,\ F_2 \geq f_2,\ F_3 \geq f_3,\ F_4 \geq f_4,\ F_5 \geq f_5,\ F_6 \geq f_6.$$

The sum of factors indexes F_i, i = 1,...,6, is considered to be equal to the level of research and teaching staff professional development and is marked as: $r = \sum F_i$. If we sum up every component of the last inequality it will be: $r = \sum_{i=1}^{6} F_i \leq \sum_{i=1}^{6} f_i = 1,\ r \leq 1$, so the level of research and teaching staff professional development is always less or equal to 1, and 1 is exactly one only in case if all conformance in dices values are k_i = 1, i = 1,..., 27. The questionnaire results have been calculated, including the following indexes: age, work experience, position, self-assessment of one's professional development level, as well as expert assessment of teacher's professional development level. The calculation was carried out by the method introduced by G. Boroday. To calculate the value of factors and the teachers' rate some pieces of software in EXSEL and PASCAL programming languages were applied (Borova, 2011).

The professional level of English teachers at the department of foreign languages of Simon Kuznets Kharkiv National University of Economics has noted a 15% increase due to the above-discussed criteria. We believe that the presented English teachers' professional activity description provides a definite generalized view of the content of research and teaching staff professional development, since it is multidisciplinary in nature, with the account taken of the diversity of everyday activity in the areas of specialization. The provided structure allows us not only to expand but also to specify any area of research and teaching staff professional activity. Current integration of multimedia technologies, without any doubt, reinforces the change of education role. Multimedia that is effective in learning does not consist of simply using multiple media at a time, but rather combines media rationally, capitalizing on the characteristics of each separate medium, extending and augmenting the learning experience. Multimedia technologies implementation in the process of teaching and learning English at our university has shown the following results (department wise c.f. tables 3, 4).

Tab. 3. The Effect of ESP Teaching Innovations Introduction on the Dynamics of the Students' Progress in Learning English

Departments	IT	IT	AA	AA	EL	EL	M&M	M&M	F	F
Year	2nd 2012	4th 2014	2nd 2012	4th 2014	2nd 2012	4th 2014	2nd 2012	4th 2014	2nd 2012	4th 2014
A grade	3.7	35.56	2.7	16.04	0.74	7.94	0.4	13.51	2.3	15.66
B+C grades	39.26	43.7	21.62	55.66	22.96	48.41	21.86	42.99	27.27	36.75
Total students' progress quality rate (A+B+C)	42.56	79.26	24.32	71.7	23.70	56.35	22.26	56.50	29.57	52.41

The research has revealed the following results: the best dynamics in students' progress was achieved at the department of Information Technologies (IT), with a number of highest grades increasing from 3.7% to 35.56 %, while the quality in students' progress in learning English has grown from 42.96% (2nd year) to 72.26% (4th year). The department of Audit and Accounting (AA) proved to be the second best, with the quality of students' progress showing almost a 3 fold increase from 24.32% (2nd year) to 71.7% (4th year). The results attained by the students of departments of Economic and Law (EL), Finance (F) and Management and Marketing (M&M), have exceeded 50% mark as well.

The discussed technologies introduction at Simon Kuznets Kharkiv National University of Economics also stipulated an average mark increase, namely an increase in the number of A's received by students at an English exam (from 2.07% to 17.74%), mostly due to the progress quality growth at the department of Information Technology from 3.7 to 35.56%. Meanwhile, the number of B's and C's

received by the students at English exams, has grown, on average, from 26.59% to 45.28%.

Tab. 4. The Business English Certificate Exam Results

Year / Grade	2011	2012	2013	2014	2015
KhNUE Students					
Preliminary	17	32	57	48	15
Vantage	6	32	17	17	12
KhNUE Teachers of Economy					
Preliminary/Vantage	52	43	16	10	21
Total	75	107	90	75	48

Of interest and essence is individual (both KhNUE students' and teachers') awareness of and interest in growth, brought about by the innovative technologies introduction. Table 2 data have revealed a definite increase of BEC exam passing.

One of them is the introduction of the International Certification. Since 2011 more than 395 students and teachers of our university (Simon Kuznets Kharkiv National University of Economics) have passed a Business English Certificate exam (administered by Cambridge English Language Assessment).

Conclusions

To organize one's activity effective self-government, the model of its development has to comprise the very parameters that make it possible to follow the progress of the scientific and educational staff professional development. The submodel of professional development of higher education institution scientific and educational staff, offered by us, reflects the continuity of actions to be taken to improve the professional needs of any scientific and pedagogical worker.

Coaching technologies open up possibilities for every scientific and pedagogical worker to independently select ways and means of updating one's professional activity (pace and direction) on every level, as any scientific and pedagogical worker can coordinate their actions with both internal and external factors. In turn, the model of adaptive management of higher educational establishment scientific and educational staff professional development helps set the goal and streamline it to a successful end-point.

Thus, the application of adaptive management model of professional development of staff at higher education institutions will definitely enhance the professional level of not only scientific and pedagogical workers and leaders, but also increase the scope of any higher educational institution human capital in which a given teacher works. This in turn will directly influence the competitiveness level of that particular institution.

Thus, using adaptive management model of educational establishment scientific and educational staff professional development, it is possible to sustain the already available teacher competences, as well as to stimulate the emergence of new ones. To attain these goals, it is necessary to carefully consider every scientific and pedagogical worker's right to independently determine their goals, plan their activity, select the style of their proficiency updating, as well as face the consequences of their professional activity. However, it is worth pinpointing that any model requires certain mechanisms of realization. According to the present research, those mechanisms are monitoring and coaching. The coaching and monitoring technologies are discussed in the research at length to determine the methods of practical implementation of the suggested model. In view of the above, coaching and monitoring technologies, as well as their interaction and the role in adaptive management of professional development of scientific and pedagogical workers have been discussed.

On the one hand, the term exam results have revealed a 15% increase in students' ESP skills development level (years 1-4) due to constant implementation of e-learning tools. On the other hand, the results of the questionnaire distributed among the teachers of the department (45 members) at the end of the term, have shown that the majority of the staff (92%) are actively employing e-learning tools in the classroom, while some 8% staff members are all for gaining the necessary experience of e-learning tools usage in classroom teaching by increasing their e-learning skills through the Moodle proficiency skills upgrading program, as well as other programmes functioning at our university.

Opportunities for further findings in the research area

Thus, using e-learning techniques in ESP classes has both positive and negative aspects, but one thing is evident: this mode is an integral part of modern education, as it meets the requirements of education system upgrading.

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The impact of professional development of research and teaching staff on the implementation of innovate learning technologies

Abstract

The research highlights the application of educational coaching as the foundation to stipulate professional and self-development of research and teaching staff in higher education institutions. The authors stressed that the self-organization mechanism, central to educational coaching, has appeared to be essential for supporting faculty professional and self-development, as well as the awareness of university research and teaching staff of innovative technology and techniques. Education coaching procedures discussed in the research were based on educational monitoring, providing a constant feedback and thus speeding up the process of faculty professional and self-development. Proficiency enhancement, as well as faculty self-realization level growth have brought about a creative potential growth which, in turn, ensured a definite positive search for innovative technology application by higher education research and teaching staff. The scope of innovations included using e-learning

models and tools in the learning process. The research findings reliability has been verified through a qualimetric model. Certain student-friendly results of e-learning technology implementation in teaching English to higher school students not majoring in linguistics have been obtained.

Key words: educational coaching, e-learning techniques, ESP teaching, professional development of research and teaching staff in higher education institutions, monitoring, qualimetric model

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Storytelling in teaching language arts as a representation of change in animation of science culture

Introduction

The language arts animation teaching plan that we present is connected to interdisciplinary teaching of science and language arts. Scientific animation is supposed to have tremendous potential as an instrument of insight and dissemination in education (Lowe, Schnotz, 2008). However, audiences are often unable to determine the degree to which visualizations are informed by scientific evidence and young children turn to lose verbal ability as long as they use the visual art of animation. Traditional animation, cel animation or hand-drawn animation is an eligible teaching tool in language and science classrooms. Individual frames of a traditionally animated film created by children are not a new idea. The completed character cels are photographs of children's drawing, first drawn on paper to create illusion and play. All we need in a simple class is a camera against a painted background by rostrum camera and a scanner onto motion picture film and children's scenario. Digital video can be used as an alternative tool to improve movement and effects. The final animated piece is output to one of several delivery media including digital video as a tragidal version of a storytelling presentation in language arts. (Musa, Ziatdinov, Griffiths, 2013) Stop-motion animation or puppet animation can be used to provide a source of learning language and environmental sensitivity. Clay animation is also a good choice in working with younger children. Although graphic animation and object animation is more usual with children of age 9–12 we can combine Pixilation in use of alive humans as stop motion characters that students can take as a role playing story. 2D animation and 3D animation and computer graphics may be used in case that there is a member of the school community to encompass a variety of techniques (Masson, 2007). Flip books can be designed in class and produce a language arts idea as an informative model of learning science and culture. In English this technique is mostly called flick book. From our point of view teachers can take advantage of illustrated story books to create flick books

and work on cognitive development of children in Science and linguistics. We can encourage our students to participate in academy awards for best animated short films in the country or in international settings. By providing a more detailed account of source use, developers can increase the credibility of animations as scientific tools. We try to figure out if children can improve their skills in language by creative use of books, storytelling and animation. From this perspective we designed a teaching methodology in a project called "Young environmental scientists searching in our culture". It was divided as a teaching process into four thematic units. This division may be more or less applied according to the number of students in an experimental class. In didactics, we give the educators the opportunity to try some of the activities described and transform these ideas in accordance with special interests and needs of experimental teaching. The production of this experiment in progress at schools from September 2015 till May 2016 will give us details of the importance and the results of the attempt. The units that were confirmed in cooperation with primary school teachers were as follows:

1. Water as a source of life on Earth.
2. Pollution and its effects on Earth.
3. Cultural peace and the effects of war on Earth.
4. Climate changes and technology.

In this study we present the teaching experiment as an original research work in progress at the University of Ioannina, Department of Primary Education and the laboratories of "Intercultural Education" and that of "Language, Didactics of Language and Cultural Studies" in Greece. Ten schools and 200 students between the age of 10-12 are involved in the experiment and another ten schools and 200 more students that work only in the traditional way are included as a control-group of our teaching experiment. Both groups come from ten different places of the country and we cooperate for this purpose. Since this is a work in progress we cannot assume results and conclusions but only present a didactic principle of language arts and the challenges of storytelling, animation and environmental education (Potyrala, 2004; Potyrala, 2008).

Methodology of our Study

Problem solving methods in language arts, social-emotional communication in groups and animation of science culture in creative storytelling language and teaching mother tongue in cross-cultural settings, interdisciplinary methodology. (Musa, Ziatdinov, Griffiths, 2013). A written story from the students is taught to have a definitive beginning, middle and end, relatable characters, a comprehensive plot, a compelling voice, a sense of rhythm, pacing, tone and style. This can objectively skims the surface of the requirements for solid storytelling learning. Since children can encompass in an animation any picture from their Phones we can take advantage of technology to concentrate on monologues and dialogues that can reflect a vivid story of what they have learnt from science and environmental

sensitivity. The goal of the story, the anticipation and the emotional words can lead to the appropriate effect through children's literature. Color and mood are connected in animation story boards. We can capture the history of human animation art by showing to the students examples of animation drawings in caves and the example of a phenakistoscope disk as designed by Eadweard Muybridge in 1893. The perception of motion and the language motion are combined in our experimental teaching suggestion as it follows.

Language tools – Sources from Greek Children's Literature

Each team takes one book to work on and tell a story. The books that the children decided to work on with the teacher as their coordinator were:

1. "The Giving Tree" a children's picture book written and illustrated by Shel Silverstein. First published in 1964 by Harper & Row. This book will be discussed at this article as a teaching example of a project

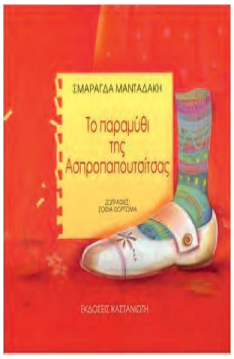
https://www.youtube.com/watch?v=32A31SzVhyw
https://www.youtube.com/watch?v=32A31SzVhyw
https://www.youtube.com/watch?v=1TZCP6OqRlE
https://www.youtube.com/watch?v=8wGhqtWR4uo
https://www.youtube.com/watch?v=JOGMzGDEQoU
https://www.youtube.com/watch?v=fbLaX20hNw8
https://www.youtube.com/watch?v=5paKczJn4IU
https://www.youtube.com/watch?v=2wttWU3T34o

The book is about the relationship between nature and humanity; a tree that always gives the boy everything he wants and the boy that always needs new things and does not visit the tree often enough and finally forgets to love it. The children book works as an "allegory about the responsibilities a human being has for living organisms in the environment as a kind of environmental ethics". From this point of view, the story ends with the boy as an old man who sits on the stump or what is left of this friendship. The tree represents how humans are constantly taking from the earth until there is nothing left. As we learn from Wikipedia "Jackson and Dell (1979) wrote an "alternative version" of the story for teaching purposes that was entitled *The Other Giving Tree*. It featured two trees next to each other and a boy growing up. One tree acted like the one in *The Giving Tree*, ending up as a stump, while the other tree stopped at giving the boy apples, and does not give the boy its branches or trunk. At end of the story, the stump was sad that the old man chose to sit under the shade of the other tree" (https://en.wikipedia.org/wiki/The_Giving_Tree retrieved December 6, 2015, *Bosustow, Nick, and Shel Silverstein (Producers); Hayward, Charlie O. (Director and Animator); Silverstein, Shel (Original Story, Music, and Narration) (1973). The Giving Tree (VHS). Chicago, IL: SVE & Churchill)*.

TEACHING CONCEPT: There are other interpretations and educational outcomes of interaction with the plot in class that can be symbolized from the

storytelling in any other plot that children create. Friendship, relations between children and parents, relation of woman and a man, religious consciousness of the giving attitude can be reflected in language lessons through discussion, writing activities and language arts as an interdisciplinary process of teaching methodology. Children design and create animation storytelling of the episodes in story map and in dialogues with descriptive language. They use their imagination and put another person in the story which is each one of us as readers/players and alive parts of the storyline.

2. "*The fairy tale of the little Whiteshoed* " by Smaragda Madathaki-Papadopoulou, in Greek, Athens, Kastaniotis ed.



In this story *the Little Red Riding Hood* has grown up and is an old lady. Her granddaughter wears white shoes. This is why we call her the Little Whiteshoed. She asks her grandma to tell her the fairy tale with the wolf before she goes to sleep. Each time she never listens to the end of the story because she falls asleep. Though, the old Red Riding Hood retells her true story to her granddaughter that adults have misunderstood. The story has messages about the forest as a natural environment of the animals that human beings destroy and kill animals because of their fear of everything different than them and their cupidity as if we are the kings of the earth. The Little Red Riding Hood says that she was a friend of the wolf, how he made her laugh because she was anxious about her grandmothers' absence. They were just playing and had fun, when the hunter appeared with her and shot the wolf. The Red Riding Hood in this real story had helped the wolf jump from the window and got spared. The Little Whiteshoed decides to meet the wolf's grandchildren and becomes a friend of them. But this happens in her dream and when she wakes up

TEACHING CONCEPT: We read and act out the book and create animation storytelling on the way that humans behave in the forest and the animals of a forest. Fear is the significant issue in problem solving discussion about the main characters' problem. We stop the story line to continue it in new versions which seem more fair and reasonable from the wolf's point of view.

3. Antoine de Saint-Exupéry, *The little Prince*, Original title*Le Petit Prince,* Translated (in English editions) by: Katherine Woods, Irene Testot-Ferry, D. Wilkinson, Illustrator: Antoine de Saint-Exupéry. France Language French Publisher: Reynal&Hitchcock (U.S.) Gallimard (France) [2] Publication date 1943 (U.S.: English & French) 1945 (France):

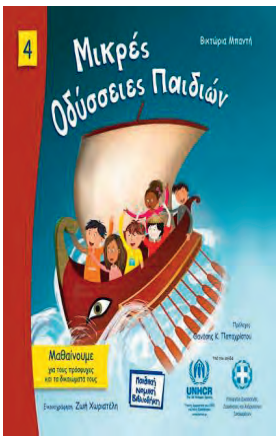
The well-known story brings a new reading of the planets that we imagine, different things happen and finally we build a planet that is exactly as we want it to be from the children's point of view and they choose how the environment should be so as nature is respected. Though ostensibly this book is styled as a children's book, The Little Prince makes several points about life and human nature. For example, what the fox says upon meeting the young prince during his travels on Earth: "On ne voit bien qu'avec le cœur. L'essentiel est invisible pour les yeux" (in translation: "One sees clearly only with the heart. What is essential is invisible to the eyes"). Other key thematic ideas are also articulated by the fox, such as "You become responsible, forever, for what you have tamed" and "It is the time you have given for your rose that makes your rose so important".

TEACHING CONCEPT: Children can read about and discuss human relations and also create science animation with information on astronomy and scientific details about the possibility of life on other planets or any other thematic union that the science teacher wants to explain to the students through a pleasant way of reading literature and using animation.

The plot is described in the following way (from: https://en.wikipedia.org/wiki/The_Little_Prince): "one day, his plane crashes in the Sahara desert, far from civilization. Here, the narrator is suddenly greeted by a young boy whom he refers to as "the little prince". The little prince asks the narrator to draw a sheep. The narrator first shows him his old picture of the elephant inside the snake, which, to the narrator's surprise, the prince interprets correctly. After a few failed attempts at drawing a good-looking sheep, the narrator simply draws a box in his frustration, claiming that the box holds a sheep inside. Again, to the narrator's surprise, the prince exclaims that this is exactly the picture he wanted. The narrator says that the prince has a strange habit of avoiding directly answering any of the narrator's questions... The prince begins by describing life on his tiny home planet: in effect,

an asteroid the size of a house (which the narrator believes to be the one known as B-612)... The prince has since visited six other asteroids, each of which was inhabited by a foolish, narrow-minded adult, including: a king with no subjects; a conceited man, who believed himself the most admirable person on his otherwise uninhabited planet; a drunkard who drank to forget the shame of being a drunkard; a businessman who endlessly counted the stars and absurdly claimed to own them all; a lamplighter who mindlessly extinguished and relighted a lamp every single minute; and an elderly geographer, so wrapped up in theory that he never actually explored the world that he claimed to be mapping. When the geographer asked the prince to describe his home, the prince mentioned the rose, and the geographer explained that he does not record "ephemeral" things, such as roses. The prince was shocked and hurt by this revelation, since the rose was of great importance to him on a personal level. The geographer recommended that the prince next visit the planet Earth".

4. Little Odysseys of Children (in Greek), a book by B. Mpantis, illustrated by Zi Choriatelli, edited by the Law Library of Athens, Greece.



Odysseus (Ulysses) and his best friend, Them have often seen children of other skin color when they play on the field or when they ride bicycles. "Where do they come from? Why they left their homelands? What is the weather like there? Why did they come to Greece? Did they also pass a small Odyssey like the mythical Odysseus, to arrive in our country?", the two friends wonder.

TEACHING CONCEPT: Their teacher as a *navigator* makes a great trip to the countries of their classmates refugees and learn about their small Odysseys. They work on their personal stories, awaiting not pity but your understanding. The Aziza, Fatima, Isaac, children of the neighboring benches invite you with tales to approach them, accepting their differences. Through this book you will learn, but also combine language learning vocabulary, science knowledge and information on international organizations that protect the rights of refugees. Children turn to animation parts of

the story book to give others more details on environmental and cultural awareness. Changes of climate during the time is discussed in a problem-solving approach.

Reading tips and storytelling – Interaction with the books

Each team decides what exactly they are going to present through animation on a certain thematic union such as our relationship with wild animals (the wolf of the story in the case of "The Little Whiteshoed" and the forest life, the disaster of war and its effect on environment, fantastic adventures of the "Little Prince" when he visits the planet Earth after fifty years and the stories that may have present as a biography of the story characters who are refugees in our country such as the case of the war in Syria which is a recent situation (events that children watch on the television). Moreover, there is a culture they are describing, emotions and thoughts about humanity and scientific progress on earth having children's literature and language as the fundamental initiative for activities in class (National Education Association, 2007).

Description of the activities animated by children and the procedure of the teaching plan.

Next, we intend to describe the work of one group on one selected book. Each book can give different ideas and activities for creative animation and science research through language and reading of children's books as an interdisciplinary perception of teaching methodology.

TEACHING EXAMPLE: of the "ANIMATED GIVING TREE"

Description/Animation and storytelling teaching plan

Title of the group "Young researchers"

Book involved with animation: "The giving tree" (see also Miller, 2012).

Students get involved in an active animation environment and the teacher works as co-ordinator.

A. Students get involved in an energetic digital teaching plan and communicate through literacy which may be verbal, visual, kinesthetic or other (See also: Radeva, 2012).

Aims of the teaching plan

Language acquisition through reading, storytelling and animation.
Positive activation of children in scientific research thinking and environmental problems.

The main aims are concentrated in three fundamental pillars.

Cognitive objectives (Bloom, 1956)

Students comprehend the value, utility, necessity and interplay between environmental components and creatures.

- to become socially alerted and work problem solving strategies on science and environment through the language of storytelling and animation (Barman, 1999),
- to create argumentation in writing and reading as a whole language approach of literature on ecological consciousness of them as future citizens.

Development of skills-objectives:

In teaching and learning through language students work on skills application and development of:

- communication (Reading, Writing, Listening comprehension, speaking abilities, critical thinking, imagination and animation, dialogues),
- co-operation and socialization in class,
- searching of information at the thematic union of Science,
- creative thinking and language expression.

Regarding the uses of digital animation in storytelling and teaching of the language students should learn to:

- use the computer to select animation materials related to the book that each team works on (WebQuest),
- create writing enriched with animation descriptions through language,
- design conceptual story maps and write stories inspired by the book characters and combining animation cards in the plot as they present their work to the other groups in class,
- to make use of webpages about articles on the environment and information or ideas for their storybook,
- to connect the book and the visual motion in expressing themselves as a stimulus for language improvement.

Duration of the Teaching Example

2 hours every week for a month (8 hours) and one day of presentation for each group in class. In our case: four days (8 hours).

Meanwhile, students put together a schedule of meetings for preparing their presentation – twice a week during "The Creative zone" of the Curriculum in Greek public schools, which gives the opportunity for each class to produce something

creative as a unit of activities and cultural-science research and artistic production from the students of primary education.

Pre-existing Knowledge:

Students can read, they are aware of grammar and syntax rules of the Greek language, know how to search the web, they have a basic vocabulary and orology on the science animation and the environment. They can describe and re-tell stories, they read or listen to them in a stimulating environment. (Barab, 2009; Bishop, 2006).

Teachers' obligation and attitude:

To be the coordinator of students in their groups during the procedure. (S)he brings teaching materials and explains how to use them in a positive and pleasant approach (Baker & Delacruz, 2012).

Description of the teaching procedure

1. **The application of a teaching plan on science storytelling and animation follows these guidelines as a whole** (Wells, 2012).

Select the topic
Define objectives in co-operation with children and in relation with their interests, decisions on who is going to do what in each group
Planning of work and establishment of small groups. Definition of problems to be solved and learn through the uses of science culture and storybooks
Award and implementation of work on individual and group level
Presentation of the books from the group members before the use of animation as book readers and presenters
Presentation of their story as they have created the plot with the use of animation and all the things that they found out through the science culture and the combination of the storybooks in expressing their thoughts and solve interesting problems
Discussion of results, reflective journal and description of the story maps as a procedure to express themselves verbally and in writing.
Rating of the work for each group and metacognitive comments of the participants

2. **Experimental problem solving with the problem of the story characters**

Students read the story but we stop the procedure at the critical scene of the problem that the story character faces in their environment Students identify and investigate the problem of the story character/the issue
Students set targets for the solution or participation in solution of the problem and get involved in the storytelling in creative ways
Students explore alternatives for the main character of the book and the problem itself
Drafting of criteria for the selection of possible/realistic solution or solutions
Students select the appropriate solution or solutions according to the principles of sustainability
They develop action plan

Animation is combined to do so as a picture and motion or an assistant character that can be the student as a person/friend of the boy that makes him change attitude about the environmental values. The assistant – a character of the storytelling can be an assistant case or magical helper as in traditional fairy tales. The key concept is that we change the story to change people's mind and have a better world and environment (Lowe & Schnotz, 2008; Tramell, 2013).

Implementation of action

Students read the story but we stop the procedure at the critical scene of the problem that the story character faces in their environment
Students identify and investigate the problem of the story character/the issue
Students set targets for the solution or participation in solution of the problem and get involved in the storytelling in creative ways
Students explore alternatives for the main character of the book and the problem itself
Drafting of criteria for the selection of possible/realistic solution or solutions
Selecting the appropriate solution or solutions according to the principles of sustainability
Developing action plan – animation is combined to do so as a picture and motion or an assistant character or case to help in finding solutions for the story characters and the problem Implementation of action Assessment and feedback process.

Activities – Description of activities

A) Teacher – Coordinator asks students to choose a picture card that fits to the word Environment. They make a sentence or a phrase that reminds the word concept. They communicate and have a dialogue as groups and then as a whole class with other keywords related to the environment and the way that they feel about the picture and the sentence they wrote (Paul, 2011).

We put the pictures down on the floor and play the sounds of nature. Students have the chance for a few minutes to walk around, see all the pictures and stand by the one that is most familiar or interesting to them. This happens when the music stops. We explain to children that these pictures are alive and can be seen in animation progress at their computer (Masson, 2007). They imagine and try to guess how it could look when there is motion in it. The picture-card will be explained in connection with the "The Red Hawk Effect" later.

B) The teacher-coordinator tells the students to create groups in accordance with the same interesting pictures that they chose or as they want. They pick the card from the floor and sit down as groups at their desks in a way that they can see each other at a round table (Adams et al., 2008a).

C) In relation with the books as they have been noted before, each group takes a book to read. They also see the Light tree in relation with the Giving tree (the first book) which makes children aware of the changes of the climate and the vocabulary of this problem (http://photodentro.edu.gr/ugc/r/8525/453. Beck et al., 2012).

D) Children read "The Giving Tree" by Shel Silverstein, Harper and Row publishers, 1964). Then they watch it from You Tube. They try to combine th animation-picture with the book and make their own story (see also: Lowe & Schnotz, 2008).

E) As the illustration of the book, on a symbolic tree made from paper children put their wishes for the tree and the salvation of the Trees from human greediness.

They make drawings and set a story map that can become animation book in a raw of pages. We scan the pictures and make an animation story book based on the giving Tree called "the beloved tree" as a version of the people who finally respect and love the nature of the forest.

The card referring to gif animation is used to assist the episodes of the story (Buttenfield, Weber, Mac Lennan, 2015). Finally, children write a letter to the main character of the book – the boy or the Tree. They can also put themselves in the story plot as a game strategy so they can change whatever seems problematic from their point of view (Barab, Arici, Jackson, 2005).

Problem-solving strategies and argumentation

Problems to be discussed can include: water as a source of life in danger, energy as a declined need, pollution, variety in biology of all creatures on Earth and accepting what is different, climatic changes and chances to keep the Earth alive (Baker, Mayer, 1999).

Each group decide how to present the book of their choice and the problem to be the issue of the storybook, as well as what they write as authors of a new option (Bennett, Persky, Wiss, Jenkins, 2007).

In this phase the students can also search in digital machines and find ideas and information as suggested by the teacher-coordinator.

They keep a reflective journal of what they read and the story book. They keep notes on related information. They write down reasons and consequences of the problem solving strategies.

They present what they learned and what the story should be like in case they do not feel interested in it (Behrens, 2009; Behrens, et al., 2008).

Metacognitive discussion is used as an evaluation tool

- children of the other groups come up with their own ideas and animation cards and design activities for the same creative and critical thinking issues through fairy tales and the stories they chose (Bewley et al., 2009),
- an event at the end of the project can be organized for parents and other students of other schools,
- students may send their animation storytelling books to the Major of the city or any other place, for example to the Ministry of Environment, the President of the parliament or a radio station to explore other people's awareness on

environmental problems by showing their work in a discussion with journalists (Barron, 2006, Baxter et al., 1992).

The giving tree and the cards: materials to be used in class regarding technology of gif

We select the work of a real person who started to lose his vision. George Redhawk started to work with computer at the same time he started to lose his vision. Since he could not do his job as a doctor he turned to work with the art and technology. The loss of his vision in different phases inspired him to create moving images as he kept vision as a memory in a cognitive development. The term "The Redhawk Effect" can be explained to the students before they start working with the animation to make their own stories. We start with the work of this Redhawk Effect that can also be printed by the Science-Language teacher as cards to play with students (Barabet al., 2005, Barab et al., 2007):

http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2011.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2022.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2033.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2044.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2055.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2066.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2077.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2088.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%20100.gif.
http://img.pathfinder.gr/CMAN/f/3309/I4511399/kain%2013.gif.

OTHER RELATED TEACHING-VISUAL LANGUAGE ARTS EXPERIMENTAL MATERIALS

- a short animated film of the book, produced in 1973, featured Silverstein's narration.
- silverstein also wrote a song of the same name, which was performed by Bobby Bare and his family on his album *Singin' in the Kitchen* (1974).
- silverstein created an adult version of the story in a cartoon entitled "I Accept the Challenge". In the cartoon, a nude woman cuts off a nude man's arms and legs with scissors, then sits on his torso in a pose similar to the final drawing in *Giving Tree* in which the old man sits on the stump.

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Storytelling in teaching language arts as a representation of change in animation of science culture

Abstract

The subject of the article is connected to teaching strategies of storytelling, problem solving and social-emotional perspectives of communicating language through the animation of science culture. The importance of creative language settings as an early support within the context of the Greek national education policy is discussed. A modification of the animation of science culture to language arts' context with specific examples of applications and teaching practices in class (6-12 year-olds) are discussed. The need of an eligible curriculum to create cultural environment at school propose changes in primary education cross-culturally in a democratic human interaction of social organizations and school systems "Animus" as a key word of the working spirit and the soul in learning mother tongue or another language enables teachers to explore animation techniques and experience creative learning of being alive components of knowledge in new ways with their students.

Key words: Animation, culture, storytelling, language, teaching methodology

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New course on curricula of natural sciences – popularization of scientific knowledge as a tool to link science and public – good practice in higher education

Introduction

At a time when so many decisions are being made on the basis of science, it is becoming increasingly important to inform the public about the issues at stake. The question is: how to do it in a transparent way and give clear and up to date high quality information. This type of skills should be formed from early childhood education. However, particular emphasis on developing the ability to popularize scientific knowledge should be placed on higher education.

The current labor market requires people with the right knowledge, however it should be a standard qualification after higher education. But above all employers are looking for people of high level of soft skills like: communication, creativity, team work and time management. Therefore there is a need to educate students not only with academic specialized courses, but at the same time insert to their education practical workshops supporting soft competences. The course carried out as the part of project 'Animation of Scientific and Science Culture' combine the aspects of scientific knowledge and create the environment to practice soft skills.

The skills and knowledge of graduates should be broader than just preparation for teaching in formal education. The universities, especially pedagogical universities, should be an example that differs from other higher schools and prepare not only to be a teacher but also to be a competent candidate to work in museums, national parks, landscape parks as an educator or animator (Gruszka, 2004).

The study of other authors showed that the public wants to interact with scientists and people are dissatisfied with how little they can be engaged in science (Bensaude-Vincent, 2001; Blum, 2008). Thus, public engagement can play an important role in furthering the research agenda (Paul, 2004), attracting people to science and generating public support. Hence, being creative about public engagement, using alternate forms of communication and different settings, may

help to incentivize researcher involvement, reach broader audiences, and foster public fascination for science (Sayer et al., 2014).

Natural Science Popularization

During the course on the popularization of scientific knowledge at first we tried to determine when we are dealing with popularizing. Part of the students mistakenly assigned many situations of formal education, as popularizing such as: field work in their studies, laboratory exercises. Many students correctly pointed in formal situations related to the activities of natural history museums, science centers and science festivals as the popularization. It is worth mentioning that students perceive as a popularizer an individual with extensive experience in scientific work, often the person with the title of professor. They did not have the conviction that as graduates from the life sciences they can work as a popularizer of science.

Finally students agreed that popularization is a kind of communication between representatives of science and the rest of society. It is an art that requires a wide knowledge of natural science. The effectiveness of the popularization determines both the topic and the choice of means of communication, as well as the way of presentation (Hassana et al., 2009).

Another issue discussed during the classes was the role of the senses in perception of biological content. Forms and techniques of learning depend on personal preferences and the characteristics of the learner (table 1). Skills needed for popularizer of scientific knowledge is to use in popularizing the varied and attractive ways of working that will help customers remember presented content.

In this case of great importance is the adjustment of the working methods to the sensory type of recipients. The sensory type is a very important factor influencing the way we learn. It points out which senses are dominant when learning. There are three basic sensory types:

- auditory learners – people who acquire new information mainly by the sense of hearing,
- visual learners – people who remember what they see,
- kinesthetic learners – people who remember what they experience.

With the characteristics of the different kinds of sensory types come preferences regarding methods of learning.

Auditory learners prefer to listen to themselves or others. They remember best what they hear or talk themselves. They learn in a group or with another person – both asking questions and answering them. During the learning process they need peace, because sounds distract them.

Visual learners prefer to learn by watching, reading, observing or demonstrating. People with this sensory type remember best what they see in the form of graphic materials, eg. text, images, movies, presentations or charts. Visual learners will automatically acquire, transform and remember information printed or drawn. Visual clutter distracts them.

Kinesthetic learners prefer to learn by doing something and by direct involvement in experiments. This sensory type remembers best new content through the involvement in physical activity. They like to touch objects and manipulate them. While studying they need to do frequent breaks for exercise or movement.

Workshop – senses engagement in learning process

Each student identified their sensory type answering quiz questions. Among the students dominated a visual learners or mixed type: a visual and auditory learners. Then a workshop was conducted. The aim of the workshop was to demonstrate how the use of varied methods influence on proper memorization. The task was to remember as many details of the illustration from the book as possible. Three volunteers came out of the class. A teacher presented the illustration to the first volunteer, while the other two did not take part in it. The teacher used illustration but also described it in words, and at the same time performed gestures relating to the location of components in the illustration. The first volunteer repeated once the description. In this case all three senses were involved. Next the first volunteer entered the classroom and described to other students the illustration that was presented to him. The task of the group was to outline this illustration in a notebook. Then the teacher left the classroom to another volunteer and described illustration using only words and gestures. The second volunteer repeated the description. In this situation auditory and kinesthetic sense were involved. Similarly as in the first situation, a second volunteer entered the classroom and described to other students what he remembered. At the same time students performed a second draft in their notebooks. At the end the teacher went out to the third volunteer and showed him the illustration without a comment or gestures. The third volunteer walked into the classroom and described to students what he remembered. Thus the students created a third draft in their notebooks. As an effect of this workshop each student (except three volunteers) had three outlines in their notebooks. The outlines had common features but at the same time they differred noticeably. Confronted with original illustration, the most precise was the description given by the first volunteer. The largest loss of information occurred in the description of the third volunteer, who saw the illustration without any comment.

Transformation of scientific knowledge – scientific event from popular science article

The starting material for this part of the course were popular science articles in Polish on amphibians, issued by the Wigry National Park (Krzysztofiak, Krzysztofiak, 2003). These are articles of biological content. When choosing materials, several criteria were taken into account. First, the articles relate to protected species. Second, they are species difficult to observe and students have little contact with them during their studies. Third, the articles were a good example of popularization

of knowledge about amphibians – accessibly written with high quality pictures and graphics (Weiner, 2009). Papers about amphibians were the basis of group work and were also a good example of popularization of scientific knowledge. Articles related to: newts, green frogs, brown frogs and toads, spade foot and salamanders. Layout of the articles was presented in a similar way: introduction defined the general characteristics of the group. Further part of article described the representatives, with details about biology of species. The following is a portion of an article on newts:

„NEWTS *Triturus* are caudate amphibians, which means that both larval and adult forms have a well-developed tail, contrary to ecaudate amphibians, which possess a tail only during the larval stage. There are four species of newts in Poland: crested newt *Trituruscristatus*, smooth newt *Triturus vulgaris*, Carpathian newt *Triturusmontadoni*, and alpine newt *Triturusalpestris*.

Crested newt is present in Europe and Asia Minor; in Poland it is observed mainly on lowlands, and much more seldom in lower parts of mountains. It inhabits larger and deeper water reservoirs as a rule but it can be also seen in ditches, ponds and post-peat reservoirs. During the land period of life, it seeks shelters among shrubbery, under rotten trunks, sometimes in cellars and in earth mounds. In comparison to other newts, during its mating season, it stays in water for a very long time and while on land, it is a significantly stenothermal form.

Smooth newt is present in the central, northern and Eastern Europe and in Asia. It is common on lowlands in Poland while it is quite scarce in mountains. It is not fussy as regards selection of its habitat. During the mating season, it can be seen in various types of water reservoirs while during the land period of life, it can be seen in damp and shaded places, for example under stones, fallen trees, in burrows of minor mammals or in cellars.

Crested newt is the largest among Polish newts; its males reach the length of 15 centimetres while females even up to 18 centimetres. However, the smooth newt is the smallest and the most delicate species – its females reach the length of 10 centimetres while males – 11 centimetres. The fact that males are larger in comparison to females is an extraordinary phenomenon among amphibians.

The dorsal side of the body of both species is covered with dark, round spots located on a grey or olive-green background, while the ventral side of the body is yellow, orange or red, covered with dark spots. The crested newt is characterised by its specific pigmentation of toes – there are transverse red and yellow stripes located alternately while the dewlap is grey and covered with black spots. During the mating season, males develop a so called “crest” on the dorsal part of the body - this is a fold of skin which runs from the head to the tail with a break in the area of lower back (significantly smaller and more delicate crest also appears at the female of a smooth newt).

Crested newt wakes up from hibernation in March – April while the smooth newt wakes up much earlier – in February or at the beginning of March, and then enters water reservoirs, which are still being partially covered with ice. The smooth newt begins its mating activity as the first species of our amphibians - the temperature of water is estimated at 4–8°C then. It happens quite often that the mating season of the smooth newt and the crested newt falls out at the same time and in the same water reservoir. Males of caudate amphibians – contrary to males of ecaudate amphibians – do not have the ability of uttering mating sounds. During creation of a couple, chemical and visual stimuli play the major role. There are glands in the dorsal skin of newts, which produce aromatic substances which are peculiar for the given sex and species and which aim at attracting the partner. The male performs a characteristic dance in front of a female and if she accepts him, he places a spermatophore (that is a cluster of sperm cells), which is then collected by the female with the use of the lips of the cloacae. Then it is not the fertilization that takes place – this process is called insemination. Eggs are fertilized just before their laying. Eggs are laid one by one and then wrapped up into leaves of underwater plants. After approximately two weeks, larvae hatch from these eggs and they measure up to 10 millimetres. Just like in most of our caudate amphibians, the front limbs are the first to appear during the development process; the hind limbs are next to appear. The transformation takes place just after the period of three months and then young newts come out to the land. Newts run a hidden course of life on land. During the day, they seek shelter in damp recesses and they hunt in the evening and at night. They hibernate in rotten, damp trees, under stones, in piles of leaves and often are accompanied by other amphibians. They reach sexual maturity in the third year of their life. Initially, nourishment of newts mainly consists of microscopic animals, then minor crustaceans (daphnia, Cyclops, ostracods), larvae of water insects and larvae and eggs of other amphibians. While on land, they hunt slugs, moths, spiders as well as insects and their larvae. Natural foes of newts include predatory larvae of water insects, predatory fish, other newts, frogs, grass snakes, and wild and domesticated water birds – especially ducks, hedgehogs, weasels and rats.

The basic form of protection of newts is linked to protection of places of their reproduction. All newts are protected by law".

Based on the popular articles on Polish amphibians, the students prepared events popularizing scientific knowledge on amphibians. Of great importance was the knowledge level of popular scientific articles – they presented detailed content that was new for students.

As a result, students broadened their knowledge of the randomly selected amphibian group. Students usually used only parts of the article to the transformation and popularization. The students worked in six groups, up to six people each. Especially noteworthy are ideas of two groups. As the event popularizing scientific knowledge they proposed:

1. Learning game on topic „Toads, spadefoot and salamander".

The game requires prior preparation of about 50 questions about toads, spadefoot and salamander. The game takes place outside the classroom – in the university hallway. The players stand in a circle. First, they listen to a theoretical introduction to the topic and information about biology of toads, spadefoot and salamander. At the center of the circle stands a person with a plush mascot-frog and blindfolded. This person is throwing mascot to people in a circle. People in the circle are moving clockwise. A person standing in the middle is throwing the mascot. It cannot fall to the ground. If it falls, people in the circle stop and the person closest to the collapsed mascot leaves the circle and cannot take part in the game. Participants of the game want to catch mascot, so do not let it fall to the ground. The person who catches mascot answers to the question about biology of toads, spadefoot or salamanders. The questions are quite detailed and difficult. When the participant gives the wrong answer – they leave the game. Those who correctly answer the question – stay in a circle and take part in the game.

A change of scenery from classroom to university hallway helped to achieve an informal atmosphere of joy and fun. The participants were motivated to act. They were happy to catch 'flying frog' and willingly answered questions. The originators of the game at the end summarized the game. They informed what the correct answers were. They conclude which species caused the most problems and announced who was the winner.

2. Coloring – great crested newt

As one of the elements of a scientific event, a group working on newts prepared a large drawing – 80 cm by 30 cm. The drawing showed a male great crested newt. It was drawn with a black pen and presented the outlines of the animal. Leader of a group described species of newts which occur in Poland and what their characteristics are. He informed that in the rest of the task we will concentrate on great crested newt. He described the biology and morphology of great crested newt. Following elements were needed to the task: two volunteers, magnets, whiteboard, a sheet of paper with the contours of the male great crested newt and crayons.

The aim of the task was to color the great crested newt as described. A nice surprise was that the description was presented in the form of a rhymed poem. Sometimes the poem had the form of puzzles, making it difficult to calibrate the colors. The group watch over the correct implementation of the task. The effect was impressive – a colorful poster presenting the male great crested newt. One of the students took the poster home for his younger brother.

Non-verbal means of communication – self-presentation and body language

Scientific events presented by students were recorded on video and used later in the course. Next topic raised during the classes on the popularization of scientific knowledge was body language and self-presentation. Body language is understood as a kind of non-verbal communication, where thoughts, intentions, or feelings are

expressed by physical behaviours, such as facial expressions, body posture, gestures, eye movement, touch and the use of space (Niedzicki, 2010). Body language, a subset of nonverbal communication, complements verbal communication in social interaction. In fact some researchers conclude that nonverbal communication accounts for the majority of information transmitted during interpersonal interactions (Kurien, 2010). It helps to establish the relationship between two people and regulates interaction.

After introducing the subject, we watched videos from the previous classes. We paid particular attention to the self-presentation and mistakes in self-presentation.

1. Facial expression

Facial expression helps in expressing emotions through the body. Combinations of eyes, eyebrow, lips, nose, and cheek movements help form different moods of an individual (e.g. happy, sad, depressed, angry, etc.) (Kurien, 2010).

The most common mistake made during the students' presentations, was the lack of eye contact with audience. Quite often there were two behaviors. The first – reduced facial expression, which gave the effect of monotony and boredom. Second – excessive stimulation of facial expressions, most often it was a very frequent smiling for no reason.

2. Body postures

Sitting or standing postures also indicate one's emotions. A person sitting till the back of their chair, leans forward with their head nodding along with the discussion implies that he/she is open, relaxed and generally ready to listen. On the other hand, a person who has his/her legs and arms crossed with the foot kicking slightly implies that they are feeling impatient and emotionally detached from the discussion.

Most often repeated unwanted body postures, indicated a lack of confidence. During the course different variants of closed position occurred. Students often crossed their arms and legs or hide themselves behind their notebook.

3. The use of space

Some of the events designed by the students engaged in a natural way to move in the classroom. But it also happened that during the presentation students stood motionless in one place and did not move around the room. This kind of behavior the students explained that they do not feel comfortable performing in public.

Summary

This article demonstrates how to implement a number of issues related to the popularization of scientific knowledge. It is one of the courses that have been implemented under the project "Animation of scientific and science culture" during biology and the environment protection studies. Examples and proposals described in the article should be treated as guidance in the planning of this kind of courses.

Students of biology and environmental protection were confronted with new situations during this course, that have demonstrated their creativity. Classes with the popularization of scientific knowledge were not only an opportunity to give the workshop of culture animator. It is also a platform for communication between students and between teacher and students (Sayer et al., 2014). Classes with the popularization of scientific knowledge have provided students with new knowledge and skills. For these reasons, it should be taken into consideration to introduce such a course permanently to a higher education program. This type of activities are also an opportunity for students to learn about their own strengths and weaknesses and to improve their soft skills. These classes helped the course participants to see what are their capabilities and, what is even more important – motivated them to work on themselves.

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New course on curricula of natural sciences – popularization of scientific knowledge as a tool to link science and public – good practice in higher education

Abstract

The popularization of science is one of the most important skills that should be formed in higher education in natural sciences. In Poland only humanistic studies in the field of journalism provide preparation in transforming knowledge and presenting it to laic audience. Curricula of biological or environmental protection studies offer no course related to science popularization. This gap is partly covered by educational offer of pedagogical universities; however, they prepare future teachers to work in formal education with recipients within a certain age range. But there is still a gap in educational offer of higher education in natural sciences. Graduates often have biological knowledge but do not have the key skills needed in the labor market – concerning self-presentation, mediation and attractive presentation of scientific knowledge. Here is an example of two courses carried out as the part of the scientific project "Animation of scientific and science culture". The project was performed in academic year 2014–2015 at the Pedagogical University of Cracow. The course was dedicated to popularization of scientific knowledge. The article discusses the substantive scope of the course and methods used to work with students.

Key words: culture animation, natural sciences, popularization, soft competences

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Influence of teaching practice in the development of professional readiness of future early-childhood education teachers

Introduction

Pedagogy is a theoretical and practical science, therefore in teaching it there should be a balance between acquiring knowledge and practical activities. Consequently, in the training of early education teachers theory and practice should be interrelated. By combining theory and practice, the students or young teachers can better understand and remember the material that they study. Thanks to the teaching practice they understand practical applications of the theory that usually appears to them as useless in their future professional careers. Thanks to practical activities, students may check the level of the knowledge they have acquired which in turn may motive them to greater involvement in science. Just as the pupil likes to see some sense and reference to everyday life in the knowledge they study at school, the student draws satisfaction from acquiring the knowledge which will be useful to him in his future work.

Each student taking a pedagogical course is obliged to take part in the teaching practice. It is included in all curricula of education, regardless of field.

What is more, it is recognized as an important element of preparation for the teaching profession. At that time, the student has the opportunity to observe, wonder, question, and take action (Szkolak, 2014).

Teaching practice in the light of legal documents

The document which regulates the teaching practice in professional teacher training is the Regulation of the Minister of Science and Higher Education of 17 January 2012 on education standards in preparation for the teaching profession[1].

[1] Regulation of the Minister of Science and Higher Education of 17 January 2012 on education standards in preparation for the teaching profession, (Journal of Laws 2012 no. 0 item 131) www.isap.sejm.gov.pl (access: 22.03.2013).

Initial teacher training includes 5 modules, of which the first three are the preparation for the teaching profession.

Within these three modules, students gain practical, psycho-pedagogical and didactic knowledge. The next two modules aim at developing the skills acquired during the initial modules. The second module (psychological - pedagogical) consists of 30 hours of the teaching practice performed at school. During this practice, student teachers confront their knowledge with reality and gain experience in teaching and educating. The third module (teaching) offers a traineeship of 120 hours conducted in schools. During the practice students learn about specific elements of the school, its teaching tasks, work organization, documentation and teacher's work. In this way, they develop their professional teaching competence.

Organization of teaching practice at universities

Universities and institutions of higher education are responsible for organization, duration and financing teaching practices. The total number of hours of the teaching practice that a student is obliged to perform is 150. These are hours conducted or observed by the student at various educational institutions.

However, the number of hours devoted to the teaching practice differs among universities. In general, the limit of 150 hours of practical preparation of the student is maintained or even exceeded.

Interim and continuous teaching practices are organized in accordance with the organization of the teacher education process, with the latter ones conducted outside student's hours at university. In general, teaching practice in full-time pedagogical courses are carried out in the period from 8 to 12 weeks. Interim practices are organized within the framework of specific methodologies.

The teaching practice for students of early childhood education aims at preparing them to work independently and to use their pedagogical and methodological knowledge in practical classes.

During the teaching practice, students learn about their class, individual differences in a given group of students and personality traits, as well as documentation of a class teacher. They observe and conduct independent and integrated activities or lessons in various subjects and prepare different teaching materials.

The teaching practice aims to: illustrate methodological problems analyzed theoretically, teach students to perceive pedagogical phenomena and to define them, develop the ability to perform methodological duties, teach students to apply attractive forms and methods of work of the teacher, develop a reflective attitude towards theory, as well as observed and performed practical activities. Moreover, its goal is to deepen students' knowledge on the formulation of objectives of integrated lessons, the choice of educational content, creative learning, skills of teamwork, planning and evaluation of the educational process and the results of students' work. Such practices also help students gain the ability to express their own thoughts,

flexibility of interactive behavior, creative approach to reading materials in the field of education, competence in the field of prevention, diagnosis and treatment of difficulties and school failure.

During teaching practices, the future teacher acquires new knowledge about planning and the organization of teaching and educational work. He has a direct contact with the pupil and his/her parents, with whom he will have to work in the future. Practical classes will also help students develop the skills to prepare teaching programs, scripts or lesson scenarios.

Upon completion of the teaching practice the student has an interview with the tutor concerning reviews of classes submitted by pupils, practice record, reports on observed lessons as well as lesson scenarios.

Mandatory pedagogical training practices for students in the first degree for the specialization of early childhood education at the Pedagogical University of Cracow include:

– interim practical exercises, pursued as a separate subject (in the first year as general teaching practice, whose aim is to develop students' practical competence in the field of pedagogical activities which enable them to acquire experience in the functioning of the educational system, the specificity of schools; in the second and third years the teaching practice includes weekly classes in schools chosen by teachers and/or teaching practice supervisors). Practical exercises are also implemented within the framework of theoretical subjects, allowing students to apply knowledge gained during practical activities,
– teaching placements area test of the teaching profession. They are implemented continuously in the third year of a full-time course and last four weeks. In a part-time course, they are organized during the academic year in classes I–III of primary school. The student in consultation with the head of teaching practice decides on the place where a teaching practice is going to be conducted. The main goal of the teaching practice is to develop skills in planning and implementing educational-teaching work in classes I–III (early childhood education) under the guidance of a teacher with relevant work experience. During the practice the student can carry out related research in preparation for a diploma thesis[2].

The essence of teaching practice in the training of early childhood education teachers

The teaching practice should be treated equally with theoretical teaching. It enables observation, conducting classes, participation in the life of a given group of students as well as mastering knowledge based on action.

Apart from the fact that the practice is one way to prepare students for work in a teaching profession it also gives them the opportunity to approve of or amend student choices about their field of study or occupation. Additionally, it allows the

[2] www.ippis.up.krakow.pl/index.php/praktyki/ (access: 5.04.2013).

student to acquire skills that are necessary to fully participate in society. Preparing students for the future profession in such a way is an important part of education at the university level, also because of the demands made by employers today. As stated by M. Bartkowiak and M. Barańska "deliberately planned and actively implemented practices maybe a bargaining chip in the search for employment" (Bartkowiak, Barańska, 2012).

Thanks to the teaching practice students expand their specialistic knowledge in order to assess situations which they are part of or to make decisions and respect ethical standards. Thanks to the teaching practice students develop their knowledge and skills, gaining personal experience in working with students.

As mentioned before, according to A.T. Pearson, in order to be effective and valuable, the teaching practice must be a reflexive experience. Its objective is to both acquire knowledge and to use it, and the effect of such training is the actual practice of teaching skills not learning about them. It is therefore a key component of a teacher's training. The teaching practice should result in higher students' awareness about the actions taken by him/her and the knowledge of the action. The knowledge that a student acquires from the teaching practice is not universal, it cannot be applied in any situation, because it relates to specific circumstances or people. The future teacher must reflect and discover what would be appropriate in a given situation in which he found himself, whether he could use the strategies known to him, or maybe some of them should be modified. This is a reflexive practical experience – the ability "to modify the beliefs and teacher's plans. It is very important because the teacher must be able to adapt to changing situations and it can only be done through changes in their knowledge" (Pearson, 1994).

According to K. Żuchelkowska particular attention should be paid to the following actions of students:

- observing an organized or spontaneous activity undertaken by three educational entities, namely the teacher, pupils and their parents,
- undertaking actions providing care, education and teaching resulting from the existing situation of education in the school,
- conducting organized teaching and educational activities,
- acting as a class teacher in the school,
- analyzing and interpreting the observed and experienced events and educational situations,
- observing the course of methodical teaching in the classroom,
- developing lesson scenarios,
- conducting classes on the basis of previously developed scenarios,
- organizing the work of pupils in task groups,
- diagnosing the level of knowledge and skills of pupils,
- working individually with pupils manifesting multiple intelligences or having developmental disorders,

– discussing classes and other forms of activities with the teaching practice supervisor or tutor,
– evaluating conducted classes and other activities (Żuchelkowska, 2012).

According to R. Perry the purpose of the teaching practice is to enable students to undertake different actions and activities. These include:

– establishing contacts with children – it is one of the most important and difficult tasks for the teacher. He must first get to know his students so as to organize their learning process in a valuable way. Mutual trust is also indispensable. The activities of students during the teaching practice, which is directly related to making contact with children, are based on observation. It is useful for creating curricula, selecting strategies, monitoring progress, discovering the strengths of children, explaining unusual behavior, which in turn all enable the creation of favorable conditions for learning,
– developing one's own philosophy associated with teaching – in the process of gaining experience, learning, reading, forming personal beliefs about learning, or teaching the future teachers develop their own philosophy of teaching, which contains what the student knows and what he thinks about teaching. This is important as it will affect the decisions taken by the teacher,
– creating an environment of learning and teaching – during the teaching practice, students learn how to arrange the classroom, use the space provided, select and store materials and organize the day. Students also have the chance to observe how the organization of the physical environment affects the behavior of students. In addition, they gain practical experience related to the preparation for the classes. Another thing students learn during the teaching practice is the ability to create an atmosphere conducive to learning. It should be characterized with the provision of emotional warmth and supportive environment,
– the development of personal theory and practical skills – while becoming a teacher it is important to create and develop one's own theory of teaching, which in turn is the basis for making decisions on the practice of teaching (what the teacher does and how). It therefore concerns both the subject of teaching (what?) and methods (how?). The development of personal theory is possible thanks to the description of events or the reflection on what the student sees and does. During the teaching practice, students learn new ways and techniques, try out the ones that they already know or about which they have read. In addition, students learn how to interpret situations, make decisions, act and react to what is happening,
– cooperation with adults in institutions of early childhood education – in the course of the teaching practice students also have contact with adults such as the supervising teacher, headmaster, other people working at school or parents. Prospective teachers can observe others in these relations, learning how to build interpersonal relations (Perry, 2000).

Another goal of the teaching practice is to develop professional competence. According to K. Denka at present teachers need the following competencies:

praxeological, communication, cooperation, creative, computer, and moral. The competences comprise knowledge, abilities, skills, and dispositions that enable the realization of the task of education. Teacher's competence is also associated with his self-esteem, self-awareness, the need to constantly improve his competence and his own professional development (Denek, 2012) (cf. A. Szkolak, 2014). During the teaching practice, students have the opportunity to develop communication skills by listening and talking with children, encouraging reading and at the same time stimulating the sensitivity of children to the richness of language. In pursuing educational goals the students utilize the knowledge about interpersonal communication. According to a study conducted by W. Lane experience gained by students during the teaching practice makes it easy for them to establish contact and communicate with children, control the class and themselves. The participants in this study, having such experiences, were of the opinion that the meeting with children or youth is not scary for them and they believe they can cope with behavioral problems better (Dróżka, 2000). In contrast, social and interaction skills are improved by supporting children in their activities, giving them advice, solving common problems which helps them achieve objectives. "Adapting activities to the capabilities of individual pupils should be associated with a particular emphasis on creating an atmosphere of cooperation and social skills as well as on more intellectual development rather than on acquiring and recreating specific content" (Czaja-Chudyba, 2013). During the teaching practice, student teachers have the opportunity to apply new ways of confronting various issues, news, innovations.

The future teacher and his competences affect both the functioning of the school and the effectiveness of the education process. Thanks to his competences the teacher can properly plan the educational process, realize the set aims and tasks, evaluate his own educational activities and teaching work in accordance with accepted norms and standards. The early education teacher who has developed professional skills can enrich the personality of the child, care for their comprehensive development. He knows how to organize the reality around children where they feel happy.

Therefore, "through the teaching practice, student teachers learn about this professional group, integrate with it, they learn how to be a good teacher, and acquire the habit of self-reflection" (Żuchelkowska, 2012).

J. Kuźma identifies three basic key features characteristic of the teaching practice in preparing students for the teaching profession,

– adaptive function – it involves the gradual introduction to the teaching profession. Adapting to the teaching profession is carried out by preparing for lifelong learning, self-improvement and self-education. In addition, this is also the process of adaptation to the school environment, extracurricular and multiple organizational responsibilities, or teaching and educational institutions,
– reflective function – involves deeper analysis, considering one's own role and place in the future profession as a teacher. The scope of this function also includes internal attitude towards the pupils as the subject of pedagogical work and

reflection on the knowledge and experience gained during studies. In this case, the student can ask himself whether he is the right person in the right place and dispel any doubts about the pursuing a career as a teacher of early childhood education,

– innovative function – it has a twofold dimension and significance. On the one hand it is the development of the student as researcher i.e. to prepare him for independent learning, conducting proper experiments and experimental tests. On the other hand, this function has to be reflected in the search of and implementation of pedagogical, psychological or teaching innovations (Kuźma, 2000).

The Encyclopedia of Education of the 21st century refers to the fourth function which is "the function of integration, which aims to combine knowledge from different fields of science, objects, activities. This affects the efficient organization of the educational process, and motivation" (Encyklopedia Pedagogiczna XXI wieku, 2005).

On the other hand, K. Denek lists the functions of the teaching practice as caring, teaching-educational, economic, creative, ecological andaxiological. Thanks to them, students can link their theoretical knowledge with its practical application, leading to systematize, deepen and consolidate knowledge (Denek, 1994).

M. Jakowicka lists cognitive, educational, research, innovative and creative functions, emphasizing above all the importance of the cognitive and educational ones. The former is aimed at understanding by the candidate to the profession its specificity and the environment and to gain experience concerning the teacher's work (by conducting classes and observation). The educational function has to develop in students certain habits concerning the teaching process, increase their interest in pedagogy, building proper interpersonal relations with pupils, staff, and parents (Jakowicka, 1991).

In the course of work on the role of the teaching practice the leitmotiv of this project has been identified, namely the statement that "the teaching practice should draw prospective teachers into the research process and to shape their novel attitude, defined by the ability to ask questions, self-formulation of problems, developing sensitivity and intuition indispensable for the discovery of new and relevant phenomena and processes in the moment of their creation i.e. in an authentic, bio-socio-cultural and socio-educational environment" (Kuźma, 2000). During the teaching practice the trainee teacher needs to have an open attitude and willingness to creatively verify the knowledge acquired during the studies. Entering the school environment the student should try to become sensitive to teaching and education difficulties related to his pupils. Every day of the teaching practice is a mine of diverse pedagogical knowledge about children and their education. Particular attention is paid to the issue that in their work no teacher is confronted with the same problematic situation to resolve. The application of theoretical knowledge is not sufficient to resolve all emerging problems and dilemmas. Observing the

reactions of active teachers to emerging situations can contribute to creating one's own theories and reactions to a given situation.

Student teaching practice integrates multiple elements in the process of teacher education. It is certainly the integration of theoretical and practical knowledge of school education, but also a combination of the purposes of education in various fields of academic training, often recognized in various categories of phenomena and concepts. What is more, it integrates concepts from a range of different subjects, the so-called pedagogical ones including psychology, pedagogy, sociology, etc. It is also the integration of various forms of implementation of educational tasks that require undertaking multiple types of activity, involvement of academic teachers, students and school teachers, as well as students' and pupils' activities in the school which then become the plane for mutual communication and mutual learning.

Summing up the role of the teaching practice in teacher education and hence the student's preparation for work, the words of F.A. Diesterweg paraphrased by K. Żuchelkowska might be referred to: "the first stage of education is worth as much as is worth the teacher working with children" (Żuchelkowska, 2012).

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Influence of teaching practice in the development of professional readiness of future early-childhood education teachers

Abstract

The content of the article is related to the debate about the role of teaching practice in the training of candidates for teachers of early-childhood education. The period of vocational training and equipping the future teacher with required professional qualifications plays an important role in the way of perceiving the profession and pursuing the occupation of early-education teacher. Theory and practice in training early education teachers should be interrelated. Thanks to teaching practice it is possible to draw attention to the wisdom and utility acquired in the study of knowledge.

Key words: teaching practice, early-education teacher

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SCIENCE, CULTURE, SOCIETY – INNOVATIONS FOR EDUCATION AND TRAINING IN THE MUSEUMS

Małgorzata Nodzyńska, Paweł Cieśla

Visualization of natural processes – one of the skills of animator of nature culture

"The horse is what everyone sees" – a popular statement seems to contradict the idea of visualization of reality, especially that available to our senses. However, the practice of everyday life shows the opposite trend – we are surrounded by images of advertising from illustrated magazines, visual information, instructions, plans, diagrams, graphs, maps to the widespread use of emoticons, or even the entire language of pictorial. The beginning of the story of Adam and Eve in Zlango language (Fig. 1) can serve as an example.

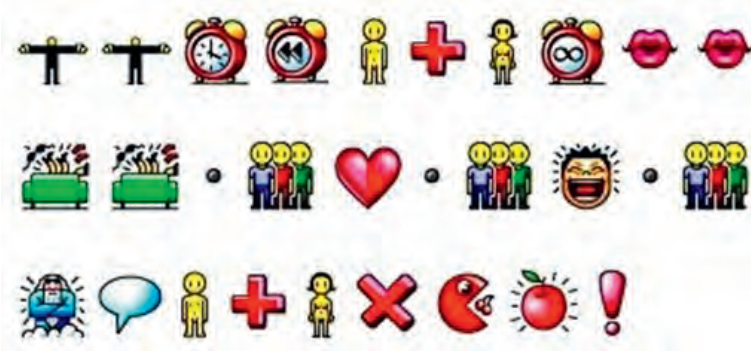


Fig. 1. Fragment of the story of Adam and Eve in Zlango

Source: http://www.mgsm.pl/pl/aktualnosci/199/Nadchodzi-Zlango.html [access: 20.12.2015]

Even a glance shows how much the image, which main purpose is to provide information (we are not talking about paintings, which main purpose is aesthetic experience) is present in our daily lives.

This is not only the practice of our time. Even from the earliest years man was accompanied by a picture. The oldest known paintings are paintings of the Chauvet cave in France dated 31 000 ± 1300 BC. Informative role of the images is reflected

the most in the oldest known writing – pictographic writing. The first pictograms appeared around 3500 BC, however, the first experiments with the presentation of longer stories in pictures/frames arranged side by side can be found in the first Bibles, even before the year 400 AD. Special educational role of visualization can be seen in the Middle Ages. Paupers' Bible (Fig. 2.) can serve as a typical example of contemporary "pictorial education".

Fig. 2. Page of The block-book Biblia pauperum from the fifteenth century. In the middle of "The Annunciation" left "Eve and the serpent" right "Gideon's miracle"

Source: http://pl.wikipedia.org/wiki/Biblia_Pauperum [access: 20.12.2015]

Combining the image with text for a fuller description of the history caused that for centuries in images the text or replacing it symbols allegories and emblems appeared, while the text was also accompanied by a picture, even in the form of initials or illumination.

Sometimes the relationship between image and text was complemented even by same object on which they were made - this applies especially to church pulpits equipments, baptismal fonts. In 1658, John Amos Comenius, a great Czech pedagogist, philosopher, reformer and Protestant thinker, formed Orbis Sensualium Pictus (Visible Word in Pictures – Polish translation 1667). Through that he became one of the representatives of the tradition of teaching through picture.

Today, when science develops faster and faster and when its findings need to be available to a large part of the population (universality of education) it seems to be necessary to prepare students to coping with this task and to choosing from the sheer volume of scientific information the most important content and necessary to others and beeing able to present it in an understandable way. It seems

that one of the methods is to visualize science understood as a representation of scientific information using a static image or a dynamic one. For the purpose of such visualization infographics can be used.

Infographics are graphic visual representations of information, data, knowledge for comprehensive, clear and fast delivery of the facts. Infographics can improve cognitive functions through the use of graphics to enhance the capacity of the human visual system to see formulas and trends (Wikipedia.org).

Infographics as a graphic technique of presenting and gathering information has been known for a long time. Below are the most characteristic of the old infographics (Fig. 3, Fig. 4).

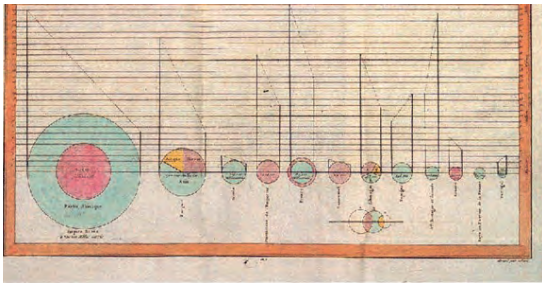


Fig. 3. The chart from the year 1801 prepared by William Playair showing the comparison of taxes in the UK with the taxes in other countries. In the figure a single wheel represent a different country. The quantity is coded by areas of the wheels. The line to the left of each circle represents the cardinality of the population in a given country. The line on the right side of the circle reflects tax revenues. William Playfair "Statistical breviary", London, 1801

Source: https://commons.wikimedia.org/wiki/ William_Playfair # / media / File: Playfair_piecharts.jpg [access: 12.06.2015]

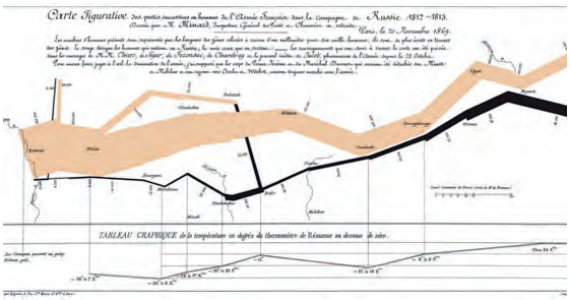


Fig. 4. Carte figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812–1813, a map published in 1869 by Charles Minard showing the course of Napoleon's Russian campaign in 1812. The graph shows multiple variables in a single two-dimensional image:
– location of the Army on the terrain map and directions in which the divisions were moving,
– reducing the size of the army,
– the temperature during the campaign.

Source: http: // en.wikipedia.org/wiki/Charles_Joseph_Minard [access: 06.12.2015]

Transmission of information through images was an important part of the natural sciences. Even today without visualizing certain information it is hard to get around, for example it is difficult to imagine teaching chemistry without modern form of the periodic table or so called tables of solubility.

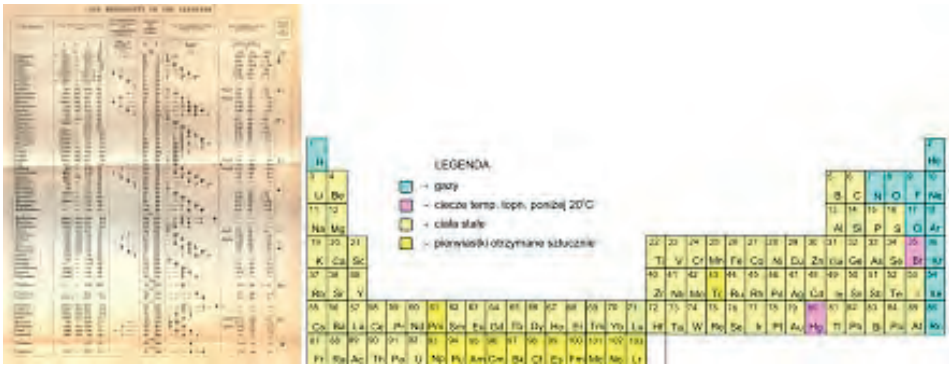


Fig. 5. Comparison of the readability of the Mendeleyev's periodic table of the elements with the contemporary version based on Werner's project. On the left the English version, made strictly according to the 5th edition of the table prepared by the Mendeleev in 1891.

Source: http://pl.wikipedia.org/wiki/Uk%C5%82ad_okresowy [access: 20.12.2015]; On the right contemporarily used so called long form of the periodic table https://upload.wikimedia.org/wikipedia/commons/8/8f/Periodic_system_extended_format.svg [access: 20.12.2015]. There is no denying that readability and ease of finding information is much greater in the contemporary version

The use of the images to provide information also causes various problems. One is the amount of information conveyed by the image. Often the reasons for the cardinality of illustration in all sorts of publications are justified relying on the Chinese proverb that "one picture is worth a 1000 words". However, this proverb can be understood in a negative way too. The image can carry so much information that it creates informational chaos. It is often forgotten that image actually carries a lot of information (sometimes not only irrelevant but also unnecessary and wrong) – this informational noise is difficult to assimilate by recipient, which is why it is difficult to select the right information from the whole excess. The recipient also may not be able to read from the image the very information that he needed. These considerations imply that if the drawing is going to comprise more information than written text it must be firmly formalized and the student needs to learn how to read it. Currently, the use of computers to create a modern infographics require prior education on how to read graphically complicated information. Examples for the above thesis are the following images that are not clear to the average consumer and understanding the contents requires more consideration and analysis.

Fig. 6. The virtual map of the world with information regarding geographical distribution of grants and frequency of granted research patents. The Worldprocessor-globe, 2006. Author: Ingo

Source: http://scimaps.org/maps/map/zones_of_invention___38/ [access: 06.12.2015]

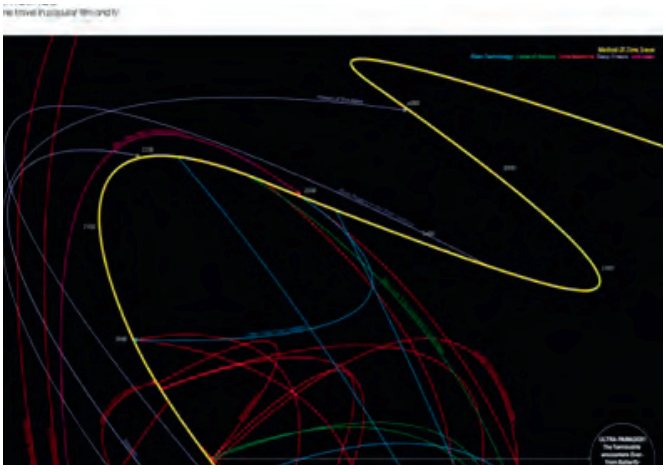


Fig. 7. Graphics showing time travel in film and TV. David McCandless, Dominic Busby, Allice Cho in 2009

Source: http://www.informationisbeautiful.net/visualizations/timelines/ [access: 06.12.2015]

Another problem in creating infographics is possible confusion with similar at first glance other forms of graphics – such as a poster or a scientific poster. Computer infographics are between the posters and the scientific posters taking into account techniques used, the color, and the ratio of text information to the drawing (cf Table 1).

The paper presents students works prepared in frames of the classes "Visualization of natural processes and phenomena" realised as a part of the project "Animation of nature culture (Animacja kultury przyrodniczej)". During the classes students were to learn how to visualize natural phenomena or natural processes, as well as how to transform knowledge into a form available and understandable to wider society.

Tab. 1. Comparison of the poster, infographics and scientific poster

Poster	Infographics	Scientific poster
 Poster by Henri de Toulouse-Lautrec. Source: Wikimedia Commons https://pl.wikipedia.org/wiki/Plakat#/media/File:Lautrec_moulin_rouge,_la_goulue_(poster)_1891.jpg	 The example of the infographics - Willingness to travel of the school youth (Infografik, Lesefreudigkeit der Schuljugend). Source: Wikimedia Commons; https://de.wikipedia.org/wiki/Informationsgrafik#/media/File:Bundesarchiv_Bild_183-1987-0618-016,_Infografik,_Lesefreudigkeit_der_Schuljugend.jpg, Authorship: Bundesarchiv, Bild 183-1987-0618-016 / CC-BY-SA 3.0	 Exemplary scientific poster Source: Wikimedia Commons - https://commons.wikimedia.org/wiki/File:Plakat_Naukowy.png#/media/File:Plakat_Naukowy.png Author Polimerek, The license CC BY-SA 3.0
A form of a propaganda or an advertisement (never only of informational character), an art form. It presents emotions. As a whole it is provided in a graphic form. The size is usually at least A2. If printed it fills the entire surface of the medium (paper, fabric etc.) Graphic elements dominate over the text. The text, if present, is often processed artistically.	Visual presentation of information or knowledge. Should be emotionless. Usually similar proportions of graphical elements and the text. Should make the receiver to think about the presented data and encourage him to compare the different sections of presented data Should present only information, not its interpretation.	Form of scientific presentation. One of the most popular forms of presenting research results during conferences. Size is usually similar to the A0 or B1 format. It usually includes the following parts: – short introduction – a brief description of the purpose of the research – a brief description of the methodology of the research – the results obtained, usually illustrated or equipped with charts or schemes – conclusions – references Background and layout are variable. In addition to the text an important communicative function if played by images and aesthetics of the whole poster.

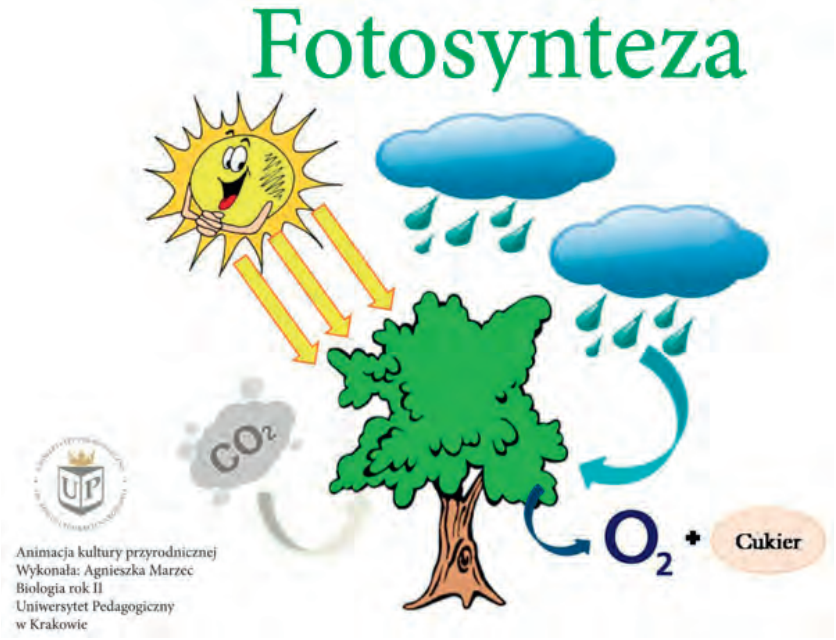
Students learned about the history of visualization in the sciences, requirements, capabilities and limitations of imaging natural content and also learnt the technical side of preparing graphics. They also were able to use professional software for desktop publishing (DTP).

Not all Infographics created by students in frames of the classes met the requirements of infographics – some showed emotions, some contained more images or more text, but most of them matched the requirements. It can be assumed that for the first meeting of students not only with a new form of graphics but also with a tool for creating it the achievements were quite good. Hopefully their further works in this direction will be even better.

Examples of students' work:

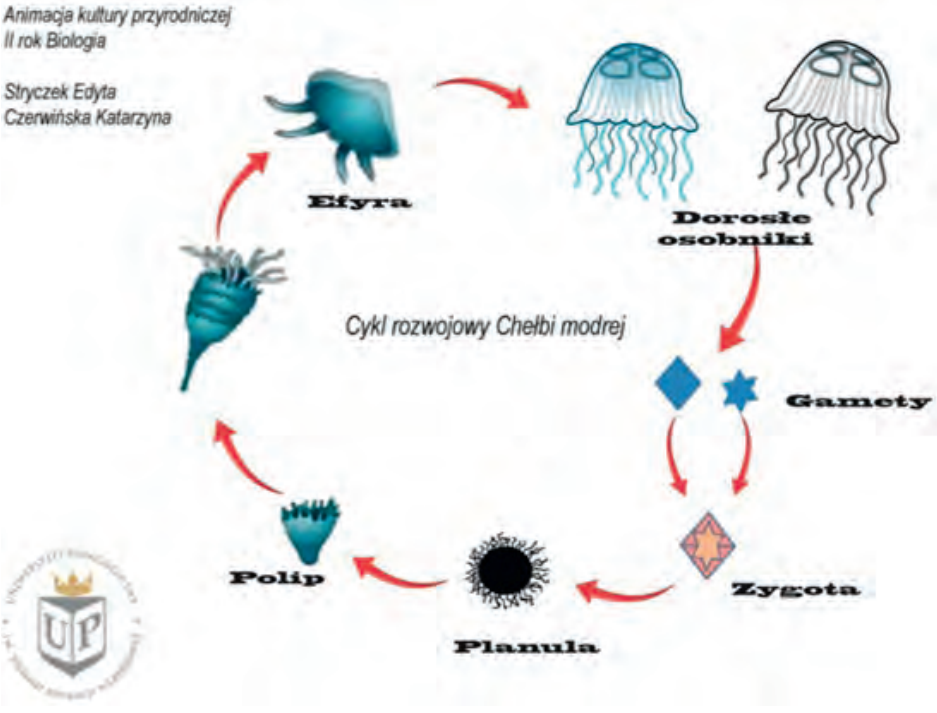
Students prefered cycles:

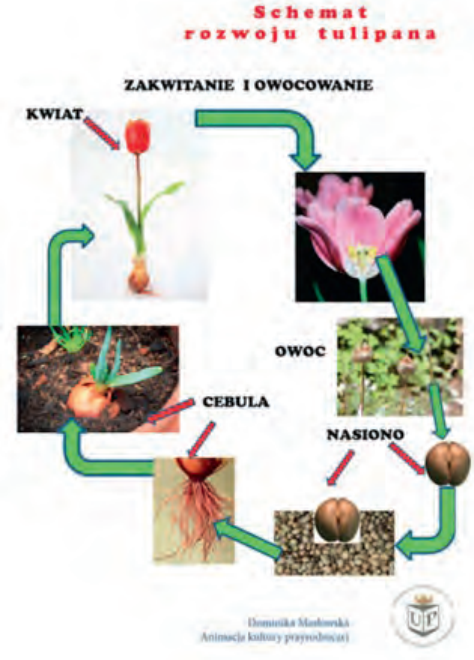
- "Photosynthesis" is kept in a uniform graphics style, but the amount of information contained in this infographics is small. It could present information about the process of photosynthesis for elementary school students,
- "The life cycle of a butterfly - complete transformation" in the correct manner combines visual information with the text,
- another infographic relates to the same subject – but its recipients are intended to be children (preschoolers and students in grades 1–3 primary school) and therefore the author used colored items (flowers) instead of the text,
- the infographics "Life Cycle of Aurelia aurita" and "Water cycle" properly operate the image, however, it seems that the information layer of presented infographics is too weak.




CYKL ŻYCIOWY MOTYLA
Animacja Kultury Przyrodniczej Justyna Herdan


Cykl rozwojowy motyla
Przeobrażenie zupełne
Poczwarka to kolejne stadium rozwoju motyla.
W ciele poczwarki następuje radykalna przemiana.
Ciało larwy przekształca się w motyla.

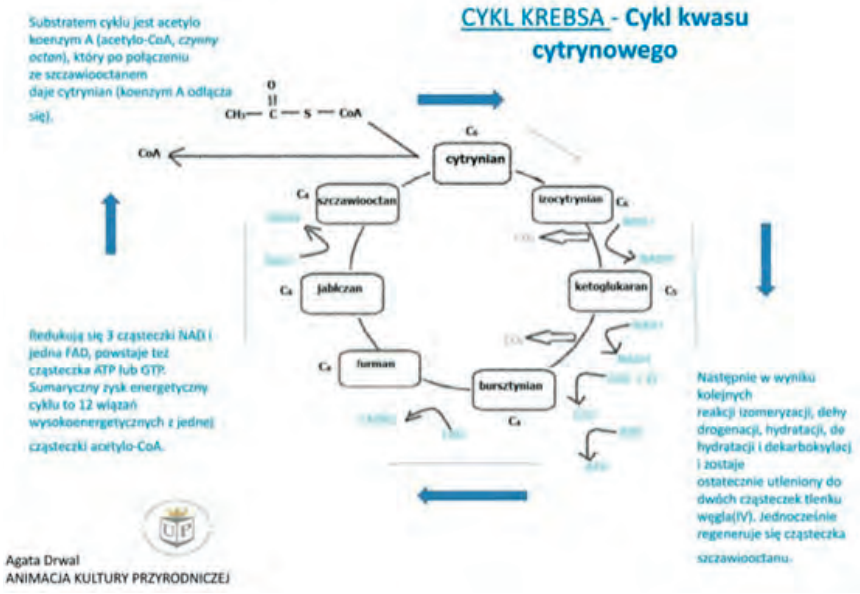

Animacja kultury przyrodniczej
II rok Biologia
Stryczek Edyta
Czerwińska Katarzyna
Efyra
Dorosłe osobniki
Cykl rozwojowy Chełbi modrej
Gamety
Zygota
Planula
Polip



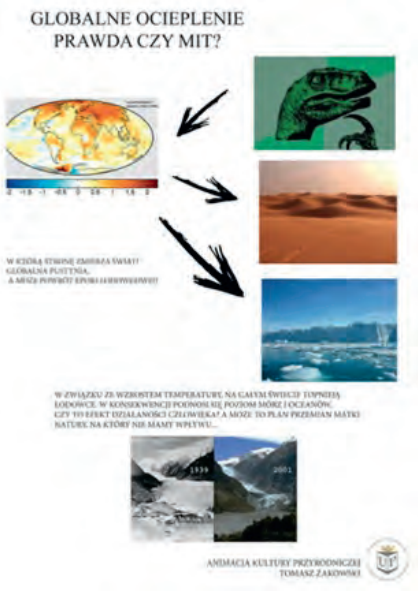
Both infographics on this page show the process of flower development, however, the process is presented using different techniques (photography, freehand drawing). Authors also use different concepts – in the first infographics the process is shown in cyclical form in contrast to the second one that shows the process linearly.

In both graphics the image outweighs the text.

Placed above infographics is a typical scientific scheme. The proportions of the text to the image are correct - but it is difficult in this case to talk about the role of popularizing scientific knowledge.

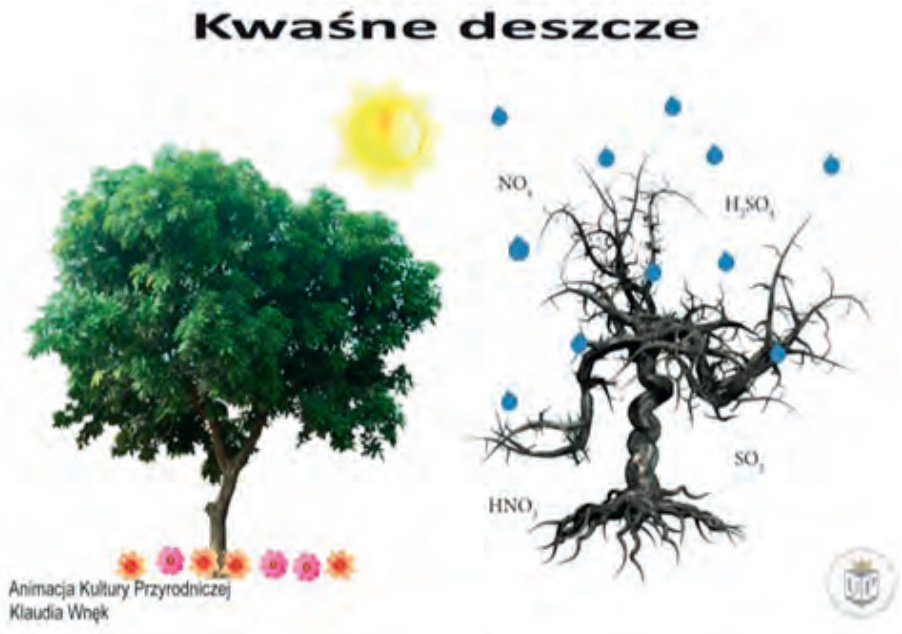


The aim of another infographics was to create graphical form of safety rules in the chemical laboratory. The idea seems interesting, but it can be assumed that the author did not manage to finish the job because of lack the time.



Other infographics concerned environmental problems.

The first infographic touches upon the problem of global warming, however, formulated topic and used graphic elements (upset dinosaur) correspond more to a poster than infographics. Alternatively, this type of graphic solutions are found in popular magazines rather than in scientific journals.



Graphics "Acid rain" is a nice poster unfortunately lack of information prevents it from being categorized as infographics. It must be admitted, however, that the graphic form and elegance of preparation speak in favor of this work.

Infographics "Forests in Poland over the years": most of all the works follow the rules of infographics:

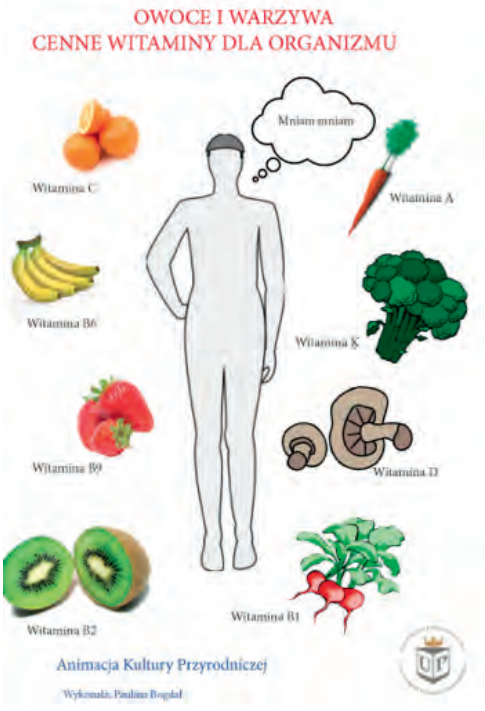
– a graph of afforestation areas in Poland depicted with trees of varying sizes is very suggestive - allows even young children to understand the information (adults are given numerical values),
– equating the size of the forested area to the size of National Stadium - also highlights the magnitude of the problem.

The next four works relate to human:

– „What happens during stress?",
– "Fruits and vegetables as valuable vitamins for the body",
– "How alcohol affects your body?",
– "Why are you deliberately killing yourself?".

Two infographics "What happens during stress?" and "Fruits and vegetables as valuable vitamins for the body" in a graphically effective and transparent form present the information relevant to their titles. The title of the first one should be slightly changed to "Changes in the human body during stress" (instead of question the affirmative sentence and specifying that the graphics concerns the changes in the human body). In the second infographics colloquial statement "Yum yum" should be removed. However, taking into account the overall work these corrections are of minor importance.


Co się dzieje podczas stresu?
Nadmierna potliwość
Rozszerzenie źrenic
Przyspieszenie akcji serca
Ból brzucha, biegunka
Przyspieszony oddech
Wydzielanie do krwiobiegu: adrenaliny i kortyzolu
Napięcie mięśni szkieletowych
Animacja kultury przyrodniczej
Wykonała: Danuta Paul


OWOCE I WARZYWA
CENNE WITAMINY DLA ORGANIZMU
Mniam mniam
Witamina C
Witamina A
Witamina B6
Witamina K
Witamina B9
Witamina D
Witamina B2
Witamina B1
Animacja Kultury Przyrodniczej
Wykonała: Paulina Bogdał


Jak alkohol wpływa na nasz organizm?
Choroby związane z nadmiarem alkoholu występują u około 10% kobiet i 50% mężczyzn.
Lekarze, do których przychodzą osoby mające problemy alkoholowe nie od razu rozpoznają przyczynę dolegliwości. Alkohol ma szkodliwy wpływ na prawie wszystkie tkanki i narządy.
Każda dawka alkoholu jest przyczyną obniżenia sprawności funkcjonowania układu nerwowego. Alkohol zaburza logiczne myślenie, powoduje zmniejszoną zdolność osądu, zanik precyzyjnego myślenia i krytycyzmu. Niewielkie ilości alkoholu powodują pogorszenie słuchu, wzroku i precyzji ruchów.
INSERT BEER HERE


Dlaczego świadomie się zabijasz?
Skład papierosa, który konsekwentnie Cię niszczy:
Butan - zapalniczki
Metan - ścieki
Amoniak - detergenty
Nikotyna - środek owadobójczy
Arszenik - trucizna
Farba
Ołów - radioaktywność
Kwas octowy - ocet
Kwas stearynowy - wosk zwierzęcy
Heksamina - podpałka do grilla
Co 10 sekund na świecie umiera ktoś na chorobę wywołaną paleniem tytoniu.
Papierosy są jedynym legalnie sprzedawanym środkiem rakotwórczym na świecie.

Graphic entitled "How alcohol affects your body?" is not the infographic. It is rather a poster. There is predominance of the text over the graphic forms, which are used as elements highlighting the text and they do not illustrate the content. It is a very good example of a poster to be placed at the doctor's waiting room where patients waiting in line can read the information presented on in.

Graphic "Why are you deliberately killing yourself?" is a typical poster – referring to emotions. The idea and preparation are very good.

The last infographic is rather a joke, or a traditional map of thoughts that can occur when there is a bacon for breakfast.

In terms of graphics and proportions of the text to the image, however, it meets the criteria of infographics.

Summary

The works presented above show that, despite the time limit and previously unknown software, students completed the task with good results. There were no significant errors in presented works and the layout was unified. Moreover, most of the works met the requirements of infographics and those that did not fully comply with the rules were also valuable works. Sometimes maybe the authors' emotions prevailed over the task and showed a lack of emotionless approach to the presented problem and the desire to impose the views of the author.

Overall, it appears that such classes should permanently access the curriculum even in wider form, so that students have the opportunity to learn how to prepare scientific poster presenting results of their research (for example the research carried out in order to prepare master thesis), as well as infographics - to be able to disseminate the knowledge and finally the poster inviting to various events popularizing science.

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Visualization of natural processes – one of the skills of animator of nature culture

Abstract

Image and text as co-existing and interdependent sources of information are linked from the Middle Ages. Today, infographics appear as another tool to combine text and images. The paper presents students' works prepared in frames of the classes "Visualization of natural processes and phenomena" realized as a part of the project "Animation of nature culture (Animacja Kultury Przyrodniczej)".

Keywords: visualisation of science, infographics, didactics of natural sciences

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Organization of conferences and science events

Introduction

One of the activities aiming to promulgate science are conferences. Usually, they are meetings of groups of people working on science, theoreticians, practitioners, as well as hobbyists for whom the subject is not a matter of professional interests. Such meetings are supposed to enable presentation and discussion about the results of scientific research. The participants can revise their knowledge, learn about new issues or seek inspiration to conduct their own research. During the lecture sessions, the lecturers can present their papers, which are often published in the form of post-conference articles or monographs. Presenting the research in the form of poster sessions is an another way of participation, during which questions may be directed at the authors. The discussions allow for the exchange of opinions and establishing new science contacts. There is also a chance to define the issues relating to the posters whose authors are specialists in the subject matter. Often the sessions can be structured around one specific key issue. Lecture sessions may dedicate part of the session to discussion panels, during which the audience can ask the lecturers questions. During the event, the so-called „coffee breaks" are also planned. In the modern society, where science culture is developed not just inside lecture halls, but in much less formal places as well, "coffee breaks" seem to be a necessary element allowing for back room conversation. This enables the participants to more directly confer with each other, without the barriers created by the podium or the auditory hall.

Thanks to the analysis of the course of various science conferences, a conclusion can be drawn that it is possible to pinpoint the elements which the organizers deem to be absolutely necessary. Such elements can be found in almost every conference schedule. This fact enables us to create a general outline of a science conference, which we can define as a model. Being aware of the principles of organizing the event can prove to be extremely useful. It enables efficient coordination, minimizing the threat of errors and let us easily introduce improvements which can enrich the

event. In recent years, the market of educational services has experienced great growth. Similarly, science conferences and educational events are no longer a niche occupied by just universities. More and more cultural institutions, associations and event private companies introduce conferences as a permanent element of their operations. The animation of natural history is a field which can benefit greatly from said forms promoting knowledge and science culture. Noticing the huge potential found in natural history, as well as the broad spectrum of forms it can take, the necessity to develop new competences in employees whose responsibility is the animation and mediation of knowledge becomes obvious.

Results

"Organization of conference and science events" classes were one of the elements of the course on Animation of Natural Culture specialization. The classes were taken by two groups: students of biology and students of environmental protection and they took the form of labs. Active participation enabled the students to learn about the concept not just in theory, but also through workshops allowing for putting the gained knowledge into test. The introductory phase of the labs made it possible to verify the initial level of knowledge of students about science conferences, various educational events, as well as their forms and course. The sources of knowledge about conferences and events were also a point of interest. According to the students, the Internet – social networking websites created by universities and similar organizations - was the most common source of information about events and conferences. This fact was enough to draw the conclusion that the students' knowledge about the subject matter needs to be expanded upon and systematized. During the classes the students were asked to give their opinions about conferences and educational events, in which they had a chance to participate in the past. They did not have any significant experience in such events, and none of the students took active part in any conference, either as a lecturer or by presenting a poster. However, the students participated in internships organized in cooperating institutions within the project of Animation of Natural Culture. Sparking the discussion allowed for the exchange of opinions, determination of the most important elements which make conferences attractive for participants, as well as the elements which should be avoided. The classes used active methods of work. Thanks to the met plan method, the students could arrange their knowledge and assumptions about conferences in three main groups: the aims, the advantages and the ballast (elements which can hinder the effective organization.) Thanks to this, the conclusion that events relating to animation of natural culture are a complex and multi-stage process. Various types and forms of conference and the possibilities of organizing educational events were discussed. A discourse about standard conferences (taking place at universities) and multimedia conferences (becoming more and more popular in the knowledge based society) also took place. According to Fisher "active participation with the use of interactive technologies can escalate the debate to levels which were unachievable

in small groups of people in the past." One of the main targets of the workshops was the creation of a "Conference kit" understood as a set of key points, which the students deemed necessary in any science conference.

The students decided that the vital elements of science conferences are:

- greeting of participants,
- defining the order of lectures according to the subject,
- pointing out the importance of special guest and honouring them with specifically designated time for their speeches,
- coffee break – allowing for the exchange of opinions in the back room,
- organization of a co-event, which would enrich the programme and/or would allow the participants to relax and integrate,
- planning poster sessions,
- organization of discussion panels,
- allowing for extra time to summarize the conference,
- saying goodbye to the guests.

The students could confront the results of their work with real life examples of schedules and plans of various science conferences, which they were given as handouts. The examples came from both science conferences organized at different kinds of Polish universities, e.g. Pedagogical University of Cracow, as well as cultural institutions such as the National Museum in Kraków. In the handouts, the students could also find examples of schedules and invitations from conferences organized by private companies and publishers of educational materials. Despite not having the rank of a true science conference, said events did have the word "conference" in their names. Additionally, the students could familiarize themselves with examples of methods of planning science conferences. The wide image of the characteristic of logistical planning the event became the basis of the next exercise which the students completed. They were to create an outline of basic and necessary activities which had to be taken into account when planning a science conference. A discussion about the exercise allowed the students to draw conclusions.

The results of their debates are as follows:

I. The scope of basic activities during planning the organization of science conferences:

- choice of the main subject – a specific subject should be chosen and the aim of the conference should be clearly defined (these concepts determine the type of guests/participants of the conference, the choice of the venue, and the budget for the particular event.) One has to remember to choose the subject prior to the event in order to give enough time for hypothetical participants to prepare their speeches and posters. Paying attention to the calendar of current science events can prove very useful as well, in order not to overlap with a different conference of similar or higher significance,

- choice of target audience – are the invited guests active members of scientific domain, or private people, students or members of a particular profession, e.g. teachers,
- preparation of the list of participants – having such a list prior to the event is essential as it allows for cost-planning, renting an appropriately sized hall, organization of transport and accommodation,
- the venue in which the event takes place is of extreme importance, as it can have a non-trivial impact on its attractiveness. The choice of the venue can determine the attendance – it can either encourage to or deter people from participation (e.g. due to inconvenient access),
- organization of co-events – a dinner summarizing the event, a ball, a trip to an interesting place, or a performance e.g. a string quarter concert,
- the organizers are responsible for checking the equipment of lecture halls and making sure that the equipment works properly. It seems necessary to designate people responsible for the technical side of electronic equipment,
- the information about accommodation, such as pricing, should be included in the plan of the event. If there is no possibility to organize overnight stay, the guests should be informed, especially those coming from afar, that they may need to find their own accommodation,
- finances are of utmost importance. We have to ask whether the event will be co-financed by the university representing our event, or if we have any sponsors – if not, barter transactions may prove very useful. It should be determined whether the admission is charged, and if yes, what is covered by the charge (e.g. the costs of post-conference publications, accommodation, etc.) The costs of renting equipment or rooms should be taken into account as well if we cannot provide our own,
- event advertising – preparation and sending the invitations e.g. via the Internet, posting the information on the university webpage or web portals dedicated to science and cultural events, websites, Facebook profiles. Designing a logo is a good idea – the logo may be placed on posters, invitations, brochures or IDs – guests will associate it with the event and, with time, it may become "a trademark",
- developing the methods of registration for participants, assembling a team of workers dedicated to supporting the guests,
- preparation of certain permissions relating to e.g. fire safety, copyrights,
- planning catering and signing deals with potential service providers,
- the team working on the event needs to make themselves acquainted with their responsibilities, roles and deadlines,
- it is a good idea to send a reminder about the event or conference to all guests,
- ways of summarizing the conference should be developed – plan out how the post-conference materials and publications will be printed out, publish photos from the event in the media, together with an informational text about it.

The above summary was useful for the students in their next task. The aim of the exercise was to plan a science conference by taking into account all the key points the students learned about earlier, as well as the logistics. The students, who were divided into groups, had a chance to exhibit their ideas and creativity, as well as their knowledge and the ability of putting it into practice. The students showed great commitment to their task. They worked in accordance with all the points discussed earlier, and, additionally, they put forward their own solutions to issues. The projects created by the students were diverse. Some of the events were planned for one day, others took two days. The students came up with ideas for many co-events. They presented the results of their work, explaining the aim of the solutions they used and encouraging others to discuss them. The lab summarizing the course about "Organization of conferences and science events" ended with an exercise on designing a certificate of participation in their conference. The students had acquainted themselves with examples of actual certificates in the earlier part of the class, discussed them and taken a critical look on the graphical design. All of this enabled them to come up with their own ideas for certificates. The commitment to creativity and the multitude of ideas let the students to draw conclusions about the aims of the course. The class ended with an evaluation survey, in which the students could present their opinions about the relevance of the subjects discussed in the class. Through the analysis of the survey it can be concluded that the topics about organization of science conferences are interesting to students. They are aware that gaining new competences makes them sought after candidates on the job market. The skills they developed during the course can prove useful in their careers. Critical analysis is useful in many life situations, relating to self-development in science, career and private life. Understanding the basics of organization events facilitates planning and makes it easier to arrange events in an interesting way. The respondents believed the subject to be exciting. They said that there should be more hours dedicated to this subject in the course. Additionally, they said that the subject matter should be expanded by discussion about law-related aspects of organization of events. One of the subject mentioned very little in the course were forms of animation and mediation of knowledge. The respondents defined these issues as interesting, due to their specialization – Animation of natural culture. They asked for these issues to be discussed more thoroughly.

Conclusions

Together with the growth of societies, there is an increase in the demand for new competences, which make it easier to feel comfortable in new fields of science, as well as professions in which the job market is fully satisfied. Animation of natural culture fills the current niche of science very well. Being able to be a part of that niche brings many new opportunities, which, up until recently, was very hard to achieve. Various competences which can be developed thanks to participation in the course may prove to be a non-trivial asset in the market of mediation and animation

of natural culture. Animation of natural culture as a groundbreaking issue requires thorough diagnosis and systematization of key concepts. Modern education should meet the expectations of the knowledge based society, which grows in a constant and multidimensional way. Various ideas and concepts interject and complement each other. Participation in labs and workshops, which can be found in the offers of modern institutions, are alternative methods of gaining and mediation of knowledge. The ability to plan and organize events or conferences opens many doors on the job markets. The awareness of the multifaceted issues related to organization of events promoting natural culture encourages seeking new solutions. What are the reasons to organize conferences? There may be many answers to this question. According to Fisher "from the outside, the most visible aspect of organized conferences are meetings of associations and training events. A conference is often chosen as a way of interaction between people from different parts of the country and enabling them to present their opinions". The wish to promote a particular institution or subject may be a separate aim, as well as propagating knowledge about niche or popular fields. Another premise are the profits – which is, of course, valid. The fact that conferences and science events can be challenging to organize remains indisputable. Therefore, it is a valid assumption that knowledge, and special competences are very useful and helpful in organizing a successful event.

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Organization of conferences and science events

Abstract

Conferences and science events are an inseparable element of animation of science culture. They allow us to not only gain knowledge and develop interests, but they are a type of an event. According to John G Fisher "a conference is a unique medium of conveying information." It is not just the subjects that lecturers talk about, but also the form of the conference which encourage the participation in the event. The knowledge of basics of organization, the necessity of a holistic approach to such a broad logistic undertaking, as well as creative use of said knowledge, all become a prerequisite as a competence of the modern animator of natural culture. What are the expectations of the participant of the conference? What should be the focus of the organizers when planning the event? Conferences provoke questions, which relate to not only science but also organization. The course "Organization of conferences and science events" enabled students to broaden their knowledge and gain practical skills, which they will be able to use as animators of natural culture.

Key words: organization of conferences, a conference, science events, mediation of knowledge, new competences, animation of culture.

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FOLIA 197

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Animation of science culture – evaluation of courses and analysis of students' attitudes

Introduction

The purpose of popularization of science is to communicate research results to the members of the knowledge-based society, search for pedagogical forms to adapt the language of art to scientific issues, inspire teachers to expand their professional, pedagogical and cultural competencies. It recognizes the important role of science in culture and public discourse, and the connections between culture, civilization, science, technology and art based on proper communication lead to a change in the perception of science. Scientific culture doesn't entirely focus on knowledge, but also on the thinking, reflection and effective operation of the mind in terms of asking questions about how the world works. Therefore, it is important that the cultural animator could transform the public imaginations by triggering inside them a self-reliant construction of thought-out scientific knowledge (Raichvarg et al., 2015). Popularizing knowledge needs to be conducted in a proper manner and should be based on communication, creative dialogue, and built connections between science and society. The task of the animator is to identify and promote the claim that book expertise in a particular field of science may be available not only to researchers, but also to every member of society. It is important to determine the content of the message, logical argumentation and be aware that substantive competences are accompanied by social competences such as: creativity, communication, interpersonal skills, organizational skills, educational skills, managing creative development of one's own and others (Potyrała, 2011).

Comparison of attractive form of scientific information is essential if we want it to reach out to the recipient. These should be exciting and motivating that the audience would want to give up the time to get to know them. Interesting form of statement is culture animator responsibility – animator should know and adapt to the type of audience with whom he has to deal with. He should use his experience of informal education to get to know the attitudes of the recipients of animation activities, embrace modern information and communication technologies, as well as be aware of the need to pay attention to both the global and local character of various kinds of phenomena and processes (Carton, Daragon, 2013).

The purposes of the courses 'Interactions and communication platforms', 'Science and society', 'Bases of public debate'

All of the analyzed courses realized in the frame of 'Animation of the scientific culture' specialization had a strictly defined educational purposes. The list of objectives included table 1.

Tab. 1. The list of educational objectives of the courses 'Interactions and communication platforms', 'Science and society', 'Bases of public debate'

Subject	Objectives
'Interactions and communication platforms'	conscious use of communication competencies in the social, scientific and natural aspects
	engage communication behaviors important in interpersonal relations in various kinds of didactical and social situations and school and outside school environments
	negotiation of scientific and popular scientific knowledge on various communication platforms
	characterization of history of development interpersonal communication in different grounds of social and cultural contacts, as well as the ways of popularization of knowledge through communication platforms
'Science and society'	characterization of social and philosophical issues of development of science and transformation of societies
	popularization of scientific knowledge in society under the current state of scientific knowledge and in a interdisciplinary and creative way
	analysis of relations between science and society in the context of mediation of natural conflicts and popularization of knowledge
	making individual and social activities towards promotion of science in formal and informal education
	acquiring social competencies serving to salvation of socio-natural culture issues as well as critical reception of information about scientific discoveries and using them for the public good
	evaluation of methods and area of popularization scientific knowledge in selected journals, books, TV programs, internet portals, etc.
'Bases of public debate'	characterization of models and ways of popularization of knowledge based on scientific debate, interpersonal and social communication
	enhance the didactical culture of students who will follow a profession based on social communication in the future
	preparing students to conduct properly in terms of scientific and cultural scientific debate which is a way to solve environmental conflicts
	perfecting public speaking
	promotion of cultural and social activity in natural aspect

Contents executed within courses 'Interactions and communication platforms', 'Science and society', 'Bases of public debate'

Courses were realized in conversational form of lectures and classes. A detailed list of topics discussed within each course is presented in the Table 2.

Tab. 2. The list of the subjects realized during 'Interactions and communication platforms', 'Science and society', 'Bases of public debate' courses

Subject	Objectives
'Interactions and communication platforms'	Models and ways of communication and mediation of contemporary civilization problems (natural, social, cultural, scientific). History of development of interpersonal communication. Closing the distance between people through the development of forms of transport. Development of media. The need to create a global time. Traveling as a way of ,dwindling the world' and the way of exchanging information. Development of oral communication and handwriting. Transfer of information from Antiquity to ,liquid modernity'. Mass communication. Socioscientific communication. Interactions of communication scientific, cultural, natural, social problems. The meaning of communication platforms in mediation natural and social problems. The meaning of new technologies in social communication. Platforms of communication of natural and cultural issues in the area of media and new media. Communicating ,myself' and ,about myself' through the media. Global society. Immediacy civilization. Visual civilization. Popular culture as a platform for interpersonal communication. 'Culture of risk' as a form and effect of media communication. Marketing strategies advertisers in a consumer society.
'Science and society'	History of development and popularization of science; theories of development of society. Civilization challenges vs paradigms of education and the need of permanent education. Knowledge essential for members of knowledge-based society. Interdisciplinary of science. The ways of facilitating new scientific knowledge in the face of hyper-reality. Problems of contemporary formal and non-formal education in the framework of lagging behing the development of science and social needs. Qualifications and competencies necessary for people in the 21st century to embark on scientific conflict mediation. Critical/righteous transmission and reception of information on scientific and technological discoveries in terms of social relations and contact with nature. Access to knowledge on a global scale, the issue of ethical research, use of scientific achievements for the public good. Promoting contemporary, holistic science in the framework of sustainable development of societies. Information and knowledge.

'Bases of public debate'	Types, objectives, functions and language of debate. The ways of communication and social mediation. Basic communications models and strategies. Effectiveness of communication. Communication competencies. Spaces of existence of scientific debate and its participants. The rules of scientific debate vs social expectations towards its forms and quality. Animation of culture as a form of activities facilitates society participation in promotion of nature and culture of a specific region. Public debate vs changes in the media and visuality of contemporary culture. The development of research on communication and media interaction to popularize science. The participants of communication - actors, media, society - their position and relations between them; theoretical models and case studies. Debates devoted to issues and events which become the themes of public and environmental discussions. Interpersonal and group communication. Conflict as a source of the processing of the objectives; identifying barriers in communication and use of appropriate methods to overcome them on the basis of specific situations.

Students' attitudes towards the courses 'Interactions and communication plat-forms', 'Science and society', 'Bases of public debate' (results of the evaluation survey; substantive assessment of the classes)

Students who participated in detailed courses of the specialization expressed their opinions of the scope of knowledge and skills they acquired during different classes. The results of students' opinions are included in table 3.

Tab. 3. Students' answers about acquisition of knowledge and skills connected with evaluation of the classes realized during 'Interactions and communication platforms', 'Science and society', 'Bases of public debate' courses

	'Interactions and communication platforms'	**'Science and society'**	**'Bases of public debate'**
The number of students who filled the survey	14	25	13
I gained new knowledge and skills	10 students 72%	14 students 56%	7 students 55%
New knowledge and skills will help me during realization of other 'Animation of scientific' courses	6 students 43%	15 students 60%	9 students 69%
New knowledge and skills increase my competitiveness on the labor market	2 students 14%	7 students 28%	6 students 46%
I know only basics; I expected more advanced level	-	3 students 12%	-
I learnt nothing new; I knew everything earlier	2 students 14%	2 students 8%	1 student 7%
These classes motivated me to further learn/development	-	4 students 16%	3 students 23%

Evaluation of 'Interactions and communication platforms' course shown that 72% of students of students perceived the increase of their knowledge and competencies, 43% used them during another courses of 'Animation of scientific culture', 14% claimed that new knowledge and skills increase their competitiveness on the labor market. In turn 4% (2 students) did not learn anything new because they knew everything earlier (before the start of this courses).

During the evaluation of 'Science and society' course, 56% of students admitted that the field of qualifications related to a culture animator occupation extended gradually with participation in the different courses of specialization, moreover the knowledge and skills gained during this course will help them to realize next courses of this specialization. Additionality, 16% of students admitted that the classes motivated them to further learning and development, and 28% of them predict that the new knowledge and skills will increase their competitiveness when they will be looking for a job. A small number of students claimed that they did not learn anything new because they had knew everything earlier (8% of students) or learned the basic knowledge only and they expected a more advanced level of this classes (12% of students). Some of the students had suggestions that some of the courses should be expanding on subjects such as: psychological conditions, verbal and non-verbal communication, body language.

Due to 'Bases of public debate' course, 55% of students gained new knowledge and skills, 69% of them used it during realization of other classes of the specialization, and 46% claimed that new knowledge will help them during looking for a job in the future. Only 1 student learned nothing during the course. Students also expressed their opinions/remarks about 'Bases of public debate' classes, for example: "Subject area of this course is more interesting than earlier/another courses – I think it will be good to increase the number of hours of this classes"; "During this classes I had the opportunity to participate in discussions about very important social issues. I think this form of classes was very congruous"; "In every debate/discussion I overcame my fear connected with public appearance".

After completing the **'Interactions and communication platforms'** course 14 survey questionnaires were analyzed. More than half of students (79%) considered that scope of the contents of this classes met their expectations to a good and very good degree, and 58% of students made a judgment that scope of contents of this course is generally useful for the area of specialization subject. Most students admitted that teaching methods used during course met their expectations (29% evaluated it as good and 43% as very good). The organization of classes was evaluated as good by 50% of students and only one student deemed it bad. Details of students' opinions are included in Table 4.

Tab. 4. Evaluation of the 'Interactions and communication platforms' course

Part of the evaluation	Very poor	Poor	Average	Good	Very good
To what extent did the scope of the courses content meet your expectations?	1 student 7%	1 student 7%	1 student 7%	6 students 43%	5 students 36%
To what extent is the scope of the courses content related to specialisation subject?	1 student 7%	1 student 7%	2 students 14%	8 students 58%	2 students 14%
To what extent did the teaching methods used during the courses meet your expectations?	1 student 7%	1 student 7%	2 students 14%	4 students 29%	6 students 43%
	Very poor	Poor	Average	Good	Very good
Classes organization/teaching	1 student 7%			7 students 50%	6 students 43%
Teacher's involvement in the classes	1 student 7%			9 students 64%	4 students 29%
Knowledge transfer – presentation of contents	1 student 7%		3 students 21%	6 students 43%	4 students 29%
Teacher's attitude towards students		1 student 7%	1 student 7%	2 students 14%	10 students 72%

After completing the **'Science and society'** course 14 survey questionnaires were analyzed. More than half of the students (60%) admitted that the area of contents of these classes met their expectations to a good and very good degree, and 50% of students rated the course as useful for the specialisation subject. Most students assessed that teaching methods used during the courses met their expectations (28% evaluated it as good and 24% as very good). The organization of classes was evaluated as good by 48% of students and as very good by 32% of students. Presentation of contents was evaluated as good by 40% of students, as very good by 32% of students and again, only one student considered it bad. Details of the evaluation are presented in Table 5.

After completing the **'Bases of public debate'** course 13 survey questionnaires were analyzed. 78% of students thought that it met their expectations to a good and very good degree and it was useful and very useful for the subject in generally. Most students claimed that teaching methods used during the classes met their expectations (23% evaluated them as good and 55% as very good). The organization of classes was evaluated as good by 23% of students and as very good by 70% of students. The presentation of content was evaluated as good by 23% of students, as very good by 77% of students and one person thought the presentation was average. Details of this evaluation are include in Table 6.

Tab. 5. Evaluation of the 'Science and society' course

Part of the evaluation	Very poor	Poor	Average	Good	Very good
To what extent did the scope of the courses content meet your expectations?	–	3 students 12%	7 students 28%	12 students 48%	3 students 12%
To what extent is the scope of the courses content related to specialisation subject?	4 students 16%	1 student 4%	8 students 32%	8 students 32%	4 students 16%
To what extent did the teaching methods used during the courses meet your expectations?	1 student 4%	3 students 12%	8 students 32%	7 students 28%	6 students 24%
	Very poor	Poor	Average	Good	Very good
Classes organization/teaching	–	–	5 students 20%	12 students 48%	8 students 32%
Teacher's involvement in the classes	–	–	4 students 16%	11 students 44%	10 students 40%
Knowledge transfer – presentation of contents	–	1 student 4%	6 students 24%	10 students 40%	8 students 32%
Teacher's attitude towards students	1 student 4%	–	5 students 20%	8 students 32%	11 students 44%

Tab. 6. Evaluation of the 'Bases of public debate' course

Part of the evaluation	Very poor	Poor	Average	Good	Very good
To what extent did the scope of the courses content meet your expectations?	1 student 7%	–	2 students 15%	5 students 39%	5 students 39%
To what extent is the scope of the courses content related to specialisation subject?	1 student 7%	–	2 students 15%	6 students 46%	4 students 32%
To what extent did the teaching methods used during the courses meet your expectations?	1student 7%	–	2 students 15%	3 students 23%	7 students 55%
	Very poor	Poor	Average	Good	Very good
Classes organization/teaching	1 student 7%	–	–	3 students 23%	9 students 70%
Teacher's involvement in the classes	–	–	–	3 students 23%	10 students 77%
Knowledge transfer – presentation of contents	–	–	1 student 7%	4 students 31%	8 students 62%
Teacher's attitude towards students	–	–	–	4 students 31%	9 students 69%

Evaluation survey conducted after the courses showed that (the total) 82% of students gained interdisciplinary knowledge of the biological and social sciences. These students admitted that they acquired competencies such as: organization of

one's own actions, coordination of the audience activities, compilation of pedagogical tools, social involvement, communication, mediation of educational issues towards urban and rural environment, mediation of science issues, creation of project for special groups of audience.

Results of pedagogical observation during the courses 'Interactions and communication platforms', 'Science and society', 'Bases of public debate'

During 'Interactions and communication platforms' course, it was observed that students: used a variety of communication techniques during the contact with different groups of audience; defined forms and contents of different kinds of socio-cultural activities, for example: performances, exhibitions, conferences, workshops; known the rules of creating their own cultural projects in cooperation with different people.

The subject 'Bases of public debate' allowed students to practise the ability to rely on adapting their own activities to audience reactions of every kind of projects, implementation of specific pedagogical animation techniques and communication strategies to work with different types of recipients. Students prepared 'performances' in very creative ways; performances were oriented at bringing people to the world of science and involving the audience in the interpretation of specific project.

In the frame of 'Science and society' course, students perceived interdisciplinary character of science in the aspects of: history of art, culture, artistic actions, literature, technique, innovations and inventions in the field of sciences and humanities. Students presented examples of achievements of science and art over the centuries and those of contemporaries. Furthermore, they noticed evolution and transformation of non-formal education institutions (for example museums) in terms of the forms of communication, rules for visitors, or including the audience in animation on their area.

Conclusions

A good animator is able to consciously animate basing on solid knowledge and responsibility. This is a person who can create a good atmosphere accompanying the conduct of educational projects and adapt to the category of people participating in the particular animation. Animator presents to the audience a certain viewpoint of the world, helps to understand discussed cultural space, approaches the complexity of the specific 'spectacle'. All this requires highly developed communication skills, openness to debate and dialogue, and use of scientific knowledge to share it with the participants of cultural mediation.

There are some specific social competencies which are required from an animator and which enable audience participation in interdisciplinary projects, solve the scientific issues and promote socio-cultural events. The task of the

animator is also to trigger creative potential and creativity of recipients, as well as motivation to learn/promote culture and integration with other participants of animation projects, sustainable development educators, scientific culture animators working in centers of science education.

Evaluation of such courses as 'Interactions and communication platforms', 'Science and society', 'Bases of public debate' showed that there was an increase in students' skills connected with: moving into the space of stage; realization of didactical, cultural and documental events; organizing and coordinating projects and educational activities; popularization of science; processing of information towards creation of knowledge; shaping attitudes connected with emotional and intellectual experiences. One of the most significant skills acquired by students was the use of mediation actions which ease every category of audience access to contemporary creation which is based on connection between science and art and animator narration/dialogue with audience.

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Animation of science culture – evaluation of courses and analysis of students' attitudes towards classes

Abstract

One of the many tasks of a culture animator is cultural mediation, which relies on the assist of different types of audience interpretation of places and objects by active narration and require a dialogue with customers. His job also relies on creating a 'stage' which allows to give new meanings to different objects of cultural heritage (Caune, 1999; Da Lage & Gellereau, 2005).

Moreover, the important thing in this job is the skills to rely on proper choice of aims and ways of communication with the audience based on knowledge about history of development of science and bases of public debate. Program of field of study 'Animation of scientific culture', which was implemented at the Pedagogical University of Cracow included education in the frame of such courses as 'Interactions and communication platforms', 'Science and society', 'Bases of public debate'. There was an analysis of aims and scope of each of this courses and survey of students' opinions about them.

Key words: science culture, animation of science culture, students, academic courses, evaluation

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CONTEXTS AND PERSPECTIVES

Monika Janiszewska

Aspergere's syndrome – picture of a child who looks for a place in society

Introduction

Asperger's Syndrome (AS) is one of the developmental disorders, that was described more than half a century ago, but the specialists were not interested in it for a long time. In the 1990s knowledge about this disorder became more common. Children with Asperger's Syndrome have great difficulty in direct contact with other people. Disruption in the social sphere makes them difficult to adapt to the existing reality, establish closer relationships with others, both with family members and peers. In this connection they require a specific approach of psychologists, educators and society.

Asperger's Syndrome as an autonomous nosological entity

For the first time Asperger's Syndrome was described by Dr. Hans Asperger (and therefore the disorder derives its name from him). In 1944 this Austrian physician published a work in which he presented the major symptoms of the disorder, defined by him as an "autistic psychopathy". His findings were based on observations of four boys showing impairment in social interactions and communication, and characterized by uncommon development of specific interests (Stachowicz, 2013). Asperger's work did not achieve any popularity, because it was known only to German-speaking readers. In addition one year earlier Leo Kanner had published an original work about autism, which gained more attention, and as a result it pushed Asperger's publication into the background (Firth, 2011). However, it does not mean that Asperger's observations were not mentioned in English literature, but they appeared very rarely. A great deal of interest of Asperger's work was aroused by a work of Austrian psychiatrist, Lorna Wing, in which the author for the first time used the term Asperger's Syndrome, due to bad associations with the word "psychopathy". In her article, she noticed that some researchers clearly differentiated the disorder described by Asperger from autism, although in fact they had more similarities than differences. She pointed out that children with AS under

three years of age, compared to children with autism, did not have major problems with communication (Wing, 1981). Numerous similarities between autism and Asperger's caused a number of ambiguities in determining the relation between them. Is AS a variant of autism, or a subset of disorders in the autism spectrum and has its own diagnostic criteria? (Attwood, 2006).

It seemed that this problem was solved in 1994, when the Asperger's Syndrome was included on the ICD-10 list, created by the World Health Organisation. It was set in the category "pervasive developmental disorder" among other disorders characterized by deviations from social norms and communication. Asperger syndrome was defined as "A disorder of uncertain nosological validity, characterized by the same type of qualitative abnormalities of reciprocal social interaction that typify autism, together with a restricted, stereotyped, repetitive repertoire of interests and activities. It differs from autism primarily in the fact that there is no general delay or retardation in language or in cognitive development. This disorder is often associated with marked clumsiness. There is a strong tendency for the abnormalities to persist into adolescence and adult life. Psychotic episodes occasionally occur in early adult life" (ICD-10: 249). The above quotation shows that the WHO clearly differentiates autism and Asperger's Syndrome, with the latter treated as a separate nosological entity. In the same way both disorders were distinguished in the Classification of the American Psychiatric Association – DSM-IV, also published in 1994 (Chojnicka, Szkiełkowska, 2013).

This problem was differently treated in the DSM-V, introduced in 2013. The term "pervasive developmental disorder" was replaced by "autism spectrum disorders" (ASD), which included autism, Asperger's Syndrome and PDD-NOS (Gerhart et. al., 2013). The authors of the changes strongly emphasized that according to them these disorders were one continuum that varies depending on the intensity of symptoms, and therefore could not be diagnosed as separate nosological entities. What is more, they underlined that the classification of disorders had been based on their characteristic feature, but not on the depth of symptoms, represented the intellectual ability and language skills. In this connection, they proposed to base the diagnosis of autism spectrum disorders primarily on the depth of the symptoms and individual differences occurring between people with ASD (Chojnicka, Szkiełkowska, 2013).

Some authors do not agree that the differences between the two disorders come down to the depth of the symptoms. In the opinion of Martha Korendo experiences of diagnosticians and therapists allow to establish some clinical symptoms, differentiating these two disorders. She presents four frameworks on which it is possible to differentiate autism from Asperger's syndrome. The criteria for the differential diagnosis of both disorders proposed by M. Korendo are presented in the table below (Korendo, 2012).

Tab. 1. The criteria for differential diagnosis of Asperger's Syndrome and autism by M. Korendo

Framework of diagnoses	Asperger's Syndrome	Autism
Language and communication	Selective communication intention	No intention of communication
	Pointing finger gesture	Lack of pointing finer gesture
	Official speech or impaired development of speech	Lack of development of speech or nominal speech
	Selective listening	No listening
Manipulative behaviour	Manipulation of language in the form of threats, confabulation, complaints, often linked with looking into the eyes.	Primary manipulation (experiential, subconscious), manifesting aggression, crying, screaming due to limited language skills
Social relationship	The presence of need of social relationship, to live with others, but according to own rules.	No needs
	Better relationships with adults than with peers	No relationships with adults and peers.
Manual disorders	The plan of moving – slight damage	The plan of moving – heavy damage
	No writing and drawing due to manual problems.	No writing and drawing due to not understanding the world.

Source: M. Korendo, 2012, p. 251–255

The list shows that there are some differences in the criteria for the diagnosis of Asperger's Syndrome and autism. They indicate however, that both types of disorders should be treated as separate entities.

Asperger's Syndrome – its causes and epidemiology

The pathogenesis of Asperger's Syndrome is still unknown. Most often, the researches point to genetic and psychosocial factors as the main reason for the appearance of this disorder. Asperger suggested that disorders described by him were caused by genetic factors (Jakuszkowiak-Wojten et. al., 2007). If we take take into account the link between Asperger's Syndrome and autism we can say that the biological framework significantly influences the formation of this disorder, as it was confirmed by empirical research. In the family with an autistic child there also appears Asperger's Syndrome, and that situation suggests that both entities may be a part of the same genetic defect (Firth, 2011).

The twin studies are also very interesting, if take into consideration an appearing of autism. They have shown that that the risk of autism in identical twins is considerably higher than in fraternal twins. This may prove that autism is caused by genetic factors. Brothers and sisters of the children with autism also have some difficulties, such as: problems with speech and with reading (Baron-Cohen, Bolton, 1999).

Some researchers suggest that the age of parents also plays a crucial role. When a child's father, in the moment of conception, is over 40, the risk of Asperger's Syndrome increases significantly. It is also suggested that prenatal injuries, toxoplasmosis, cerebral palsy, damage to the central nervous system and infections all may contribute to the appearance of AS (Stachowicz, 2013). We do not know all the factors causing Asperger's Syndrome, so there is a strong need to conduct more detailed research in this area.

It is also difficult to indicate the prevelance of Asperger's Syndrome. Research has not given conclusive results. In addition, it should be noted that researchers tend to focus on the epidemiology of autism rather than Asperger's Syndrome. According to research, which was conducted in 1993 in Sweden, 3,6% per 1000 children and adolescents aged 7–16 was affected by Asperger's Syndrome. What is more this disorder more often affected boys than girls (ratio 4:1) (Ehlers, Gillberg, 1993). On the other hand, Eric Fombonne and Lee Tidmarsch analysed the results of six studies of various authors from the years 1998–2001, four of which were carried out in the UK and one in Norway and Sweden. This study showed significant differences in the extent of the incidence of the disorder in the studied populations. They showed that Asperger's Syndrome occurs in 0.3 to 48.4 per 10 000 people. These authors found that such a significant difference in the results was caused by the sample size (Fombonne, Tidmarsch, 2013).

Referring to research conducted by M. Korendo on the group of 65 children with Asperger's Syndrome, it should be noted that the ratio of boys and girls amounted to 85.72% and 14.50% (Korendo, 2013). It confirmed that this problem more often related to boys than girls.

The clinical picture of a child with Asperger's Syndrome

There are three main areas in which symptoms of Asperger's Syndrome appear: verbal communication, social functioning and specific interests and routines. The development of speech of children with Asperger's Syndrome is usually normal, although some studies show that there could be some acceleration or delays in this area. And over time it changes. Children have more and more problems with communication. It refers to (Komender et. al., 2009):

- pragmatics (the use the language in social situations),
- semantics (the recognition of the meaning of the same words),
- prosody (problems with modulation of speech, intonation, etc.).

In the pragmatics area deficits are manifested by the fact that a child can not fit into the context of social forms of expression. They address to the adults as to their peers, cannot listen to the words of others, but only lead monologue. What is more they cannot cope with the uncertainties and mistakes, and do not understand that they should not interrupt when someone is speaking. When they feel embarrassed and do not know how to respond to a question they simply change the subject of conversation (more comfortable for them), regardless of the reaction of the others.

Children with Asperger's Syndrome also have a tendency to add comments, which are not related to the subject of conversation. This happens appears usually when during the conversation there appear the words related to earlier conversations (Attwood, 2006).

M. Korendo indicates that problems of children with AS are not limited to delays in speech development. The author points out that important is not only important quantitative assessment of spoken words, but also the qualitative characteristics of semantic fields. If a child begins to speak in words that should appear much later in the proper development of speech (atmosphere, jet, cell, Pitot tube, etc.), it is certainly an alarm for parents. These children also have difficulties with inflection and syntax. M. Korendo indicates that "disoders and irregularities in the development of the language system is one of the fundamental characteristics typical of Asperger's Syndrome" (Korendo, 2013).

Semantic disorders are manifested in the fact that a child cannot understand the meaning of the words used in the figurative sense. They not able to understand idioms, proverbs, metaphors or jokes. They have also problems with understanding slang and even colloquial speech.

Children with Asperger's Syndrome have a tendency to linguistic pedantry and great precision, some of their statements are artificial. Their language is very formal, they speak as if they read a dictionary. Echolalia (repeating of the last sentence or word) often appears in their statements. They repeat them quietly, as if to themselves. The voice of children with Asperger's Syndrome is very characteristic, sometimes monotonous or severe, with an improper accent. Sometimes, facial grimacing appears, but it is mostly indifference. Children look at the members of conversation but do not maintain contact with them. The gesture during the conversation may by very overactive. They react with anger, when they are not being listened to. They want to be listened to, so they ask questions of control or command, eg., "Listen carefully"(Maciarz, Drała, 2010).

Another characteristic feature of children with Asperger's Syndrome is a subject of fascination and the need to perform routine activities. A child collects different items, sometimes very strange, such as brush toilet. After some time they stop collecting them and start collecting new things. After a fascination with collecting things appears a subject of fascination, especially from the field of science or natural science. Fascination with statistics, symmetry and order can also appear (Attwood, 2006). The interests of children with AS are very special, precise, and may be limited, eg. to a particular film or composition of meteorites. They can talk endlessly about their interests (Woods et. al., 2013).

Children with Asperger's syndrome can be divided into two groups: those whose speech develops early and those who start speaking late. J. Cieszyńska-Rożek (2013) presents these two profiles of development (table 2).

Children with Asperger's Syndrome have problems with adapting to the social environment. They have difficulty in making friends because they do not realize

that friendship is based on the subtle behaviour towards other people. Moreover, it is extremely difficult for them to establish a friendly relationship, because peers are afraid of their impulsiveness and weirdness. The aversion to changes and the tendency to stereotypical behaviour mean that these children avoid playing with their peers and isolate themselves from the others, remaining in the own world. In addition, children with Asperger's syndrome are not able to read the signals given to them by others and therefore cannot respond in the correct manner. They cannot engage in the social relations and they do not understand social norms. In this situation they have a great difficulty in the orientation in the rules of the games and activities, they disrupt and do not react to commands. On the other hand, these children are very sensitive to the emotional moods of others, in particular members of family, but their emotions are not quite accurate because they are not able to understand the degree of emotion (grief, anger, contentment). They think that everyone should know their thoughts, and when find out otherwise, they react angrily. The negative response to changes in the environment causes that they cannot be involved in the social situations.

Tab. 2. Two profiles of early behaviour of children with spectrum of Asperger's Syndrome (children aged 2–4 years, selected cognitive functions)

Cognitive function	Profile 1 Asperger syndrome with early speech development	Profile 2 Asperger syndrome with late speech development
The development of gross motor skills	Aversion to riding a bike, early walking and running.	Aversion to riding a bike, walking and running appear at the proper age.
The development of fine motor skills	Aversion to drawing, long-lasting ambidexterity	Aversion to drawing, long-lasting ambidexterity
The development of play	Laying in a row, thematic fun occurs when the roles of people are not played, fixations on maps, timetables, etc.	Laying in a row, no thematic fun
Eating	Food selectivity, aversion to new meals.	Food selectivity, aversion to new meals, eating with fingers, aversion to cutlery.
The development of speech	Rapid development of specific vocabulary, repeating all phrases said by adults, fixations on numbers, alphabet.	There was no regression in language development, a lack of connecting words at 3 years of age, echolalia, not calling members of a family.
The development of social skills	Aversion to eye contact, lack of fear of strangers, lack of respect for social rules, inability to start a conversation, manipulation in contacts with adults, aversion to dressing, frequent aggression against siblings, serious, sad face.	Aversion to eye contact, lack of fear of strangers, lack of respect for social rules, inability to start a conversation, manipulation in contacts with adults, aversion to dressing, aversion to listening stories, frequent aggression against siblings, serious, sad face.

Source: J. Cieszyńska-Rożek, 2013: 257.

Asperger's Syndrome causes that children cannot establish social relationships because its symptoms are a psychological barrier, preventing them from connecting with others. If a child is not diagnosed with AD, she or he might be considered eccentric in a primary school, sometimes can be isolated and escape into solitude. In adolescence a child becomes aware of their isolation and feels the need of acceptance, and tries to contact with peers. Unfortunately, due to their clumsiness and difficulties in conversations, they are exposed to ridicule and a lack of acceptance. At that time there appear violent emotional reactions or a need to do strange tasks, for example frequent hand washing appear. Often in adolescence children with Asperger's Syndrome retreat into their own world, they begin to talk to themselves, they stop contacting with others. Suffered frustrations make young people perceive the surrounding reality as unfriendly and isolate more and more. Their sensitivity, which appears in adolescence can lead to depression, suspicion towards the environment, paranoid imaginations and even suicide attempts (Maciarz, Drała, 2013).

Children with Asperger's syndrome are also characterized by impaired motor coordination and sensory hypersensitivity. Coordination disorders shows their clumsiness and awkwardness, therefore they are characterised weaker level of fitness relative to peers and a lower level drawing and writing. Sensory hypersensitivity causes anxiety, fear, and in extreme cases even pain (Komender et. al., 2009).

Conclusion

A child with Asperger's syndrome requires early diagnosis, treatment, care and support. In addition, it must be remembered that this help should be addressed not only to a child, but also to their family. Early diagnosis of Asperger's Syndrome can greatly facilitate their life. Properly conducted therapy gives a chance for overcoming many difficulties.

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Asperger's syndrome – the problem is still unknown

Abstract

The article presents a brief history of research, its development, the causes of Asperger's Syndrome and today's method of diagnose. It also indicates the importance of language development of a child, as a basic diagnostic criterion. The author tries to show how important the role of early diagnosis and appropriate therapeutic interaction is, in this case it is mainly connected with language. Asperger's syndrome is a complex developmental disorder, and in this way it was presented in this article.

Key words: Asperger's Syndrome, developmental disorder, language development, early diagnosis and treatment

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Upbringing from the statistical perspective – circulating of information in science and culture

A human existence is meaningless if not surrounded by other people. This blunt statement may rise objection if we understood it as an attempt to determine a superior role of a community above every one of us. However, it is merely an obvious statement indicating that the human species is social species. Its evolutionary past, as well as biological baggage, are connected with functioning within a society.

Our social competence was shaped during the time when our ancestors – gatherers and hunters – were traveling through the plains of the Old World, merely two hundred thousand years ago. It was at that time when the solutions to basics problem were created and recorded. How to get food? How to avoid predators? Where to find shelter? How to recognize those, whose best interest is to help us? Since then our brain has not changed.

Nowadays, gatherers and hunters live in huge clusters of modern cities. They meet thousands of people every day and their cognitive systems are forced to recognize intentions based on fragmentary and deformed information, fragments of conversations, messages and gestures out of context.

Our natural penchant for seeking and gathering data, although useful in time of information shortage, becomes dangerous when we are flooded with information.

Our ancestors lived in small groups of 150 people and were subjects of socialization, the process of passing on cultural components (Dunbar 2010). The quality of that process was strongly connected with abilities of the whole group. The future of the group depended on the success of the process.

With cheap and easy access to information the authority of experts diminishes. Encyclopedic knowledge is less valued when we do not need a specialist to get it. All we need is a phone and access to the Internet. Obviously, there is a huge gap between a professor's mind the content of the Internet, but, honestly, how often does our life put us in the situation in which we would need deep and working knowledge in the field of building bridges, integration or theory of literature?

Everything that constitutes culture, including jokes, pop songs, recipes, religious beliefs and scientific theories, is **a mem.** They are influenced by processes of the memetic selection. The mechanism behind this process is very similar to the genetic selection (Richerson and Boyd 2005).

A single mem, as well as a single gene, are meaningless. As well as humans, mems only make sense in functional clusters. We call those clusters **memeplexes,** which contrary to isolated mems are subjects to distribution.

Every human receives and integrates specific meme clusters. This way a memetic baggage is created which enables us to solve problems. A functional meme cluster which we have at a given moment is called a memetype (Blackmore 2000). It determines current behavior, borders of our abilities and specify competence[1].

School is a place where we try to support memes which we recognize as important. We facilitate conditions in which these memes can be transferred to the minds of our pupils and students. Then, in properly created clusters, these memes can produce specific competence. Our attempts are planned, described and evaluated (that is how syllabuses are made). We think that in the appointed areas, school actions may be successful and efficient to the extent, which could be planned and evaluated. This assumption entails taking the responsibility for the results of our actions and for quality of the competence created in memetypes. Nonetheless, are we completely aware of the conditions in which the memetic game takes place? This awareness is an important factor as it provides us with the correct perspective determining the needs, abilities and responsibilities.

Modern world with its annoying information overload is at the same time full of challenges which are almost infinitely more complex than those which were shaping our species in the past. We live in not one, but in many environments simultaneously: house, school, job... Each of these environments is a subject to a different set of rules which governs the memetic game. Memes and their clusters may change meaning in different environments because a different configuration of memetype is suitable only for that specific place. Competence used in school may be less meaningful in house and lost entirely in the group of peers.

School understood traditionally tries to provide its students with memetype which will make them successful in solving problems outside school environment However, this attempt is obviously impossible. Assuming that we were able to recognize every single problem in social environment, there is no way that we could foresee problems of the future adult life.

Ecologists often emphasize the connection between diversity of the species in the given ecosystem and its stability. Poor biotic communities are susceptible to rapid collapses. In those environments it is more likely that problems which cannot be solved by small number of solutions provided by few inhabitants of

[1] Competence may be understand as a cluster of memes working together. To simplify, meme relates to the competence in creating which it participates in the same way as gene relates to, determined by it, characteristic.

that environment will occur. Rich, diverse biotic community is less prone to the challenges of the future. This biodiversity ensures survival despite severe external conditions. No matter how hard the future will be, there is a chance an organism will survive (Dawkins 1976).

Similarily unpredictable is the future of memetypes and the only thing that will be able to overcome it is its memetic diversity. However, this diversity cannot be granted by a homogeneous environment.

The future is unforeseen, its challenges are only possible and the only solution is the diversity of competence. Even though some of them seem rather useless nowadays and sometimes even conflicting with social interest they may prove to be crucial to the survival not only for individuals but also for the whole groups.

Multidimensional nature of memes means that all changes present in the cultural environment are as fast as the reproduction of Memes[2]. Today, Memes thrive: television, radio, cell phones and above all the Internet with its almost unlimited applications in the distribution of information. All those media facilitate memes reproduction. On the other hand, the memetic market is extremely crowded. All components of the culture compete for human's limited attention and memory. They are like toys on a big stall in front of which a confused child stands with little cash in hand.

It is worth asking one more crucial question. Taking into consideration everything we have already learnt, is it possible to say that there is some specific superior social environment which has the monopoly of key memes delivery? Maybe it is home, school or any other place of social influence?

If the key to success is variety then also in that case, in the presence of changeable and unpredictable future the safest meme is the one deriving from diversity. Determining the dominant course of memes' influx would entail a restriction in just one profile of action and the loss of potential opportunities. Some of the latest research and analysis of the previous results confirm the lack of a dominant and specific social environment in the development of memetypes[3]

Every teacher believes, or at least assumes that their work has an influence on their pupils' future. If they believe in a way to achieve univocally specific results and in the possibility of existence of some sort of educational pattern, then while

[2] This rule is also present in the world of genes. The difference between genes and memes is only in the motion and direction in which those two duplicate. The evolution of memes surpasses the evolution we undergo in terms of biology however, this obvious disproportion does not justify the thesis that people do not evolve biologically any more.

[3] Especially noteworthy here is the research of Judith Harris who strongly criticizes the opinion of the dominant role of the family environment. Her controversial works and conclusions have been the topic of many debates among psychologists, sociologists, educationalists and tutors. Calculated, scientific approach to the issues of the meaning of the upbringing in the family causes almost primitive objection. However, examples given by Harris make it impossible to immediate rejection of her theses and force us to think more about the problem.

searching for the connection between the intensity of their actions and their effects they will be disappointed. Is there any point in engaging in the educational process the degree of their influence may be statistically neglected? It is one of the possible and of more convenient conclusions.

The fact that it is impossible to determine conditions in which we get the largest influence means that we cannot predict the significance of particular actions. Restricted or sometimes even non-recurring influence on somebody may often be crucial in the process of shaping one's meme. Many people have experienced such phenomenon. Single, short contact with somebody who represents in a given area a very attractive meme decides about one's interest. It may be a politician, artist or musician whose lecture or exhibition we attended (Harris 2006).

To summarize, the above-discussed issues are not an acknowledged scientific theory but the author's point of view. The meaning of such interpretation of phenomena, as well as of all memes, must be verified in practice.

Bearing in mind this reservation, the teacher's responsibility should not be underestimated. If a minor effect may have a serious educational consequences than the unpredictability in this field should make us accept responsibility rather than reject it.

CONCISE DICTIONARY:

MEME – a conventional information unit which is distributed in the culture among people through the process of teaching and upbringing. It is difficult to establish the confines of this concept. A Meme may be a symbol, gossip, scientific theory or a simple recipe. A Meme is everything that may be passed on in an understandable way and has a meaning for people's actions in the society.

Research in Memes limit the meaning of this concept to language and the information conveyed by it. However, for the concept proposed in this article it does not seem right. A Meme may be a piece of information passed on without the use of language, for instance gestures, behavior, etc. Memes are everything that stimulates humans' brain mechanisms.

MEMETYPE – A collection of Memes present in one's mind. Memetype determines a person's behavior, world view, relations with others. People absorb new Memes all their lives and verify memes they have already absorbed. That is why we may assume that a Memetype is still changing and modifying. Collections of Memes in a Memetype create competence. Their collections are changeable and also the competence is subject to modifications.

MEMPLEX – a collection of Memes connected with something in reality. It is a system in which Memes complement each other and define their meanings. Memplex, however, as a whole is not connected with any person, it is not a component of a Memotype. It exists in the exchange of information in a social space.

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Upbringing from the statistical perspective

Abstract

Everything that constitutes culture, including jokes, pop songs, recipes, religious beliefs and scientific theories, is a mem. School is a place where we try to support memes which we recognize as important but there is no some specific superior social environment which has the monopoly of key memes delivery. The fact that it is impossible to determine conditions in which we get the largest influence means that we cannot predict the significance of particular actions. Restricted or sometimes even non-recurring influence on somebody may often be crucial in the process of shaping one's meme. Single, short contact with somebody who represents in a given area a very attractive meme decides about one's interest. If a minor effect may have a serious educational consequences than the unpredictability in this field should make us accept responsibility rather than reject it.

Key words: socialisation, a meme, teacher's responsibility

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Contents