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Introduction

The new challenges that we have to face, mainly due to the pandemic, require new forms of school organization, as well as new procedures for achieving educational goals. They put questions about interpersonal relationships and motivation to learn at the center. At the same time, current life values and priorities are being questioned. Orientation on shaping the competences of the future, such as creativity, critical thinking, cooperation and communication is a key element of considerations regarding the didactic process in the face of new social challenges.

It requires a fundamental change in the concept of education, a return to the idea of holistic education or curricula with a spiral structure, and the introduction to curricula of content that allows teachers to carry out important issues and shape social competences within a specific standard. The authors of this issue highlight the benefits of various forms of participatory culture, including opportunities to learn from each other, diversify cultural expression, develop skills valued in today's world and workplace, and a more empowered concept of citizenship. It is an open problem to meet these challenges in various teaching and learning environments, not only real but very often virtual.

Ethical challenges are also an important issue: the disintegration of traditional forms of socialization, the disintegration of traditional norms of social life, new ethical standards, the collapse of traditionally understood authorities (teachers, parents).

There is an urgent need for an alternative (very selective, trace) method of implementing the education strategy for sustainable development in augmented reality and education for science culture, as compared to the proposed by the core curriculum. Current research in the field of education reveals numerous antinomies and, among other things, opens a wider discussion on the subject of human dependence on nature and its simultaneous destruction. Ecological awareness in combination with aesthetic sensitivity can help in recognizing and respecting nature, both untouched by humans and those in which humans interfere. To see beauty, you need to understand the natural relationships and relationships of a person with the environment in which she/he lives.

Concrete educational activities are the basic condition for raising the level of educational practice at all levels of teaching and learning. That is why many authors reach for practical solutions, especially important in the situation of living under the pressure of technology, the progressive degradation of our planet and concern for the life and health.

As early as 2012, Joke Voogt & Natalie Pareja Roblin expressed the view that curricula must change radically in order to adapt to the needs of the 21st century. They analyzed eight conceptual frameworks describing 21st century competences, which

were compared on the basis of rational premises and goals, the definition of 21st century competences, and recommended strategies for implementing and assessing these skills in educational practice. Furthermore, they characterized how different countries (EU Member States, OECD countries) and schools (SITES research) deal (or not) with 21st century competences.

These studies showed a high degree of adjustment of the framework to the theoretical assumptions of 21st century competences and the reasons for their implementation (horizontal coherence), but also showed that educational intentions and practice are still distant, which indicates a lack of vertical coherence. Contemporary pedagogical reflections, unfortunately, also confirm this. We devote a lot of space to ICT tools in education, treating them as an argument for the need for 21st century competences and as tools that can support the acquisition and assessment of these competences.

I hope that the articles in this volume will be a source of inspiration for Readers and will allow them to look at the pedagogy of tomorrow from the perspective of this year's diverse experiences and reflection.

Katarzyna Potyrała

Andrzej Ryk

Idealism in Education. Tradition and the Present. Selected Approaches and Implications

Introduction

The goal of the paper is to present the selected opportunities of applying the project of philosophical idealism to shape, understand and interpret education as such. Since the ancient times to the present, the identity of education – as seen in philosophy, social sciences or humanities – often changed rapidly. The identity of idealism has evolved from the project of holistic and systemic approach to reality to partial project which treat the idea as an existing being of sort but rooted (in time and space) not outside the subject but within it.

Idealism in ancient times

According to G. Reale (2005: 66), one can identify five stages of evolution of the term *eidos* in Greek thought: first, in the pre-Socratic thinking, it is used in its common meaning as the form of that which is. Second, for Plato, it is a technical term used as a synonym to “idea” (Platon, 2010). Third, Aristotle uses the word *eidos* to name the form of the immanent thing understood as a being and, at the same time, primary substance (Aristoteles, 2010). Then, with the renaissance of Platonism, the approaches of Plato and Aristotle become reconciled. Platonic ideas are considered the thoughts of God and form is understood as the reflection of these ideas in the matter. Finally, Plotinus keeps this distinction: ideas exist in the eternally existing Mind, whereas forms are in the soul.

Later, ancient idealism was reflected in the Christian concept which assimilated this idealistic philosophy to a large extent for the purposes of its own philosophical system; the system where understanding human soul as an immortal form of the everlasting Idea of God was dominating. The main assumption of idealism understood in such a way was the holistic and systemic project of the reality as such, in its different dimensions: ontic, epistemological, axiological, anthropological. This entirety was inseparable and logically interconnected. This state of things was also reflected in the existing education system which tried, more or less, to reflect this view of the reality. The project was integrated around the axis of either the eternally existing idea, eternally existing mind, the Absolute or God. The real Self of the subject is not

material and biological but, first of all, spiritual. According to the ancient idealists, it is the spiritual element, however understood, that constituted the core, the meaning and the essential content of the reality as such. These external ideas have their own ontic, inner order and are not subject to any changes or modifications. Neither those originating from some other ideas, nor those generated by the mind which studies them. This permanent and unchanging order is reflected in education which also should, in its basic foundations, reflect this permanent order.

Idealism in modern times

New thoughts on idealism, however in a slightly different project, emerged with the new strength in German philosophical thought by Kant (1724–1804), Hegel (1770–1831), Fichte (1762–1814) and Schelling (1775–1854). Following the Platonic idealism, they too assumed that thought precedes being.

Hegel (1999) made an attempt to synthesize the whole hitherto philosophical thinking and created his own original philosophical project. The starting point of his concept is the spirit (idea) which manifests itself in the subject “Self”, first subjective, then objective and, finally, absolute. Hegel built a holistic project and the object of cognition is the spirit as such:

“The knowledge of spirit is something the most concrete and hence the most important and the most difficult. *Know Thyself*, this absolute command in itself nor where (...) it was said, does not mean mere *self-knowledge* of the particular abilities, character, drives and weaknesses of the individual but rather knowledge of the true in man as well as of the true in for itself – the essence of itself as spirit” (Hegel, 1990: 399).

For Habermas (2000: 26) “Hegel sees the modern age as marked universally by a structure of self-relation that he calls subjectivity (...) When Hegel delineates the physiognomy of the new age (or the modern world), he elucidates «subjectivity» by means of «freedom» and «reflection»”.

Then Habermas (2000: 27) shows the main ideas emerging from Hegel’s understanding of subjectivity. These ideas are: individualism, the right to criticism, autonomy of action and idealistic philosophy itself as autonomous thought structure that grasps the self-conscious idea. As a principle of subjectivity, individualism determines the formations of modern culture, science, art and education (Hegel, 2010). Habermas notices that Kant replaces the substantial notion of reason, typical for the metaphysical tradition, with the reason dissipated into moments, the reason the unity of which from now on is only formal (Kant, 2010).

A new impulse for the idealistic reflections comes from phenomenology. This extremely complex and multi-layered philosophy originated from the refusal to accept the positivistic view of the world both in its ontic and epistemological layer. According to Edmund Husserl (1859–1938) reducing reality to mere biological or social idea, as advocated by the positivists, Marxists or socialists contradicts not only that what is obvious but also the common reason so much praised by the 19th century materialistic-empirical philosophy (Husserl, 1987).

For phenomenology, especially as represented by Husserl, real world is not only the world of matter, biology or genetics but it is, first of all, the world of spirit which can be read using intentional and intuitive cognition. Thus, everything that is given through and for our cognition has its sense which, on the one hand, is the sense of knowing an object and, on the other hand, is established in the person who explores this object. Phenomenology breaks down the traditional cognitive structure dividing the world of epistemology into object and learner. They are not isolated objects of reality but they always operate in a context, in some of their own or someone else's life-world and in the surrounding world of multiple contexts (Husserl, 1982).

Along with the phenomenology, other, hermeneutic thought was maturing, with a triad by Wilhelm Dilthey (1833–1911): experience – expression – understanding. For Dilthey (2004: 95): “The infinite richness of life unfolds itself in individual existence because of its relations to its milieu, other humans and things. But every particular individual is also a crossing point of contexts which move through and beyond their particular life and possess an independent existence and development of their own through the content, value and purpose which they realize. Thus they are subjects of an ideal kind.”

Implications for education

Resulting from ontic assumptions: the world is both temporal and spatial. It is characterized by existential diversity. The world of spirit infiltrates the world of matter and otherwise. Any reduction of reality, e.g. to its solely material or biological dimension, and the consequences thereof are a mistake. Such an ontic structure of reality should be reflected in the curricula and structure of education, where this diversity should be present.

Resulting from epistemological assumptions: ontic diversification of reality “forces” diversification of the cognitive ways to explore it. Thus, cognition as such becomes, in the first place, spiritual experience of the reality with the dominant role of intuitive search for the truth as such. In this paradigm, the projects of systemic presentation of reality are replaced with partial, fragmented or perspective references. Thanks to discovering the idea of intentionality, that what is being known is always, in some sense, the one who explores. In the dimension of concepts, senses and meanings, the world becomes a derivative of the temporal-spatial contextuality of life of the subject in its diversified dimensions.

Resulting from axiological assumptions: the change of the identity of the idealistic paradigm in philosophy led to the breakdown of the projects of orthodox meanings of values and ethical perspectives in both culture and education. Idealistic formula of the objective world of values is replaced by individualistic, existential, contextual and perspective formulas.

Resulting from anthropological assumptions: humans are seen mainly as a derivative of idea in its diverse forms and shapes. Later, during the modern phase of idealism, man is a subject characterized by wide volitional, intellectual and cultural-social aspect. The subject is actively engaged in creating its cultural reality. The subject becomes the agent of its own actions and primary creator of its own

identity. But in the idealistic formula, the subject is not totally alienated from different surrounding systems both in micro and macro scale. It is part of them, even though in the idealistic approach, the subject is the one who consciously co-creates them and tries to maintain control over them.

One of these systems is education which is understood as the environment where identity of the world as such and, first of all, of human as the creator of his own identity is revealed. As dependent on cultural and social reality in time and space, education becomes a kind of ideal being with certain degree of self-consciousness of its own value and needs. This self-awareness permeates both discovering individual educational needs and the whole legal and administrative system of the educational law.

Summary

Idealism seems to be a constantly present and relevant form of describing reality. It has evolved from the holistic and exhaustive systems of explaining and translating the reality to ideas emerging from the cognitive activity of learning subjects both individually and collectively. The latter approach, emphasized in modern and postmodern times, becomes of great importance for education. In this approach, the role and responsibilities of the subject in education process increase significantly as the subject becomes the first investigator and interpreter of the studied reality. In this context, education is not only a passive recognition of reality but it becomes – according to, for example, idealistically understood phenomenology – the act of co-creating this reality in its semantic and symbolic aspect.

The main purpose of education realized in the idealistic spirit is to encourage students, seen as researchers, to discover the truth. The teaching-learning process should help students to fully realize their individual human potential. As a social institution, school should ensure that students have access to knowledge locked in cultural messages and heritage, so that they can find their own identity and gain skills and competencies to protect and develop this heritage (Gutek, 2003: 31).

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Idealism in Education. Tradition and the Present. Selected Approaches and Implications

Abstract

The paper present selected approaches to ancient and modern idealistic thought and its ability to influence how we think about education. Idealism has evolved from systemic understanding and interpreting reality to more subjective forms where an idea is rooted within the subject, its consciousness or self-consciousness in the first place. It turns out that idealism understood in such a way can still inspire the way educational activities are viewed. This refers in particular to the following categories: subjectivity, individualism, cognition, understanding, surrounding world, experienced world, mutual infiltration of individuals and systems.

Keywords: idealism, education, change, phenomenology, hermeneutics, subject, individualism, cognition

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Maja Wenderlich

Can You Consciously Plan your Life?

The Course of Human Life According to Charlotte Bühler

Introduction

The genesis of mankind has been fascinating for both ordinary mortals and scientists since the beginning of time. The course of human life has been the subject of books, films and works of art. This theme has been often present in music. According to the United Nations (2020), there are around 7.6 billion people in the world. By 2050, this figure is expected to increase to 9.7 billion (Central Intelligence Agency, World Factbook, 2020). Imagine the lives of each of those 7.6 billion people. Everyone is different and has a different story to tell. Can we find anything we have in common when we try to compare the courses of human lives, apart from birth and death?

Charlotte Bühler answered these questions with the help of her scientific work. The monograph *The course of Human Life* (1933) was created using biographical materials. The author was a clinical psychologist, developmental psychologist, co-creator and a representative of humanistic psychology. Bühler had reached her conclusions gradually. Initially, she conducted research on the importance of play in human development; to this day, there is a division into functional, games, games of make-believe or illusion, receptive games and games of construction (Rzepa, 2005). There were numerous experiments, e.g. related to the behavior of an infant in contact with an adult wearing an animal mask (Rzepa, 2005: 11). However, her ingenuity was at its best while she was researching the youth and regularity in adolescence. She used the method of analyzing her own creations (letters, diaries, and literary works). She developed the theory of scientific use of materials included in works of the youth. She described the results of the practical use of this tool in her work published in 1927 entitled *Kindtheit und Jugend*. The book has been translated into many languages, e.g. Polish in 1933.

When Bühler was collecting materials for her book, she found that it is difficult to conduct research on any period of human life in isolation from other developmental stages (Rzepa, 2002). She adhered to the principle of holism and in accordance with it recognized that only studies that comprehensively capture the course of human life make sense.

Thanks to this discovery, the pioneering and innovative work was entitled *The course of human life* was created. This article is devoted to the work. I think

that it is very underrated and still relevant to this day. Looking back, it is a really original work. It is also important to note that without previous experience, Bühler (a researcher of the mind of the children, then the youth) would not have had the opportunity and chance to implement this project. The author also became the pioneer of *developmental psychology*. Bühler takes a look at the development of a person throughout their life. This development is not limited, as it was thought then, only to the period of childhood and youth. It was later confirmed thanks to the research of Robert Havighurst (1948, 1953, 1981) concerning the concept of developmental tasks and Erik Erikson's (1950, 1968, 2000, 2004, 2011) research on the theory of psychosocial human development. The prominent scientists considered human life throughout its whole course.

As Teresa Rzepa (2002) states after Richard M. Lerner and David F. Hulstsch (1983), research on the aforementioned course of human life from a holistic perspective was not conducted until the 1920s and 1930s. At that time, three papers came out which discussed the need to consider the need of a holistic approach to the course of human life. In 1927 H.L. Hollingworth published *Mental growth and decline: A survey of developmental psychology* in 1933 Prince Ch. Bühler published *The course of human life* and the third is S.L. Pressey, J.E. Janney and J.E. Kuhlen, *Life: A psychological survey*, published in 1939. Only Bühler's work refers to a collection of empirical material (Rzepa, 2002: 14).

Description of the research method

What exactly is the biographical research conducted by Bühler and what did it consist of? What do they owe their timeless character to? Bühler and a team of her colleagues analyzed 50 biographies based on the interviews with the elderly from the Vienna care home, as well as 200 autobiographies and biographies of well-known people. The outstanding psychologist conducted a psychobiographic analysis (1933) of specific content. In regards to that, she distinguished three problem areas of life course:

- 1) The course of life in terms of behavior and objective data. Its scope is determined by biological processes that determine the development and destruction of the human body and its functions. Here the author described the general biological curve of life (biological phase image), behavioral image of phases, statistical data on growth and regression, vitality as the basis of life (lives that diminish with decreasing vitality), vitality and experience (achievements based on experience replace vitality as the basis of life and retardation, production (Bühler, 1999), (humans can create products that are subject to development and bring benefits while they die, biological production, proper human production; fun, creativity, achievement, transition from function to work, etc.). Bühler (1999) one must perceive the world the same way biologists do, perceiving and describing its course in the context of the processes of growth (expansion) and reduction (restriction) of various functions of the human body.
- 2) The course of life in terms of experiences and subjective data – a set of individual behaviors and experiences, possible to determine on the basis of biographical

data and established personal experience. In this perspective, Bühler described: objective and subjective data, intentionality (the dual role of production in the course of life). The way of life, the realization of existing for something – destiny. Conscious destiny in the form of total dedication that can even question the existence of the individual, the action “for” and “to” something; being and permeation (the idea of fulfillment, the wholeness of life, task, as a new dimension of life, being is intended to be fulfilled, destiny is the production of one’s own life); need for task and destiny (five elements of the phenomenon of destiny, examples of clearer separation of destiny from the need and more and more complete formulation of tasks); the content of destiny (action undertaken for the sake of something and for personal development); free space of destiny (more or less wide possibilities of choosing destination); experiencing destiny (passive-drawing and active-establishing the way of experience of destiny); classification of destiny (correct, as the quality of destiny, authentic, as the quality of commitment); change of the dominant (task, life for some matter or for others, replaces life as the fulfillment of own needs); intellectualization of vitality; vitality in the intellectual sphere (the creative force of the period of growth is also important for intellectual creativity); specification – the development of what is fully compatible with man (Bühler, 1999).

- 3) The course of life in terms of a work or result – own products of individual life, reflected in the ability to influence other people, the acquired social or historical role, in the works left behind: the specification of the work, commitment and chance – involvement as an act of risking for something. The correctness of destiny for commitment; success in life – statements, facts and ordering both as conditions for success in life; satisfaction and fulfillment; fulfillment (Bühler, 1999).

In this article, I will only mention some of the key issues that I have chosen.

“Dedicating your life” to someone or something

One of the most important messages of Bühler’s outstanding monograph is the meaning of life understood as a “dedication” to someone or something. In the second scope: the course of life in the aspect of experiences and subjective data, the author established: “the fact that people, not only consciously, are occupied with «something» and oriented towards their thing, but they actually are devoted to «something», they want to exist, they act and believe that they must be here. They devote themselves and devote their lives to what it should be for; or believe that they read such a destiny from themselves and interpret their lives in the sense of such initially chosen destiny” (Bühler, 1999: 111).

Research shows (Bühler, 1999; Gardner & Walters, 1986; Rzepa, 2005; Wenderlich-Pintal, 2019) that some people know from the early age what they want to devote their lives to, what makes them happy, and what can make them feel fulfilled. The first decision on choosing a way of life is often made in childhood and experiences and reflections recorded at that time (Rzepa, 2005). This was not the

rule; it has happened that there was a random meeting between two people and during the meeting one of them inspired the other. This has even happened to mature individuals (Walters & Gardner, 1986).

Further we read: "The basic criterion for a fully human existence is self-determination, determining what you want to exist for. This is what people got used to call the meaning of their lives" (Bühler, 1999: 111).

According to Bühler, if a person has determined why they want to live, they have discovered the meaning of life. Their existence is no longer pointless but it has a specific purpose. All intelligent human beings ask themselves that very question at some point in life. There are even a number of psychological tests to help discover this sense, e.g. Purpose in Life Test (Crumbaugh, Maholicka, 1964), Meaning in Life Questionnaire – MLQ (Stegera et al., 2006). Such tests can diagnose the feeling of sense of meaning of life during therapy, then examine the change that occurs in this respect – i.e. the effects of therapeutic interventions regardless of the disappearance of symptoms, e.g. depression or anxiety.

As part of the biographical perspective, Bühler also includes the procedure of reading biographical materials in terms of content in them demonstrating healthy human development, focus on creative development, self-fulfillment, and the belief of being a creator of one's fate. As Rzepa rightly pointed out (2002: 4), as a result of using the technique proposed by Bühler, one can obtain a set of example ways to achieve full development, based on them, e.g. designing courses or training focused on self-development, even issuing psychological guides. Individual therapeutic or coaching work with clients would also make a lot of sense.

Bühler had many helpers when carrying out her research, e.g. Hanna Albrecht, Hedda Polgar, Ella Dub, Lotta Fischer, Egon Kern, Buruna Sonneck, Dr. Kathe Wolf, Paul Poschana, Dr. Paul Lazarsfeld, Dr. Else Frenkel (Bühler, 1999). The author of this outstanding monograph had research teams that were responsible for various aspects of the research. Bühler was the irreplaceable head of the study. Therefore, when deciding on research in this style, one must keep in mind their complexity. I think that it is still a topic of scientific research worthy of interest. Initially, one should focus only on one specific field (e.g. mathematics, art, humanities, etc.) and discover regularities in it. Then one can expand their perspective to other areas of knowledge.

However, not everyone can immediately take care of their self-development. Certain conditions and needs that will allow this self-development to exist must be met. Needs research is closely related to a person and their functioning. It could be said that satisfying the needs of the individual affects the quality of their life. Ten years after the publication of Bühler's paper, Abraham Harold Maslow said that by satisfying these basic human needs: organic, peace and stability, participation, approval, cognitive, aesthetic, one can speak of self-development and self-realization. His theory of human motivation described in the *Psychological Review* (1943) is also scientifically valid today. It gives us a picture of a self-realizing person with highest-order needs met.

Fulfillment as the meaning of life

When discussing Bühler's theory, one cannot ignore the logotherapy of Viktor Emil Frankl (1984). Frankl was the creator of the third Viennese school of psychology (along with Z. Freud and A. Adler). The author believed that the basic motivational mechanism of a mentally healthy person is the will to make sense, and therefore a life in which one is striving for a meaning. Authority and honors may or may not be the consequence of recognizing meaning in one's life. On that basis, Frankl creates the assumptions of his theory. The author of logotherapy is the first to recognize that the model for psychology is not of a sick individual, but a healthy one, and human health is expressed in his pursuit of a meaningful life. If a person loses meaning in their life, it means that we are dealing with a pathogenic symptom (Kamińska, 2018). Frankl called this phenomenon noogenic neurosis (1984).

Bühler tells us the same thing. The most important point in the life of an individual is to find the meaning of life. In addition, the author also emphasizes that the human behavior depends on external factors only in the early stages of development.

Rzepa (1999) states after Bühler that: along with the acquisition of proficiency in ability to make choices (conditioned by past experiences), the basic determinant of human behavior is internalized. From this development moment, which is difficult to determine, an individual can overcome his own past, project himself into the future: defining it by formulating and achieving set goals. In this way, the person takes the responsibility over their own life (Rzepa, 1999: 17). This important message is also associated with such important content as e.g. realizing one's destiny as the meaning of life, recognizing one's vital capabilities, recognizing one's inner possibilities – i.e. the free space of destiny (Rzepa, 1999). Simply put: This most difficult life task – finding the meaning of one's own life – seems to be successful only when a rare but simple discovery appears in consciousness – that only I can decide about the destiny of my life and that this destiny results from my recognized values, which the person is guided by.

One may be tempted to say that this is the critical point in human life. From this moment, a person is able to give meaning to their life. Conscious determination of the meaning of one's life is intentional, similarly to transgression.

Another interesting aspect of "fulfilled life" is transgression, treated as human activity (Kozielecki, 1987; 1997). This activity consists of going beyond the limits of previous experiences, thoughts, adventures and achievements, as well as creating new qualities. According to the author of the concept of psychotransgressionism (1987), human life consists of daily and routine activities, i.e. repetitive and habits that are focused on meeting basic needs.

It happens, however, that in certain circumstances the individual takes up challenges and organizes his psychophysical structure so as to be able to undertake innovative, transgressive activities (Czerkawska 2012). Transgression plays a huge role in shaping personality – it is personality-forming. Each "going beyond" is an important development step.

Bühler believed that transgression beyond the course of one's own life is possible by producing works lasting after one's death (Rzepa, 1999: 16). For example, all

scientific studies or works related to art, even after one's death, cause transgression. The scientific work can be used further, by living scientists, the image – to gain other, more contemporary interpretations, the second and maybe even the third and fourth "life". Human history is full of such expansive, transgressive behavior. Thanks to this, there is continuity of development, thoughts. Deconstruction causes construction anew.

The peak of human life

Many of us have been looking not only for the meaning of our lives but also for periods of the greatest creativity, success and happiness. There are people who are sentimental about the most beautiful years of their lives when they were healthy, others about wonderful childhood, and some about the period when they managed to create fantastic works. There are also those who think that the most beautiful moments are already behind them or they are in the middle of them.

Bühler (1999) noted that the issue of the peak of life is not so obvious and simple. One can, for example, regard the peak point of human life as the time in which a person created their most outstanding works, but also the time in which they subjectively felt in their prime, as well as the time in which they lived the most expansively outward, or finally, the one in which they looked their best and their health and strength seemed to be at their peak (Bühler, 1999: 317).

The author divided human life into experience and achievement phases taking into perspective the course of life in terms of a work or result. Because, as I mentioned earlier, discussing the peak point in human life is quite problematic, I will focus only on the part concerning the achievements phase – the number of achievements in a given course of life. Bühler (1999: 302) distinguished four main types of quantitative capacity peak:

- 1) First of all, this peak may lie at the relatively beginning of life, from the climax of achievement, the curve falls to the end gradually, but constantly.
- 2) Secondly, the peak may fall in the middle of life. The performance curve is more or less like a biological curve.
- 3) Third, the peak occurs when the number of achievements in the best part of life gradually increases, and reaches its peak relatively late – in the second half of life – and there is a steep and unexpected fall from there by the end of life. We have the impression that creativity develops for a long time, more and more, until the excessive weakening of the psychophysical constitution by diseases ends this development.
- 4) Fourth, it is distinguished by the fact that the achievements show no clear connection with the phases of life at all, but extend throughout life as a certain constant. Work manifests itself as a kind of constant phenomenon accompanying life.

The outstanding psychologist in her monograph even tempted to assign the biography to specific types.

After analyzing the four distinguished types of peak points of human life, the question arises whether any specific professions performed by man are more suited

to one of the types? Bühler (1999: 304) answers this question, obviously emphasizing that her research material was too small to draw general conclusions from for the entire population, but nevertheless a certain regularity caught her eye. People with sports, acting, singing achievements usually show the first type distribution. Trade enterprises, artistic achievements, inventions, research travel seem to intensify in the middle of life, and then disappear, they run in their quantitative distribution in accordance with the biological curve of life (type 2). Accumulation of the achievements of politicians, political journalists, scholars, as long as they do not show an isosceles distribution of the type 4 curve, are most often shifted towards the second half of life – curve 3.

It can be concluded, therefore, by examining the quantity and quality of human products, to which group a given person will belong. In other words – by examining a single biography of a specific person, we may find at what stage of life he is at present (knowing his past) and what may await him in the future (of course, if biological issues do not get in his way).

Manfred Spitzer in the book *How the brain learns* (2007) wrote about the breakthrough in mathematical and physical discoveries made by young people. The author mentions, for example, 20-year-old French mathematician Evariste Galois who have made great contributions to the development of algebra, in particular the problem of solvability of polynomial equations. This also results from my research in which I compared the life stories of outstanding mathematicians of the last eighty years (Wenderlich-Pintal, 2019). It turned out that the mathematicians studied by me present only two types indicated by Bühler: type one and two, with a large predominance of the first.

Conclusion

I agree with Roman Zawadzki's position that recognizing the whole truth about man is simply impossible, even more impossible is his full and reliable "portraiture". Despite this, since the beginning of time people have been trying to inquire about the essence of their nature and seek the truth about themselves, about the world around them and about their mutual relations with it.

Bühler's outstanding work is timeless, but is only a small element in the "garden" of human life. An interesting implication to the author's research, it could be to study the course of life in terms of culture, time, etc. It would help us build an image of entire societies and interesting transformations on a global level.

As I mentioned in the introduction, the course of human life has been an inspiration for representatives of science, art, religion and philosophical systems for years. It is close to all beings on earth. It has features unique to the entire human population: birth and death. It also has features common to specific groups and features designed for individual units. The duration of human life is different. Everyone has or will have their own unique, one of a kind story. No wonder that human biographies are still relevant to this day. After all, they can inspire others to get to know themselves and the world better.

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Can You Consciously Plan your Life?

The Course of Human Life According to Charlotte Bühler

Abstract

The article is about an outstanding monograph entitled *The course of human life* by Charlotte Bühler. The author proposes a holistic view of human development, which makes this work timeless. She recognizes three aspects in the course of human life. The first one is the aspect of objective behavior and data – biological processes determining the development and destruction of the human body and its functions. The second is the aspect of experience and

subjective data – a set of individual behaviors and experiences possible to determine on the basis of biographical data and established personal experiences. The third one is the aspect of the work or result – personal products of individual life, reflected in the ability to influence other people, the acquired social or historical role. The author also talks about accumulations in life – e.g. periods of outstanding creativity and she notes that human lives differ in this respect. The various aspects behind the main theme of Bühler's work, which is "devoting one's life" to something or someone, are discussed.

Keywords: Charlotte Bühler, the life course, qualitative research, dedicating your life

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Religious Declarations of Youth versus their Opinions and Attitudes towards the Phenomenon of Sexting

Introduction

Apart from critics of religion who see it as something harmful, such as C. Marx, F. Nietzsche, S. Freud or R. Dawkins, many researchers like V.E. Frankl, G. Allport, E. Fromm, R. Otto, C.G. Jung, A. Maslow or P. Tillich present quite the opposite concepts and ideas. They state that religion is a constant and natural component of human life, emphasizing its worth or need as the ultimate concern, important relationship, spiritual, inspirational, mystical experience, associated with full-humans, a valuable manifestation of expression, meeting the self and the Divine, providing the highest meaning to life and therapeutic influence. Regardless of any opinion, religious matters are an important part of many peoples' lives (both in case of belonging to some religious group and reversely – fighting all spiritual manifestations).

Poles have been perceived as a very religious and Catholic nation for ages. This view seems to be confirmed by Public Opinion Research Center statistical data (Boguszewski, 2017), even though people's declarations are not always followed by strong beliefs or regular practice. The data showed that over 90% of Polish adults were Catholics, a few (1%) indicated a different denomination (including Protestantism, Orthodoxy), Christianity in general (2%), or else referred to as non-denominational, agnostic, atheists (4%). There were 85% believers, 8% of deep believers, and 7% of non-believers (including rather and strongly non-believers). The data also shows (Boguszewski, 2018) that since the end of the 1990s, invariably over 90% of respondents (92–97%) declared to be believers, including approximately every tenth (every twelfth in 2018) assessed their faith as deep. The percentage of respondents who are completely or rather unbelieving has remained relatively low for years (3–8%). After 2005, there was a slight increase in the percentage of those who described themselves as non-believers and a decrease in the percentage of deep believers, but in the last seven years there has been stabilization of declarations in this respect. When it comes to practice, there were 49% of adults practising regularly (several times a week), 38% of the ones practising irregularly (1–2 times a month to several times a year) and 13% of non-practising.

The results referring to Polish youth look slightly different (Głowacki, 2019). Interviews conducted in 2018 with 1609 teenagers mainly aged 18–19 years old

(94%) show that 17% of the surveyed youth are non-believers, 21% – undecided, 63% – believers (including 8% – deep believers). In addition, the percentage of non-believers increased over the decade (since 2008) by 12% and the undecided ones by 8%. Believers usually regularly participate in religious practices, although there is also a significant group of religious young people practising very rarely or even not practising at all. Undecided respondents usually do not take part in religious practices or do it sporadically. Unbelieving students in the vast majority never participate in religious practices. Believers as well as practising students are more often female than male and residence of villages rather than of cities, especially big agglomerations (Jedynak, 2014). The discrepancies between the above data can be explained among all by the fact that rebellion against existing norms and values, including religious values, is natural for young people. Some of them may engage again in the religious sphere as they get older, others will not. In the meantime, most of them will presumably be interested in another aspect of life, which is also a natural component of human existence, namely sexuality. Religiosity and sexuality are very specific phenomena, involving different intimate experiences, which seem to be very distant from each other. The first one refers mainly to the spiritual sphere, the second one is often wrongly attributed only to the physical sphere, related to procreation or hedonistic aspect, while the mental and socio-cultural dimensions are overlooked. Even though the two phenomena seem not to have much in common, many studies have shown that they in fact are closely associated.

As the authors of the article *The Impact of Religiosity on the Sexual Behaviours of College Students* note (Penhollow et al., 2005), there have been evidence that religion plays a large role with regard to sexual decision making. In a study where five different dimensions of religiosity (such as identity, behavior, attitudes, perceptions and practice) were correlated with sexual attitudes and behaviors, religious behaviour turned out to be the strongest predictor of sexual behaviour (Lefkowitz et al., 2004), which supported reference group theory (Zaleski, Schiaffino, 2000). Religious affiliation may be associated with less sexual activity and having less sexual partners than in the case of those who report none (Laumann et al., 1994), moreover it can also affect attitudes toward premarital sex (Cochran, Beeghley, 1991).

The range of experiences associated with one's sexuality changed along with the nature of interpersonal communication which has shifted with the widespread use of the Internet and cell phones. One of the new way of sharing sexuality is trough sexting – one of the risky sexual behaviours connected with the new media. The phenomenon refers most of all to receiving/sending sexually suggestive images or messages through the Internet or cell phone. The problem, even though quite a new one, has been known worldwide, due to some highly publicised stories of harmful actions including suicides caused by sexting. In many other cases sexting has been related to psychological distress, harassment and (cyber)bullying. It can also lead to criminal charges, especially if cases where sexting overlaps with pornography are considered. And quite often young people (specifically under 18 years old) involved in sharing sexual videos and pictures may not be aware that they can be committing a criminal offence. It may be breaking a law to take an indecent photograph or allow for an indecent photograph to be taken; to make an indecent

photograph (including downloading or opening an image that has been sent via email); to distribute or show such an image; to possess such images, especially with the intention of distributing them; to advertise (Aynsley et al., 2013: 17). Apart from pornographic content, the Copyright Act also applies to matters related to sexting, namely prohibiting the distribution of one's image without their consent (unless that person is famous or is a part of a larger whole (Kodeks Karny, art. 81, § 1).

It is hard to estimate how popular sexting is among the youngsters. According to different studies the numbers range from 15% to 40% depending on methodology, definition etc. (Ringrose et al., 2012: 12). However like other Internet threats, affecting most of all children and youth, sexting in recent years has become a subject of interest and concern, which resulted in publishing more and more worldwide studies on the matter (e.g. Phippen 2009; Badenhorst, 2011; Mitchell et al., 2012; Albury et al., 2013 etc.), including European studies, like those conducted under EU Kids Online – multinational research network seeking to enhance knowledge of children's online opportunities, risks and safety (e.g. EU Kids Online 2018). In Poland research work has been done e.g. by The Empowering Children Foundation; formerly Nobody's Children Foundation (Wójcik, Makaruk, 2014). There are also more and more scientific publications, in which attention is paid to the risks posed by sexting and is seeking the explanation why teenagers take such risks and how it can be counteracted. In some of them critical opinions against punishment for certain forms of sexting are expressed strongly, emphasising at the same time the need to support, protect and educate minors about the threats and legal consequences of misconduct, teach them empathy as well as take good care of the mutual communication (Levick, Moon, 2010; Shariff, 2015).

The research

Our research regarding sexting consisted of three parts related to knowledge, experience and opinions of young people about the phenomenon of sexting. In this article only students' opinions (along with some attitudes) are presented and we focused only on the most popular form of sexting, that is pictures. The purpose of this study was to determine if religiosity could differentiate our respondents' views.

The research was conducted in 2019 among 318 secondary school graduates from two high schools and a technical school from the Małopolska voivodeship. Students voluntarily completed the questionnaire in a regular classroom setting and all subjects remained anonymous. The survey was completed by 109 men (34%) and 209 women (66%). The respondents' places of residence were villages – 176 students (55%) and cities – 142 students (45%). Regarding family situation of respondents, 236 of them declared having a full family (74%), in 54 cases their parents had broken up (17%), and 20 students (6%) indicated that one of the parent was dead. Additionally, two people declared they were orphans, one person maintains contact with a parent who resides outside the country and one person chose the answer "others" without providing any further information and four people did not answer at all.

The questionnaire elicited information regarding religion matters (Fig. 1). Over half of respondents (173 students, 54%) declared they were practising Catholics; 82 students (26%) – non-practising Catholics; 47 students (15%) – atheists. Other 4% of all respondents, i.e. 13 students, indicated a different faith (4 responses for agnosticism, 2 responses for Buddhism and single responses for “Christian faith without church”, Judaism, deism, satanism, worship of time, “faith in myself” and “another religion”). Only 1% (3 students) did not give an answer to that question. In the analysis we concentrated on the three largest groups.

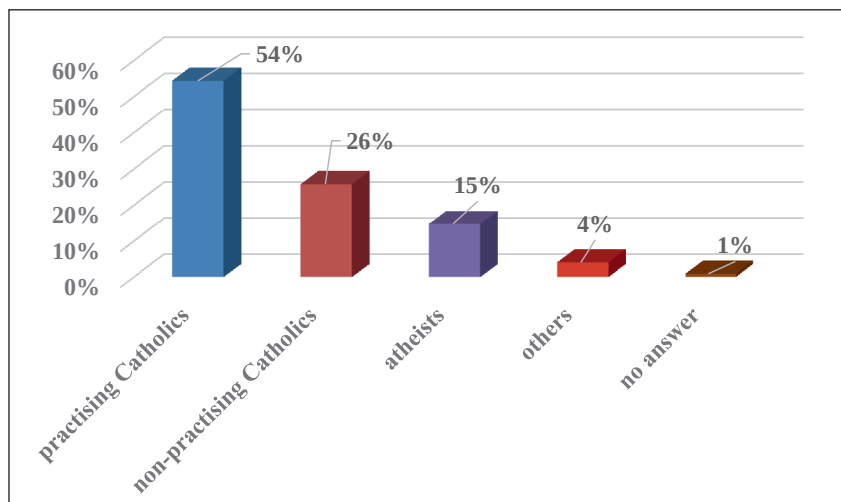


Fig. 1. Respondents' religion

Regarding the above variables along with the sex of our respondents (Table 1), 43 men (39%) and more than half of women – 130 (62%) – turned out to be practising Catholics, 35 men (32%) and 47 women (22%) – non-practising Catholics, and 19 men (17%) and 28 women (13%) – atheists. The answer “others” was chosen by 10 men (9%) and 3 women (1%). So, there were proportionally more female students declaring Catholic faith (84% vs. 71% of male respondents) and they were more often practising ones, while more men indicated to be atheists (17% vs. 13% of female respondents).

Table 1. Respondents' religion

students' declarations	number of students			%
practising Catholics	male	43	173	54
	female	130		
non-practising Catholics	male	35	82	26
	female	47		
atheists	male	19	47	15
	female	28		

others	male	10	13	4
	female	3		
no answer	male	2	3	1
	female	1		
total number	male	109	318	100
	female	209		

Home education has a great impact on young people's attitudes towards sexuality. Therefore, the first question referred to raising the subjects such as love, contraception or sex in respondents' family homes (Fig. 2). The question was of a multiple choice. In all groups slightly more than half of students replied that love was being talked about in their homes. On the other hand, the issues of sex and contraception were discussed more often in atheists' families (almost 49% indicated the first item and 45% – the second one) as well as non-practising Catholics (38% – about sex and 38% about contraception). Among practising Catholics, only 21% reported holding conversations about sex and 17% about contraception, so the difference between the data is significant. At the same time, sex was taboo in the homes of nearly 25% of all Catholics and 19% of atheists. Respondents also indicated other answers (in the family they did not talk about such topics, and there was no need to talk about sex). Also 29 students did not give answers to this question.

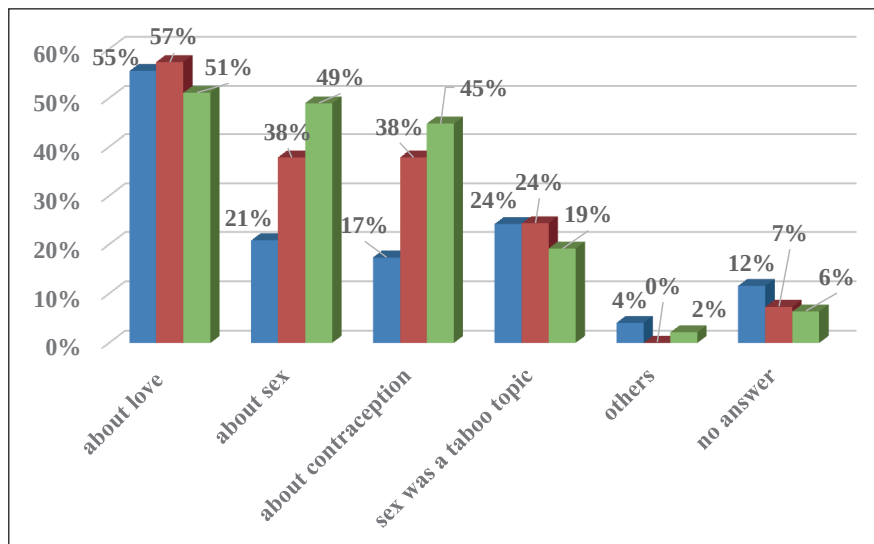


Fig. 2. Conversations in respondents' families

Another multiple-choice question referred to attitudes towards nudity in respondents' family homes (Fig. 3). In all groups, nudity was most often perceived as intimate (43–56%, most indications among practising Catholics) and natural (30–43%, most indications among atheists). Nudity was seen as "something indecent" in respondents' homes according to 5% of practising Catholics and more than

twice as frequently by non-practising ones (12%) as well as according to 6% of atheists. Terms such as “something beautiful” or “something embarrassing” (in both cases chosen more frequently by atheists) received low results (5–9%). The term “something sinful” was chosen even more rarely (3–4% in all groups) and just a few students selected category “others”. No answers were given by 19 students.

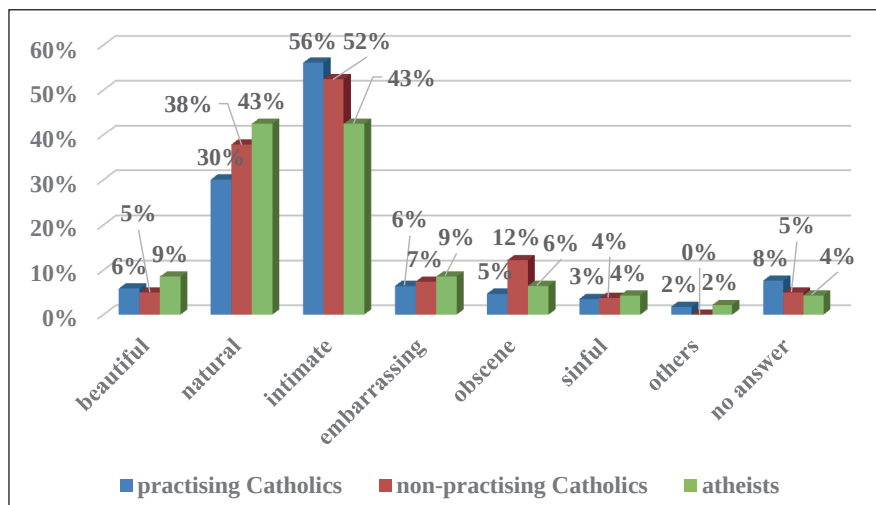


Fig. 3. Attitudes towards nudity in respondent's home

Then, respondents were asked about their own attitudes towards sexuality (Fig. 4). It is difficult to make any assumptions as far as atheists are considered, since the group may consist of people with very different worldviews and norms, whereas in the case of Catholics the certain preferred values are quite obvious. According to the Catechism of the Catholic Church or flagship works such as *Love and Responsibility* by K. Wojtyła sexuality is an integral component of human nature, expressed in sexually diverse femininity and masculinity and this sphere should be reserved only for the spouse while respecting mutual dignity (KKK, 1994; Wojtyła 2001; Komorowska-Pudło, 2017).

The most common choice among all groups was treating sexuality as something meant only for a partner (54–64%). More than half of Catholics (57% practitioners and 54% non-practitioners) and as many as 64% atheists marked this answer. Sexuality intended only for a spouse was a declaration chosen mainly by Catholics, with a large majority of practitioners (42% vs. 27%), while only 11% of atheists agreed with that. It can be presumed that among a group of atheists, marriage, especially joined by the church, is less often considered a key value in life, so – in relation to the sexual sphere, it is difficult to expect that they will be guided by the principles of faith they do not profess.

The other options assumed a more subjective treatment of sexuality. In the group of atheists, every fourth respondent considers that sexuality can be presented to the environment, within certain limits, where the same answer was given by 17%

of non-practising Catholics and only 6% of practising Catholics. A small percentage of respondents described sexuality as a commodity for sale, respectively: 11% atheists, 9% non-practising Catholics and 3% practising Catholics. The question was not answered by 24 students.

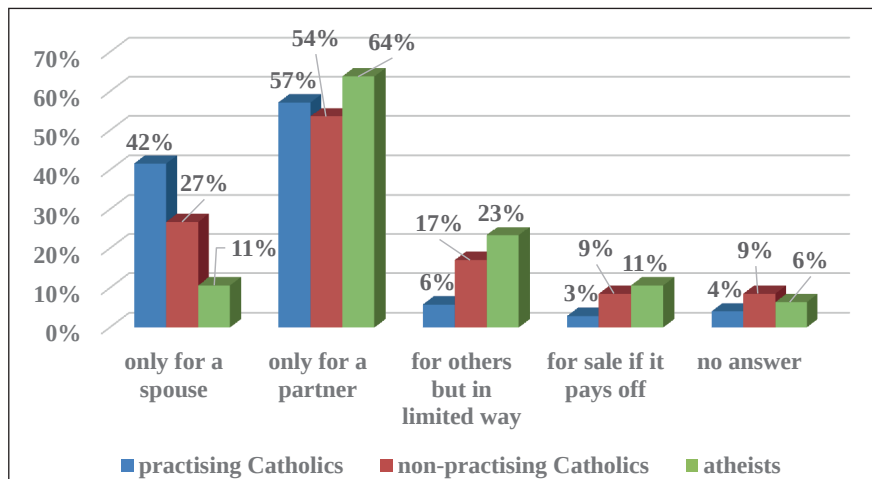


Fig. 4. Attitudes toward sexuality

The next issue dealt with the assessment of pornography by respondents (Fig. 5). Pornography often entails sexualisation and risky (or even deviant) sexual behaviours (Krawiec, 2017). Sexting often coincides with pornography, moreover, according to research, people who have contact with pornography are more likely to engage in sexting (Makaruk, 2017).

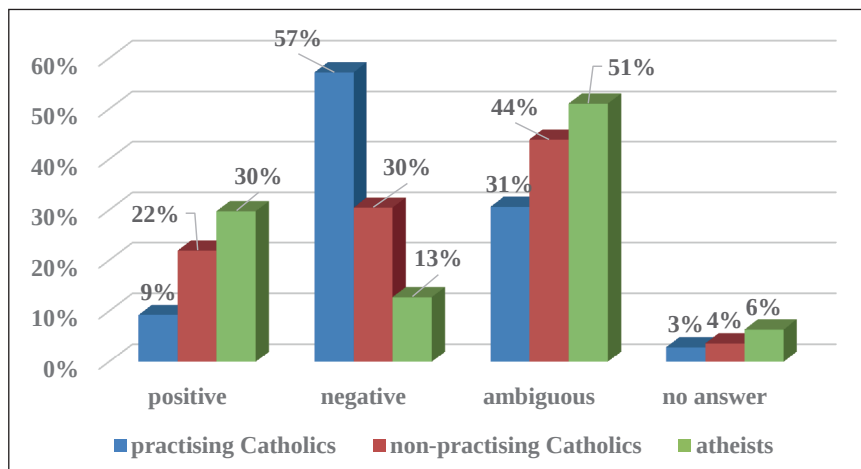


Fig. 5. Attitudes towards pornography

The answers varied. Among practising Catholics the majority of the chosen answers were negative ones (57%), with ambiguous (31%) and positive ones (9%) being their second and third choice. Non-practising Catholics turned out to be more liberal in this aspect (30% – negative evaluation; 44% – ambiguous one; 22% – positive one) however not as liberal as atheists (respectively 13%; 51%; 30%). It is worth adding that according to the data obtained from our research, almost 75% practising Catholics have never watched pornographic materials, just like 38% of non-practising Catholics and 34% of atheists. The question was not answered by 17 students.

After that, our respondents were asked to share their views on safety regarding sexing (Fig. 6). The vast majority of Catholics (88% of non-practising and 67% of practising ones) as well as more than half of atheists see such activities as not safe. Positive opinion on the issue was chosen by more than 1/6 of non-practising Catholics, slightly less than 1/10 of atheists and only 1/20 of practising Catholics. In addition, 1/4 of atheists added their own answer in “other” category, stating that it depended either on the situation, security measures or on the person. The question was not answered by 11 students.

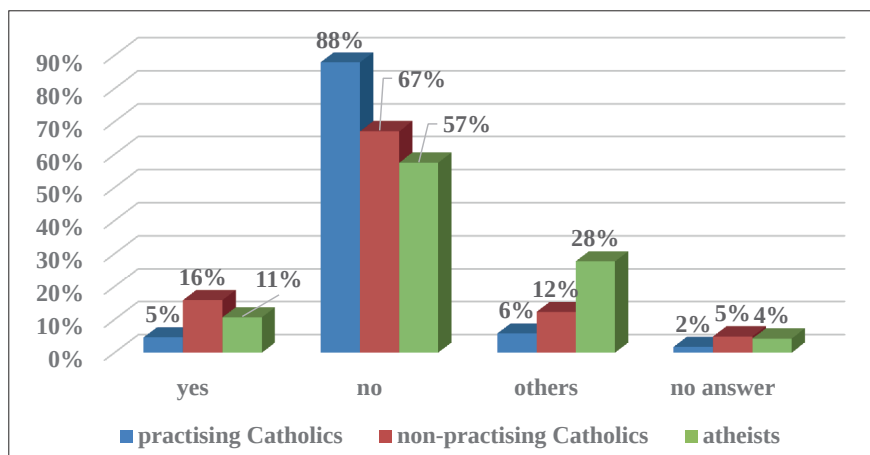


Fig. 6 Opinions on sexting as a safe behaviour

The next issue referred to respondents' judgement opinions about people involved in sexting regarding their sex (Fig. 7). Most of the students stated that gender did not matter here (52–81%), the largest number of such choices was among atheists, the least among practising Catholics. More severe opinions concerning females turned out to occur more frequently than concerning males, notably more among Catholics than atheists, whereas males were judged more severely most often by non-practising Catholics and atheists. The question was not answered by 13 Catholics.

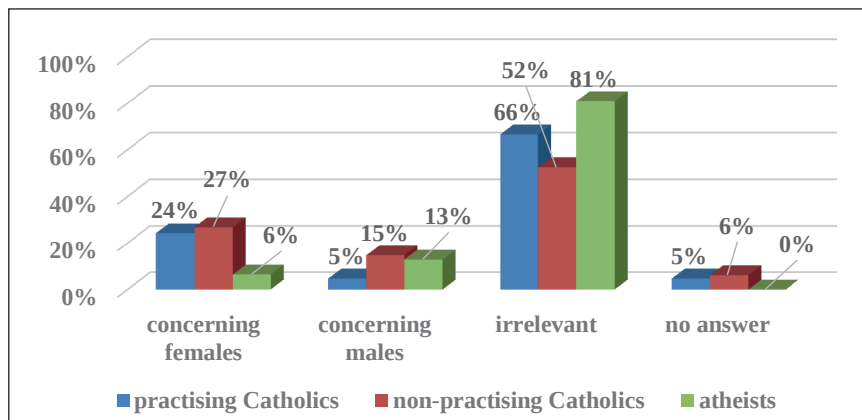


Fig. 7. More severe opinions regarding sending sexually explicit images

Respondents were also asked to give an opinion on the age from which sexting should be legal (Fig. 8). Nearly half of non-practising Catholics reported that adulthood (that is 18 years of age in Poland) should be significant here. Their second choice was “over 21” and the third one – “any age.” Atheists also most often indicated adulthood (40%), with “over 15 years of age” as their second choice and “over 21 age of years” – the third one. In the group of practising Catholics adulthood was a similarly frequent chosen option as the answer “over 21 years” and the category other (around 25% of them), containing mainly suggestions that sexting should not be legal at all. 22 Catholics did not answer this question.

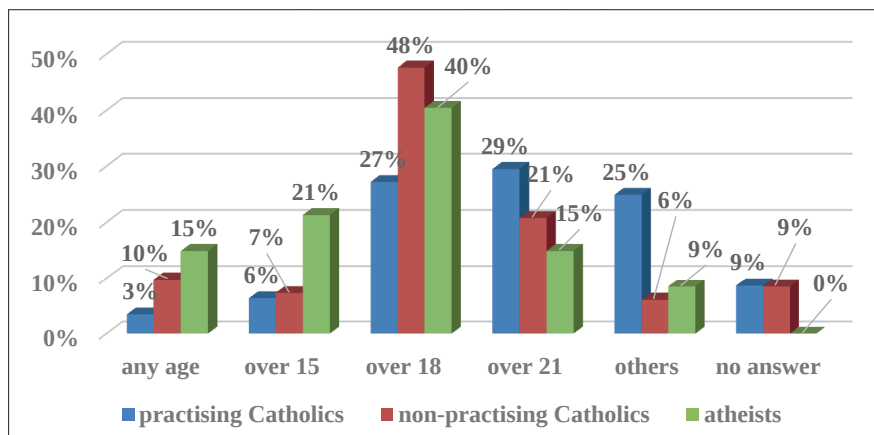


Fig. 8. Sexting legality age

The respondents were also asked to express opinions on sending their nude photos to the indicated persons or placing them on the network (Table 2). Almost half of practising Catholics and a quarter of non-practising ones replied that they assessed negatively sending such materials to girlfriends/boyfriends (45%), while

more than half of atheists rated this activity positively, as did 1/3 of non-practising and 1/4 of practising Catholics.

Apart from that, negative opinions prevailed in all groups, including sending nude photos to ex-partners, as well as to friends, strangers and a public website (the highest results in every group).

The majority of neutral opinions pertained to situations engaging girlfriends/boyfriends; that was the choice of 1/4 of practising Catholics, 1/3 of non-practising ones and over 1/4 of atheists. Also, higher results concerning neutral opinions occurred among atheists referring to ex-partners (1/5 of them) and friends – 1/4 of them as well as 1/5 of non-practising Catholics.

Table 2. Opinions on sending nude photos to others (%)

		positive	neutral	negative	no answer
to a girlfriend/boyfriend	pr. Cath.	24	25	45	5
	n-p. Cath.	34	34	24	7
	ath.	53	28	19	0
to an ex-partner	pr. Cath.	3	5	86	6
	n-p. Cath.	10	7	71	12
	ath.	4	21	74	0
to a friend	pr. Cath.	4	11	81	6
	n-p. Cath.	11	20	60	11
	ath.	12	25	64	0
to a stranger	pr. Cath.	1	4	88	6
	n-p. Cath.	2	10	77	11
	ath.	6	6	87	0
to a public website	pr. Cath.	1	2	92	6
	n-p. Cath.	4	4	83	10
	ath.	6	6	83	4

In the next question, analogous to the previous one, respondents were to respond to sending semi-nude photos with erotic poses (Table 3). The category connected with girlfriends/boyfriends was chosen equally among practising Catholics (nearly 1/3 of them). Non-practising Catholics were even more liberal here, with half of them assessing positive answer, and only 1/10 of them – negative one. However atheists turned out to be the most liberal; majority of that group (62%) chose a positive answer here, while 13% indicated negative views.

The results are not very different from data in the previous table, however it is clear that in most cases there are more positive and neutral opinions, while negative ones are reduced, comparing respondents' views on the subject.

Table 3. Opinions on sending photos of partially nude photos and erotic poses (%)

		positive	neutral	negative	no answer
to a girlfriend/boyfriend	pr. Cath.	31	32	32	5
	n-p. Cath.	49	32	11	9
	ath.	62	26	13	0
to an ex-partner	pr. Cath.	3	10	82	5
	n-p. Cath.	13	13	62	11
	ath.	11	32	57	0
to a friend	pr. Cath.	6	14	77	5
	n-p. Cath.	17	17	56	11
	ath.	20	29	52	0
to a stranger	pr. Cath.	2	5	88	5
	n-p. Cath.	6	11	71	12
	ath.	11	17	72	0
to a public website	pr. Cath.	2	3	90	5
	n-p. Cath.	6	7	77	10
	ath.	13	17	68	2

Finally, respondents were asked to provide an answer to the question, who should educate about the potential risks of sexting (Fig. 9). The most frequently marked answer in every group was school (57%–69%), especially among practising Catholics. Their second choice were parents and the media (over 1/3 of each). More non-practising Catholics reported that education in the discussed subject should be provided by parents than by media (respectively 45% and slightly more than 1/3 of them). Atheists, apart from school, pointed more often to media (2/5 of them) than to parents (slightly more than 1/4 of them).

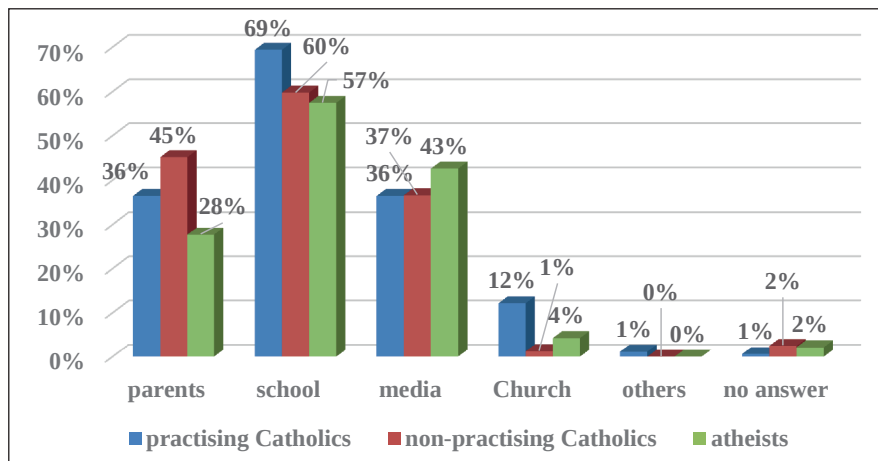


Fig. 9. Who should educate about the risks of sexting

School is quite an obvious choice, with professionals who can teach students about the aspects of Internet threats and safe online behaviour (Bereźnicka, 2019b). Also media can (and do) invite professionals to collaborate on projects dedicated to online security. However, parents do not always have the necessary knowledge and awareness in this regard (Bereźnicka, 2019a) in spite of children's needing their support also in virtual world. Finally, the Church was the least frequently mentioned option and it was mainly marked by practicing Catholics, followed by atheists in second place; surprisingly more frequently than non-practicing Catholics, among which only a handful of students indicated this item. Four respondents did not reply to that question.

Conclusions and discussion

Starting from home, where attitudes towards sexuality are shaped, the results show as follows. Regarding conversations about love and sex, the first issue was more often raised in Catholics' homes, while the other one – in atheists' home. As far as nudity is concerned, the largest number of students in all groups indicated that in their families it was perceived as something intimate (more Catholics than atheists) or natural (more atheists here).

Considering respondents' views on their sexuality, it is most frequently perceived as something dedicated only for a partner, but that option was chosen more often also in both Catholic groups. Among atheists it had a few times higher results than any other items. Second option chosen by a group of Catholics, especially practising ones and not many atheists, was treating sexuality as something only for a spouse. Sexuality presented to others in a limited way, as well as treating it as a bargain for sale were the option chosen by only a few practising Catholics, a group of non-practising ones and a larger number of atheists who tended to treat their sexuality in a subjective way more often. Also evaluating pornography, atheists seemed to be the most liberal group, however surprisingly, some of the Catholics (more frequently non-practising ones) viewed that issue as something positive, too.

As to sexting, as it was mentioned before, it is hard to assess how such a potentially diversified group as atheists treat that dealings, however Catholic beliefs clearly do not go hand-in-hand with that kind of activities, especially with regard to young (not married) couples, let alone teenagers who are single.

Most of respondents see sex of persons engaged in sexting as irrelevant. In groups with more severe judgements regarding females, Catholic students dominated, while in the smaller one, regarding males – there were proportionally more atheists than believers.

Over half of the recipients in all three groups indicate that sexting should be legal at least over 18 years of age (including a group thinking that over 21 would be more appropriate). Additionally in all groups there were students choosing the answer "over 15 years of age" or "any age", but atheists clearly prevailed here.

Sending nude photos to others was rated negatively by most respondents in all three groups, except when receivers are girlfriends/boyfriends. The most negative assessments of sexting came from the group of practicing Catholics. Surprising,

opinions of non-practicing Catholics in some cases turned out to be less restrictive than of atheists. Positive views on sexting involving girlfriends/boyfriends were rated by more than half of atheists and – another surprise – as much as 1/3 of non-practising and 1/4 of practicing Catholics. That category had also a majority of neutral opinions in all groups. Apart from that, sexting had very few positive reviews regarding sending nude photos to ex-partners, friends, strangers and especially the uploading of such material onto a public website.

Comparing respondents' views on sending nude photos to sending partially nude photos with erotic poses, we can see that all groups tend to be slightly more liberal in the second case. The results also show that practising Catholics were much more strict here than non-practising ones, while atheists turned out to be the most liberal group again.

Majority of respondents (most of Catholics and more than half of atheists) believe that sexting is not a safe behaviour, however that aspect is related more with students' knowledge and awareness than religious views. Regarding their opinions on who should educate about the risks connected with sexting, the most frequently chosen answer in all groups was school. Parents were the second choice for Catholics and a third one for atheists, and reversely – media were the second choice for atheists, and a third one for Catholics. Church was indicated much less frequently, and mainly by practising Catholics.

Interpretation of these results should consider the limitations of the study such as the number of respondents (sample of 318) in which proportions in both groups of Catholics and a group of atheists varied considerably, and also not all types of schools were covered. Therefore, the findings may not be generalizable to the population or youth of similar ages. Additionally, it was hard to have had any assumptions regarding atheists, except maybe that they could be more liberal in their views than believers. Atheists are theoretically a more diverse group than those who share the same religion because they can hold on to very different values and norms. So that group should be studied more closely.

Nevertheless, results of the study support the findings of the mentioned previous research, presupposing relation between religious conviction and sexual behaviours. It may be slightly surprising that in many cases the data were more similar considering atheists and non-practising Catholics than in both Catholic groups. However, there were usually significant differences between students who declared to be practising Catholics and atheists, with the first ones as the most strict in their opinions and attitudes toward sexting, and the latter ones as the most liberal ones. This may imply an assumption that that not only mere faith but (also? mostly?) participation in religious practices is a significant factor in professed values and norms. However, this is only speculation, which should be verified in further studies.

Referring to more indulgent attitudes toward sexting (as well as pornography) among some Catholics, one of the possible explanations in the lack of consistency between their faith and opinions is a general increase in liberal attitudes (e.g. regarding premarital sex) and ambivalence towards moral norms that can be observed (Zdaniewicz, 2013: 119), especially regarding youth (Dziedzic, 2016: 82).

Furthermore, when analysing the results, the age of respondents and the phase of their religious development should be taken into account, as this may be crucial for their answers. From the perspective of developmental and educational psychology Cz. Walesa (1982: 50) distinguishes the following stages of religiousness development: a) non-religious period (1 year old); b) the beginning of the child's religiosity (2–3 years old); c) magical religiosity (from 4 to about 7 years of age); d) authoritarian moral religiosity (from 7–8 to 12 years of age); e) the formation of autonomous religiosity (12 years to 16–17 years of age); f) the development of authentic religiosity (from approx. 18 to approx. 25 years of age); g) religious stability (from around 25 to around 40 years of age); h) religious maturity (from approx. 40 to approx. 60–70 years of age); i) eschatological religiosity (from about 60–70 years of age). So, our young respondents are in a period of developing their authentic religiosity, which may be stabilised only in 5–20 years. Therefore, religious sphere can reflect their life, but their opinions, attitudes and behaviour may change to a large degree.

Another important factor that most likely influenced the results were the surveyed students' types of religiosity which were not verified in our study. According to Gordon W. Allport (1967), there are two types of religiosity. Extrinsic religiosity plays an instrumental role, serving only to gain benefits for the individual. The rules of faith are not followed in one's daily life. This type is considered characteristic of an immature personality, full of prejudices, deprived of positive emotional relationships with other people and emotional security. Intrinsic religiosity is the primary motive of a more mature person's life. It affects individual's motivation and values (which are combined with social norms), and facilitates understanding of the world by integrating it. This type of religiosity is more reflective and universal (Kasik, 1998). This division is also consistent with the distinction of mature and immature religiosity (Uchnast, 1982) as well as personal and non-personal religiosity (Jaworski, 1989), where the first one is marked by existence of a relationship between man and God, while the other one, in which God is to meet the egoistic needs of man, is a deviant form, associated with a lower level of self-acceptance, adaptation, and personality integration, a higher level of hidden anxiety and a more negative attitude towards the environment. However, C.D. Batson (1983: 38) referring to Allport's theory, decided that two types of religiosity do not cover the whole complexity and multidimensionality of the problem, since there is one more group of the so-called open-ended people, whose religious life is full of questions, doubts, and searches as in the quest dimension. They are not satisfied with simple answers, therefore they are looking for a way to discover the sacred, accepting the fact that they may never know the final and complete truth (Kasik, 1998). It can be assumed that not only various types of students' religiosity, but also probably different views in the group of atheists, may have affected their opinions expressed through the survey.

Apparently, faith and religiosity are complex issues, and therefore they require further in-depth research. In the meantime, however, an issue that seems to be urgent needs to be addressed, namely the approach of some young people to sexting. Regardless of students' religiosity or its lack, it is disturbing that some of them find sexting as a safe behaviour (and the younger students, the less responsible) and that some of them accept it not only in reference to their girlfriends/boyfriends, which

also may end tragically when they prove to be unreliable or the intimate material somehow gets into the wrong hands, but also regarding strangers or even the entire network. Those seem to be universal problems causing necessity to take multilevel actions, among which education – also perceived as a need by young people – is the first measure to be taken. And the problem should be treated as a whole, meaning along with raising awareness of threats and education for online safety, children and young people should be taught assertiveness, respecting their own and someone else's body and subjective treatment of it.

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Religious Declarations of Youth versus their Opinions and Attitudes towards the Phenomenon of Sexting

Abstract

The aim of this paper is to present the results of a survey on the opinions of high school graduates and their attitudes towards the phenomenon of sexting with regard to respondents' religious declarations. The authors, recalling various studies, introduce the role that religiosity plays in relation to various sexual behaviours. After that the authors present the analysis and results of their survey, taking into consideration three groups of students: practising Catholics, non-practising Catholics and atheists. The similarities as well as the discrepancies among these groups are discussed. The paper shows that students' declarations connected with faith are not always consistent with their opinions on the discussed subject, which can be seen especially in the group of non-practising Catholics. At the end, key conclusions and postulates for the practice are presented.

Keywords: youth, attitudes, religion, sexting, education

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Teaching Modern Attitudes through Science of the Past: Hypatia of Alexandria

Introduction

In this article we present a remarkable woman scientist from the late 4th and early 5th century AD, whose life, activities and achievements even though from so many centuries ago, teach us attitudes pertaining to our modern life. An extraordinarily gifted woman, Hypatia of Alexandria was in her time the greatest mathematician and astronomer, also a philosopher and a charismatic teacher. In a male-dominated world, she outpaced the prevalent gender standards thanks to her talents, strength, independence and courage. Apart from femininity, her attitudes included religious tolerance, high moral standards, social and educational activity and political temperance, all of them appropriate for teaching in today's schools. Hypatia died tragically murdered by Christians in Alexandria. Unfortunately, all of her writings were lost, and her life, although partly distorted by legends, is primarily reconstructed from the contemporary correspondence of her students.

Life of Hypatia of Alexandria

Hypatia was born in the 4th century AD in Alexandria, Egypt, then part of the Eastern Roman Empire. She lived her whole life there, which was fortunate and as will be argued later, unfortunate for her.

Fortunate because Alexandria was a special place. Founded by Alexander the Great in 331 BC it soon became a thriving centre of knowledge, learning and scholarship spanning all disciplines of human life and activity, from science, medicine and philosophy to literature and art – a centre radiating over the whole Hellenistic world. The city boasted the Mouseion (the Museum in English, meaning the house of Muses), that was the greatest centre of scholarly work in the ancient world and the meeting place of the most brilliant minds of the time. The central part of the Mouseion was the great library that housed between 40,000 and 400,000 scrolls at its height. The Mouseion also had an astronomical observatory and botanical and zoological gardens in addition to lecture halls and classrooms. In the Roman times the Mouseion was in decline and Hypatia's father, Theon of Alexandria, a mathematician and philosopher is said to be its last head before it was closed down

on the decree of the Roman emperor Theodosius the Great in 391 AD (*Hypatia – Lover of Wisdom*, <https://justine.durrell.net/hypatia-lover-of-wisdom/>, Zielinski S., *Hypatia, Ancient Alexandria's Great Female Scholar*, <https://www.smithsonianmag.com/history/hypatia-ancient-alexandrias-great-female-scholar-10942888/>).

The year of Hypatia's birth is not certain. It is estimated to be around 355 AD. She received her education from her father and consequently grew to be a highly-educated scholar in mathematics, astronomy and philosophy, remarkably, a female scholar in a male-dominated world. Her works have not survived till today, but it is known that she collaborated with her father and wrote numerous original commentaries on important works in geometry and astronomy, e.g. those of Euclid and Ptolemy, likely contributing original work of her own. Hypatia is also known to have constructed an astrolabe, an instrument used in navigation to measure the location of stars over the horizon, and a hydrometer, an instrument used to measure the density of liquids.

Apart from her research Hypatia devoted her life to teaching. After her father's death in 405 AD she became head of the Neoplatonic school in Alexandria, where she taught mathematics, physics, astronomy and philosophy. To be a female teacher who taught male students was another unusual accomplishment of a woman at that time. Importantly, Alexandria at Hypatia's times was a mixture of religious communities of Christians, Jews and pagans. She declared herself as non-religious and interestingly, admitted to her school everyone from everywhere independent of religion and background, including Greeks, Jews, Christians, pagans and native Egyptians. In addition to her school, Hypatia held public lectures, which were hugely popular and drew crowds, and also private courses in her home. Owing to her activities and attitudes Hypatia was highly respected by Alexandrians and became moral authority not only among her students but among the entire community of Alexandria, which greatly appreciated her wisdom and moral standards, honesty, truthfulness, diligence, and importantly, her attachment and devotion to the city. As a result she occupied a strong social, political, and cultural position in Alexandria (Hanson, 2019, *Who was Hypatia?* <https://medium.com/@mollyfhanson/who-was-hypatia-37d64a438064>, *In Memory of Hypatia of Alexandria*, <https://ordinaryphilosophy.com/2018/03/09/in-memory-of-hypatia-of-alexandria-3/>).

As a teacher Hypatia inspired her students to work hard, to develop their personalities and to acquire difficult knowledge. She demanded of them and herself, to inquire more deeply into matters, to look at the universe with fresh eyes, and to question the axioms of their day. That she was an excellent teacher revered by her students, can be inferred from their achievements – many of them held high political, administrative and church posts. One such successful student was her life-long friend Orestes, the governor of Alexandria representing the secular authority in the city (*Hypatia – Lover of Wisdom*, <https://justinedurrell.net/hypatia-lover-of-wisdom/>).

As shown, Hypatia dedicated her life to science and teaching. She never married and likely led a celibate life, which possibly was in keeping with Plato's ideas on the abolition of the family system. Even though her life aroused admiration with some and hostility with others, Hypatia was regarded as a remarkable woman. The Suda lexicon, a 10th-century encyclopaedia of the Mediterranean world, described her as

being “exceedingly beautiful and fair of form... in speech articulate and logical, in her actions prudent and public-spirited, and the rest of the city gave her suitable welcome and accorded her special respect.” (Fig. 1) (*Hypatia*, http://penelope.uchicago.edu/~grout/encyclopaedia_romana/greece/paganism/hypatia.html).

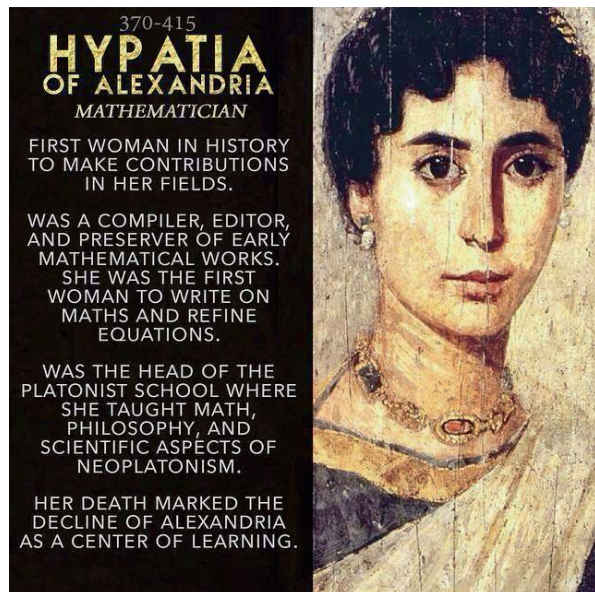


Fig. 1. There is no contemporary portrait of Hypatia. As a woman from the upper class she could have looked like a lady in the painting above, which is a fragment of one of the Fayum death portraits of a wealthy woman, c. 160–170 AD (Wikimedia Commons)

Hypatia's death constituted the unfortunate side of her life in Alexandria. She died in 415 AD in dramatic circumstances, which resulted from a religious-political situation in Alexandria. In the early 410's there grew a serious conflict between Orestes, Hypatia's friend in charge of the civic government, and Cyril, the archbishop of Alexandria, a powerful man known for his hostility towards other faiths. The conflict was over who should control the city – the secular administration or the church. Orestes himself was a Christian but did not want to cede power to the church. It is also believed that Cyril was jealous of the high social standing of Hypatia and respect she enjoyed in Alexandria. It was obvious that eliminating Hypatia would have weakened Orestes' position in this conflict. As a result, Hypatia was charged with witchcraft, satanism, disobedience and impiety. The mob of Christians, most likely instigated by Cyril, attacked her in the street, dragged her to a local church, stripped her naked and beat her to death with broken tiles. Then her remains were paraded through the city and burnt outside the city walls.

Throughout centuries Hypatia's death has aroused controversies and has been interpreted in different ways. For the most cases Hypatia has been seen a victim of a political-religious fight, a victim of political jealousy and sometimes a martyr

of science. By contrast, Enlightenment scholars viewed her death in more general terms, i.e. as a symbol of a conflict between reason and religion, freedom and fanaticism, and knowledge and ignorance.

Independent of how her life and death are interpreted, Hypatia remains the first woman mathematician/scientist whose life is reasonably well documented, and most importantly, a symbol of an erudite, strong and independent woman.



Fig. 2. The school of Athens by Raphael (Hypatia marked with a black rectangle) (Wikimedia Commons)

Rich in a variety of exciting elements, the life of Hypatia has fascinated ever since and has become inspiration for numerous literary and art works. For instance Raphael included her in his School of Athens (Fig. 2). The most iconic and widely reproduced image of Hypatia is that by Jules Maurice Gaspard, prepared to be the illustration for Elbert Hubbard's 1908 fictional Hypatia's biography (Fig. 3). By contrast, Hypatia by Charles William Mitchell is a depiction of a scene of Hypatia's death in Charles Kingsley's 1853 novel "Hypatia" (Fig. 4).



Fig. 3. The fictional portrait of Hypatia by Jules Maurice Gaspard, 1908 (Wikimedia Commons)

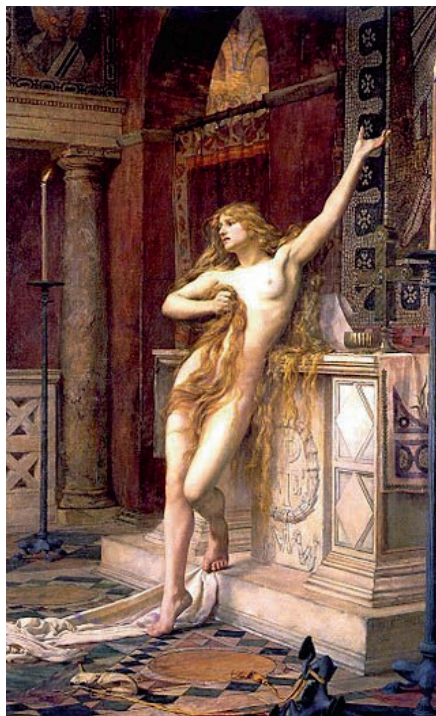


Fig. 4. Hypatia by Charles William Mitchell, the scene of Hypatia's death, 1853 (Wikimedia Commons)

In modern times, Hypatia also became inspiration for the feminist movement, where her life and death are regarded in terms of the women's rights, and for which her prominent social role in a patriarchal society, endurance and ability to overcome gender inequality became symbolic. As a female intellectual, Hypatia also became a role model for modern educated women and two feminist journals were named after her: "Hypatia: Feminist Studies" and "Hypatia: A Journal of Feminist Philosophy" (*Hypatia*, <https://en.wikipedia.org/wiki/Hypatia>).

Modern attitudes derived from Hypatia's life

Even after so many centuries, Hypatia's remarkable life resonates with us and our modern values teaching us attitudes pertaining to our life. Let us look at some of them.

1) Religious tolerance and religious neutrality

Hypatia was a mainstay of religious tolerance. Non-religious, she never urged anybody to forsake their religion or to convert. In her times, Christian-pagan turmoil was prevalent, but she invariably maintained religious neutrality even when Christians burnt down the Alexandrian library in the name of fight with

paganism, Accordingly, she had students, associates and friends of all religions and faiths (Pisarska-Umańska A., *Co ma Hypatia ze św. Katarzyną wspólnego*, <https://www.gdanskstrefa.com/hypatia-ze-sw-katarzyna-wspolnego/>).

2) Secular political authorities (separation of state and church)

As a Neoplatonist, Hypatia held that the state/city political authorities should be autonomous and secular. She shared the conviction that bishops' authority should not be involved in the civil administration and that political power should not be transferred onto the church (Pisarska-Umańska A., *Co ma Hypatia ze św. Katarzyną wspólnego*, <https://www.gdanskstrefa.com/hypatia-ze-sw-katarzyna-wspolnego/>).

3) Female scholar in a male-dominated world

Hypatia was, in her time, the world's leading mathematician and astronomer, the only woman with such recognition. This, in a male-dominated world at the time, proves not only her extraordinary, intellectual talents, but first and foremost her strength, independence and courage in the face of prevalent prejudicial gender standards, a fact that later duly made her a powerful feminist symbol (Deakin M., *Hypatia, mathematician and astronomer*, <https://www.britannica.com/biography/Hypatia>).

4) Charismatic teacher

Hypatia's renowned school was open to everyone interested regardless of faith and origin. She attracted students with her eloquent, engaging, inspiring and inquisitive lecturing for which they adored her and revered her. This is especially remarkable in view of the fact that she mentored male students (*Hypatia – Lover of Wisdom*, <https://justinedurrell.net/hypatia-lover-of-wisdom/>).

5) Social activity; Moral standards

Hypatia often held public lectures for the general public of Alexandria, either in her home in front of which crowds assembled or in lecture halls. She conversed on philosophy and science (which today we would refer to as popularizing science) as well as on the issues arising from the political and religious developments in Alexandria at the time. The attendants appreciated her teaching talents, as well as her beauty and both elegance and modesty. She was a moral authority in the city. People admired her knowledge and clarity and logic of argumentation, but also her temperance and moderation, simplicity and directness, sexual abstinence, and most importantly, her love of Alexandria, in whose issues she fully engaged (Pospieszny T., *Hypatia z Aleksandrii*, <http://piekniejszastronnanauki.pl/hypatia-z-aleksandrii/>).

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Teaching Modern Attitudes through Science of the Past: Hypatia of Alexandria

Abstract

Hypatia lived in Alexandria in Egypt in the late 4th and early 5th century AD and was in her time the greatest mathematician and astronomer, also a philosopher and a charismatic teacher. She lived her life in a male-dominated world and outfaced the prevalent gender standards thanks to her personal characteristics including talents, strength, independence and courage. Apart from femininity, her attitudes included religious tolerance, high moral standards, ceaseless social and educational activity and political temperance. All of these attitudes apparently pertain to our modern life and are appropriate for teaching in today's schools.

Keywords: Hypatia of Alexandria, science, history, life attitudes, teaching

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Elżbieta Buchcic

Nature – a Medium of Value in a Constructivist Pedagogy

"Value is a basic axiological category which means everything that is valuable and desirable, aim of human pursuits. Established values are a basis for evaluations, norms and cultural patterns"

Encyklopedia PWN

People are intelligent and conscious beings that are aware of the world around them and of their actions. They constantly aim for certain values determining all aspects of their lives: mental, spiritual, social and physical, which are criteria of people's attitude and decisions. Values also enable development and realisation of established goals or aspirations – these are both material things, as well as beliefs that determine relatively similar mental experiences and human actions. At the same time, they are criteria for choosing social pursuits. They are standards for integration of an individual with the society and differentiate the social sphere of human personality. Values determine attitudes, affect emotional states and self-evaluation. Their system as well as hierarchy plays an important role in attempts of understanding human psychology and also our demeanour. It is agreed that a value is a basic category of axiology.

According to Mieczysław Łobocki (1993), a value is everything that is important and valuable for an individual and society, and is desirable, what is associated with positive experiences and at the same time, is an aim of human pursuits. Stanisław Kowalczyk presents a similar view; he claims that a value is what human being desires and what is an aim of their actions. On the other hand, Danuta Dobrowolska argues that everything that is a subject of human needs, attitudes, pursuits and aspirations, is the most generally defined value. It may be a material object, a person, an institution, an idea and a kind of action.

Classification of values based on their level of generality:

- a value of everyday life, such as family life, work, education etc.,
- detailed elements of each of the aforementioned fields, i.e. children's health, a bigger apartment, a better car,
- abstract values such as prestige, fame, wealth (Dobrowolska, 2007).

However, human demeanour is influenced by internalised values – values which people figured out are right, real and worth desiring. They are the main factor that influences our demeanour, determine course of action, and create personal behaviour norms. According to premises taken by Milton Rokeach (1973), the world of values creates a closed, well-organised and available for all people area. Nevertheless, not

every individual may appreciate a given value at the same level, because sources of values are both in an individual, in their personality, as well as in the society and its influence on the individual through culture. The author lists two groups of values:

- final values which are the most important goals of human life; supreme values which take the highest place in the hierarchy,
- instrumental values – general ways of acting; they are an auxiliary element helping in reaching the highest values.

This is why everything that is a goal coming from needs, demeanours and aspirations can be called a value. Same as in attitude, in values there is a cognitive, emotional and driving component. They are an incentive to act, they become a base for norms, and also stir emotions, cause and select ways of acting. Health, beauty, family, education, safety, but also career or fun may be values. Values which people use in life influence every decision and action; this is because people try to get and keep things they care about (Koźmińska, Olszewska, 2007).

For a human being, a value is everything they need for living, for physical and mental comfort, and for activity development; also everything that determines human identity and their place in the world (Tomaszewski, 2007). There are functions that values have in the process of individual and social development and one of those functions is regulation of fulfillment of needs that determine what is important for living and for proper functioning of an individual. Values establish needs and determine the way of satisfying them; they let us prioritise the needs; they influence an individual's life plans as well as an individual's self-evaluation. They influence evaluation of one's action's results, and in the end they influence satisfaction or dissatisfaction coming from the achievements. People, however, create their own hierarchy of values and needs, and their individual systems of values change depending on social changes such as change of political, economy or cultural systems. They are also influenced by adolescence or changes in particular life situations or mental changes, which have their influence on new experiences.

The best hierarchy of values was made by Max Scheller. He listed five types of values: religious, spiritual (cognitive, legal, aesthetic), vital, hedonistic, utilitarian. Every person gets their values mostly from home, however, both at kindergarten and at school, values are discussed and enacted (Koźmińska, Olszewska, 2007). Human beings, as free beings, choose values they will live by. They are the ones choosing what is important for them, what is worth their sacrifice, and what their goal would be. Their adopted system of values has an impact on their personality and gives their lives a purpose. During the valuating, an individual should reject apparent values and give up lower values for higher values.

In the hierarchy of own values, each of us should take an axiological paradigm of nature into consideration because human beings come from it, they are natural beings that cocreate, change and reshape the biosphere. Nature brings us a lot of positive experiences that constitute a base of positive valuation of nature itself. People consider contact with nature as an important element of their own experience and this element may have therapeutic effects so people seek for it constantly.

The attitude towards nature includes not only an emotional sphere but also opinions about nature, awareness about dangers, as well as willingness to act in

the interest of nature. Ecology means perceiving the world of plants and animals as a carrier of its own value that is independent from human beings. Only human beings possess the ability of moral evaluation thanks to which we are able to discuss a value of nature and demand its protection (Sobański, 1998). Together with civilizational development rises the scale of human influence on ecosystems, which disrupts natural balance. Therefore, shaping ecological awareness – so totality of accepted ideas, values and opinions – about an environment as a place to live and develop for an individual and for society should be implemented from early childhood (Domka, 1998).

Nature is a value because it is:

- essential for people's lives and well-being,
- a source and base of life,
- a value on its own,
- and also a source of any values.

Taking the relationship between people and nature as a duty and responsibility is related to different concepts of building ecological ethics. People as a part of nature should notice and respect harmony and freedom in it. Each species affects nature in their own way but it is doing so according to the rules of this world, always being within the biosphere adapting to and merging into it. Currently, the awareness of the environment being in danger is more and more common. It is important to form human attitudes that will be sensitive to the problem of nature and will feel responsible for finding a solution. This is why human conscience needs to be shaped based on the set of values and moral imperatives given by ethics. Let us hope that it will trigger human activity towards the care for the world of nature, as currently the knowledge about nature and its creatures, as well as awareness of its priceless value and beauty of the world is still insufficient.

In pedagogy, value is usually associated with things we consider extremely precious and important, both for an individual and for the society. It is directly connected with positive feelings or emotions, and is an aim of human pursuits. It is also a base for recognising things as right or wrong, which affects dividing values into positive and negative, such as:

- good and evil,
- beauty and ugliness,
- true and false,
- love and hate.

Differences between them are considered in terms of quality, not quantity.

According to Wincent Okoń, value can be considered in terms of subjectivity and objectivity:

- from the objective point of view, a value is seen:
 - as a certain quality of a subject,
 - independently from how it is valued by others;
- from the subjective point of view:
 - value given by a human being in the context of their personal needs, emotions and will (Okoń, 1998).

It is difficult to imagine everyday life without established values, which can be either an ideal, a goal, or something else. Therefore, values play an important role in people's lives. It is worth mentioning that the world in which people live is a world of values. We can use nature's benefits but at the same time, we should live in harmony with it. It was the human being who had an influence on the development of civilisation through interference in the environment since the dawn of time.

Perhaps nature is not a value on its own but it is a value for a human being and thanks to that, it can fulfill its role in depth. An individual's social behaviour is affected by animate and inanimate nature. Thanks to people, it is possible to discover benefits of the surrounding world. The world of nature is a big, constantly working machine, following the Paracelsus's vitalistic theory: "it is all animate, it finds itself in a constant flow, connecting and disconnecting, endowed with a power to breed – the fullest manifestation of vitality, being the essence of nature" (Heller, 2007).

Michał Latawiec (2001) notices the fact that it is crucial to keep the continuity of the education process which should be started in kindergarten and continue for the rest of the life while having regard to the changing reality of knowledge and science. This education needs to be multifaceted and it needs to provide for the aspect of respect to oneself.

This is why equipping people in skills allowing proper existence in social environment is one of the most important missions of education nowadays. In relation to ecological crisis, the ability to develop proper relations between society and nature is more and more emphasised. Acquiring competencies in problem solving and decision making is gradually more accentuated. In the context of decision making processes, one cannot avoid the matter of responsibility and motivation (Embros, 2010). Nowadays, the education in this field is an extremely important and its main goal should be spreading awareness that people are only a part of nature and their actions are inseparable from the state of the environment. The education based on the constructivist theory, strongly emphasized in recent years, may be helpful in this matter.

Constructivism is a theory of cognition and education. According to Bożena Śniadek (2008), during the analysis of the process of learning and teaching, we can observe two approaches – individualistic and social. The scope of the issues that constructivism covers obliges to change views to cognition, to what knowledge is, and to what the mechanisms which create it are. It also allows for new idea of educational process, taking its planning and diagnosis into consideration in the first place.

As Bogusław Śliwierski (2016) points out, in the light of constructivism, educational process needs to provide students with conditions that allow them to create and develop their individual knowledge. It will let them to understand this knowledge better, and as a result, to understand the world to which it applies. The fundamental rule of constructivism is active and subjective construction of knowledge by the individual who discovers it, while in development discussion and dialogue are used. Participants build their substantive knowledge in a comfortable atmosphere, encouraged by a teacher to solve various problems and conduct experiments. In the process of discovering knowledge with the use of premises of constructivist pedagogy, we can list the following phases:

- presentation of the knowledge within the field,
- belief in the need of change of this knowledge (enrichment and complementation)
- a process of constructing and discovering knowledge,
- restructuralisation of knowledge,
- application of knowledge in extended contexts concerning everyday life, techniques and other scientific fields,
- discussion over perspectives of implementation of the gained knowledge in practice (Śliwierski, 2016).

In the case of a conflict, people stand very often between what they already know and what is coming to their knowledge. This is a result of interactions with the outer world. In such situation, people make decisions according to their knowledge and experience, and depending on how they interpret and explain this information (Michalak, 2005).

Constructivists strongly emphasise the necessity of personal involvement in the cognitive process because knowledge is constructed actively by discovering one's surroundings. As constructivists claim, learning is a process of building a new resource of information based on experience and information that the individual already possess. Previous knowledge is a benchmark for decoding and memorising new information. Constructivists argue that learning with a support of a competent person is much more effective. The proper understanding and help result in achieving much more than it would be possible on one's own. Effects of cognition depend mostly on the scale of the cognising one's activity and also on the level of their maturity and a system of direct external influences. An individual needs to be active and creative so that such education brings satisfying results. Taking into consideration the fact that nature teaches and educates, at the same time it creates perfect condition to realise premises of constructivist pedagogy.

Piotr Bołtuć (2011) claims that theoretical base for adopting constructivist model by education is a belief that the knowledge nowadays is so complex that the teacher cannot teach in the strict sense, they can only give support in searching for knowledge, both individually or as a team work. The real world is complicated enough so that it is difficult to see the reality as it actually is. Nobody can make final and indisputable claims that something is an absolute truth. Therefore, constructivist educational establishments are ceasing to be mentors teaching complicated issues and become co-participants in cognitive situations. According to the constructive pedagogy premises, learning is an active process of creating new models and representations of reality. In the early stages of cognitive development, these models are related to particular objects and situations (Michalak, 2005). This pedagogical theory relates to ways of developing knowledge in human mind while taking the relationship between teaching and learning into consideration. Therefore, in order to understand nature and phenomena occurring in it, one needs to be aware that we are a part of nature – we do not live beside or above it. In view of the fact that education and school have a great impact on our way of thinking, constructivist pedagogy gives us a possibility to explore nature.

Following the ideas and premises of constructivism, the student:

- is a nature observer,
- explores dependents occurring in it,
- discovers the sense of its existence,
- constructs the knowledge about it on their own,
- realises that contact with nature has a positive influence on their physical, spiritual and mental development.

The role of a teacher is about motivating and creating research opportunities, which students take up themselves in order to solve them. It needs to be kept in mind, though, that we can explore nature not only at school where we see its values through content and definitions in core curriculum and textbooks. It is present in our lives every day, it surrounds us and we can observe changes that undergo in it every second. In every moment, it sends us hundreds of pieces of information which we often just ignore; it teaches us love, humility, tolerance, thriftiness, and many other values.

According to the premises of constructivist pedagogy, learning and using gained knowledge in practice is not only storing information within a particular scientific field. It is because the cognitive process assumes a need of modifying learning mechanisms themselves and it is supposed to lead to gaining competencies in using certain actions which occur spontaneously and aim at improving the quality of acquiring information, skills, and cause a change of cognitive structures. According to the same aforementioned premises, learning means constructing own structures of knowledge by the thinking subject, and not acquiring ready-made contents or patterns. Since human mind is not a camera that records and reflects the reality, it creates knowledge in a form of pictures, concepts, judgements and emotions. Basing on a neurobiological approach to the way human brain functions, constructivism claims that:

- We learn by interacting with our surrounding,
- Our knowledge is an individual CONSTRUCT,
- It is widened by adding new elements to the elements we already have, following the assimilation and accommodation law (ORKE, 2019).

The representatives of this current argue that people learn by interacting with their surroundings and they construct their own knowledge actively by using the knowledge they already have. Effects of cognition depend not only on the level of maturity and a system of direct external influences (teaching), but first of all, on the scale of the student's activity. They do not register incoming information as much as they build knowledge structures from available data. Therefore it brings the pedagogical postulate for the students to be active and creative because passive acquiring of knowledge brought by the teacher and textbooks will not bring satisfying results, both in terms of quantity and quality.

Contemporarily smart ecological education cannot be limited to passing a portion of information necessary to understand how the world of nature functions. It should also help in finding a place in the world understood as a harmonious unity of people and nature (Kalinowska, Skolimowski, Simonides, Wałaszczyk, 1995).

It is worth remembering that ecological education is a medium of a chance for a change in people's attitude and for a new awareness, including ecological awareness. In the age of technological advance, in an increasingly faster way of life, it must not be forgotten that the basic rule of living in harmony with nature is finding this harmony in ourselves. We need to take care of our environment, both outer and inner, so that we have a greater will to act for the nature around us. Danuta Cichy (1978) writes that what she understands by positive attitude towards the environment is a taking a positive attitude towards all elements of this environment and readiness to speak out (in the wide sense of this word) about its features, and most of all, having a will and competence to protect. Let us not forget that people are a part of nature and they should live in harmony with it. This is why the ecological education from an early age is crucial in shaping correct attitude towards the natural environment.

Nowadays, the knowledge about the state of the environment and about its protection, dangers and ways of counteracting them, should be possessed by all citizens because the quality of environment depends on its users' attitudes. Therefore, there is a task for all of us, to act for spreading this information. United effort and investment in education will contribute greatly to developing personalities characterised by sensitivity and respect for nature. These people will also be able to use nature's resources in a rational way. Effectiveness of such efforts is possible thanks to including the environmental issue in all levels of social life (Buchcic, 2017).

Wojciech Świątkiewicz (1995) states that nowadays the awareness of nature as a value which needs to be protected, used wisely and cooperated with exists in group and individual mentality but not strongly enough yet. Sociologists assume that various attitudes towards nature are related not only to their natural biophysical needs but also to one's culture, social group, and nation's culture. Beginning from an early age, a human individual is fascinated by the world around. Already in a kindergarten, teachers try to encourage children to take an interest in nature. They do it mostly through playing but whether a child will later want to deepen their knowledge about nature and acquire pro-ecological attitudes, depends on the variety and quality of the teacher's efforts. Personality and enthusiasm of a young person who is open to learning mechanisms behind natural phenomena are worth using. With time, people get used to the fact that there is a world of living organisms around them and maybe do not pay as much attention to it as they did as children. Each of us has their own values that play a superior role. This is why it is worth remembering that depending on the way nature is presented, it may become a value for an adult. After all, human life is a process of realising values through selection and hierarchisation. Proper system of values impacts our personality and gives meaning to our existence.

Therefore, shaping a desirable sequence of values should be visible in becoming a better person – here they are:

- stimulate and shape awareness,
- motivate to be active,
- determine goals,
- integrate people and unite societies,
- stimulate,

- stabilise and set direction of development,
- are an important part of culture.

Nature as a value has been recognised in various economy sectors and in politics; it has also been popularised in formal and informal education. Nowadays there are numerous projects thanks to which it is possible to present this priceless treasure that nature is. All the actions the society undertakes in order to preserve beauty of the surrounding environment proves that nature on its own may be a value. Thanks to various institutions and organisations, currently there are many projects connected with environment protection, preserving and enrichment of biological diversity, and with formal or informal environmental education. The dimension and the meaning of a value is a subject of interest of many researchers representing various scientific fields, which generates pluralism in interpretation and categorisation of the term. Natural environment as a value is a highly topical issue and a subject area of research.

Nature can surprise and amaze us all the time. It shows its beauty through colourful leaves changing during autumn, or charming landscapes which in Poland are easy to find. It depends on each person how they perceive nature. Nature is priceless but we often do not see its value in everyday rush, even though we have a contact with it performing regular tasks, between classes, work or shopping. Leaving home, everybody can look at trees, green grass, lakes and rivers (Buchcic, 2017).

We need contact with things that are alive and wild. If there is a lack of it, a human being suffers from stress, exhaustion, or other conditions both physical and mental. Currently, provoking sensitivity to the environment around us and showing correct paths is a very important aspect of people's development.

To sum up, nature presents itself as a valuable source of information and a medium of values essential to proper functioning of a human in the environment. It teaches us sensitivity, respect, love for all living things, proper people-environment relations, it helps us understand how the world is constructed and how to be to avoid disrupting its harmony.

*"Values are a base that not only decides about life,
but also determine lines of acting and strategies
which build life in society.*

Personal values and social values must not be separated."

John Paul II

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Nature – a Medium of Value in a Constructivist Pedagogy

Abstract

In Polish pedagogy, at the time of change, there is a reflection on the way of educating young people and on the need of creating a new educational system. Groundbreaking systems and educational methods are being searched for. The new ones are being created but also the old proven ways that have permanently made the educational process, both in formal and informal education, are used again.

In the article, it is brought to attention that nature is an inherent element of every human's life and should be a value to them. It should also be kept in mind that knowledge is not only facts, laws and theories drawn from observation of phenomenons and occurrences but is also the ability to use it rationally and to interpret information in everyday life. Using premises of constructivist pedagogy in formal and informal education, one can or even should form axiological paradigms of nature.

Keywords: nature, medium, constructivist pedagogy, value, formal education, non-formal education

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The Communication between Students and Teachers: Barriers and the Ways to Overcome them

Introduction

It is widely believed that the level of communication competence affects the quality of life of an individual (McCroskey, 1982). Effective communication can be impeded by obstacles called communication barriers. In order for interpersonal communication to be effective, everybody needs to develop his/her own communication competences, among others, by becoming aware of the existence of communication barriers, as well as by actively working on overcoming these barriers.

One of the basic competences in the teaching profession are communication competences (Jagielska et al., 2019; Bakic-Tomic et al., 2015). Barriers in the process of communication significantly impede and limit the communication of the teacher and students, which often results in low effects in the process of teaching – learning. A reflective teacher, striving for professionalism, should be aware of his own communication barriers and barriers on the part of students. In the modern world, in which permanent change is the only certainty, a reflective teacher (Schön, 1987) who analyzes his actions, in uncertain and exceptional situations, looks for solutions adequate to the current situation, is desirable. On the way to professionalization, the teacher should constantly reflectively and critically watch his work, develop his competences. Pedagogical thought assumes that the stronger the teacher's and the students' relationships are, the more positive they are, the more students feel motivated to strive for better learning results, and emotions play a special role in the process of building relationships with students. Therefore, it is worth undertaking the effort to break the communication barriers to strengthen relationships with students and improve teachers' style of work.

Communication competences and communication barriers

Communication competences are related to knowledge, skill and motivation to use the language in a way that is adequate to the given situation and adapted to the social role of the speakers, as well as the ability to adapt the message to the recipient (his capabilities, skills, social position, etc.) (Hymes, 1966; Canale, 1983). Communication skills are commonly associated with the ability to precisely and clearly express

and understand the interlocutor's statements. A language user engages his own cognitive, emotional and social capabilities in order to select appropriate language structures for the intentions of his speech, situation and recipient. The effectiveness of communication depends on the level of integration of these possibilities.

An important element of communication competence is the ability to overcome communication barriers. Communication barriers are all those factors that distort, hinder or prevent communication between the sender and the recipient of a statement. These barriers may be physical, cultural or psychological.

Cultural barriers

When we look for the word culture in the dictionary it has some definitions. If we check the Cambridge Dictionary we find culture defined as "the way of life, especially the general customs and beliefs, of a particular group of people at a particular time." Cultural barriers are therefore considered as the consequence of differences associated with norms, values or behaviours predetermined by the cultural group or community to which we belong. Therefore this aspect is probably the one that gives our way of communication the highest level of diversity and complexity. As a result, we might find some discrepancies related to values, interests, traditions, or knowledge when we are trying to communicate with each other. Also having this level of complexity and diversity has an important influence for us as teachers. Depending on the situation we may have to focus on one specific aspect of culture or another. For example, when we are teaching to Erasmus+ students the main cultural aspect that we are focusing is probably the nationality. However, the main cultural aspect that every single teacher in the world has to be always aware of is the age or experience difference, also called generational barrier. It does not matter what type of teacher you are, most likely you will be from a different generation than your students. Depending on the level of education that you are teaching, this difference changes. One of the most obvious example, is when we compare kindergarden or pre-school teacher to any other type of teachers. Just think for a moment on how many times a day has a kindergarden or a primary teacher has to overcome this specific barrier each time he or she wants to explain or tell something to their pupils. However, watching how these professionals deliver such incredible examples of how to deal with this barrier can make us think that it is an easy task. But this impression is very far from reality.

Before approaching these barriers as teachers, we should start with a more general point of view. First of all, if we want to overcome these barriers, we must focus on developing empathy (Rani, 2016). What we are trying to explain is how to familiarize ourselves with other people's cultures and backgrounds is the first step. For achieving this goal, we suggest some tips on creating empathy that can be found in our presentation. Taking back our role as teachers we would like to emphasize how we should not only just respect these different cultural backgrounds and teach our pupils how to respect each other. Instead, we can go one step forward and study these differences found in our classroom and use them in our lessons. And consequently, our pupils will not just learn how to respect and be aware of all the different cultures presented in our daily context. Also, they will learn about them.

Furthermore, depending on how we develop this practice we can even make our pupils protagonist of their own learning process by making present or explain their own culture to the rest of the group.

Overcoming this type of barrier can be considered one of the biggest challenges in our daily lives as teachers. But it is probably one of the most relevant of them all. As I have mentioned before our students will need to develop some level of empathy in order to be able to communicate with each other. If we study this “empathy” aspect a little more we may discover it involves many other ideas that are key for them. Being able to view themselves and the world through the eyes of others and as a result developing the ability to communicate with others is often recognized as part of the success of many students (Cotton, 1992). Furthermore, when we take a look at the European Union’s key competences for lifelong learning we can also appreciate this idea. For example, understanding the codes of conduct and rules of communication generally accepted in different societies and environment is an essential aspect for achieving successful interpersonal relations and social participation. This idea is present in the personal, social and learning to learn competence. If we continue in this same competence we will also appreciate the relevance of acquiring respect towards others cultures. However, probably the most obvious competence related to cultural barriers in communication is the cultural awareness and expression competence. Even in the name of this competence we can appreciate the relevance of being familiar with other cultures for our students.

Psychological barriers

When we talk about psychological barriers we are referring to any aspect related to the state of mind of every person participating in the communication. First, the most obvious solution to overcome them is basically avoiding this feeling when we want to deliver a message. However, as teachers, we must avoid any type of attitude of disinterest or unwillingness. As students we may have experienced such a situation more than once, so we should know how frustrating it is. It can be even a logical idea if you are not interested in what you are teaching that you pretend to make your students interested in it. Another very common psychological barrier in our classroom will be probably a lack of attention. There are several techniques for dealing with it and we suggest some of them, that we consider more useful for teachers (Jiménez & Hernández). On the one hand, we have the stimulating contrast, there are three types:

- Sensory contrast: changing your voice tone or use visual or auditory contrast. But we must be careful with them because we can only use them sporadically and ONLY with a likelihood of success.
- Thematic contrast: it is basically changing drastically the theme of the conversation, for example asking about what they did during the weekend, telling an anecdote...
- Procedural contrasts: it does not matter the type of activity that you are developing if it is in excess it will end up being very boring. However, you can avoid it changing your teaching procedure, adding new elements...

Digital generation

This last barrier is considered a type of psychological barrier, however, we can see some characteristics of cultural barriers as well. It is related to how technology has influenced recent generations and its effect on the way they communicate and process information. Based on that Mark Prensky (2001) established a difference between digital immigrants and digital natives. Teachers will be in the first group because although they have learnt to manage and use these new and their minds have adapted they still have some kind of an “accent”. It is similar to learning a new language when you are an adult versus learning it as a little kid. Because of this the students are considered digital natives who have been raised with all these new technologies. Some of the main differences of the new students that Prensky highlights are:

- They thrive on instant gratification and frequent rewards,
- Prefer games to “serious” work,
- Prefer graphics before text,
- Like to parallel process and multi-task,
- They function best when networked,
- Prefer random access (like hypertext),
- Receive information really fast.

If we take all these aspects into account we will have to introduce some changes or modifications to our way of teaching and consequently to how we communicate during the learning process. For example, applying this to our methodology will make us go faster, less step-by-step, more in parallel with more random access, among other aspects. Also some changes of the content should be made, like not just focusing on past contents and trying to use more future contents that are more interesting to the student (robotics, politics, sociology...).

Conclusion

Although all these barriers may seem extremely complex, overcoming them may not be very difficult. In the beginning it can be very exhausting and even complicated, but once you interiorize and get used to change, those little aspects of our teaching practice will progress easily. Especially when we are talking about cultural barriers everything becomes more interesting and enjoyable for everyone, particularly the children.

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Abstract

The purpose of this article is to explain some of the barriers that teachers can face when they are trying to communicate with their students. At the same time we will suggest some ideas to overcome them, as well as examples of different situations experienced by teachers. Also, there are some cases where we can even use these barriers as a way to improve the learning process. More specifically, we are going to focus on cultural barriers and psychological barriers. Another topic that we will be focusing on is the digital generation and how these differences can generate a new type of barrier.

Keywords: communication barriers, psychological barriers, cultural barriers, digital generation

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The Relationship between the Strategy of Coping with Difficult Social Situations by Students with Mild Intellectual Disability and their Overt Aggressive Behaviour

Introduction

According to Danuta Borecka-Biernat (2003: 9) psychologists use different terms when referring to human behaviour in a difficult situation e.g. reaction to frustration, behaviour in a stressful situation or coping with a stressful situation. Therefore, it is worth taking a closer look at opinions of researchers on the semantic scope of these terms. When it comes to a difficult situation – the views of T. Tomaszewski and M. Tyszkowa (Kiedrowska, 2016: 84–90) are particularly popular in the Polish psychological literature on the subject. According to the first of these authors, we can talk about a difficult situation “(...) when the internal balance of a normal situation is impeded in a way that the normal process of the main activity will be disturbed and the probability of finishing the task on the normal level will be diminished” (Tomaszewski, 1978: 32). The aforementioned normal situation is the result of a frequent repetition of a specific situation during which “(...) its internal organization stabilizes, mutual adaptation of its basic elements takes place, namely: tasks to be carried out »values«, conditions in which they are carried out, methods of implementation »activities« and the accomplisher himself »subject«” (Tomaszewski, 1978: 32). As a result, the mutual arrangement of the mentioned elements is established and consequently the task is adapted to capabilities. This makes it possible to reduce the difficulty of the task if the capabilities are insufficient or to increase it if the capabilities are greater. This happens without any adverse consequences for the course of the main activity in each situation. If the course of the activity is disrupted and the chances of completing the task diminish, an individual responds with a complex reaction known as stress (Tomaszewski, 1978: 35) which is followed by several “post situational” burdens (Reykowski, cited in Tomaszewski, 1978: 35). These burdens – demonstrated, among others, in a prolonged state of emotional tension, assessment and analysis of a particular behaviour in the past situation or an assessment of the degree of difficulty and meaningfulness of the performed task – result in changing of conditions of “entering” into next situations.

M. Tyszkowa adds an important facet to specify the understanding of difficult situations in social interactions. She believes that we deal with them when “(...) the

values and aspirations of an individual are threatened or thwarted by other people, through the very fact of their presence or as a result of specific forms of their opposing interaction or incompatibility with the individuals' own aspirations" (cited in Kiedrowska, 2016: 87). Among these difficult situations, the author points out situations of social exposure threatening an individual's self-esteem as a consequence of being subjected to public evaluation and criticism; situations of social conflicts that pose a threat to one's own interest as a result of dissonance or incompatibility with other people's goals; situations of social pressure that disrupt or prevent the individual's goal from being achieved as a result of pressure exerted by others to change the course of one's own actions or aspirations (cited in Borecka-Biernat, 2003: 10).

J. Heitzman (2002: 36), on the other hand, mentions the views of J.L. Janis who believed psychological stress can be described as a change in the environment which causes high emotional tension that prevents an average person from normal functioning. The literal reading of this definition suggests that stress should not be defined as a reaction of a person to destructive and threatening stimuli in the environment, but the stimuli themselves, which an individual appraises as stressful. Further explanation suggests that the author proposes separate terms to describe *changes in the environment* and *increased emotional tension*. He defines the first one as a *stressful situation*, the second one as a *stressful reaction*. J.L. Janis appears to have combined two traditional perspectives on psychological stress which is viewed – as Heitzman (2002: 36) reminds – as:

(...) negative external factor (...) an event in the human environment – usually harmful, unpleasant or excessively overloading, generalized reaction to the action of damaging factors or mental state manifested by a series of changes in behaviour, associated with strong negative emotions.

In view of the subject of this work, attention should be paid to the concept of psychological stress developed by R. Lazarus in 1966. According to the author (cited in Heitzman, 2002: 36), psychological stress is defined as a state in which internal psychological processes caused by external factors are dealt by a person in a very individual way. This individual way of coping is related to a subjective assessment of events involving not only a simple perception of a threatening situation, but also more complex cognitive processes which depend on the previous experience associated with processing this type of information, shared values, as well as the level of functioning of perceptual-cognitive and intellectual processes. This theory – as we can see – focuses on the way in which a person interprets a given situation and how this interpretation affects the strategy of dealing with experienced problems. The issues outlined above are key elements of the concept developed by R. Lazarus and co-workers and known as *transactional theory* of stress (Heitzman, 2002: 37). The term *transaction* refers to a relationship between individuals and their environment. W. Łosiak (1994: 15) describing the mechanism of stress in the context of this theory points out the following sequence of such processes as: transaction, cognitive assessment, emotions, and coping:

The individual – environment transaction (...) is assessed as threatening, harmful or challenging, which is a source of emotions. The following elements (...) are coping processes, and their effects in the form of changed subject-environment relationship (...) or changes in meaning and attention (...) (referred to as problem-focused and emotion-focused coping respectively – author's note) are the subject of another cognitive assessment (...), which stimulates new emotional processes. This cycle can be repeated (...).

Transactional theory of stress points to three types of cognitive evaluation (appraisals): primary, secondary and reappraisals. As a result of the primary appraisal of a specific situation, a threatening impact may be assigned (other options are positive or no impact). Secondary appraisal, on the other hand, allows to determine coping strategies focusing on solving the problem in the assessed situation. Reappraisal is an assessment of the response to the current person – environment relationship that can lead to a change in the first two types of appraisal (Heitzman, 2002: 36–37; Kiedrowska, 2016: 75–77). These ways of dealing with a situation assessed as harmful and threatening can focus – as stressed in the above quote – on the problem, then they are aimed at active attempts to change themselves or a stressful situation, or on emotions, which is manifested by controlling feelings and distress¹ with the intention of lowering or eliminating unpleasant tension and alleviating adverse emotional states (Heitzman, 2002: 37; Korczyński, 2015: 36). The choice of the particular reaction depends – as we already know – on the perception and assessment of the situation: “If someone thinks that they can handle a given situation, they choose a strategy focused on the problem, otherwise they choose strategies focused on emotions” (Wrona-Polańska, cited in: Korczyński, 2015: 36).

In the context of information about the role of cognitive assessment in choosing a coping strategy, the question arises about how people with mild intellectual disability deal with difficult situations, especially those of a social nature? If we take into consideration that the level of functioning of cognitive processes determines the extent of the perception of various types of relationships in which people are the main element, it should be noted that different types of deficits in cognitive orientation and intellectual sphere, which are characteristic of this group of people, contribute to the fact that they have “(...) impaired ability to accurately assess social situations and relationships between people” (Wyczesany, 2012: 72), which makes it difficult for them to assess these situations as threatening, neutral, or challenging. The course of this assessment may be additionally hindered by various emotional-motivational disorders (Giryński, cited in: Mikrut, 1995: 12). This factor cannot be underestimated because the global nature of disability “(...) is not only in the sphere of intellect, but also in the field of emotional and motivational processes,” with anger and anxiety among the most frequent negative emotions experienced by this group of people (Wyczesany, 2012: 71).

It seems that the very fact of not understanding interpersonal relationships that people with intellectual disability are involved in, can lead to the situation being

¹ According to H. Selye (cited in Heitzman, 2002: 19) who views stress as psychological phenomenon, the term *distress* refers to *bad stress*, i.e. excessive, debilitating and leading to illness.

deemed as threat. In a threatening situation – as D. Borecka-Biernat (2019: 259) writes – emotions are felt in a particularly intense way. Anxiety and anger as emotions characteristic of this group of people create conditions for destructive reactions to threat which are aimed solely at reducing unpleasant emotional tension. The first of these emotions is reduced by escape, the second – by aggression. However, it happens – as D. Borecka-Biernat explains (2019: 260) – that “when a man has nowhere else to run away (...), then fear can be the reason for an attack.”

The above-mentioned arguments suggest that a typical way of dealing with difficult social situations by people with mild disability are aggression or escape (avoiding a problem). Stalter (2009: 122) believes that overloading with difficult situations can consequently lead to behavioral disorders due to increased level of anxiety and aggression. Therefore, as the author explains, we are dealing with a situation of positive feedback loops which is expressed in the fact that the mentioned negative emotions indicate experiencing difficult situations, but also intensify already existing problems in the emotional and motivational sphere, resulting in difficult behaviors, including those of aggressive nature.

Methodological assumption of the author’s research

The main problem of empirical inquiries was the question: What is the relationship between the strategy of coping with difficult social situations and the level of overt aggressive behavior of students with mild intellectual disability manifested in everyday life? In addition, an attempt was made to answer the question of possible differences between students with mild intellectual disability and their non-intellectually disabled peers in terms of the examined variables, and above all, the strength of the relationship between these variables?

In order to gather empirical data, two diagnostic tools were used: 1. Questionnaire for dealing with difficult social situation (Kwestionariusz radzenia sobie w trudnych sytuacjach społecznych – RTSS) designed by D. Borecka-Biernat (2003: 9–36) and 2. Questionnaire of overt aggressive behaviour (student version) (Kwestionariusz jawnych zachowań agresywnych – KJZA) formulated by S. Olszewski (2005: 131–133).

The first of these tools (RTSS) is intended for junior high school adolescents; standards are based on scientific research conducted on a sample of girls and boys aged 13–15. The questionnaire contains a brief description of thirty difficult situations, each of which is accompanied by 3 types of behavior which are indicators of a coping strategy. The respondent should choose one of them, with the first indicating aggressive coping with a given situation (A), the second – strategy of avoidance (U), and the third – the rational (task-oriented) strategy (R). Since the questionnaire consists of 30 situations, the respondents can obtain 0 to 30 points in each range. The described tool has appropriate standards, however, due to the fact that a few students that participated in the conducted research were 1 to 2 years older than those in the standardization group, the data obtained was not used for the purpose of this study.

In turn, the Questionnaire of overt aggressive behaviour (KJZA) was designed for testing adolescents with mild intellectual disabilities. It has two versions – one for students and the other one for teachers. They differ only in the grammatical form of the statements used. It is composed of 25 statements, 16 of which are brief descriptions of aggressive behavior – without giving the situational context in which they take place – and eight buffers. Completing the questionnaire consists of responding to all statements by choosing one of three answers, i.e. “never”, “sometimes” and “often”. Each answer is assigned a certain number of points, that is: 0, 1 and 2, respectively. The result demonstrating the level of general aggressive behavior (AO) measured – as shown by the scale used – by the frequency of its occurrence was obtained by summing the points received in each statement (0–32 points). Only the student version was used in the presented analysis. In order to maintain consistency in analyzing the obtained data, also in this case, the reported standards were not used.

Research was carried out in 2018 at junior high schools. In total, 60 students were surveyed, including 30 with mild intellectual disabilities (16 girls and 14 boys) and 30 with normal intellectual development (17 girls and 13 boys). The average age of the former was 15.63 years, the latter – 15.10 years. Empirical material was collected by Justyna Ewiak as part of the master’s seminar under the supervision of the author of this work.

Presentation and analysis of the research results

Matching the distribution of the analyzed variables to a normal distribution

In order to select suitable methods of statistical analysis, the distribution of examined variables i.e. “ways of coping with a difficult social situation” and “overt aggressive behavior” was examined against a normal distribution. The Kolmogorov-Smirnov test was used to verify the null hypothesis that assumes compatibility of the analyzed distribution with a normal distribution (Stanisz, 1998: 290). These and all other calculations were made by using the Statistica 13.1 program. As a result, it turned out that in most of the examined distribution there are no grounds for rejecting the proposed hypothesis. Only one exception was noted, which was the distribution of the variable “aggressive coping with difficult social situation by students with normal intellectual development.” Therefore, in statistical analyses that took this variable into account, non-parametric procedures that do not rely on assumptions about the shape of distribution were used (Brzeziński, 1980: 149). These included the Mann-Whitney test and the Spearman’s rank correlation coefficient. For all other distributions, the parametric procedures such as Student’s test and the Pearson correlation coefficient were used.

Ways of dealing with difficult social situations by the surveyed students in the light of the obtained results

The results obtained using the RTSS questionnaire are presented in Table 1.

Table 1. Differences in dealing with difficult social situations between students with intellectual disability and their non-disabled peers (the Student's t test for independent groups²)

Coping with difficult social situations	Surveyed students	Students with intellectual disability				Non-intellectually disabled students				Test value	Significance level
		arithmetic mean	standard deviation	median	quartile deviation	arithmetic mean	standard deviation	median	quartile deviation		
aggressive (A)	total	3.33	3.24	3.00	3.00	5.10	5.89	3.50	2.50	0.9314	ni.
	boys	4.36	3.73	3.00	3.00	6.08	6.56	3.00	2.00	0.2184	ni.
	girls	2.44	2.53	1.50	2.25	4.35	5.40	4.00	2.00	1.0807	ni.
avoidance (U)	total	8.83	3.31	9.00	2.00	6.80	3.65	7.00	2.50	2.2588	0.0277
	boys	7.64	3.73	7.50	2.50	6.31	3.01	7.00	1.50	1.0178	ni.
	girls	9.88	2.58	9.00	1.25	7.18	4.13	7.00	2.50	2.2358	0.0327
rational (R)	total	17.83	5.02	19.00	3.00	18.07	7.44	18.50	5.00	0.1425	ni.
	boys	18.00	5.96	19.00	3.50	17.63	8.41	19.00	5.50	0.1379	ni.
	girls	17.69	4.22	19.00	2.75	18.41	6.85	18.00	3.00	0.3629	ni.

Considering the fact that for each of the selected ways of dealing with difficult situations it was possible to obtain the same number of points, it is easy to see that students with intellectual disability were most likely to choose a rational strategy (R) and the least often – aggressive strategy (A). This observation applies to the whole group of students in this category, as well as a group distinguished by gender. Therefore, the collected empirical material allows to formulate the conclusion that these students, when experiencing difficult social situations, are more likely to undertake actions – as the author of the KTSS questionnaire explains – that aim at:

(...) solving the problem and reducing and mitigating the negative effects caused by it. This includes behavioral attempts to transform a threatening situation or change one's own actions by means of which a person overcomes the problem, difficulties and remove the state of tension, and at the same time, achieves his goal or goal equivalent (Borecka-Biernat, 2003: 21).

If we take into account that the potentially highest score in each of the examined coping strategy is 30 points, we can observe that the value of the arithmetic mean on the scale measuring the rational approach (R) to the existing difficulties by students with mild intellectual disability, presented in Table 1, oscillate around 18 points

² Due to the fact that the distribution of the variable "aggressive coping strategy in difficult social situation by students who are not intellectually disabled" does not match the normal distribution, the non-parametric Mann-Whitney test was used to verify the hypothesis of significance of differences regarding this variable.

(60% of the potentially highest result). This indicates a higher than average level of this variable – measured as we remember by the frequency of using this strategy as a response to the social situation in question.

Similar regularity was observed in the case of non-intellectually disabled students. Although the arithmetic mean values of the R and A scales are slightly higher in their case (the only exception was the rational response to a difficult situation by boys), the differences are not big enough (statistically insignificant) to think that the level of intellectual functioning is a discriminating factor when it comes to the frequency of choosing these two strategies of behavior. However, it plays a significant role in terms of the strategy of avoidance (U). The obtained results show that students with intellectual disabilities use this strategy more often, whereas this observation applies both to the whole sample of respondents and the girls themselves (statistically significant difference).

Level of aggressive behavior manifested by the surveyed students in the light of the obtained results

Empirical material collected using the KJZA questionnaire is presented in Table 2.

Table 2. Differences in aggressive behavior (AO) between students with intellectual disability and their non-disabled students (the Student's t test for independent group)

Surveyed students	Students with intellectual disability				Non-intellectually disabled students				Test value	Significance level
	arithmetic mean	standard deviation	median	quartile deviation	arithmetic mean	standard deviation	median	quartile deviation		
total	5.83	4.09	5.50	3.50	9.13	6.54	9.50	4.00	2.3418	0.0226
boys	5.36	3.99	5.00	3.50	9.85	6.35	10.00	4.00	2.2170	0.0359
girls	6.25	4.27	5.50	3.25	8.59	6.83	9.00	4.00	1.1708	ni.

By analyzing the results of the students with intellectual disability it is easy to conclude that they rank at low level. We can see that arithmetic mean value for the total of the surveyed students, as well as in the group extracted because of their gender, oscillates in the range of 5–6 points which is only about 16–19% of the potentially highest score. Moreover, they are lower than those obtained by non-intellectually disabled students. These differences are statistically significant in relation to the total number of surveyed students as well as boys themselves. The comparison of the results obtained by girls indicates that they are lower in case of the girls with intellectual disability but not enough to conclude that the level of intellectual development of girls is a differentiating factor when it comes to the intensification of their aggressive behavior (statistically insignificant difference).

Analysis of the correlation relationship between coping strategies in difficult social situations and overt aggressive behavior of the surveyed students

Results of the correlation analysis are presented in Table 3.

It is easy to notice that most of the correlation coefficient values related to students with mild intellectual disability reached the level of statistical significance. The only exception was noted in case of using the strategy of avoidance (U) by boys. Observation that proved to be particularly important indicates that aggressive (A) and avoidance strategy (U) used to deal with difficult situation of social nature is positively correlated with general aggressive behavior (AO), whereas rational behavior (R) – negatively.

Table 3. Value of the correlation coefficient between coping with difficult social situation and the level of general aggressive behavior (Pearson's correlation coefficient r^3)

Coping with difficult social situation	Surveyed students	General aggressive behavior (AO)			
		Students with intellectual disability		Non-intellectually disabled students	
		coefficient value	significance value	coefficient value	Significance value
aggressive (A)	total	0.69	0.000	0.68	0.000
	boys	0.83	0.000	0.67	0.012
	girls	0.72	0.002	0.72	0.001
avoidance (U)	total	0.53	0.003	0.35	ni.
	boys	0.42	ni.	0.68	0.010
	girls	0.67	0.005	0.21	ni.
rational (R)	total	-0.79	0.000	-0.75	0.000
	boys	-0.79	0.001	-0.75	0.003
	girls	-0.84	0.000	-0.77	0.000

By expressing the regularity descriptively it can be stated that firstly, the more often students with intellectual disability react to a difficult social situation with physical violence against persons or objects associated with the existing problem and/or by manifesting their negative emotions in contact with these people in the form of harmful and degrading comments (Borecka-Biernat, 2003: 21) (aggressive strategy), or the more often they withdraw from this kind of situation and ignore it by "escaping" into substitute activities and seeking contact with other people (Borecka-Biernat 2003: 21), the more often they reveal aggressive behavior in other everyday situations. This pattern – as indicated by the results – does not apply to boys who choose to use the strategy of avoidance. Secondly, the more often they choose a rational strategy (R) in coping with difficult situations of social nature (as previously described is characteristic of this category of students) the less often they show aggressive behavior in other conditions and situations.

³ Given the fact that the variable "aggressive coping with difficult social situation by students with a normal intellectual development" is not matched to the normal distribution in the correlation procedures that take the aforementioned variable into account, the Spearman's rank correlation coefficient was used.

Similar pattern was noted in relation to non-intellectually disabled students. Described relationships between a strategy of avoidance (U) and overt aggressive behavior in the surveyed group of students apply only to boys.

Conclusions from the research

The quantitative analysis of the empirical material obtained during the research allows to come to a number of conclusions:

- the typical way of coping with difficult situation of social nature by students with intellectual disability is a rational strategy (R), the least prevalent – aggressive strategy. These coping strategies do not differentiate these students from their non-disabled peers;
- students with mild intellectual disability, especially girls, more often than their non-disabled peers use a strategy of avoidance in coping with difficult situations, however this strategy is neither typical nor the least used in the examined situations;
- students with mild intellectual disability are characterized by a low level of overt aggressive behavior, what is more, the frequency of this behaviour especially in boys, is lower than in their non-disabled peers;
- aggressive coping strategy in difficult social situations (A) used by students with mild intellectual disability “goes hand in hand” with their aggressive behavior revealed in other everyday situations;
- avoidance as reaction to difficult social situations by students with mild intellectual disability, especially by girls, also indicates a positive relationship with their aggressive behaviors in various everyday situations;
- rational approach to difficult social situations by students with mild intellectual disability shows a relationship with avoiding overt aggressive behaviors in everyday conditions and situations;
- all mentioned relationships between aggressive (A) behavior and rational coping strategy (R) in difficult social situations and overt aggressive behavior manifested in everyday life related to students with intellectual disability are not different from those observed in the group of their non-disabled peers. This gives grounds to believe that mild intellectual disability is not a factor modifying the relationship between the examined variables.

In conclusion, it is worth emphasizing that the obtained results did not confirm the hypothetical assumption that students opt mostly for aggressive or avoidance strategy in difficult social situation. By attempting to explain this state of affair we can point to at least two reasons. Firstly, it turns out – as M. Koscielska (1984: 288) writes – that these people might adopt correct coping strategies in social situations even if they do not understand all the relationships involved. Secondly, cognitive deficits make it more difficult for them to adopt adequate self-esteem (Wyczesany, 2012: 73) which can result in choosing a strategy that exceeds their capabilities.

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The Relationship between the Strategy of Coping with Difficult Social Situations by Students with Mild Intellectual Disability and their Overt Aggressive Behaviour

Abstract

The present study is an attempt to verify the assumption of mutual relationship between coping strategies in difficult social situations by students with mild intellectual disability and their aggressive behaviour displayed in other everyday situations and circumstances. Justification of this assumption can be found in the repetitive and ensuing sequence of occurrences and processes: the deficits in perceptual-cognitive, intellectual and emotional-motivational functions which are characteristic of this group of people, make it difficult for them to understand and evaluate the interpersonal relationships, hence they perceive them as threatening. Emotional tension arising from those situations is released by using destructive strategies including aggression. The repetition of this experience leads to destructive

behaviours which are manifested in various everyday situations and circumstances. These fixed behaviour patterns are then used in subsequent difficult social situations etc.

Keywords: intellectual disability, difficult situation, strategies of coping with stress

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The Hidden Aspects of Academic Assessment and its Unintended Outcomes: the Perspective of Students

Introduction

The assessment system is a system of elements including: degrees, procedures, methods for verifying knowledge, criteria and examination requirements. Most of them are described in educational curricula (syllabuses) and made available to pupils, students and parents, etc. It is assumed that thanks to all these carefully designed elements it will be possible to reliably and accurately measure educational achievements planned in official curricula. It is also assumed that the assessment process will be compatible with the didactic process. Meanwhile, the elements enter into dynamic relationships and interact with each other, and their implementation is subject to numerous modifications and distortions. Therefore, it is impossible to predict or plan everything, especially as information on assessment is embedded in different contexts of the learning environment, comes from various sources and is communicated to learners in an informal way. Day after day, they learn to recognise the tone of voice, facial expressions, gestures and reactions of their teachers, which reveal, for example, their approval for the answer given and give a hint about the right or wrong solution. Teachers send informal hints – how to get a positive grade, pass a course or pass an exam – when, for example, they display some content and omit other content, praise only those who use scientific language, use logical argumentation and hide emotions and their own opinions, and ‘turn a blind eye’ to various manipulation strategies or unfair practices during examinations (Bergenhengouwen, 1987; Entwistle and Entwistle, 1991; Meighan, 1993; Pauluk, 2016).

On a daily basis, students are subjected to the impact of all these elements as they are part of the so-called hidden curriculum: ‘Assessment messages are coded, not easily understood and are often read differently and with different emphases by staff and by students’ (Bound, 1995: 39). Philip Jackson, who first used the concept of a hidden curriculum to describe the second life of a school class, considered assessment as one of its important elements. He pointed out that it is not only a student’s achievements, but also his or her character traits and ability to adapt to the school’s requirements that are assessed (Jackson, 1968). Students also evaluate each other, develop strategies to maintain good relationships with their peers at school and adapt to the expectations of teachers (Jackson, 1968; Dreeben, 1968).

Many scholars dealing with the problem of assessment do not approach this issue from the perspective of a hidden curriculum. Nevertheless, they also note that many of its aspects are beyond the conscious control of teachers and authors of educational programmes. The learner's perception of various elements of the assessment system – in its explicit and hidden dimensions – affects their approach to learning and, consequently, determines their educational achievements (Gibbs, 2006; Gibbs and Simpson, 2004; Joughin, 2010; Lizzio, Wilson, and Simons 2002; Struyven, Dochy, and Janssens, 2005; Pauluk, 2016). Graham Gibbs states that assessment can have a greater impact on the approach to learning than teaching (2006). In turn, by learning the truth about the assessment system, we gain an insight into the functioning of the education system (Rowntree, 1987).

In the assessment system, grades and their outcomes deserve special attention. Learners constantly hear about the importance of good grades, which are treated as a measure of educational success and a predictor of high social status in modern societies. Although the development of social competences is promoted in official curricula, in educational practice, competition is fostered as grades force students to compare themselves with each other, which may also affect positive relations between them. The negative effects of assessment include decreased interest in learning aimed at satisfying cognitive curiosity. Excessive emphasis on grades leads to the disappearance of internal motivation and permanent motivation, which makes students return to tasks without the supervision of a teacher or a parent (Dembo, 1997). Students strive for good grades to avoid negative consequences (Meighan, 1993). Assessment is accompanied by fear and anxiety. While children are afraid of punishment from adults (excuses, claims, comparisons with siblings and peers), students feel the pressure that if they do not finish their studies with good results, they will be in a worse position in the competitive labour market than their peers achieving academic success (Pauluk, 2016).

Teachers also believe in the magical power of grades. They are subject to external evaluation. The quality of their work is measured by the number of students achieving high scores in tests and subject competitions. In their work, they focus on preparing students to pass tests in accordance with the applicable key. For them, ranking lists are a source of knowledge about the student's position against others, and they also receive ready-made and simplified diagrams concerning talented and weak students. The label of a talented student is like a magnet attracting further positive qualities: nice, cultural, friendly. In turn, the label of a poor student also generates a sequence of subsequent, but negatively associated features: naughty, unpleasant, problematic. Even reflective teachers, who are aware of these schemes, address different messages, expectations and tasks to these types of students using different teaching styles, which in turn affect their actual educational achievements (Dembo, 1997; Meighan, 1993; Rosenthal and Jacobson, 1968).

The unintended consequences of grades also result from the fact that pupils and parents consider them objective and indisputable because they are granted by a teacher – an authority in the field of knowledge. Education institutions teach us that authorities should be uncritically trusted and their opinions should be valued (Meighan, 1993). Similar effects of assessment in higher education institutions,

resulting from a rigid model of competitive examinations and classification procedures blocking development and critical thinking, are indicated, among others, by Pierre Bourdieu and Jean-Claude Passeron (1990) and Michael Crozier (1996). Crozier notes that French students must be conformists, reject that which is uncertain and courageous, and conceal their own reasoning in order to pass exams positively (Crozier, 1996).

The knowledge that is subject to assessment is often perceived by pupils and students as uninteresting and unrelated to life. Therefore, they use various strategies to survive and 'outsmart' the assessment system (Holt, 1969; Jackson, 1968; Snyder, 1971; Woods, 1980; Pauluk, 2016). Where learning efforts, individual searches for solutions and learning from mistakes are underestimated, learners focus more on satisfying teachers and on answering correctly (Holt, 1969; Meighan, 1993).

It can be assumed that experience with the assessment system acquired at earlier stages of education is a kind of educational heritage for future students. When beginning their studies, they are well versed in informal guidelines, more or less accurately read informal expectations of individual lecturers and react to them; they also notice gaps and imperfections in the assessment system. This is confirmed by research results. Becker et al. (1968) show that students defined academic classes as situations in which good grades are obtained for doing what teachers want. They learned to read their preferences, quirks and assessment methods. They regarded grades as the institutionalised form of good, an equivalent of money and a type of payment for the work done. Good grades brought them tangible benefits, raised personal prestige and even increased their chances of a date with the opposite sex. These experiences diverted their attention from learning to satisfy cognitive curiosity to 'earning' degrees (Becker, Geer, and Hughes, 1968).

Benson Snyder points out that in addition to official goals such as independence, critical thinking and problem-solving skills, there are simultaneously a number of opposition demands and expectations embedded in the context of academic life that are informally communicated to students, who recognise and adapt to them. During their studies, students learned that they should strive for grades. Informal assessment requirements determined their approach to learning and 'overloaded' curricula prompted them to choose between different coping strategies, including learning for grades with little time expenditure and self-involvement in learning (Snyder, 1971).

Another study has proved that non-substantive factors, such as the ability to read informal cues from lecturers and examiners, determine the final results. Students referred to as 'cue seekers' tried to learn the preferences of their lecturers and examiners and make a good impression on them to obtain the potential examination content. In turn, cue conscious students were able to listen carefully and read hints sent to them by lecturers. They learned selectively, paying attention only to certain parts of the material. In contrast to both these groups, cue deaf students – not sensitive to informal signals – received worse grades (Miller and Parlett, 1974).

Materials and methods

The aim of the study was to identify the hidden aspects of the academic assessment system and the unintended outcomes based on the subjective experience of pedagogy students at one of Poland's universities. It was assumed that in their free statements, research participants would present their personal knowledge, tacitly accepted assumptions about their educational environment and assess situations and phenomena. The study was conducted using the qualitative variation of an unreactive technique, i.e. content analysis (Babbie, 2004; Mayntz, Holm, and Hübner, 1985; Holsti, 1968; Krippendorff, 1980; Pauluk, 2016).

Procedure

The presented results come from material collected between 2011 and 2014. During this period, students wrote free statements about: *What does studying teach?* When writing about the real effects of studies experienced, they simultaneously indicated various elements – embedded in the academic educational environment and not included in syllabuses – which generated them (hidden curriculum). The contents were separated into simpler elements, i.e. units of analysis, which were thematic threads separated from the content of the students' free statements and classified according to the categorisation key (Berelson, 1952; Holsti, 1968; Krippendorff, 1980; Frankfort-Nachmias and Nachmias, 2001). When constructing the categories, care was taken that each category includes the most similar thematic themes (judgements, opinions). The categories were then grouped based on evident differences between them (Mayring, 2000; Kluge, 2000). The categories were introduced to the QDA Miner software and subjected to quantitative and then qualitative analysis (Pauluk, 2016).

The results collected showed that students indicated assessment as one of the various elements of a hidden curriculum. As these contents appeared in different contexts, they were only subjected to qualitative analysis and interpreted with regard to the so-called units of context in which they appeared (Frankfort-Nachmias and Nachmias, 2001). In order to identify thematic threats related to assessment, selected contents were repeatedly analysed. Moreover, during the analysis of students' free statements, particular attention was paid to guiding key words, their various grammatical variations and synonymous concepts, such as: assessment, grades, evaluation, colloquium, diploma, test, oral answers, essay, pass, exam, European Credit Transfer System (ECTS) points, criteria, expectations, requirements, passing, cheating in the exam, plagiarism, strategies, stress, session, unfair/fair assessment. To increase the credibility of the research, original students' statements were used to illustrate the relationship between various elements of the assessment system as perceived by students and the consequences experienced by them.

Participants

The source material, i.e. 319 free statements, was collected from pedagogy students at one of Poland's universities, including 142 students of bachelor's degree programmes majoring in: social care pedagogy (P), social rehabilitation (R), cultural

management (M), and 177 students of master's degree programmes majoring in the same subjects. Pedagogical studies are feminised and so the participants included 272 women (F) and only 47 men (M).

Participation in the study was voluntary. Due to the nature of the research, the students were assured of anonymity. They were told that research results may be used to modify the assessment process and may have a real impact on improving quality of education.

Results

Academic assessment as a mirror of the educational environment

The experience related to assessment reported by students indicates many of its unintended outcomes reflect the situation in the academic learning environment. According to the research participants, it is important for them to have information about both the explicit and implicit dimensions of assessment. They pay attention to the criteria related to grading, methods of assessment and examination conditions, which are described in syllabuses, expecting them to be followed by teachers. They also search for suggestions about assessment in the context of the educational environment. Information on how, what and how much to learn are derived from their experience at earlier stages of education and from older students. The source of knowledge is also their personal experience related to examination successes and failures or fulfilling the informal expectations of academic teachers. For example, they pay attention: 'to what extent teachers are flexible and consistent in adherence to the set assessment criteria and examination requirements' (M, R/27). They note that they are not as strict in their assessment as they threaten to be at the beginning, and that they assess even more leniently at higher years of study.

Academic teachers attach great importance to grades for mastering academic knowledge. From the students' perspective, grades are more important than the content to be assessed. They believe that this is one of the factors that is responsible for their instrumental and superficial approach to learning and academic knowledge: 'Teachers do not convey the ideal that knowledge is something valuable; what they convey is that so much material is required for a grade of 4 or 5, and everyone, depending on his or her individual ambition, has to learn for a given grade' (F, P/227).

Students notice different relationships between the assessment system and the academic didactic process. A teaching style provides suggestions for how to learn. If the passive transmission of textbook knowledge prevails in the classroom, it is a message for them that the same teacher will expect them to recreate this knowledge during an exam. It also affects their approach to learning: 'Students are focused to note down everything that might possibly appear on the exam. It takes their full attention. ... Students are often unable to repeat the topic of a lecture even 15 minutes after its end' (F, A/27).

Their subjective experience with academic assessment tells them that examination success is determined by their knowledge of scientific concepts, theory and classifications. Moreover, they should use the proposed literature and behave safely during exams because: 'Intelligent, unruly students, all individualists are not

appreciated. ... an ideal student is systematic, unreflective, conformist, passive and nodding' (M, P/92).

What they conclude from their university days is that each lecturer thinks that his or her subject is the most important. Therefore, each teacher asks students to read a lot of content in a short time. They admit that it is often beyond their psychophysical abilities. These situations discourage them from learning and provoke them to use various survival techniques and take to superficial learning, particularly when examination requirements are too burdensome: '...there is too much knowledge, syllabuses burst at the seams, and the examination literature has a rigid frame and there is no space and time to look for information in other sources that are more interesting for students' (F, A/16). They also see the negative consequences of learning material that does not interest them and does not satisfy their expectations: 'Students are often simply flooded with content, a multitude of topics and definitions that they will learn, pass an exam and then simply forget, they are not useful to them and will not provide them with any skills' (F, R/157). They do not hide that, under such conditions, they are focused on passing the exam, often putting in as little effort as possible. They take a minimalist approach to learning according to the principle: just to pass and not to fail the exam.

Deficiencies and inconsistencies in the academic assessment system and their outcomes

Students experience a discrepancy between what they would like to be assessed and what is subject to formal assessment in the university, i.e. primarily academic knowledge. They note that at the university great importance is attached to grades while their additional activity, such as volunteering, extracurricular activity, which develops their passions and interests, is not graded. They note that workshops are also definitely lower in the academic hierarchy than the 'canonical' classes, focused on theory. This lower position is evidenced by the fact that neither knowledge nor skills are verified and no grades are obtained after completing apprenticeships. Meanwhile, classes developing professional skills are particularly valuable to them.

Students experience inconsistencies between what is assumed in the official content (for example in educational outcomes) and the assessment methods, which are their negation. For example, they note that during studies, the importance of independent and critical thinking is emphasised, yet traditional methods of assessment are used in practice: 'You hear a lot about not learning by heart and then... you receive a test with tasks to supplement quotes with missing words' (F, R/191). At the same time, they note that they will not fill in gaps in sentences and circle correct answers in real life.

Students perceive inconsistencies between what lecturers declare during classes and what they expect from them during exams: 'On the one hand, students are required to be creative, think independently and have original judgements and opinions. On the other hand, however, knowledge is uniformised. It is impossible to write an essay without referring to a dozen or so publications' (F, P/317). They discover paradoxical situations when a teacher chooses an essay instead of tests and

assesses it by confronting students' opinions with the views of scientific authorities. They do not understand the purpose and meaning of writing free statements when they are judged in the traditional way:

I wrote an essay about my professional identity. I knew the exact criteria and the title itself indicated that I should refer to my personal thoughts on this topic. I received a poor grade. I was disappointed because it turned out that there were too many personal threads in the paper and too few references to literature. But then it would not be the presentation of 'my' professional identity, but the vision of the textbook's author (F, A/101).

Other irregularities related to the assessment system, which were noticed by the research participants, included: too high and too low requirements, too few points (ECTS) for a subject, unclear or ill-considered criteria and exam requirements, changing them just before an exam (e.g. a written exam is replaced by an oral exam), taking a long time to publish results (e.g. the day before a retake exam), grading papers that teachers have not read, no feedback on errors, stressful forms of knowledge verification (multiple-choice tests), too little time for exams, exam questions not matched to the subject matter of a course: 'The form of colloquium leaves much to be desired. Questions are unspecified, based on the principle 'what the author meant', too detailed and inadequate. There is not enough time to answer them' (F, R/202).

The research participants suggested more frequent use of more attractive forms of examination, such as games or modern technologies (e-learning). They also pointed out that: 'Evaluating your own activity is not the best solution' (F, A/10).

Peer relations from the perspective of academic assessment

Exams and preparation for them are factors regulating relationships between students. They pointed out that thanks to team work they get to know each other better and learn cooperation. Official curricula also assume that the use of this form in the classroom will contribute to the development of social competences. The research participants admit that they conceal the fact that they are not prepared for classes and are lazy. Parasitism of some at the expense of the hard work of others leads to a sense of unfair assessment: 'Group work ... an interesting mechanism in which one person works for the assessment of several others...' (F, P/290).

It turns out that team work can develop a wrong approach to learning. Too much material to master and the belief that learning it is beyond the psychophysical possibilities make students focus primarily on the collection of material and sharing it with each other to save time and effort when preparing a presentation or preparing for an exam. Their learning style consists in assigning one person a piece of material for elaboration, but without consulting the other members of the team. Although they receive positive grades, as is clear from their statements, this way of learning deepens their belief in the chaos of academic knowledge, which is fragmented and unrelated.

Exams also reveal the development of specific relations between students. As they combine studies with professional work and additional extracurricular

activities, they particularly value their time and try to manage it well. They need the support of other students to obtain notes from classes, information on the requirements of lecturers and find a convenient place at the exam. However, they need peers who are well-prepared, provide the correct answers and allow them to copy their answers. Therefore, the preparation period for exams and the exams themselves are perceived as a time of rapid development of apparent friendships: 'A common strategy is to pretend friendship with students who do not regularly attend lectures. During exam sessions, everyone is suddenly friendly, wants to photocopy notes, talk about their problems and experiences, and after the sessions they do not speak a word' (F, A/284). Before exams, students often do each other favours: 'If you want help, you often have to repay, but in a significant way. ... those who have older friends and who know where to look and what to do are important. Individualists can rarely enjoy their success because it leads to complete rejection' (F, A/284). From the perspective of the research participants, exam success depends on collective cooperation, even if it is only momentary and lasts only during this difficult time.

From the students' perspective, an exam itself and the accompanying anxiety have many positive aspects, and they treat experiencing failures as an inseparable element of student life. They admit that in this way they learn determination and perseverance in pursuing a goal and preparing to deal with the challenges of adult life. Thanks to such situations, they discover their strengths, various types of self-reinforcement (positive thinking, sense of humour, distance to themselves and problems), which allow them to familiarise themselves with difficult situations. They also admit that university exams teach them 'to do a lot in the shortest possible time' (F, R/304) and thus prepare them for a fast-changing social reality.

Coping strategies as a feedback response to irregularities in the academic assessment system

Subjective experience related to academic assessment, as well as deficiencies, inconsistencies and shortcomings observed in this area are among the factors that generate manipulative strategies and many unfair practices. According to students' statements, academic teachers perpetuate them when they do not respond strongly enough to phenomena such as plagiarism, cheating and copying from others in examinations. In turn, their personal experiences with the various manipulative tactics used in relation to teachers confirm the effectiveness of some of them, such as making a good impression and learning to meet a teacher's expectations. For example, one of the students convinces: 'You do not need to learn everything; you only need to know what topics the teacher is particularly interested in' (F, P/53). Another effective strategy consists in pretending that you know something and: 'absorbing the teacher's attention with yourself, particularly to distract him or her from your ignorance' (M, A/102).

Students also notice the unintended consequences of non-substantive factors that determine the assessment of their work: 'studies and the way our knowledge is checked really show who can survive and adapt to the expectations of academic teachers' (F, R/23). They realise that high grades are not necessarily determined

by the amount of knowledge they possess, but by the ability to move in academic reality: 'There are people among us who may not attend classes for half a semester, but a pretty smile, some compliments and they pass the semester with high grades ...' (F, P/32), or: 'You show off with your eloquence ... in front of your lecturers and examiners – you are labelled smart and clever' (F, R/2). Students note gaps in the grading system, which underestimates honest individuals and praises those who can cheat, do not attend classes, but are resourceful. Such situations give rise to a belief in unfair assessment, discourage learning and encourage the use of various manipulation strategies:

Studies. What else do they teach us? They give us quite a painful lesson that it is not worth it. It is not worth swotting till late at night, it is not worth trying, learning and understanding. Those who do not do this but have instead acquired the ability to cheat do better or like those who write exams using knowledge which has its source in the head (F, R/23).

Another person stated:

Where is the justice? One student can honestly learn all the material and, for example, he gets a 3 and another student who cheated because, for example, he wrote a colloquium with the help of the Internet, gets a 4 or a 5. Why, then, does the educational system not do anything about it (F, P/256)?

As students notice the causes of this unethical behaviour, they can easily explain and justify them.

They admit that they also cheat in examinations for other reasons: 'Many of us use crib sheets. Why? Most often when the material has not been well explained, or when the questions look the same each year. This does not motivate us' (F, P/290). Organisational errors also lead to such behaviour: 'Studies teach us survival and cunningness. Two exams in one day and four in one week preclude reliable preparation and satisfactory grades' (F, A/166). Students also point out that the large number of unfair practices makes them an element of student culture.

Discussion

Students who are subject to assessment remain on the margins of the debates that directly concern them. Meanwhile, as the research results show, their perception of the educational environment, including their experiences related to assessment, determines their approach to learning and the actual learning outcomes (Lizzio, Wilson, and Simons, 2002; Gibbs, 2006; Pauluk, 2016). From their perspective, there are many irregularities related to the explicit and implicit aspects of assessment that generate unintended consequences, including the approach to learning and knowledge, relationships with others, as well as ethical behaviour in an academic learning environment. Sharing students' subjective experiences makes it possible to discover the various gaps and inconsistencies between assessment and the didactic process, and to identify the informal expectations and requirements of academic teachers perceived by students.

The subjective experiences of students with the assessment system and its consequences may constitute an important element of the evaluation of the quality of education conducive to undertaking corrective actions. It seems reasonable to replace the testing culture model, which to some extent emerges from the statements of the research participants and treats assessment and education as isolated activities, with a model of assessment culture supporting the process of effective learning (Dochy et al., 2007). In the context of students' statements, it is important to ensure greater coherence of both processes. Assessment requires close integration with the educational model, in which learners are genuinely active entities who influence the process of their own education, participate in the creation of curricula and selection of education content, and are responsible for the evaluation of their own work (Bound and Falchicov, 2006).

This requires creating a new educational environment from the earliest stages of education, which will assess more complex cognitive activities, social competences and the non-academic activity of students, and will constantly emphasise the importance of applying ethics in one's own and peers' behaviour.

In designing the assessment and education systems, it is helpful to know the pedagogical and psychological patterns of effective learning by students as adults, who need clearly formulated expectations and assessment criteria, feedback on deficiencies and progress, self-regulatory learning, monitoring and self-learning control, learning from experience and personal knowledge, and understanding the meaning of one's own learning and the effects of one's own work (Chickering and Gamson, 1987; Dembo, 1997; Gibbs and Simpson, 2004; Knowles, Holton, and Swanson, 2009; Dochy et al., 2007; Bound and Falchicov, 2006; Nicol and Macfarlane-Dick, 2006; Norton, 2009). In the light of the research results presented, twenty-first-century academic education also needs academic teachers who will be aware of the hidden aspects of assessment and are sensitive to the unintended outcomes they generate.

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The Hidden Aspects of Academic Assessment and its Unintended Outcomes: the Perspective of Students

Abstract

The aim of this article is to describe the hidden aspects of the academic assessment system and the unintended outcomes. In official curricula, academic teachers include an assessment system which contains, among others, methods, criteria for verifying knowledge and skills, requirements needed to obtain a certain degree and examination conditions. The results of research on the hidden curriculum show that various elements of this system lead to many unintended consequences. Assessment is embedded in a broad educational context, and the elements of the educational process and assessment enter into mutual relations. Moreover, the implementation of planned assessment elements by teachers is always connected with errors

and irregularities. Students are constantly evaluated and so they experience the unintended outcomes of this evaluation on a daily basis. Based on my own study – a qualitative analysis of the content of free statements of pedagogy students at one of Poland's universities – certain shortcomings, inconsistencies and gaps in the scope of assessment as perceived from their perspective have been identified. Based on their subjective experience related to assessment, research participants discovered the unintended outcomes of assessment. They concerned, inter alia, their approaches to academic knowledge, learning, coping strategies and peer relations.

Keywords: hidden curriculum, assessment, students, unintended outcomes

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Teacher – Lecturer, or Supporting tutor? Do and How do Teachers Check their Students’ Initial Knowledge?

Introduction

The teaching profession is one of the oldest professions in the history of human culture and civilization (Ascenzi, Patrizi, 2016; SEIP, 1992; KAPP, 1983; Nodzyńska, 2012a–2012d; Bojarski). It has a special symbolism and rank. Theorists and practitioners of various scientific disciplines have been interested in the person of the teacher since the beginning (Savina, 2018). Teacher qualifications, competences, and personality traits have a decisive impact on the didactic and educational achievements of students, the effectiveness of contemporary school activities, as well as the quality of education (Goset Poblete, Navarrete Ponce, 2017; Anders, Kunter, Brunner, 2010). The teacher’s role is often invaluable and his responsibility underestimated, because it is the teacher who shapes the minds of subsequent generations of students.

Background

We live in a time when change is the only constant, and learning and acquiring new skills throughout life is crucial at all levels. Therefore, the role of the teacher is evolving, because – in contrast to dying professions – in the 21st century, the teacher will be needed in a new, intense, and constantly redefining role. In connection with these changes, eSchoolNews asked its readers the question on the desired qualifications of the 21st century teacher. The most frequent voices were that: the teacher stopped being an “actor on the stage” and started to act as a supporting tutor (Kowalczyk, 2011). To change from the role of a teacher-lecturer to the role of a supporting tutor one needs to change the approach to education. From teacher-centered education, i.e. transmission of knowledge, one should move to student-centered education, i.e. pedagogical constructivism. In this case, we assume that the student’s knowledge arises as a result of his activity, is constructed in his mind and the acquisition of knowledge is a process that takes place in interaction with the educational environment. Therefore, the teacher cannot pass on theoretical concepts to the child by explaining them, even clear and very accurate, even if he illustrates them with specific examples. For, contrary to popular belief, effective teaching is not about the teacher giving ready knowledge, and the student is to learn it, remember

it, and then recreate it. The learner should discover knowledge as much as possible. For knowledge is not only facts and information, but also the ability to put them into practice.

The schematic plan of such a constructivist lesson includes 5 stages:

1. organizational activities, discussion of the topic of the lesson, discussion of the objectives of the lesson,
2. orientation and recognition of colloquial knowledge of students, disclosure of initial ideas or knowledge, ideas and experiences of the student and possible misconceptions,
3. restructuring or reconstruction of knowledge,
4. ability to apply new knowledge, new information, skills and apply them in various situations and contexts,
5. summary of the lesson, the student noticing changes in his/her previous knowledge and comparing it with previous knowledge.

The most important from the point of view of creating new knowledge are points 3 and 4. However, it is difficult to build new knowledge without knowing the initial knowledge of students including their misconceptions. The teacher, knowing his students, should be able to use their previous knowledge and experience in building meaning, the relationship between the known and the unknown. That is why point 2 is so important – the teacher's acquaintance with the students' initial knowledge. Equally important is the last element – checking the correctness of the acquired content.

Research

It was decided to investigate how secondary school teachers in the Małopolskie voivodeship are able to use the students' previous knowledge and experience in building meaning and connections between the known and the unknown.

Main hypothesis: High school teachers are able to use the previous knowledge and experience of students in the process of constructing new knowledge.

Specific hypotheses: The ability to use students' previous knowledge and experience depends on:

1. teacher's seniority (a teacher's longer seniority should positively affect his ability to check students' initial knowledge),
2. teacher's level of education (a higher level of teacher's education should positively affect his ability to check students' initial knowledge),
3. applied methods/techniques of checking knowledge (modern methods/techniques of checking knowledge should allow the teacher to check the initial knowledge of students more accurately),
4. length of time for checking previous knowledge (longer time for checking knowledge should allow the teacher to check the students' initial knowledge more accurately).

To be able to use students' knowledge, one must first study it. Therefore, the initial indicators of the ability to use students' initial knowledge were considered the

length of time to check the initial knowledge, selection of tools, and own teachers' opinions.

Results and discussion

The study involved 110 high school teachers from the Małopolska region who previously participated in training in the use of new communication technologies (ICT) in school education. The research was carried out about 6 months after the teachers completed the ICT course, so they had time for practical use of newly learned ICT techniques in their schools. In the sample examined, 78.2% were women and 21.8% were men. This corresponds to the average statistical gender distribution in the teacher population since in total women constitute about 80% of teachers of general subjects in schools for children and youth ("Raport o stanie edukacji – Liczą się nauczyciele", Instytut Badań Edukacyjnych). Teachers were of different age (cf. Table 1) – most teachers were in the group from 40 to 50 years old, which also corresponds to statistical data because according to "Raport o stanie edukacji – Liczą się nauczyciele" the average age of a teacher in Poland in 2013 was 42 years. The seniority of the teaching profession (Table 2) was strongly correlated with the age of teachers (the correlation coefficient rho Shapiro is $r = 0.91$). There was no correlation between gender in age ($r = 0.03$) and gender and seniority ($r = -0.01$).

Table 1. The age of the teachers surveyed (own study)

Age of teachers	up to 30 years	between 30 and 35	between 35 and 40	between 40 and 45	between 45 and 50	between 50 and 55	more than 55 years
percent	10%	12.7%	11.8%	22.7%	22.7%	14.5%	5.5%

Table 2. Teachers' seniority (own study)

Teachers' seniority	up to 5 years	between 5 and 10	between 10 and 15	between 15 and 20	between 20 and 25	between 25 and 30	more than 30 years
percent	16.4%	10.0%	11.8%	21.8%	21.8%	10.9%	0%

All surveyed teachers had an appropriate subject and pedagogical education (completed master's studies), in addition 19.1% completed post-graduate studies and 9.1% had a doctoral degree. There was no correlation between the education of teachers and their sex ($r = 0.00$), age ($r = 0.09$) or seniority ($r = -0.00$).

Teachers worked in various size centers: in the countryside (11.8%), in a small city – up to 20,000 inhabitants (19.1%), in a medium city – from 20,000 to 100,000 inhabitants (41.8%), a large city over 100,000 residents (27.3%). Also, no correlation was found between the place of residence of teachers and their education ($r = 0.12$), gender ($r = 0.08$), age ($r = -0.15$) or seniority ($r = -0.12$).

The survey questionnaire contained 22 questions, of which six were related to methods, techniques and tools that teachers use to study students' initial knowledge.

The first question concerned the frequency of individual methods to check students' initial knowledge. Teachers had 5 methods to check the initial knowledge:

- two traditional:

- The rhetorical question “What do you already know about this topic?”,
- The question “What do you already know about this topic?” along with the discussion,
- two modern (for which ICT can be used, these methods were learned by teachers during training on the use of ICT in education):
 - Quiz/test from new material,
 - Concept maps,
- and tasks aimed at capturing students’ misconceptions.

The teachers’ task was to indicate how often they use a given method: they had 4 answers to choose from: never, sporadically (less than 25% of lessons), sometimes (for about 25–45% of lessons), every second lesson (for 50% of lessons), very often (over 50% of lessons). The collected results are presented in Table 3.

Table 3. Percentage of teachers’ answers to question 1: *Please indicate how often you use individual elements of researching the students’ initial knowledge in teaching* (own study)

	The rhetorical question “What do you already know about this topic?”	The question “What do you already know about this topic?” and discussion	Quiz/test at the beginning of the lesson from NEW material	Tasks to check students’ misconceptions	Concept maps
never	13	1	65	21	29
sporadically (less than 25% of lessons)	26	15	26	47	43
sometimes (for about 25–45% of lessons)	20	26	15	24	28
every second lesson (for 50% of lessons)	27	46	4	13	8
very often (over 50% of lessons)	24	22	0	5	2

The collected data shows that the most commonly used method of checking the initial knowledge of students by teachers is the question “What do you already know about this topic?” along with the discussion – every second lesson or more often is used by up to 68% of teachers surveyed. The rhetorical question “What do you already know about this subject?” is often used – as much as 51% use this absolutely ineffective solution (see Figure 1). It may be worrying that as many as 65% of the respondents do not check the initial knowledge of students using quizzes/tests, despite the fact that in the earlier ICT course for teachers they were presented with these techniques. Equally, 21% and 29% of teachers never examine student misconceptions or use concept maps to check students’ initial knowledge.

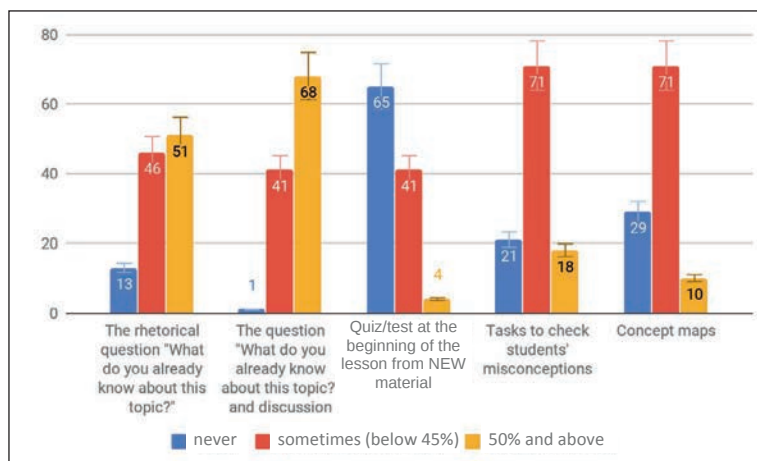


Fig. 1. Answers grouped into three categories (own study)

The second question was an open question and was: Do you use any other methods to check the students' initial knowledge? (if the answer is YES, please specify which ones). 99 teachers chose the answer NO to this question. The remaining 11 people listed different methods (some people two or more). Four people mentioned exercises, three problem questions, one discussion, games, educational project, exchange of information. 10 teachers also mentioned quiz – although it was mentioned in the first question.

It can therefore be concluded that teachers do not use a variety of methods to check students' initial knowledge. And the main source of their knowledge of what information their students have is the traditional question, "What do you already know about it?"

It was decided to check whether there is a correlation between gender and the way of checking initial knowledge. Only in the case of the question "What do you already know about this topic?" along with the discussion a weak correlation was found ($r = 0.20$), women more often than men chose this way of checking knowledge. It was also decided to check whether there is a correlation between the age/seniority of the teacher's work and the method of checking the students' initial knowledge. Only in the case of the question "What do you already know about this topic?" along with the discussion, a weak correlation was found ($r = -0.28$; $r = 0.21$), older teachers and teachers with longer experience less frequently than younger chose this method of checking knowledge. Correlations between the teacher's level of education and the method of checking initial knowledge were also examined. Weak correlation ($r = 0.28$) occurs when using the Quiz/test from new material, i.e. the more educated the teacher, the more often he uses this method to check the students' initial knowledge. No correlation was found between the size of the city in which the teacher teaches and the way of checking initial knowledge.

Therefore, it can be said that women more often than men supplement the question "What do you already know about this topic?" with a discussion, while older

teachers and teachers with longer experience less frequently than younger choose this type of knowledge checking. And the more educated the teacher, the more often he uses the Quiz/test from new material as a check of the students' initial knowledge.

The third question was about the time teachers spend checking their students' initial knowledge. The vast majority of teachers (48.2%) spend 3 to 6 minutes to check their initial knowledge. Fewer teachers (29.1%) spend 1 to 3 minutes to check their initial knowledge, and 19.1% spend a little more time checking their students' initial knowledge – from 7 to 10 minutes. Only 2.7% of teachers check students' initial knowledge for more than 10 minutes and 0.9% of teachers do not check this knowledge at all.

There was no correlation between the time to check the students' initial knowledge when using the Rhetorical question "What do you already know about this topic?", Questions "What do you already know about this topic?" – along with the discussion and use of Concept Maps. There was a weak correlation ($r = 0.28$) between the time of checking the students' initial knowledge when using Tasks aimed at capturing students' misconceptions – this means that teachers who use this method more often also check the students' initial knowledge longer. An even stronger correlation ($r = 0.45$) can be observed in the time of checking the initial knowledge of students and the use of Quiz/test from a new material – the more often teachers use this method to check students' initial knowledge, the longer it takes to check their knowledge. There was no correlation between the amount of time spent on checking knowledge and gender ($r = 0.01$), age ($r = -0.03$), seniority ($r = -0.16$), size of the city ($r = 0.16$). Only a weak correlation ($r = 0.26$) was found between the amount of time spent on checking knowledge and the level of teacher's education – teachers with a higher degree of education longer check the students' initial knowledge.

It seems that the time spent checking the students' initial knowledge is insufficient, especially in the context of how to check this knowledge (3–6 minutes in a well-designed initial test may be sufficient, while a 3–6 minute discussion will not give the teacher a complete picture of his students' knowledge). This is confirmed by the teachers' answers to the **fourth question**: Do you think that after checking the students' initial knowledge, you are well versed in what your students already know and can? A five-point Likert scale was used, with answers: 1 No – it seems to me that I have only random information about the knowledge of individual students, and 5 – Yes, I am sure that I know perfectly well what my students know and can. The answers of the teachers are shown in the chart below (Fig. 2). It can be said that almost half (44.5%) of teachers declare that on average they know what their students know. 25.5% of teachers are not oriented (summed up answers 1 and 2) and only 30% of teachers are familiar with the knowledge already possessed by their students (summed up answers 4 and 5). It seems that this level of recognition of the students' initial knowledge is absolutely insufficient to build new knowledge on it. When we do not know the basics of students' knowledge but we also do not know what misconceptions they have in their minds, it is difficult for us to construct the building of knowledge on such uncertain and perhaps erroneous foundations.

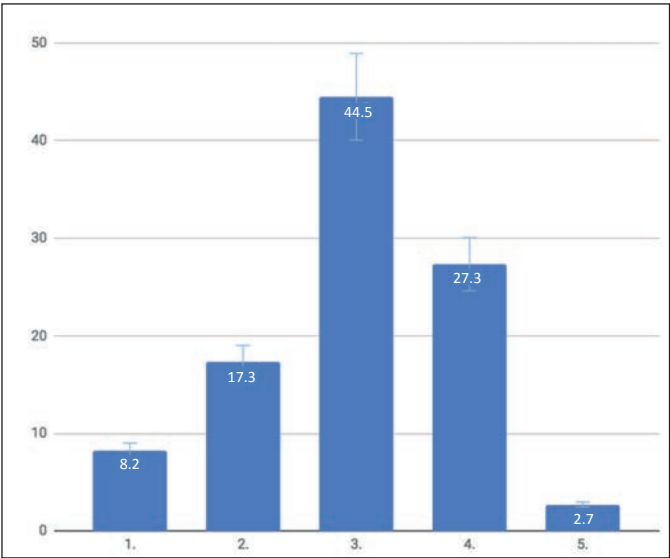


Fig. 2. Teachers’ answers to the fourth question: Do you think that after checking the students’ initial knowledge, you are well versed in what your students already know and can? 1 – No – it seems to me that I only have random information about the knowledge of individual students 5 – Yes, I’m sure I know perfectly well what my students know and can (own study).

No correlation was found between the teachers’ belief in the knowledge of their students’ knowledge and the methods used to check this knowledge (correlation coefficients for individual methods in Table 4).

Table 4. Correlation coefficients for individual methods of checking the initial knowledge of students (own study)

Theoretical question „What do you already know about this topic?”	The question „What do you already know about this topic?” and discussion	Tests at the beginning of the lesson (from NEW material)	Tasks aimed at capturing students’ misconceptions	Concept maps
0.15	0.10	0.11	0.15	-0.06

Interestingly, only a weak correlation (0.02) was found between the time allocated to checking the students’ initial knowledge and the teacher’s belief that he actually knows what his students already know. So, not always, the teacher checking the students’ initial knowledge for a longer period of time made him more convinced that he knew the facts. There was also no correlation between the teachers’ belief in the knowledge of their students’ knowledge and gender, age, seniority as a teacher, education level, or city size (correlation coefficients for individual methods in Table 5).

Table 5. Correlation coefficients between teachers' beliefs in their students' knowledge and gender, age, seniority as a teacher, level of education or size of the city (own study)

sex	age (in years)	work experience as a teacher	level of education	size of the city
-0.09	-0.17	-0.17	-0.08	0.00

The fifth question was about teacher motivation and it was: What motivates you to check the students' initial knowledge in the teaching process. Teachers could choose any number of answers from 9 or enter their own. The answers used in the questionnaire come from previous consultations with teachers.

Table 6. Teachers' answers to the fifth question. What motivates you to check the students' initial knowledge in the teaching process (own study)

I need to know what students already know	70.9%
students are activated during classes	63.6%
motivates students to learn the subject	38.2%
increases interest in the subject	37.3%
makes students absorb information faster	36.4%
I think that this is an essential element of the lesson	35.5%
positively orientates students to the subject being taught	29.1%
I need to know their misconception	13.6%
ensures peace during classes	5.5%
other	2.4%

In most cases (over 70%), teachers declared that they needed to know what their students already knew. However, this declaration contradicts the answer to question 4 – because, after checking the students' initial knowledge, most teachers still do not know their students' initial knowledge (25.5%) or are not sure of their knowledge on this topic (44.5%). Many teachers (over 63%) point to the activating role of knowledge checking – however, in the light of previous findings, this point can also be challenged. Teachers check the students' initial knowledge briefly (about 3–6 minutes), usually by asking them only general questions, so it is hard to expect them to activate the majority of students. Many teachers say that checking initial knowledge motivates students, increases their interest in the subject, or positively orientates students to a given subject – however, no relevant evidence has been found in the literature on the subject.

The sixth question was about the teachers' lack of motivation to check the students' initial knowledge and it was: What doesn't motivate you to check the students' initial knowledge in the teaching process? Also in this case, the answers used in the questionnaire come from previous consultations with teachers. The most common answer of teachers to this question was the statement "it takes too much time" – as many as 58% of the surveyed teachers answered. However, as statistical calculations showed, there is no correlation ($r = -0.05$) between the teachers' opinion

regarding the time of checking the knowledge and the actual time of the teacher checking the student's initial knowledge (compare Fig. 3).

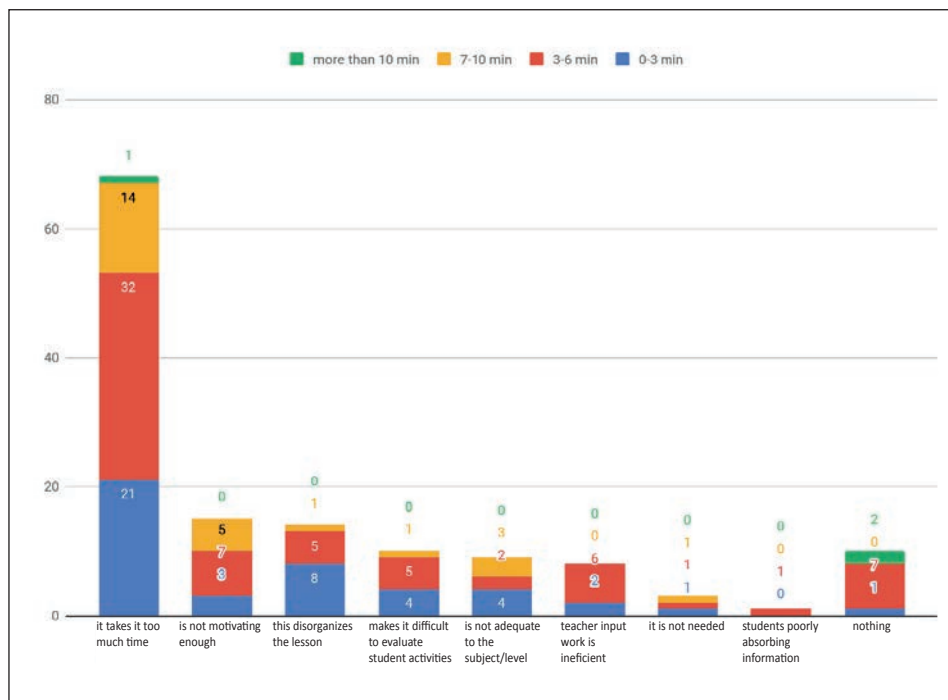


Fig. 3. Teachers' answers to question six: What doesn't motivate you to check the students' initial knowledge in the teaching process? – the chart also indicates the time declared by teachers to check the initial knowledge (own study)

Summary

The research conducted by secondary school teachers in the Małopolskie Voivodeship shows that in most cases teachers are not able to use the previous knowledge and experience of students in the process of constructing new knowledge. Lack of this skill is not strongly correlated with the length of work, degree of education, methods or techniques of checking knowledge or the length of this process. Although the teachers declare that they know how important this element of the lesson is, however, the time devoted to checking the initial knowledge and the methods of checking it mean that even the teachers themselves believe that their activities are insufficient. It seems, therefore, that despite the 21st century, most teachers still play the role of a traditional teacher, reluctantly moving away from the transmission teaching model. In order to change this trend, it would be necessary to introduce constructivist teaching not only to the curriculum of future teachers but as a permanent method of teaching at universities.

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Teacher – Lecturer, or Supporting tutor?**Do and How do Teachers Check their Students' Initial Knowledge?****Abstract**

Colloquial and initial knowledge that students have is the foundation on which the teacher builds a further building of knowledge. Therefore, before starting to teach, the teacher must know what is the scope of knowledge of his students and whether their knowledge does not contain misconceptions.

The article presents the results of research on over 100 high school teachers from the Małopolska voivodeship. It was examined whether and how teachers check the students' initial knowledge. It was checked whether the teacher's education, seniority, age, and gender have an impact on the methods used to check the students' initial knowledge. It was also examined whether the time of checking initial knowledge by teachers was sufficient.

Keywords: common and initial knowledge; constructivist teaching

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Students' Opinion on Compulsory Distance Learning at the Pedagogical University of Krakow

Introduction

For thousand years education has been delivered in a traditional way with a teacher and student present in a real space: a school or university classroom. However, since the traditional classes for students were suspended¹ universities have had to promptly adapt to a new situation. The pandemic broke out suddenly and academic education faced the unexpected challenge of a total change of teaching methods overnight. In view of the necessity to adopt emergency measures in an effort to prevent and contain COVID-19 new solutions had to be introduced in schools, educational centers and universities to facilitate teaching in changed organizational conditions and with distance learning methods and techniques.²

Were we prepared for that? Honestly – no, either legally,³ infrastructurally or methodologically. Students were not prepared for those changes either. Education for them in the time of the COVID-19 pandemic was a challenge, Black Swan – an unexpected situation which suddenly fell to them (and also to academic teachers) and took its toll.⁴

¹ The Regulation of the Ministry of Science and Higher Education of 25th March on temporary limitation of functioning of some higher education entities for the reason of prevention and response to COVID-19 (ammended)/ Rozporządzenie Ministra Nauki i Szkolnictwa Wyższego z dnia 25 marca 2020 r. w sprawie czasowego ograniczenia funkcjonowania niektórych podmiotów systemu szkolnictwa wyższego i nauki w związku z zapobieganiem, przeciwdziałaniem i zwalczaniem COVID-19 (z późniejszymi zmianami).

² See: recommendations of the Ministry of Science and Higher Education on education delivered with distance teaching methods and techniques. *Rekomendacje Ministerstwa Nauki i Szkolnictwa Wyższego w sprawie kształcenia prowadzonego z wykorzystaniem metod i technik kształcenia na odległość*. Accessed July 20, 2020. <https://www.gov.pl/web/nauka/ksztalcenie-zdalne-na-uczelniach>. *Kształcenie na odległość. Poradnik dla szkół* (accessed: 20.07.2020).

³ Pursuant to the Regulation of the Ministry of Science and Higher Education of 27th September 2018 on studies at least 50% of classes shall be completed in a traditional mode not online.

⁴ As Nassim Taleb claims, this kind of events (the coronavirus pandemic forced compulsory distance education) although influence the fate of the world, they are not foreseeable. Only after they happen, we can try to rationalize them (Taleb, 2014).

It is worth noting that distance learning in Poland before the pandemic was treated unfairly – as an additional element of minor importance in the proper educational trend. For years only circles of enthusiasts – academic teachers had taken an interest in distance learning. While delivering traditional courses they additionally used distance learning platforms. Generally, in decision-makers' circles on both ministerial and university levels there was distrust toward distance learning which would never be on a par with traditional education because it did not ensure a proper master-student relationship.

It should not be forgotten that the need for the widespread distance learning results from many contemporary social phenomena, including necessity of life – long learning of members of the information society as their knowledge and competencies are getting outdated. Distance learning – blended learning or online education is defined as one of trends, which in the nearest future will influence the teaching, learning and querying of the university education (*Educase...*, 2019; *Educase...*, 2020).

It would be difficult to disagree that the distance learning and experience gained during the pandemic will be a permanent element of university education, certainly not as the only one but an accompanying teaching method. It has appeared that distance learning will be with us and gradually will become a standard. Thus, the Ministry of Science and Higher Education aims to increase a maximum number of points possible to gain for distance learning courses. It means that new students will be able to complete most courses in a form of distance learning⁵. Moreover, for the reasons of the unpredictable epidemic situation (guidelines issued by the Ministry of Science and Higher Education on 18th May 2020) many Polish universities (including the Pedagogical University of Krakow) decided on a hybrid form of courses in the academic year 2020/2021.⁶ Practically, it means that since October the students will receive education in a following model: lectures for groups over fifty students in distance learning (in a synchronous interaction), classes, tutorials, seminars, laboratories in a traditional or hybrid forms.⁷

Distance learning – the concept and general characteristics

Distance learning (distance teaching, distance education, tele-education, e-learning) is a method of learning which instead of direct contact of a student – teacher and a student – a group of other students (typical of traditional education) uses indirect contact (e.g.: radio, television, traditional mail, computer screen, ICT,

⁵ The amendment to the regulation on studies prepared by the science ministry changes the rule about number of ECTS points possible to gain for distance learning courses of general academic profile – the limit of 50% is changed to 75% of total number of points necessary to complete studies at a particular level. This entails higher number of courses possible to complete online. This project does not eliminate the possibility to organize traditional classes in a university venue or affiliate.

⁶ These rules can change depending on the epidemic situation in autumn 2020.

⁷ The detail conditions for organization of classes are defined in the deputy Chancellor's Order (portfolio: education): Zarządzenie Nr RD/Z.0201-5/2020 Prorektora ds. Kształcenia Uniwersytetu Pedagogicznego im. Komisji Edukacji Narodowej w Krakowie z dnia 6 lipca 2020 roku w sprawie organizacji zajęć dydaktycznych w roku akademickim 2020/2021.

Internet). Thus, distance learning involves gaining knowledge independently without attending traditional lessons – a considerable input of own work with limited direct contact with school. Every distance learner sets their goal adjusted to their needs, conditions and lifestyle (Juszczak, 2003: 124).

Distance learning has not started today – its beginnings date back at the turn of the 17th and 18th century – however, a real breakthrough in this type of education was achieved with a common use of the Internet. This new media providing the highest level of interactions and global communication has shaped a new paradigm in education and facilitated the student-student and student-teacher interactions, which considerably influenced the effectiveness of distance learning and the range of teaching impact (Skrzydlewski, Strykowski, 2004: 394–442).

Distance education can be delivered in many ways. Especially the methods and techniques (a catalogue of tools and techniques of distance learning is not completed) can be categorized (Wodecki, 2006: 10):

- 1) By the availability in time:
 - a) synchronous – live learning with digital media, e.g.: a chat, communicator, videoconference, online classes;
 - b) asynchronous – the contact of participants and a tutor is not in real time, information exchange between a lecturer and student is possible via email, chat or forum.
- 2) By techniques used:
 - a) traditional mail, radio, television;
 - b) computer-based learning;
 - c) Internet-based learning (databases, with communication tools).
- 3) By the student-teacher interaction:
 - a) courses delivered by a teacher (asynchronous or synchronous);
 - b) courses without a teacher (e.g.: multimedia courses);
 - c) self-study (with an access to digital information).
- 4) By the relation to traditional learning:
 - a) distance learning as a complementary component of traditional learning, e.g.: virtual camps;
 - b) distance learning replacing traditional learning (for the whole curriculum or the whole particular subject).
- 5) By the degree of formalizing:
 - a) “formal” learning – strictly connected with the university curriculum, structured;
 - b) “informal” learning – not being an integral part of the academic education.

According to the distance learning and teaching theory (at present mainly via Internet) the role of a student and a teacher in a teaching system also undergoes changes. “The learner is a subjective being in that process and knowledge is a dynamic process of his interactions with the world. The process of gaining knowledge involves discovering the rules that govern the reality. Tutor accompanies a learner in a process of exploring the world and helps him/her to understand the objective reality and apply the gained knowledge” (Barczak et al., 2006: 111). This change influences also teaching materials which should stimulate students' high creativity,

diversify learning and match students' capacity. Then, it is worth indicating several basic rules for designing online classes. They are (*Ibidem*):

- motivating students – various communication forms;
- defining the areas of knowledge necessary to gain – planning the teaching content;
- relating to the previously gained knowledge, phenomena and facts;
- presenting the teaching content – activation methods;
- supporting learners – clues helping to understand the content;
- encouraging students to act – environments friendly for various students' activities;
- delivering feedback for students' self-evaluation and progress – guidelines, for example in the separate references/links;
- assessment of the learning process – individual or in a form of project group work;
- inspiring (supporting, encouraging) to consolidate and broaden acquired knowledge and skills – additional reading list, links, glossary.

Along commonly cited advantages of distance learning there are (Siemieniecki, 2005: 14–15):

- individualized learning;
- an access to various information sources;
- flexibility of enrollment for the course;
- the free choice of the learning location, speed and time;
- developing independence and self-discipline;
- eliminating cost of commuting and accommodation in the educational venues;
- possibility for the disabled or single mothers to gain education and qualifications.

The disadvantages of this form of education are as follows: limited human interactions, more time devoted to prepare materials for distance learning, learners' problems with motivation and self-discipline, unequal "vulnerability of subjects to e-learning"⁸, technical problems, high costs incurred by institutions implementing distance learning systems.

It is worth remembering that it is a learner who plays the main role in distance education. The key to successful education of that type is: self-confidence, positive thinking, strong motivation to achieve goals, communicative skills, collaborative learning and ICT literacy.

The teacher here acts as a facilitator who supports learning but does not control it directly – influences the teaching process by motivating students and building their self-confidence, helping (answers questions, steers discussions) providing feedback (commentary, marks), creating atmosphere (inspiration for help and cooperation with other learners) monitoring (observing learners' activities).

As it has been indicated above, so far distance education in state universities in Poland has been treated as an addition of minor importance to the proper educational trend. However, the time of the pandemic has dramatically changed this situation,

⁸ This means that not all subjects are equally suited for distance learning. This term can be used when teaching methods for a particular subject in traditional and distance teaching slightly vary (Potyrała, 2017: 186).

whether the universities wanted to or not, they had to start – practically overnight – moving from traditional teaching to distance teaching. Thus, distance education became a fact. Consequently, the question arises: how the time of “emergency” education during the pandemic was exploited by the academic community, especially by students? Was this time not wasted? What findings should be drawn from that situation? Can it be claimed that university education will be different after the epidemic from the one before?

Methodology

For the pandemic reason since the 12th March in the whole Poland not only in schools and kindergartens the traditional classes, childcare and socio-educational training for children, as well as university education controlled by the Ministry of Science and Higher Education were suspended. Therefore, to limit the negative effects of temporary teaching suspension and a delay of completing course programs, the traditional teaching was replaced with distance teaching under the regulation, even if this form of teaching was not planned in a particular course program. Since 25th March distance teaching has become a fact and a duty – universities and schools moved classes to the virtual world. The classes, lectures, students' service including examinations and thesis examinations were delivered in the network. This situation endured till the end of a school and academic year 2019/2020. Since the beginning of September children and the are coming back to school and at the beginning of October students are coming back to universities, although in a slightly different form than before the pandemic. There are indications that since October the lectures will be delivered in a form of distance learning and classes – hybrid, even if some universities consider delivering selected classes in a form of distance learning on regular basis.

During the pandemic the educational practice included such tools as Moodle, MS Teams, Zoom or Hangouts. Using these tools, teachers and students could meet in virtual classrooms to complete classes whereas teaching materials were provided for example on Moodle. How then, as the result of the suspension of the education for universities and consequently for students, was the educational routine in Pedagogical University like? What was students' opinion on distance learning in university “venues”? Did students meet this new challenge? What problems in the time of the pandemic did they have during classes delivered with the methods and techniques of distance learning?

The students of the Pedagogical University of Krakow were asked about these issues and other ones related to commonly delivered distance learning in the time of the coronavirus to verify their opinions. The aim of the analysis was the distance education in the students' eyes and their assessment of distance education.

833 students of the Pedagogical University from almost all faculties, course types and levels participated in the research conducted with the method of surveying – its basic function is to collect data about facts, phenomena, processes or events, i.e.: to canvass respondents' views and opinions (Łobocki, 2006: 243–244). At the turn

of May and June 2020 the respondents were asked – via email⁹ – to answer almost 30 questions (excluding questions about basic data about a person – an imprint). The vast majority of respondents appeared to be women (84%) between 21–23 years of age (49%), of full-course studies (75.5%) of the first degree (57.1%).

The survey was in a form of a questionnaire with questions about distance learning divided into several groups (themes). Thus, the questionnaire included – following the funnel approach – closed questions about general aspects of distance education, and then questions drilling down to a more specific point in each, asking for more and more detail at each level, i.e. referring to distance education before and after the pandemic, distance examination session and the assessment of distance learning. Moreover, at the end of the questionnaire¹⁰ respondents were asked an open question: What are your opinions/thoughts/observations about the commonly binding compulsory distance education?

Analysis of the results

First of all, the respondents were to provide answers about the general issues of distance education. The vast majority (almost 90%) declared that they understand what distance education is about and what are its characteristics and almost 80% of respondents are familiar with its teaching methodology. The answers about distance teaching models were worse – only almost 30% students declared they are familiar with synchronous and asynchronous distance education.

Almost half of the students (47.8%) declares that they participated in various distance learning courses before the pandemic. Mostly these courses were: health and safety training for students (78.4%), library training (67.8%), large lectures (42.5%) and classes to compensate for cancelled ones (24%). The listed classes were delivered on the Moodle platform, as students declared (95.8%) in a form of tests, survey, worksheets to consolidate knowledge and lecture content provided by a teacher through traditional mail or in a cloud (38.8%).

Another group of questions included specific questions related to the general ones. They were about “emergency” education during the pandemic. Students declared that:

- at the time when the compulsory distance education commenced in most cases lecturers ensured that the crucial information about organization of distance learning classes, methods and techniques reach the students (40.2%), 25.5% respondents claim – nobody informed them about that; moreover 84.4% of respondents could not choose the communication channels for online learning (this was decided by lecturers), what is more they used various platforms/tools for distance learning for the courses of their studies (48.5%), although it is not a problem for them;

⁹ The questionnaire form was sent by university email to all students of the Pedagogical University (the accounts with a domain: student.up.krakow.pl were used) with a help from Mss. Edyta Kowalik. The survey was anonymous and voluntary.

¹⁰ The questionnaire form was designed in Google Forms and is available at: <https://forms.gle/ooqHn6YYVqVHajBS6>. The function of answering is blocked at present.

- for the distance learning classes at university they mostly used Moodle platform (87.3%) and a team work center on Microsoft 365 platform – MS Teams (93%), moreover ZOOM Cloud Meetings (26.3%) and Skype (15.7%); among the applications for quizzes and surveys as an activation element of distance learning there were mostly Google Forms (41.4%) and Microsoft Forms (37.2%);
- the forms of classes varied depending on their type – lectures were mostly delivered in an asynchronous form (lecture content sent via email: 51%), similarly classes, tutorials, laboratories and seminars. This does not mean that there were no other forms (quite a considerable number of respondents mentioned classes on Teams, courses on Moodle and videoconferences for lectures); emailing was a predominant tool for consultations with lecturers;
- the number of respondents who experienced during their classes three main activation forms for distance learning is comparatively similar, i.e.: regular contact with a teacher (38.2%), various communication forms (43%) and a feedback (25%), whereas the most often mentioned online teaching methods were: presentation of teaching materials, e.g.: by delivering knowledge in various forms on platforms (43.9%), explaining, informing about the content, e.g.: by communicating goals and presenting the most important terms (39.9%), and relating to the previously presented knowledge, e.g.: references to already familiar rules, phenomenon and facts (33%);
- during distances education respondents encountered problems with: an Internet connection (55.6%) and equipment, e.g.: a camera (42.4%), the lack of feedback from a teacher (41.3%), teaching programs not adjusted to students' capabilities and well-being (39.7%), as well as the lack of preparation for distance learning classes (38.7%); it is worth noticing that 67.9% of respondents faced a problem of spending too much time in front of the computer and educational overburdening (60% of students complained about the overload of self-study materials, complicated or even impossible tasks to do individually);
- this form of education did not meet their preferences, almost half of students had a difficulty with self-organizations, self-esteem and being systematic. They also lack a direct student-teacher contact.

The survey was conducted at the end of the summer semester and therefore, students were asked to assess the approaching examination session. Thus, 60% of respondents expressed their concern about the approaching session which was to be in a distance learning form. Among the most often listed concerns there were: technical problems, stress, keeping deadlines for overload of credit assignments, unclear examination rules, fear if the knowledge gained this way is sufficient to pass examinations in a given subject, which generally means fear of the unknown.

The last theme of survey questions aim to assess the distance education which the students of the Pedagogical University experienced. 34% of students declared that in that situation this form of education worked out and it is a good educational solution during the pandemic. When it comes to assessment of distance education, over 55.5% of students claimed that distance learning classes are worse than traditional ones, and distance education can considerably influence their marks and credits for particular subjects they receive or not, as well as the way they "tackle"

the examination requirements in the approaching examination session (32%). One third (1/3) of respondents believed also that distance education can cause a decrease in their knowledge and progress during the pandemic.

Summary and conclusions

At present, the experiences lead to the reflections that the world after containing the pandemic will not be the same as before the pandemic outbreak. The necessity to deliver education at distance has proved that distance education cannot be disregarded not only in the time of pandemic and perhaps it should become a permanent element of Polish educational system. And although most universities believe that they have handled the situation it is worth considering what in fact is a “bottleneck” of digital education.

The analysis of the results of the survey leads to several basic conclusions:

- 1) Students in distance learning have a superficial knowledge about the fundamentals of distance education, which is typical of the contemporary generation of young people, the so-called multitaskers. Multitasking causes the brain of people who do multitasking jobs to lose effectiveness and move to a superficial mode of working. Here definitely the deep knowledge (among others cause-effect knowledge) is important and teachers should ensure its development, e.g.: by dexterously organized and managed distance learning environment.
- 2) Effective distance education involves moving from the traditional model of education towards the constructive model, where a learner creates knowledge on their own drawing on experience and own individual or group activity and a teacher steers the learning process. Entering the mode of distance education requires not only different competencies (among others: self-organization, self-esteem, being systematic) from students but first of all proper preparation of teachers. It is necessary to adapt digital teaching methods and search for unconventional application of digital tools which enable a teacher to follow the teaching strategy focused on problem-solving, project work and teamwork, and first of all develop digital competencies. There should be less of teaching with giving methods, which unfortunately dominate, and more with activation methods especially those concentrating on online cooperation. Moving from classes in an asynchronous mode partially (transmission but noninteraction) toward classes in synchronous mode with an audio-video contact and ongoing revision of students' progress. Asynchronous communication can be a key to a successful teamwork. Tasks and comments exchange or emailing (which, however, have a lot of drawback) work out for discussions in which everyone must be familiar with information and, if needed, prepare their answer. So that, everyone is informed but can react when is ready.
- 3) The time of distance education is a difficult time, not only because of new formula for classes but first of all digital overload. Extended screen time, information overload, isolation from friends and the lack of the learner-master contact – i.e. the most often listed drawbacks of distance learning – can be a source of numerous problems, cause the respondents' poor mental and physical well-being. This issue is discussed in the report on the scientific research “Zdalne

nauczanie a adaptacja do warunków społecznych w czasie epidemii koronawirusa" (Ptaszek et al., 2020)

- 4) Distance learning can worsen the education quality and influence the final results of the students who finish the academic year. Perhaps they lack one of the key competencies of the 21st century, i.e.: ability to learn and the knowledge on how to improve our brain functioning to better acquire new information, remember it and effectively use it in the future. This is metacognition which also means meta learning. In other words, "the learning process must be consciously managed to be effective, to engage deep brain structures and give permanent effects" (Zdybel, 2015: 55). Thus, it is necessary to initiate learning, planning strategies to solve, monitoring processes of understanding, evaluating own progress in relation to accepted goals and criteria, modifying plan or the way the task should be completed in case of problems or realizing own educational needs. Perhaps it is high time to not only teach students but also teach them how to learn – which is important from the self-education point of view.

The coronavirus pandemic has accelerated the common use of distance education in Polish schools and universities and almost immediately enforced new legal solutions which consequently permitted new forms of education. Hopefully the developed good practices and tamed new technologies will enable schools and universities to be leaders of digital transformation and not to back on proven analog track when the time of the pandemic finishes.

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Students' Opinion on Compulsory Distance Learning at the Pedagogical University of Krakow

Abstract

The coronavirus pandemic has introduced a number of restrictions. One of them was the closure of schools, educational institutions and universities. Compulsory distance learning has started, including at the university level.

Until now, distance education in Poland has been treated at state universities as an unimportant addition to the mainstream of education. However, the time of the pandemic changed this situation radically, whether the universities wanted it or not, they had to start – practically overnight – the process of transition from traditional to distance education. And, which raises the question: how the time of “emergency” education during a pandemic was used by the academic community. What did the didactic everyday life at the Pedagogical University look like, in connection with the suspension of classes for universities and, consequently, for students? What was the opinion of students about distance learning within the “walls” of our university? Have the students dealt with the new challenge? Finally, what were the most common problems they faced in teaching during a pandemic using available distance learning methods and techniques?

These and other issues related to universal distance education in the era of coronavirus were asked – in order to verify their opinion – students of the Pedagogical University of Krakow. The aim of the study was distance education seen through the eyes of students and their assessment of distance learning.

Keywords: distance learning, advantages and disadvantages of distance learning, student and teacher in distance learning, distance learning in a pandemic

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Beata Kuźmińska-Sołśnia

Remote Teaching – a Challenge for School Education

Introduction

The modern 21st century society (mobile information) which provides access to many devices, including the Internet, has a significant impact on a daily life of the society, as well as the teaching process. Current situation in Poland has obliged many teachers to use tools for remote work.

Will the suspension of a stationary classes at school due to a pandemic and the experience gained during several months of remote learning change the attitude of teachers and students to the teaching and learning process, and will online learning become a real alternative to some forms of traditional learning? The answers to these questions are crucial for the 21st century students and therefore it is worth considering how education can or should change and what challenges we face.

Trends in teaching

Digital technologies nowadays offer potential for learning opportunities not only at school. It is worth to refer to the Horizon Report, developed periodically for several years, showing changes in both the technology and school education sectors. The trends included in the report provide educators with many ideas and guidelines for implementing new educational tools. In the Horizon Report: 2017 K-12 Edition, prepared by an international team of experts, they are presented in three perspectives: short, medium and long (related to years of implementing changes) (Freeman et al., 2017).

In the first one, coding played an important role as a basic skill to understand, communicate and use digital devices. In recent years, there has also been an emphasis on the STEAM education model (Plebańska, 2018), a combination of fields such as Science, Technology, Engineering, Arts and Maths (STEAM), which primarily supports the development of innovation and the economy. It was complemented by multi-disciplinary and interdisciplinary education, which put knowledge from different areas of science into practice.

The medium perspective (3–5 years) concerns the present day and includes, among other things, measuring progress in the learning process. New measuring tools

are emerging in this respect, which allow to monitor the educational achievements of students, not only the current state of knowledge, skills or abilities but also to stimulate their development and motivation to learn. Moreover, the transformation of educational spaces is also expected in this period. As students nowadays have unlimited access to the various sources of knowledge, the teacher must change his or her thinking about his or her role. At present, there is no place for a teacher to play the traditional role which guaranteed him/her a central and dominant position in the teaching process, i.e. to transfer knowledge and control students. Instead, he or she should take the position of an organizer of the learning process and a supporter of students' educational activity.

The long term perspective (over 5 years) includes the promotion of a culture of innovation in schools through activities aimed at developing competences such as teamwork, project-based learning, creativity or critical thinking, and the development of deep learning concepts that seek to move from theoretical to more practical education.

Certainly, in today's world the only constant thing is change. This also applies to education systems. As a result of the emergence of new online learning environments that foster exchange and learning, traditional education models are constantly evolving. Therefore, we should be aware of the fact that many changes will accompany us throughout our lives, and the undertaken reforms of education will never end (Kołodziejczyk, Polak, 2011).

Remote learning

Computer-based learning can take place in various ways. The two basic forms of e-learning are:

- Computer Based Training (CBT) – training based on a computer technology,
- Web Based Training (WBT) – training using the Internet.

In the case of WBT it is also said about Online Learning, i.e. remote “live” teaching via a computer network (in synchronous mode) (Nojszewski, 2003).

Online learning has been arousing interest among educators for years due to its flexibility and increasing accessibility. Especially nowadays, in the era of rapid change, sharing knowledge and information, communicating at a distance using modern information techniques plays an important role and can at the same time constitute an individual educational environment.

The advantages of such a system include:

- the possibility of learning at a time and pace adapted to individual possibilities,
- easy access to teaching materials published in electronic form,
- accessibility for disabled people,
- reducing the costs of universal education,
- increasing self-education opportunities.

Moreover, this form of communication is supported by the fact that the modern generation, called generation Y, does not know the world without the Internet, computers, mobile phones. It is a natural environment of the young generation, for whom a school classroom and standard education becomes unattractive.

School at home – such a form of teaching was valid for almost the entire summer semester of students at all stages of education in the school year 2019/2020. The specificity of the implementation of remote education was faced by both teachers and their pupils. What was until recently the perspective of education for the future, and largely for adults, suddenly became a reality and a necessity.

The new remote learning process, as opposed to the traditional one, has reduced (blended learning) or turned off (e-learning) direct contact between the student and the teacher. Oral communication has largely been replaced by written communication, using online IT tools (Wedel-Domaradzka, Raczyńska, 2013). Teachers and students had to switch to remote education overnight without prior preparation. Many new challenges emerged for teachers. From the previous organizer of typical lessons, they had to become organizers of the remote education process, during which the student worked mainly independently with didactic materials. The teachers intuitively adjusted the ways of acting to the specifics of the new form of work with students, the content they passed on, motivating to act and checking the effectiveness of teaching. The consequence of this unexpected situation was a necessary change in attitudes and evolution of teachers' working methods.

Thanks to a large number of digital educational resources and a good computer infrastructure and the availability of devices which are able to connect to the Internet, virtual space has unexpectedly become a new environment for learners to work and cooperate. According to Marcin Polak, this process should be based on four pillars: infrastructure, services, education and management (Polak, 2016).

Of course, hardware and software would be useless without a teacher who could not use it skillfully. Therefore, in this case, the teachers' attitude of "I don't need it, I'm not going to use it on a daily basis" was replaced with the approach "how can I use these methods, these techniques in my subject" (Rokicka-Broniatowska, 2005).

Technology has primarily a servant role and should therefore strengthen and support educational processes. It is worth mentioning the SAMR model constructed by Dr. Ruben Puentedura, which defines different levels of technology integration in the education process (Puentedura, 2014). SAMR stands for the first letters of four words in English: **S**ubstitution, **A**ugmentation, **M**odification, **R**edefinition.

They characterize the successive levels of using technology in the teacher's work (Fig. 1.).

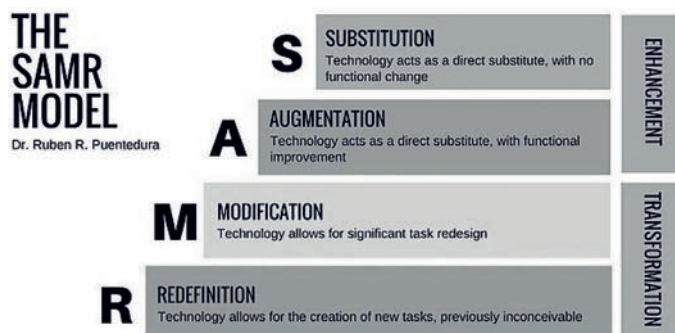


Fig. 1. Model SAMR [source: <https://en.wikiversity.org>]

The first stage – SUBSTITUTION i.e. using ICT tools interchangeably with traditional ones. In the second stage – AUGMENTATION, the teacher introduces ICT tools, which are used to effectively solve the tasks set for the student. On the third level – MODIFICATION, technology becomes essential to solve tasks. The student has the opportunity to actively use the digital tools for educational purposes. The fourth stage – REDEFINITION, allows to take full advantage of the benefits of modern technologies and achieve the goals and tasks that were previously impossible to achieve without them.

New technologies are therefore powerful educational tools, but the main key to show their proper usage is the human factor – the knowledge and experience of the teacher and his or her ability to apply ICT in teaching. His or her proper competences will allow them to choose from the variety of educational tools available on the Internet and offer their students the most suitable ones.

As a result of the pandemic, the Polish school has unexpectedly entered a new era of teaching – one could say of the 21st century. The whole process involved both teachers, students and parents.

In case of teachers, many, in the face of a new situation that has overwhelmed them, have shifted responsibility onto the parents. Others overwhelmed students with tasks and materials for self-analysis and resolution. On the other hand, those familiar with the online world conducted their lessons in an interesting and creative way.

The students were initially rather enthusiastic about remote teaching. Free from the rigors imposed by the school – they could sit in front of the screens of a monitor or smartphone and use modern communication tools, which were forbidden at school before. With the passing of time however, they began to lack direct relations – between the teacher and the student, as well as with their peers.

There were also different attitudes among parents. Some were satisfied that their children were busy and did not sit in front of the TV. Others carried out tasks and materials sent by teachers together with the children and they expressed their disapproval of the situation. On the other hand, the parents of the children who, as far as they were able, carried out the tasks and materials sent by the teachers on their own and analyzed the school material, approached the situation with caution.

Remote learning has become possible thanks to the possibilities offered by the Internet. Many applications and tools have proved to be perfect for conducting online lessons, sending homework or verifying students' knowledge. Most platforms used by educational institutions that wanted to implement remote learning via the Internet were based on available solutions. Among others, the tools of companies: Google (Google Classroom, Disk, Hangouts Meet), Microsoft (MS Teams), Librus and Vulkan (electronic register systems), etc. and materials of the Integrated Learning Platform, made available by MEN (Ministry of National Education) at www.epodreczniki.pl.

Remote teaching in the opinion of primary school students – research results

The coronavirus outbreak has forced a new reality. The middle of March changed our everyday life – social, professional, family and education. Since 25 March 2020

MEN (Ministry of National Education) regulation on the obligation to teach at a distance came into force. Due to the closure of schools, learning from a traditional school class moved from day to day to virtual spaces. All of a sudden, stationary teaching had to be reorganized into remote teaching, using distance learning methods and techniques. Polish school had never before conducted classes with such a large use of the Internet. Meanwhile, it was even forced to switch to them overnight. Pupils, parents and teachers were faced with completely new challenges. In connection with this, many questions and doubts arose, among others:

- Is the Polish school prepared for such a change and will it cope with it?
- How to organize remote learning in order to achieve the assumed goals and tasks of the core curriculum?
- How will teachers who have not yet used the possibility of remote communication with students cope with online teaching?
- Will each student have access to a computer and to the Internet?

Today, after the end of the school year, the time has come for an initial analysis and evaluation of remote school activities.

On the basis of surveys carried out in the first half of June among 100 pupils of primary schools (classes IV–VIII) in the area of Radom, it results that remote work from home was possible due to the access to the computer equipment (or phone) and to the Internet. Most of the students assessed it as very good (43%) and good (36%). In the opinion of 13% it was sufficient, and in the opinion of 8% of the respondents – weak. Permanent access to the Internet was declared by 82% of the surveyed students. The average quality of connection in the opinion of the respondents was 3.84 on a scale of 1–5. Among the educational tools most often used in communication with students and distance learning the respondents mentioned MS TEAMS application (85% of the respondents). Next, the most popular were: electronic journal (45% of respondents) and e-mail (38% of respondents) – Fig. 2.

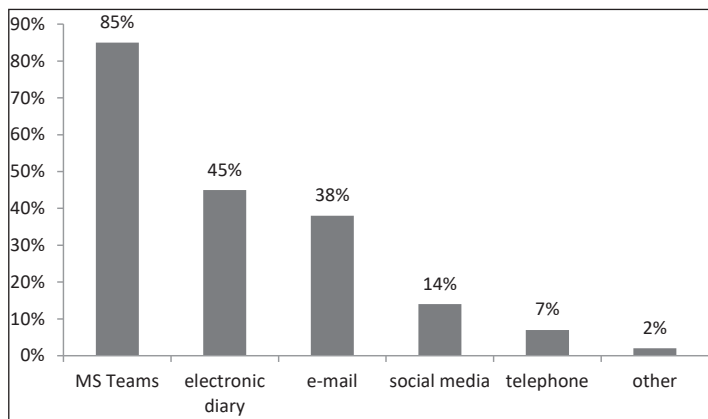


Fig. 2. Communication channels and tools of remote work

Remote learning can take different forms, but should consider the capabilities of all participants. Various tools for synchronous and asynchronous communication

have enabled continuous contact with students. In the opinion of the respondents, it varied, depending on the teachers (39% of students). In the opinion of 34% of the respondents it was good, and for 25% – very good. Only 2% of respondents indicated their dissatisfaction – Fig. 3.

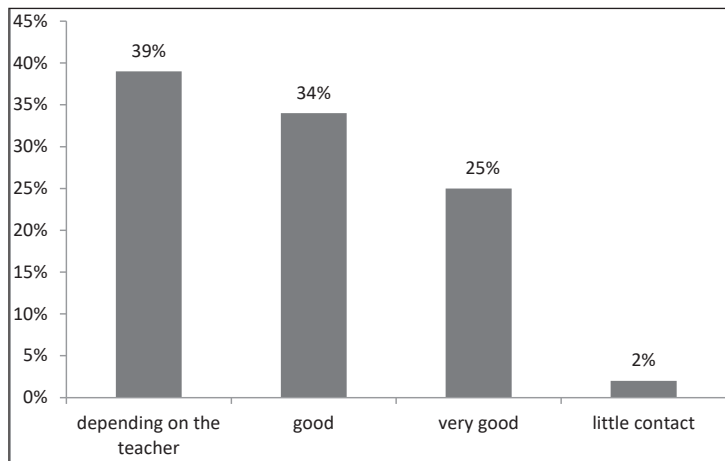


Fig. 3. Contact with teachers during remote teaching

In the past time of forced remote education, the main means of teaching was the Internet, offering a multitude of media, information and interaction. Thus, the role of the teacher from the “provider” of knowledge was turned into the organizer of the education process. Replacing the traditional “teacher-pupil” model with the “computer-pupil” model proved to be much more interesting than the stationary school reality. More than 80% of respondents described their activity during classes as very good or good. However, their opinion on the attractiveness of classes (often affecting their effectiveness) presented in Table 1 for different subjects ranges from 3.6–4.01.

Table 1. Evaluation of attractiveness of remote classes in the scale 1–5 in the opinion of students

Group of subjects	Evaluation of the attractiveness of classes
Strict	4.01
Language	3.96
Humanistic	3.74
Artistic – music/plastic/physical education	3.6

Perhaps this average result was influenced by a lack of experience and preparation of teachers in conducting remote classes, or the proper use of online resources, or the appropriate portioning of content, which sometimes exceeded the possibilities and discouraged students from working. Although, according to the survey, in the majority of cases (55%), students determined a comparable range of processed material within the framework of home classes, with that carried out in the

stationary mode. According to 16% of respondents, it was very extensive. A similar percentage of respondents assessed the scope of homework as sufficient. The others considered it insufficient or had no opinion about it.

The majority of students were cheered on by their parents, while the main motivating factor was the marks. In the opinion of 69% of the respondents, the overall assessment of school achievements in the remote mode was correct and deserved, in the opinion of 13% – it was overestimated, while 4% of the respondents considered it understated (Fig. 4).

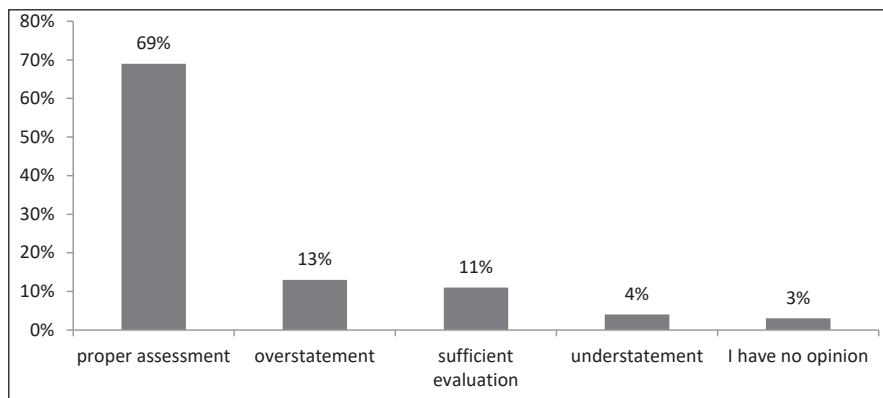


Fig. 4. Students' opinion on the assessment of remote school performance

Despite the relatively good marks received in the remote learning mode, 50% of the respondents were critical of this form of teaching, while 28% of the respondents were of the opposite opinion, and 22% of the respondents had no opinion on the subject. According to the survey, most of the respondents (over 60%) would not want to continue remote learning in the next school year. In their opinion, the main barriers are: big amount of teaching material, lack of interaction with the teacher, lack of proper equipment, insufficient skills and lack or limited contact with peers.

The survey is only a fragment of the picture of remote education that has been faced in recent months. An excellent supplement to the full picture of the state of reality would be the results of surveys conducted among all educational entities, especially teachers and parents.

Summary

The sudden need to change the mode of education, dictated by concern for the health of students and teachers, forced schools to implement the curriculum remotely. Despite the earlier lack of preparation in terms of equipment, curriculum and methodology, as a result the school environment once again managed to meet the new challenge. Teachers, often those who criticize and oppose smartphones and computers, now had the opportunity to see that modern technologies can support education and can be used effectively.

Thanks to this situation, the Polish school may have a chance to become more creative. In 2011, the book *The End of the Cretaceous Epoch* by Aleksandra Pezda was published, but this end has not happened until today. It seems that it is worthwhile to introduce changes to e-learning solutions in schools in a thoughtful and controlled way, but through evolution, not a sudden revolution. Certainly, the process of traditional stationary learning cannot be eliminated, especially at the first and second level of education, but the changes should concern the change of school reality. Attention should be paid to moral changes, unlimited access to information, its dynamic growth and devaluation, or requirements of the changing labor market.

Today, we have passed the first stage of the exam providing students with the opportunity to continue learning in the new conditions, passing on the basic knowledge and skills to students, achieving the goals and tasks of the core curriculum as far as possible online. This is done by paying attention to safety and shaping socially desirable attitudes and values. This challenge has been faced even by teachers who have not yet used the opportunity to communicate with students remotely, but who have tried to create a learning environment that is conducive to learning, according to the individual needs of the students. The impulse for further changes in school education should be the reflection of the whole school community on the conclusions from the research data and analysis of the remote learning process.

In the future, it is worth taking care of, among others:

- ensuring proper infrastructure for the organization of remote education and thus counteracting the phenomenon of digital exclusion of children and teachers,
- a specific education plan adapted to the situation and capabilities of the students,
- the appropriate choice of content and the setting of new objectives and priorities for the programs and the core curriculum, also adapted to remote learning,
- adequate preparation of the teaching staff for the use of distance learning tools,
- the educational potential of new technologies that can be used in teaching work,
- motivating and supporting students in remote teaching and monitoring their learning achievements,
- guarantee of safety and development of the principles of the so-called net-label in the acquisition, exchange of information and contacts in the network,
- the psychophysical development of students who spend many hours in front of a computer monitor or a smartphone,
- supporting students in maintaining contacts and relationships with their peers.

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Remote Teaching – a Challenge for School Education

Abstract

The article deals with the challenges facing education in the 21st century. The current situation in Poland has obliged many teachers to use remote working tools. Concern for the health of students and teachers has forced the implementation of distance learning at all stages of education. The main aim of the article is to present the direction of changes, both in the technology and school education sectors, as well as the analysis of research conducted among primary school students on the implementation of remote education.

Will the distance learning experience gained in recent months change the attitude of teachers and students to the teaching and learning process, and will the use of digital technologies change the educational environment preparing students for the challenges of the 21st century? What steps should be taken in schools to use available technologies in a more innovative and creative way? The clues for further changes in education should be the reflection of the whole school community on the findings of research data and the analysis of remote learning.

Keywords: remote learning, information and communication technologies, Internet

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III. RESEARCH ON PRACTICAL CASES, DIDACTICS OF BIOLOGY AND SCIENCES

Daniela Placinta, Eduard Coropceanu

Laboratory Works with Digital Resources – Motivative Means of Research for High Schools Pupils in Biology

Introduction

Modern Didactics proposes various methodological approaches to valorize the pupils' specific skills in Biology. The complexity of the instructional-educational process and the effectiveness of learning are based on active methods applied within the motivational activities of exploring the unknown with the help of information and communication technologies (ICT). The use of new technologies in the training process in the field of Nature Sciences allows the strengthening of interdisciplinary connections and the opening of new perspectives in personal and professional development [1].

The implementation of technological innovations and their adaptation to the specific of the study disciplines offers to the society multiple mechanisms of the development of the new ideas that underlie the socio-economic evolution, and to the pupils – possibilities to study some processes and laws based on technologies that allow to carry out investigations, formulate conclusions and crystallize own visions. People's interest towards this environment, in order to improve the learning process, has changed the approach of the educational process exceeding the limits of formal education. Learning becomes captivating when in classrooms, for example in Biology, there are opportunities to carry out the research in digital and virtual laboratories.

The digital laboratory is a means of investigation in the field of Nature Sciences in which devices, installations and instruments are used to obtain results represented by well-argued statistical data based on contemporary research methods [2–5].

The research, depending on the purpose, can generate qualities and behaviors by satisfying the needs of internal order, orienting the pupil to success by integrating several activities such as: solving problem situations, group and individual projects, communicating results, selecting the necessary information for formulating hypotheses, data processing and presentation of research results, etc. Thus, the research competence represents an integrated set of specific acquisitions practiced in different situations, by combining knowledge and experience, as well as the availability to mobilize, reorganize internal and external resources to achieve the purpose pursued [6].

The research at the high school level, as part of the training, designates the field in which the “scientific truth” is discovered through practical activities and through the methodological system proposed to the pupil in different learning contexts. The research activities in the school programs are based on the pupil’s psychological nature. The products and results can be related to the type of extravert and introvert research pupil.

The extroverted pupil details and materializes the facts of the investigated object. He is dominated by curiosity; analytical spirit, cultivates the details, decomposing the whole into its component parts, interested in “forms”, “images”, “objects”. This type of pupil is projective cultivating visible, spectacular aspects.

The introvert pupil is attracted by ideas, builds theoretical thinking systems, seeks to give explanations to those studied. He follows the clarity and ordering of the facts studied. This type of pupil is primarily interested in “ideas” and “qualities”, being a theoretical type. He has the tendency to prove, to logically argue the asserted ones, being “critical” in discovering the truth.

The differentiation of the pupils according to the psychological nature, creates their own research attitude and style through: choosing the object of the research, the type of truth, the methodical attitude towards the research object, the motivation and the style of research, the choice of the research topic, the correspondence between the research and the pupil’s personality [7]. The pupils’ individuality according to the psychological nature mentioned above, must be adapted to the dynamic tendencies of the digital technologies era, which qualitatively enhance the thorough study of a topic or field.

The training process (Fig. 1) creatively enhances the pupils’ cognitive abilities. The result of the process is appreciated according to the effort made by the teacher in planning the learning activities.

Based on the general structure of the training process, we identify that research is also found methodologically among the forms of organization of the didactic process.

During the Biology lessons, within the practical and laboratory work, there are planned actions in which pupils study certain processes and phenomena from nature.

Completing investigative activities with new applications for experimental work in the digital era helps to better understand the biological legitimacy specific to a living organism. For example, sensor sets of the digital laboratory can be applied as teaching tools for research. With their help, the competence of investigation and research in Biology is placed on a new stage of development, having a motivational character for all the actors of the educational system.

The sensors allow the development of a series of experimental activities, such as: cell diffusion; pulmonary respiration; thermoregulation and sweating; photosynthesis; germination of germinated seeds; soil humidity for plant growth; heart rate and cough; heart rate and physical activity; measuring the emotional stress values through the polygraph test; monitoring the yeast growth process; electrocardiogram; lung and spirometry parameters; temperature variations in the human body; breathing speed in humans; muscle strength, etc. [8].

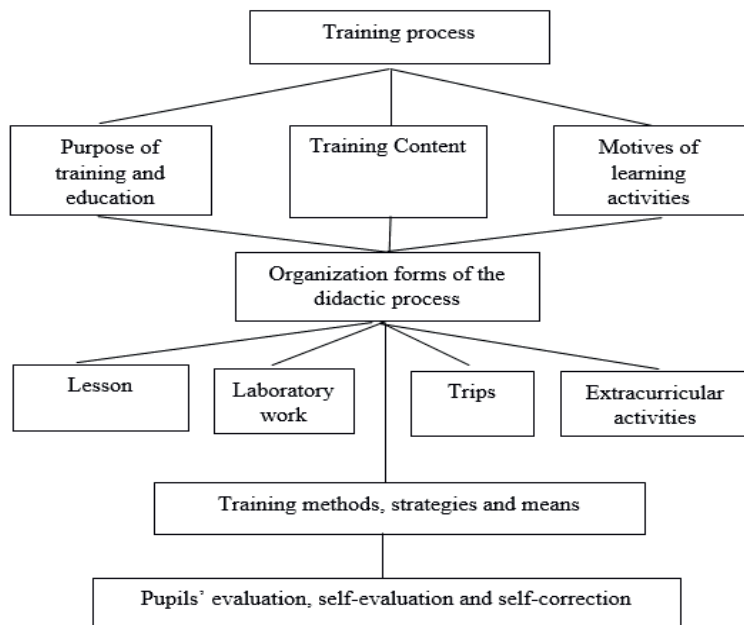


Fig. 1. Structure of the training process [7]

In the eleventh grade, the Anatomy and Physiology of the human body are studied according to the modular structure of the Biology discipline.

For example, in the Human Respiratory System module, by exploring respiratory devices, pupils can take research actions on the specificity of human breathing. The use of respiratory devices during laboratory work provides them with information about the physiology of this system in the form of pneumograms.

Materials and methods

In order to measure the respiratory rate and the comparison of the male and female respiratory rates, at rest and after physical exercise, the pupils researchers used the digital laboratory, which includes the sensor set and the specialized NeuLog software [9]. 28 students, aged 16–17 participated in the experiment.

Results and discussions

The laboratory work is carried out according to the stages established, for example, in the scientific work *Respiration rate in humans*.

Objectives:

- to know the rate of lungs respiration;
- to measure the pupils' respiratory rates;
- to compare the rates of male and female breathing at rest and after exercise.

Required materials: PC application and NeuLog application, USB-200 module, NUL-236 recording sensor breathing belt, which is intended for educational purposes only.

Pulmonary ventilation

The human respiratory system is vitally important through the exchange of O_2 and CO_2 (respiratory gases), between the external (atmospheric) and the internal environment of the body.

Pulmonary ventilation includes processes that ensure air circulation from the external environment into pulmonary alveoli and from the alveoli into the external environment. Pulmonary ventilation occurs in a rhythmic sequence of inspiration and expiration.

Inspiration is an active process achieved by the contraction of the intercostal muscles and the diaphragm. In one minute, 1 in a state of rest, the human breathes about 6 liters of air, of which $1/3$ remains in the upper airways and does not exchange O_2 and CO_2 . The remaining $2/3$ penetrate into the alveolar sacs, where they give off oxygen and receive carbon dioxide.

Expiration is a passive process conditioned by the relaxation of the intercostal muscles and the diaphragm. During the exhalation the lungs do not completely empty the air, because the lung volume is smaller than the chest one.

The two phases of lung breathing follow one another rhythmically, without pause, with a frequency of 14–16 per minute in men and 18 per minute in women. The frequency of respiration increases depending on O_2 consumption and CO_2 accumulation. Normal values for different age groups are: 18–30 breaths per minute in school children (6–12 years); 12–16 breaths per minute in adolescents (13–17); and 12–18 breaths per minute in adults.

The lung volume represents the total volume of air that the lung is able to retain after inspiration. It varies according to age, gender, race and physical development and it consists of four components:

The residual volume ($VR = 1.8$ l), which remains in the lungs after forced expiration;

The reserve expiratory volume ($VER = 1.2$ l), which can be eliminated from the lungs by forced expiration following an ordinary expiration;

The current volume ($VC = 500$ ml), which is the air introduced into the lungs following normal inhalation and which can be removed by exhalation;

The respiratory inspiratory volume ($VIR = 3.6$ l), which enters the lungs after normal inspiration through rapid inspiration.

Lung capacity is the volume of lung air at different stages of ventilation. All lung volumes and capacities are lower in women than in men (about 25%) and greater than 5800 l in athletes.

Calculation of lung capacity:

Inspirational capacity (CI) $VC + VIR$;

Functional residual capacity (CRF) $CDF = VER + VR$;

Vital capacity (CV) $CV = VIR + VC + VER$;

Total lung capacity (CPT) $CPT = CV + VR$.

Laboratory work progress:

For the work to be done, the digital sensor NeuLog Respiration Monitor Belt logger sensor NUL-236 (Fig. 2) should be connected to the recording belt of the measurement data of the respiratory rate, and the belt in turn should be fastened around the trunk of the human body (Fig. 3).

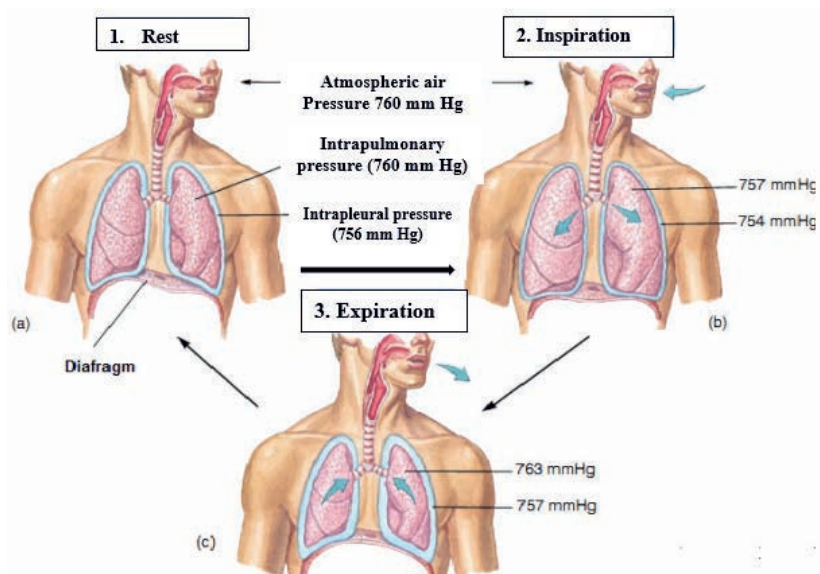


Fig. 2. Mechanics of pulmonary ventilation [8]

During the laboratory work, the belt connected to the sensor, will be applied according to the measurement of the pectoral and abdominal respiratory rate in resting state and after the physical exercise.



Fig. 3. Sensor digital NeuLog Respiration Monitor Belt logger sensor NUL-236



Fig. 4. Applying the belt for recording the measurement data of the respiratory rate

Sensor setting:

We connect the USB-200 module to the PC and check the connection of the NUL-236 sensor (Fig. 4).

Application of NeuLog software:

The NeuLog application needs to be checked if it has been identified by the sensor of the recording belt of the measurement data of the respiratory rate.



Fig. 5. Settings

Settings:

When the NeuLog application is opened, click the Settings button on the screen. The sensors connected for carrying out the laboratory work are automatically identified by the software; including disconnecting or connecting other sensors.



Fig. 6. The automatical identification by the NUL-236 sensor software connected to the computer for carrying out the work of measuring the respiratory rate in humans

When selecting a function button and the software key, you will be guided through the **Options** function:

- a. "Run experiment" with the sensors connected to set the duration of the experiment and the sampling rate;
- b. "One Step" Experiment;
- c. "View" display with four options for one of the values of the connected sensors: Digital, Bar, Analog, gauge and Graphic accumulated;
- d. "Experiment recorded" from the measurements data made and stored by the sensor;
- e. "Open the experiment" from a saved file;
- f. "Tools" for changing software settings or ID sensors.



Fig. 7. The bar with the software setting options for the experiment

Testing and recording of data:

Two persons (male and female) participate in the research through laboratory work. Each person will be tested in several samples: at rest and after exercise (20 floats).

The first step of the laboratory work is to calculate and measure the respiratory rate in chest respiratory comfort.

In order not to cause discomfort, the breathing belt is well wrapped around the lower ribs and the diaphragm area. The rubber tube must be connected directly to the breathing belt. With the hand pump and the air release valve closure, the breathing belt is filled with air until it reaches the right shape. When you press the button with the Registration icon the necessary measurements will start.



Fig. 8. Measurement of respiratory rate in chest respiratory comfort on a 17 year-old boy

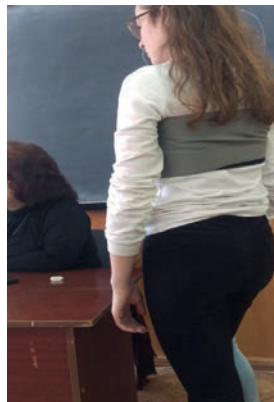


Fig. 9. Measurement of respiratory rate in the chest respiratory comfort on a 17 year-old girl

At the end of the measurement, click the Zoom icon to view the recorded graph.

The graphs obtained during the investigation and recorded using the NUL-236 sensor, represent a graph of the respiratory movements. They have ascending curves that indicate the inspirations of the respiratory act and descending curves, being specific to the expirations.

Through the Export and Save icons the measurement results recorded in the graph, depending on the purpose of the work, are analyzed and compared.

The results of the measurements from the first stage of the laboratory work are shown in the graphs below, corresponding to the male and female gender.

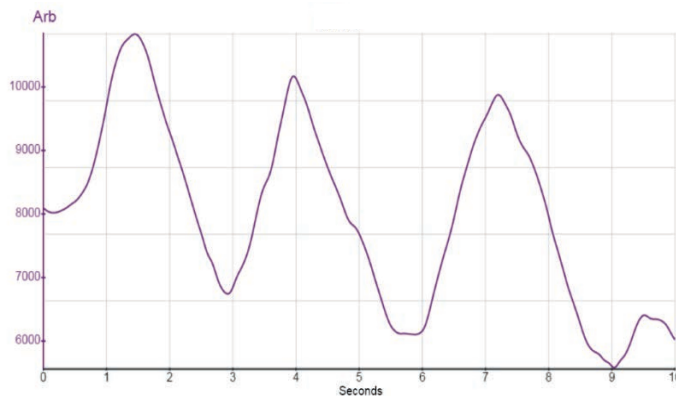


Fig. 10. The graph with the results of the respiratory rate measurement in chest respiratory comfort, on a 17 year-old boy

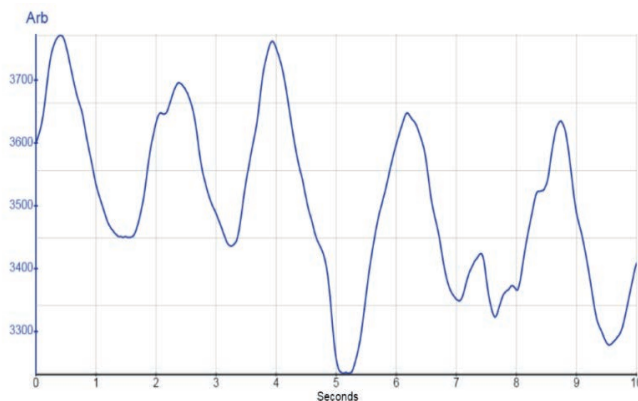


Fig. 11. The graph with the results of the respiratory rate measurement in chest respiratory comfort, on a 17 year-old girl

In the adolescent graph it is observed that in the chest respiratory comfort, the current volume (CV) constitutes 500 ml, and at the adolescent, it is approximately 400 ml. This difference is due to the boy's better physical training and greater lung

capacity compared to the girl. At the same time, the differences are also caused by the physiological peculiarities between the greater lung capacity in the male versus the female. The frequency of respiration recorded in measurements in the female gender is higher than in the male gender, which corresponds to the values of adolescents aged 13–17 years who have from 12 to 16 breaths per minute.



Fig. 12. Measurement of respiratory rate in abdominal respiratory comfort on a 17 year-old boy



Fig. 13. Measurement of respiratory rate in abdominal respiratory comfort on a 17 year-old girl

The next stage of the laboratory work referred to the calculation and measurement of respiratory rate in abdominal respiratory comfort. Following the procedure from the previous stage of the laboratory work, actions are taken to record the respiratory rate.

Graphs from Fig. 14 and 15 show the results of the measurements of the abdominal respiratory rate in the resting state.

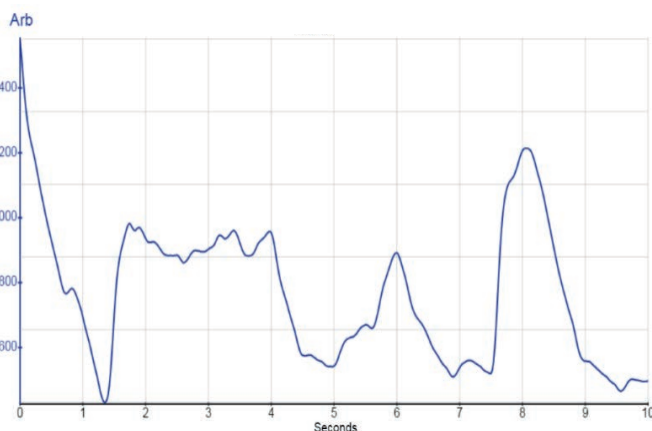


Fig. 14. The graph with the results of the measurement of the respiratory rate in abdominal respiratory comfort, on a 17 year-old boy

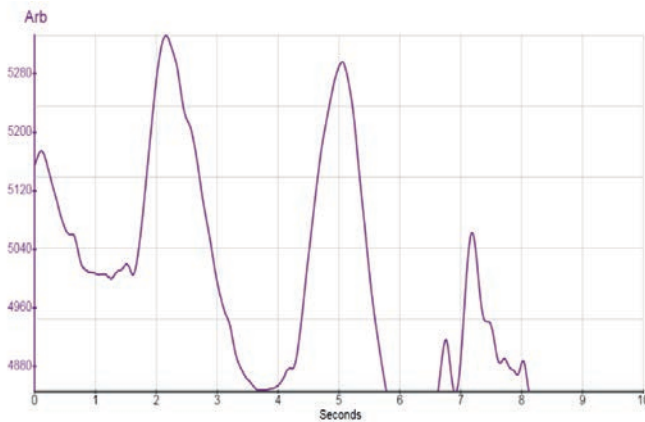


Fig. 15. The graph with the results of the measurement of the respiratory rate in abdominal respiratory comfort, on a 17 year-old girl

The values of these measurements differ from those of the pectoral breath (Figs. 10 and 11). Thus, at the boy there predominates the pectoral breathing, and at the girl there predominates the abdominal breathing.

Following these two measurements, the boy obtained values greater than 10,000 Arb as in the case of chest test, while the abdominal values are less than 5,000 Arb. In the student the values of the abdominal area are higher up to 5,300 Arb, compared to the values of the pectoral area up to 3,800 Arb. As a result, the female gender breathes predominantly through the abdominal area, rather than the chest area.

After a forced exercise (20 floats) and the measurement of the pectoral and abdominal respiratory rate, the following graphs were obtained.

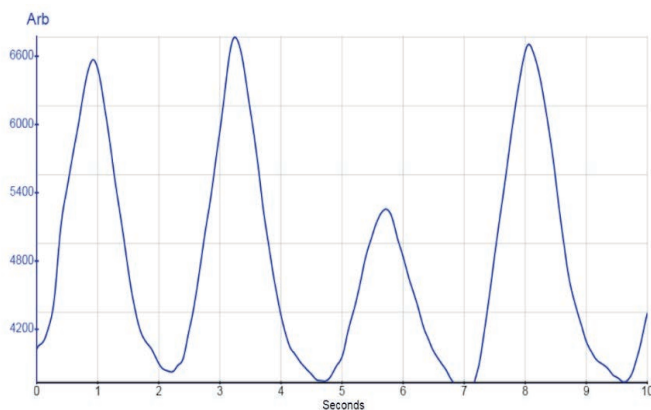


Fig. 16. The graph with the results of the measurement of the pectoral respiratory rate following physical effort, on a 17 year-old boy

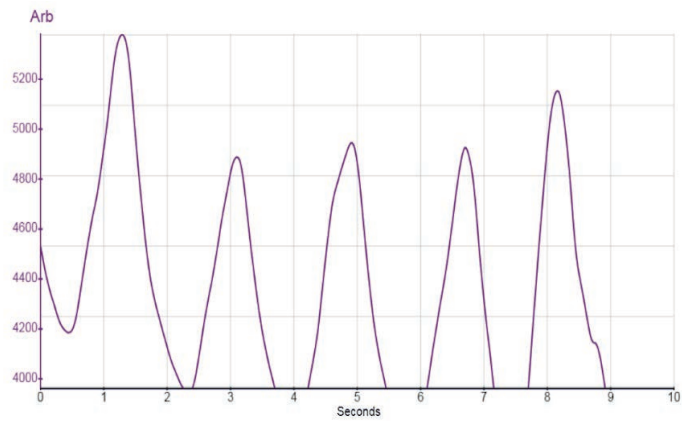


Fig. 17. The graph with the results of the measurement of the pectoral respiratory rate following physical effort, on a 17 year-old girl

The boy, after performing the physical exercises, obtained lower values in the pectoral area, and the girl, higher values as in the case of pectoral respiratory comfort. The measurement data are shown in Fig. 18 and 19.

At this stage, compared to the abdominal breathing stage at rest, the boy’s respiration rates increased to 5,700 Arb, and at the girl decreased to 2,700 Arb.

We notice that after the physical exercise in the male, the breathing changes from the pectoral to the abdominal, obtaining abdominal values greater than the pectoral ones, whereas in the female, the abdominal breathing goes into the pectoral breathing.

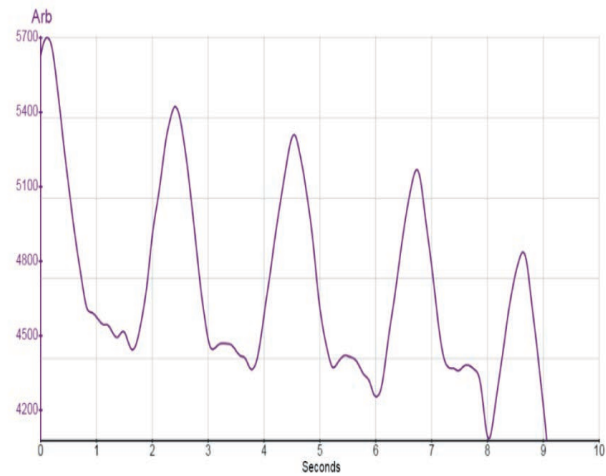


Fig. 18. The graph with the results of the measurement of the abdominal respiratory rate after the physical exercise, on a 17 year-old boy

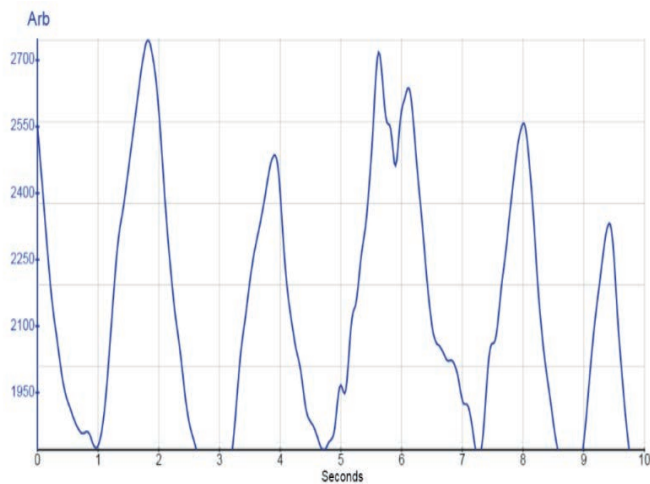


Fig. 19. The graph with the results of the measurement of the abdominal respiratory rate after the physical exercise, on a 17 year-old girl

For research purposes, a group of 28 pupils tested digital lab sensors. The obtained results were based on the integration and practice of the assembly necessary for the laboratory investigation. Their views on the work done with the help of digital sensors are presented in Table 1.

Table 1. The results of the student questioning regarding the usefulness of the sensors in the practical activity

Diagram 1 The accessibility of the digital sensors in the accomplishment of the stages of the laboratory work	Diagram 2 Accuracy of data recorded using digital sensors	Diagram 3 The usefulness of digital sensors in drawing conclusions																														
<table><tr><th>Category</th><th>Count</th></tr><tr><td>very good</td><td>23</td></tr><tr><td>good</td><td>5</td></tr><tr><td>sufficient</td><td>0</td></tr><tr><td>insufficient</td><td>0</td></tr></table>	Category	Count	very good	23	good	5	sufficient	0	insufficient	0	<table><tr><th>Category</th><th>Count</th></tr><tr><td>very good</td><td>18</td></tr><tr><td>good</td><td>6</td></tr><tr><td>sufficient</td><td>4</td></tr><tr><td>insufficient</td><td>0</td></tr></table>	Category	Count	very good	18	good	6	sufficient	4	insufficient	0	<table><tr><th>Category</th><th>Count</th></tr><tr><td>very good</td><td>19</td></tr><tr><td>good</td><td>8</td></tr><tr><td>sufficient</td><td>1</td></tr><tr><td>insufficient</td><td>0</td></tr></table>	Category	Count	very good	19	good	8	sufficient	1	insufficient	0
Category	Count																															
very good	23																															
good	5																															
sufficient	0																															
insufficient	0																															
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very good	18																															
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Category	Count																															
very good	19																															
good	8																															
sufficient	1																															
insufficient	0																															

The results of the diagrams represent the very good motivational truth of the pupils regarding the activity undertaken. The combination of scientific investigation and laboratory work is a way of integrating the learning process with scientific research and arguing their importance in everyday life.

The use of the digital sensors in the investigation activities leads to the motivation of the pupils to explore ideas that personalize the instructional-educational process and make it efficient. The increase of the school performance is also due to the acquisition of certain skills, through the pedagogical methods suitable for learning.

The teacher's professional competences must be tangential with the competence of using the informational and communication technologies. The applicability of this knowledge helps to select the methods necessary for the research and investigation of the surrounding world through various forms of the didactic process organization.

Conclusions

Investigating the living world with the help of methods and means specific to improving the quality of life and environment, is one of the specific competences of biology. The laboratory work with the use of digital sensors, allowed the pupils to go through a creative, interdisciplinary teaching approach, also obtaining results of very good accuracy. The generalized conclusions in their own words, about the physiological peculiarities of the human body, will motivate them to promote a healthy lifestyle with a responsible attitude towards their own health and those around them.

The training through the implementation of new technologies in the didactic approach, motivates all educational actors to achieve the priority goals of education. The application of the competences specific to the school disciplines in different cases of learning, has a favorable impact on the development of the young generations' personality. This aspect will cause them to successfully integrate into the priority areas of human society based on attitudes and values.

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Laboratory Works with Digital Resources – Motivative Means of Research for High Schools Pupils in Biology

Abstract

The teacher's competence to select the most efficient methods, necessary for research using digital tools, is an imperative of modern didactics. The combination of digital skills and research methods helps pupils get involved in investigating the living world. Digital sensors enhance the applicative and interdisciplinary nature of laboratory work in Biology. The recorded results help young researchers discover scientific truths of processes and phenomena in nature. The conclusions formulated generate existing reflections on the processes and phenomena in the surrounding reality. Thus, we can mention that the digital Biology laboratory improves the quality of the instructive-educational process of the Biology discipline.

Keywords: biology, research, investigation, digital sensor, digital lab, breathing.

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Reading Comprehension of Various Infographics in the Field of Nature by Young People with Hearing Impairment

Introduction: specific difficulties in textbooks reading comprehension of deaf students

The possibility of using written texts by deaf students, due to the visual code used during this cognitive activity, is a very important element of the effective learning process of this group. Reading comprehension has its place at the various stages of developing reading skills. The perception of graphic images is subordinated to the sense of the text being read. The unit of reading is a word, part of a sentence or the whole sentence. The technique of reading and understanding the text are closely related. Expertise in visual recognition of words and sentences is the basis for understanding their meaning, and capturing the essence of a read text has a positive effect on the ability to distinguish its graphic elements (Warsicka, 1977). In reading comprehension, the reader should understand basic semantic categories, be able to transform synonymous easy texts, search for the main thoughts in them, as well as remember the content, infer and be able to use the read content in practical activity (Pawłowska, 2009).

The analysis of curricula made in terms of determining the causes of failures in reading of non-disabled students allowed to state that they do not include neurophysiological and mental mechanisms in the reading process. The consequence of this is the lack of exercises developing the perception of graphic signs and their systems supporting the effective work of the eyes when reading, related to widening the field of view. Studies also identified problems related to assessing students' mastery of reading skills. It was found that they result from various criteria according to which an assessment should be made. Too little attention is paid to the need for systematic checks on students' progress, without indicating the necessary ways and tools to carry out this check through special prepared tests. Another significant disadvantage of the programs is the approach to reading comprehension, which is treated as the goal of educational activities, as an obvious skill achieved by students after reading the text once (Pomirska, 2011).

An important element of the text, especially in reading comprehension, is the illustration of its content. As a complement to the text, it should be consistent with it. Properly selected illustration, supports the reception of the by explaining the relationships or dependencies present in it, graphically transmits knowledge.

This is visual knowledge, received through the eyesight and shaping clear visual imaginations (Jakubowicz, Lenartowska, 1997). Illustration should perform several functions: update and consolidate language experiences, consolidate vocabulary, practice using well-known grammatical structures and practice perceiving the whole, not just individual elements. One of the guiding principles of teaching when working with deaf students is the principle of visibility. Therefore, pictures and illustrations are often used in the educational process of this group. Texts intended for deaf students should be provided with attractive illustrations, adequate to the content.

Problems of deaf students with mastering reading skills result primarily from their limitations in language development. Despite the mastered reading technique, they often do not understand the text being read (hyperlexia). Thus, they cannot use it to acquire knowledge, mechanically remembering and reproducing literally, without understanding the content. The memory of people with hearing impairments is of a visual and analytical nature. Therefore, they remember individual elements better, but have a problem with capturing relationships and connections. The dominant role of the sense of sight is conducive to the development of visual-movement memory, while it weakens verbal-logical memory (Podgórska-Jachnik, 2004).

"...Therapeutic and school practice has provided evidence many years ago, that textbooks that deaf students should use are hardly used during lessons, and even more they cannot be used to learn independently..." (Korendo 2009: 45) and books cannot be the sources of information and a language pattern for students with hearing impairment, because the language used in textbooks is not adapted to their capabilities.

Research report: reading comprehension by young people with hearing impairment of the content of various infographics in the field of nature

Aim of the research: The aim of the research was to determine the effectiveness of reading short scientific and informational content on various forms of infographics, taken from the school textbook for teaching nature. Thus, an attempt was made to assess the adaptation of the way the content is presented in the textbook to the possibility of using it by this group of disabled people, as well as to compare the course of the cognitive process characteristic of information retrieval by students with hearing impairment with analogous hearing students of equal age.

Research problems: What is the relationship between the method of selecting the infographic for presenting scientific information and the learning effectiveness of deaf youth? Does the presentation of information, typical for school textbooks, enable effective perception and thus the possibility of processing during the learning process by students with hearing impairment? The method of choosing research material in the form of three different infographic presentations additionally allowed to assess: Which infographic is best suited to the capabilities of a student with a hearing impairment while dealing with reading comprehension? What cognitive activity do students with hearing impairment show when searching for information in a scientific text? To what extent is this activity different from that of hearing

students? To what extent the cognitive activity of deaf students depends on the way information is presented in the text. All problems raised were left open.

Study group: The study covered 48 students aged 16, including 24 students with hearing impairment and 24 non-disabled students.

Research method: A test in the form of three tasks implemented on a computer screen, data collection method according to Krzysztof Rubacha was used (Rubacha, 2008).

Measurement technique: The research was carried out using eye tracking technique using the Hi-Speed 1250 eye-tracker from the German company SensoMotoric Instruments (Zielińska, 2016).

The surveyed students read the content of tasks “for themselves”, thereby eliminating the acoustic-motor side of the activity. This allowed us to potentially use the positive aspects of such reading, i.e. associating graphic signs with non-linguistic content, following predictions and guesses, and capturing both the literal and additional sense of the text. The fact of understanding the information read was checked on the basis of choosing one answer from among the five possible in particular question. About the fact that only one answer is correct, the examined person was informed before the examination, when discussing what it will consist of and what will be its course. The content selected for research was informative and scientific, hence their reading was functional. Its goal was to learn, so to find relevant information on the screen, understand them, memorize and organize knowledge that will allow the correct answer to be given to the question.

Research material: The research material was selected from the nature textbook for the second grade of junior high school. A quantitative and qualitative analysis of the contents of three nature textbooks authorized for use at this level was carried out. Three different infographic representations of scientific information were selected: Fern development cycle information in the form of a diagram, elements described with a small amount of text, connected by arrows), Skin – sense of touch (information in the form of a uniform text, next to supplemented with an illustration) and a Graphic method for determining the correct ratio of body weight to height (information in the form of a chart with legend). The material selected for testing was bimodal. The modality referred to as Visual-V (visual sensory modality) was used deliberately for learning preferences when learning information in graphic form (graph, diagram, arrows) and the modality Reading / Writing-R, for information preferences in language written text.

Results and conclusions from the research: The research results were prepared in two forms: graphic and numerical. The graphical form of the heat map showed focus of attention of the examined person, the warmer the color (red) – the greater the focus, the colder (blue) – the smaller. The next form is the scan path – the path of looking – showing the succession of fixations and saccades, thus informing about the way of looking. The eyes cannot see the surroundings continuously. Sight stops at the selected, observed fragment of the image for about 200 ms. Then it is abruptly transferred to other places at a frequency of 4 to 5 times per second. The conscious processing of information needed to analyze the read text occurs within 50–120 ms from the beginning of the fixation for the word, depending on its

length. The main measures used in oculographic studies are fixations and saccades. Fixations correspond to the relatively constant position of the eyeball and very slight vibrations. Hence, they can be defined as focusing on a given element. Saccades are fast eye movements occurring between successive fixations, so intense eye ball movements, can be defined as fast movements of point of sight concentration from one place to another (Zielińska, 2015). The heat maps obtained in the research clearly indicated the possibility of using eye tracking technique to assess cognitive activity. For example, it may be determining whether and for how long the examined person took up activity, what it consisted of and how it went. The duration of cognitive activity obtained in the studies was a numerical result. Studies have shown that the time of activity of both groups of students, both deaf and hearing, were similar, with a significantly different end result, not providing an answer or giving a correct one.

There were a lot of numerical results obtained with the eye tracking technique, useful for evaluation. For example: the number and frequency of fixations and saccades, their duration (total, average, maximum, minimum), time elapsed since the first fixation, so until taking cognitive action, time spent, so time of watching of the given element, the time after which it was noticed, allowing to assess its significance from the point of view of undertaken cognitive action, the number of returns to a given place and many others. Which of them and how they will be used depends on the person conducting the test. The obtained results showed that the longest "time" of students with hearing impairment is the time to focus attention on the first answer on the left. It amounted to 580.4 ms on average. This led to the conclusion that this group practically did not analyze the text and did not seek information to answer. The results of hearing students in the assessment category: "residence time" significantly differed from the results of the group with hearing impairment. On average, the attention of hearing youth focused on the text that contained the information needed to answer the question correctly. The average time spent on it was 1653.6 ms and 1684.4 ms, respectively. The search activities were intended, planned and effective. Focusing on the text of the correct answer indicated its fairly quick selection, the average time spent on it was 972.3 ms, other answers were practically not taken into account. The next result obtained concerned the category: return visits, so the average number of returns to a given place by the respondents. The obtained result was used to assess how important this place was for tested youth from the point of view of obtaining the necessary information, so how they assessed its importance and usefulness for solving the task. The results obtained in this category indicated the planned nature of strategies for obtaining information by hearing students. For students with hearing impairment, it was chaotic and unplanned.

An example of the use of the so-called the sequence of action was the statement that students with hearing impairment first looked at the largest of the drawings, and only then at the title of the assignment. In the analyzed case it was a graph described by height and weight. Performing a similar analysis to the presented research results of hearing students showed differences between the groups. These students started the analysis by reading the assignment title. However, it was only in the second place that they looked at the chart. Similarities and differences between students with hearing impairment and without disability were also seen in the calculated average

values of eye tracking results characterizing fixations and saccades. The biggest differences between the examined groups occurred in the categories of assessment: average fixation time, maximum fixation time and also total time of the saccades and average latency (delay).

The results obtained and averaged for the groups clearly showed that between the groups the biggest differences regarding fixations occurred during solving of the "Fern" task, while between the saccades in the "Skin" task. The smallest differences in these assessment categories were for the "Weight" task, in which the illustration was big and there was little of text. The maximum and average fixation time and average latency (delay) in the group of students with hearing impairment reached higher values than in the hearing group. The opposite situation concerned the total time of the saccades. This may indicate that students with hearing impairment longer than hearing colleagues stop their eyes on individual elements of the viewed image, are slower in action and look less "accurately". Hence, they have higher values of the maximum and average fixation time and average latency, while their total time of saccades is lower than in case of hearing students.

Research results of both groups of students in many categories proved to be highly divergent. The difference between the groups was mainly in the number of correctly answered questions. All three tasks proved to be very difficult for students with hearing impairment. Only four of them gave one correct answer. The group with hearing impairments obtained the best results in the category "Skin – sense of touch", in which the information was given in the form of a uniform text, supplemented with an illustration. The results of the hearing group were significantly different. Task topics were very simple for this group, as evidenced by the final results obtained. Only 4 students had one error, all other answers were correct. It was surprising that three incorrect answers of hearing students appeared in the category in which deaf appeared to be the best, namely "Skin – sense of touch". Hearing youth did not make any mistake in answering the question in the "Fern development cycle" category, in which the information was given in the form of a diagram, and the elements were described with a small amount of text and combined with arrows.

A detailed analysis of the research results obtained in the form of focus maps and view paths allowed for an initial assessment of how different forms of presentations of scientific information are read by the surveyed youth. There were clear differences between the groups depending on the type of infographics. Research results obtained for the task "Fern development cycle" in a group of hearing students indicated that they only read the text and did not analyze the drawings on the infographic. For deaf students, illustrations proved to be much more important. This confirms the need for such presentation of information in textbooks intended for students with hearing impairment, which contains only its essential elements. They are not able to select information on scientific infographic and analyze all its elements. Similar conclusions to the presented ones concerned the other two tasks used in the study. The results of the task "Graphic method for determining the correct ratio of body weight to height" were assessed in the following categories: number of students looking at the text, graph, legend, answers. The solution to the task required analysis of all these elements. And again, similarly to the task discussed earlier, the analysis carried out

by all hearing students and only two deaf students went similarly. While solving the task, they read the text and analyzed the chart, legend and looking for answers. Among the other students with hearing impairment the following behaviours took place: they did not read the text contained in infographics (not even its title) or (and) did not analyze the chart, did not look at the answers, did not analyze the legend. Therefore, they could not have the information needed to give the correct answer and consequently did not provide it.

Summary

The results obtained indicated the usefulness of using eye tracking techniques in the process of determining what errors in the cognitive functioning of the student took place in the situation of lack of success in the learning task performed by him and what infographic presentation of information is most accessible to him. This creates the possibility of individual, profiled, compensatory educational work with the student and the choice of a textbook adapted to his capabilities (there are always several proposed on the publishing market). Research has clearly shown that for students with hearing impairment, the excess information contained in textbooks, including reproduction of it by use of text and graphics, only makes the learning process more difficult. They analyze all the information and do not perform selection, for example in terms of its usefulness for solving the given tasks.

The conducted research showed that hearing youth prefer presentation of information in textbooks in the form of diagrams described by text (in many textbooks such infographic representation of information is used). However, for deaf youth, a much better solution is to present information through a separate text and its representation in the form of illustrations. Focusing only on the text, without being distracted by the redundancy of graphics: drawings, arrows, gives this group with language problems the chance to focus on the content of the read text; creates a more comfortable cognitive situation when reading comprehension. This was clearly indicated by the research results during the "Skin – sense of touch" task. The adoption of infographics typical for this task, so separate text, separate drawing, the most important information in bold font, led students with hearing impairment to undertake information search strategies, identical to the strategies of hearing students, and with a great final success compared to other tasks. The final conclusion from the research, based on the results, is the statement that the information system in the infographic adopted in the task "Skin – sense of touch" is best suited to the ability of students with hearing impairment to read comprehension and launches in them similar cognitive strategies as in hearing peers, so it should prevail in textbooks intended for this group.

The research results allow to obtain also answers to the other question: How does the examined person scan the image they are looking at? And thus indirectly: How does it process the information it contains? The eye tracking method allows to determine what elements and for how long during the cognitive process attract the attention of the examined person, and which are irrelevant to them, because they are omitted. However, it does not provide an answer to the question: Why is

this happening? This type of question can be answered by a more in-depth expert analysis.

When drawing conclusions in terms of the usefulness of the eye-tracking method in the area of didactics for teachers it should be emphasized that it enables the non-invasive measurement of many important parameters related to the brain activity of pupils while solving various cognitive tasks. It shows how to study various problem-solving strategies based on the analysis of eye activity (attention maps). The results of the research performed on large, statistically significant groups, appropriately collected and interpreted, obtained by the eyetracking method, can be an extremely valuable source of information for teachers facilitating the understanding of cognitive mechanisms occurring during the learning process, including defining the strategy of proceeding in solving problems of very different difficulty levels. This method can be used by teachers in the field of remedial work with children with special educational needs, including diagnosing deficits leading to learning difficulties and developing models of effective teaching strategies.

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Reading Comprehension of Various Infographics in the Field of Nature by Young People with Hearing Impairment

Abstract

The aim of the research presented in the paper was to determine the effectiveness of reading short scientific and informational content on various forms of infographics, taken from the school textbook for teaching nature. The study covered 48 students aged 16 (24 students with hearing impairment and 24 non-disabled students). The research results were prepared in two forms: graphical (heat maps, scan paths) and numerical. The conducted research showed that hearing youth prefer presentation of information in textbooks in the form of diagrams described by text (in many textbooks such infographic representation of information is used).

However, for deaf youth, a much better solution is to present information through a separate text and its representation in the form of illustrations.

Keywords: deaf youth, infographic representation, eye tracking, heat maps, scan paths

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How Students – Future Teachers Identify themselves with the Issue of Organic Reaction Mechanisms in the Context of Chemistry Lesson Carried out at Schools

Organic chemistry involves thousands of different reactions enabling the synthesis and transformation of millions of compounds. The key to understanding this extremely important branch of chemistry is to learn about the mechanisms of organic reactions that describe the details of the reaction at every stage of chemical transformation.

Richard A. Jackson: Mechanizmy reakcji organicznych,
Wydawnictwo Naukowe PWN, 2007.

Theoretical approach: In Poland a subject-matter (CK & PCK), pedagogical (PCK & PK according to Schulmann, 1986) and formal preparation is required from each teacher, including the pre-service teachers training PSTs (Burewicz & Gulińska, 2002).

During the substantive preparation, all contents and issues to be brought up during a lesson should be determined, together with their purposes and order, keeping in mind the principles of teaching. The methodical preparation requires finding an answer to the question of how the particular lesson should be carried out – which teaching methods and didactic (teaching) aids should be applied. Teachers' and students' actions should be determined, together with forms and methods of control and homework. On the other hand, the organizational preparation is connected with the workplace preparation and necessary didactic (teaching) aids.

In the author's opinion, substantive preparation is considered to be the most important component of teacher's education. Being aware that there are also distinct opinions, the author nevertheless would like to underline the huge importance, weight and complexity of subject substantive preparation and the enormity of the problems related to it. Whatsoever, it does not mean that she calls into question, does not recognize the value of a teacher's personality traits, the knowledge of contemporary, universal teaching theories, particularly concerning creative approach to teaching. Because who will pass on thorough and reliable knowledge to students? This will only be the teacher, who possesses it, but who will also teach their students to think correctly, analyze and solve a complex task, therefore the teacher who herself has the well-established capacity of logical thinking, noticing biological-chemical-physical processes taking place in everyday situations in the world around and who can create

and solve such tasks and problems. Good knowledge of the subject taught requires constant broadening of possessed knowledge. Schools cannot handle outdated knowledge; they should also track the progress of science. Therefore, a teacher also has to update earlier acquired knowledge and confront their information with the current state of knowledge (Buchcic, 2014).

The ability to evaluate one's own self-esteem, level of expertise and didactic-pedagogical-organizational skills of students, future teachers – head teachers is not without significance.

The context and purpose of the framework: At the Faculty of Chemistry of the Jagiellonian University, students have the opportunity to obtain permission to teach chemistry at primary and secondary school level by participation in pre-service teachers training. The programme of pre-service teachers training includes a school-based course.

Based on long-term experiences of the author who conducts this course, her observations and reflections, there are several subjects, issues repeating year on year, which are unwillingly realized by students, who find them difficult. The issue related to reaction mechanisms in organic chemistry is definitely least liked and friendly to the students.

It is obvious that reaction mechanisms are a fundamental part of the study of organic chemistry. J. Brent Friesen (2008) wrote: "Organic reactions in introductory organic chemistry courses are most commonly taught with a mechanism-based approach to the understanding of molecular reactivity." Some students' problems in this area are presented and discussed in many articles (e.g Anzovino and Lowery Bretz, 2015; Sevian, Bernholt, Szteinberg, Auguste and Pérez, 2015).

Research methodology: Survey questionnaire developed especially for the needs of the conducted research was a research tool. It consisted of 4 questions concerning students' feelings about their preparation for conducting classes associated with reaction mechanisms, as well as specifying difficulty level in explaining specific notions to school pupils. The catalogue of concepts suggested in the survey was chosen on the basis of the factsheets that appeared more frequently in accessible graduation sheets (old and new formula) on the website of Central Examining Board¹. The interviewees' task was to identify difficulties in the explanation of given notions on a 5-point Likert scale. The question about chemistry exam grade was included in the questionnaire form.

The study enrolled faculty students representing Chemistry and Environmental Protection Departments. The research was carried out in the winter semester in the academic year in a 3-year period – from 2017 to 2019. Student participation was voluntary and anonymous.

The questionnaire of the survey was filled in by 69 students. A vast majority of the surveyed were women (n=51), what constituted 74%. 91% of the respondents were chemistry students.

Results and discussion: A group of 69 students were asked to complete the questionnaire, which was designed to identify factors that determine the decision

¹ <https://cke.gov.pl/egzamin-maturalny/>

to conduct lessons on the mechanisms of chemical reactions in organic chemistry in high school classes with extended curriculum. To determine these factors logistic regression was employed based on binominal distribution. Outcome variable – the decision to conduct lessons – was subjected to logistic regression with eight predictors summarized in Table 1.

Table 1. Design of survey taken by group of students.

Variable	Type	Values/coding	Relevant question from questionnaire
the decision to conduct lessons	dichotomous	Yes / No	Would you decide to conduct the lesson on the mechanisms of chemical reactions in organic chemistry in upper secondary school in the class of extended curriculum?
organic chemistry exam mark	continuous	2, 3, 4, 5	
year of study	continuous	1, 2, 3, 4, 5	
type of higher education institution	dichotomous	university / technical university	
sex	dichotomous	female / male	
university specialization associated with organic chemistry	dichotomous	Yes / No	What is your academic specialization?
personality of the person being surveyed	dichotomous	Yes / No	Do you like challenges?
assessment of the difficulty of issues related to reaction mechanisms at upper secondary school level	categorical	-2, -1, 0, 1, 2	Would you consider issues related to the reaction mechanisms in organic chemistry at the secondary school/university level as: very difficult, difficult, no opinion, easy, very easy?
assessment of the difficulty of issues related to reaction mechanisms at higher education institution level			

In order to indicate the factors influencing the decision the logistic regression model was chosen based on the Akaike information criterion. The application of this approach indicated that the decision to conduct lessons is best explained by two statistically significant variables, i.e. organic chemistry exam mark and assessment of the difficulty of issues related to reaction mechanisms at higher education institution level. The logistic regression model is further detailed in Table 2. The chi-square value is highly significant indicating that the model fit is good.

Table 2. Logistic regression model for predicting the decision to conduct lessons on the mechanisms of chemical reactions in organic chemistry in high school classes with extended curriculum.

	β (SE)	95% confidence intervals for odds ratio (OR)		
		lower	OR	upper
intercept	-3.55* (0.78)	—	—	—
organic chemistry exam mark	0.80* (0.21)	0.41	2.23	1.22
assessment of the difficulty of issues related to reaction mechanisms at upper secondary school level	0.59* (0.16)	0.28	1.81	0.93
model χ^2 (2) = 36.4, $p < 0.001$ R^2 (Hosmer-Lemeshow) = 0.13 n = 200 * $p < 0.001$				

It seems that both the organic chemistry exam grade, as well as assessment of the difficulty of organic chemistry issues at high school level may determine a potential candidate to conduct the lesson on reaction mechanisms. Consent to conduct lessons is favoured when student achieves better results in organic chemistry exam and considers high school organic chemistry material as easy or very easy. Assessing the level of difficulty of the high school material in such a way (probably from their own experiences) students are confident that they will cope with conducting lessons regarding this material, and their exam marks serve as an reinforcement. Other variables, as they are not included in the model, can be considered insignificant.

Students were also asked to assess the level of difficulty of several organic chemistry issues in scale of five statements: very easy, easy, no opinion, difficult and very difficult. The question was answered by 113 students. Results were analysed with respect to a group of student deciding to conduct a lesson and a group of students taking different decision. For each of the organic chemistry topics relevant answers were counted and the final result was given as the difference of these values for both groups of students. Resulting plot, along with hierarchical cluster analysis of organic chemistry topics (with Euclidean distance measure and complete linkage agglomeration method), is presented in Figure 1.

Interestingly, it seems that the greatest disagreement between students coming from two different groups is related to the fundamental concepts of organic chemistry when reaction mechanisms are a topic at hand, namely: electrophile, nucleophile and radical. Cluster analysis finds these topics closely related based on students responses. Students deciding to conduct lessons find these topics very easy whereas other students are inclined to assess them as easy. Both groups of students do not disagree when the concepts of carboanion and carbocation are deemed to be very difficult. Supervising teacher of a student's pedagogical training might consider deepening material related to electrophile, nucleophile, radical, carboanion, carbocation, radical and carbocation creation topics. Cluster analysis also identifies

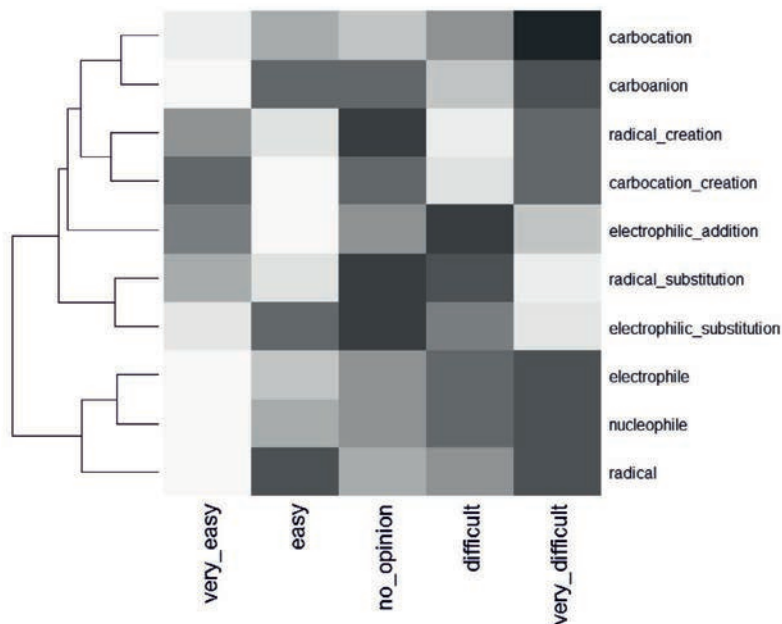


Figure 1. Differences in understanding the difficulty of the organic chemistry concepts for students who decide and not decide to conduct lessons. Brighter colour corresponds to a greater degree of disagreement between the two groups of students.

groups of topics considered as coming from the same thematic units, notably: radical and electrophilic substitution reactions, aforementioned cluster of electrophile, nucleophile and radical as well as group of carbocation and radical creation processes.

Each of the surveyed students was asked to list main reasons behind their choice whether to conduct or not the lesson. There is a noticeable variation in the responses of two groups of students. Students expressing the content to conduct lessons highlight their ambition, curiosity and possible satisfaction. It is worth emphasizing that these students stress that learning reaction mechanisms at the secondary school level is extremely valuable for students. In this way, secondary school student can reach to the heart of organic chemistry and can avoid the popular learning letter relying on the memorization of rigid list of syntheses and characteristic reactions of many types of organic compounds. As strengths, which favour the choice taken, students find the courage, expertise, thoroughness, commitment to work with children and previous experience. Students who chose not to conduct lessons also have been asked to state reasons behind their decision. These reasons relate primarily to concerns linked with stress associated with public speaking, lack of interest in teaching as well as a lack of understanding of the subject. This last reason is reflected in poor marks for organic chemistry exam. Students choosing to conduct lessons indicate the two areas of decision-making about a matter at hand: personality traits and belief in the merits of the students' need to be familiarized with the subject of organic chemistry reaction

mechanisms. Students not taking this decision point out the lack of both pedagogical and substantive competences.

Perhaps the reason for such a situation is also the fact that teachers unknowingly make mistakes and consider the knowledge contained in school textbooks to be irrefutable. This, combined with students' little experience in learning techniques, interpretations of scientific concepts oversimplified for didactic purposes as well as the lack of appropriate analogies and associations, produces the observed effect. It is obvious that active learning approaches, proper activities and a need to integrate them with teachers' classroom activities is essential for effective chemistry lessons.

Therefore, it seems appropriate to conduct further research among teachers the aim of which would be to check how they teach organic reaction mechanisms, which active techniques they use, and how they stimulate students to develop strategies and models helpful in learning and problem solving as well as how they encourage students to use different models which can help them to overcome learning difficulties in this topic.

Thanks to the participants of the survey.

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Appendix:

The survey is anonymous. I am kindly asking you to fill it reliably. Thank you.

Sex F/M Year of study

First level studies, current/planned panels

Second level studies, current/planned specialization

Grade from the organic chemistry exam:

1. I consider issues related to reaction mechanisms in organic chemistry at university level to be:
Very easy Easy I have no opinion Difficult Very difficult
2. I consider issues related to reaction mechanisms in organic chemistry at secondary school level to be:
Very easy Easy I have no opinion Difficult Very difficult
3. Would you decide to give a lesson on the mechanisms of chemical reactions in organic chemistry in upper secondary school with an extended chemistry curriculum? YES/NO

If the answer is YES:	If the answer is NO:
• Write down your strengths: • Give the main arguments in support of your answer YES:	• Write down weaknesses, the fears that accompany you • Give the main arguments in support of your answer NO:

4. In your opinion, specify the level of difficulty (in explaining the following terms to school students):

	Very easy	Easy	I have no opinion	Difficult	Very Difficult
Electrophil					
Nucleophile					
Radical					
Carbocation					
Carbanion					
Formation of carbocation					
Formation of radical					
Electrophilic substitution					

How Students – Future Teachers Identify themselves with the Issue of Organic Reaction Mechanisms in the Context of Chemistry Lesson Carried out at Schools

Abstract

Lesson is the basic unit in the teaching and learning process. Both the teacher and students participate in it, therefore they all should be prepared for the class. The requirement of good substantive preparation for a lesson is not only empowered legally, but it also results from

teacher's own reflection on the improvement of educational process in the context of its effectivity. Recognition of a future teacher in terms of their personal cognitive preferences and professional knowledge is key for the improvement of teaching quality. The main aim of the study was to find out factors that determine the students' decision to conduct lessons on the mechanisms of chemical reactions in organic chemistry at upper secondary school level. For this purpose the results from survey were analysed.

Keywords: education, pre-service teacher training, organic reaction mechanisms

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The Periodic Table of Elements and Other Materials for the Final Chemistry Exam; Students' Opinion

Introduction

The 150th anniversary of the discovery of the Periodic Table by Dmitri Mendeleev (a Russian chemist and inventor) was celebrated in 2019. That is why the year was announced by the ONZ General Assembly an International Year of the Periodic Table of Chemical Elements 2019 – IYPT2019. The celebration has been arranged and coordinated by: UNESCO, International Union of Pure and Applied Chemistry – IUPAC, European Association for Chemical and Molecular Science – EuCheMS, International Science Council – ISC, International Astronomical Union – IAU, International Union of Pure and Applied Physics – IUPAP and International Union of History and Philosophy of Science and Technology – IUHPST¹.

After 150 years of its usage, we now understand much better how properties are affected by the position of elements within the periodic table. A synergy between proper understanding of the periodic table and our understanding of different chemical materials was created.

The context and purpose of the framework

Science school education is based on the periodic table of elements. There is no core curriculum for chemistry that does not contain specific content on the Periodic Table of the Elements. Some specific requirements for chemistry at a primary school level are presented in Table 1 and for chemistry at the upper secondary school level are presented in Table 2.

¹ From: <https://iypt2019.org/>

Table 1. Some specific requirements for chemistry at a primary school level²

Main teaching content	Teaching content – specific requirements
II. Internal structure of matter. School students:	2. describes the composition of the atom (nucleus: protons and neutrons, electrons); based on the position of the element in the periodic system, determines the number of electron shells for elements groups 1 and 2 and 13–18; determines position of the element in the periodic system (group number, period number);
	6. reads basic information from the periodic table about the elements (symbol, name, atomic number, atomic mass, type of element – metal or non-metal)
	7. explains the relationship between the similarity of properties of elements belonging to the same group of periodic system and the gradual change of properties of the elements lying in the same period (metals – non-metals) and the structure of atoms;
	13. determines, on the basis of periodic system, the value (relative to hydrogen and maximum relative to oxygen) for the elements of groups 1; 2; 13; 14; 15; 16 and 17.

Table 2. Some specific requirements for chemistry at an upper secondary school level³

Main teaching content	Teaching content – specific requirements
II. Structure of the atom and the periodic table of elements. School students:	1. applies the terms: shell, subshell; writes electron configurations of atoms of elements up to Z=20 and ions with a given charge, taking into account the affiliation of electrons to subshells (records of configurations: full, abbreviated);
	2. determines belonging of the elements to the configuration blocks: s, p of the periodic table based on the electron configuration;
	3. indicates the relationship between electron structure of the atom and the position of the element in the periodic table and its physical (e. g. atomic radius, ionization energy) and chemical properties.
X. Metals, non-metals and their compounds. School students:	1. describes similarities in properties of elements in groups of periodic system and variability of properties in periods;

We cannot imagine chemistry lessons without periodic table of elements. A good periodic table is a great tool for solving chemistry problems.

The periodic table of elements is included in the school chemistry textbooks at all levels of education. In 2017, a very interesting article covering this area appeared (Chrzanowski, Buczek, Musialik, Ostrowska, 2017). The authors wrote:

² <https://podstawaprogramowa.pl/Szkola-podstawowa-IV-VIII/Chemia>

³ <https://podstawaprogramowa.pl/Liceum-technikum/Chemia>

We analysed all the series of chemistry textbooks for junior high schools, which have been approved for use in schools by the Ministry of Education since 2009. The study results indicate that the content of all series of textbooks contains the periodic table of elements along with the materials helpful in forming the skills of reading data from such source of information. The most authors of textbooks also took care of that the periodic table of elements was present in every part of the series, which should help students in consolidating the ability to use this tool.

The periodic table of the elements is also included in the additional materials devoted to students that they use during the mature exam in chemistry. This material prepared by the Central Examining Board was called: *"Selected formulas and physico-chemical constants for the mature exam in biology, chemistry and physics."* These materials are designed to help those taking the exam to solve the tasks set for them (Krzeczowska, Krajewska, 2016). What can be found in these materials? From the chemistry point of view, such material includes many important information, as follows:

- Periodic table of elements
- Selected organic acids
- Selected amino acids
- Solubility of salts and hydroxides in water at 25 °C
- Dissociation constants of selected acids in aqueous solutions at 25 °C
- Dissociation constants of selected bases in aqueous solutions at 25 °C
- Electrochemical series of selected metals
- Logarithms
- Square equations
- Prefixes
- Constants and physical and chemical units

On page 6 we can additionally find formula for the law of common gravitation, on page 7 – formula for density, the equation for the state of perfect gas (Clapeyron's), a table entitled *"Contemporary physics"* and also on page 8 – formula for Coulomb's law.

It is obvious that students should know what is in these materials and what this information can be used for. Developing these skills during chemistry classes is very important and helpful while using them during the exam, where stress occurs and finding the right part, a proper issue can be time consuming.

It was assumed that students should use these materials during chemistry study. Every day, each student should be practicing this particular skill, which makes him better prepared for the final exam.

Based on the long-term experiences of the author who conducts chemistry lessons at school with extended program and due to the special revision course for school students before mature exam, her observations and reflections, the following hypothesis can be formulated: "Not all students use these materials in every chemistry class".

The main aim of my study was to collect the students' opinion on this kind of materials.

Research methodology

To acquire and evaluate the opinions of school and university students a special form of a questionnaire was created as the research tool.

The research sample included – a) students of the first year of chemistry and medical chemistry study and b) school students at upper secondary school level. Age for boys and girls did not differ significantly. The oldest participant was 20 years, the youngest 17 years old. The research was conducted at the beginning of the 2019–2020 school and academic year. Student participation was voluntary and anonymous.

Responders answered in a written form to the questions:

Q.1. How often do you use these additional materials for final exams during chemistry lessons? An answer was on a 5-point Likert scale.

Q.2. Do you use a periodic table of elements during chemistry classes?

Q.3. Do you use a table of solubility of salts and hydroxides in water at 25 °C during chemistry classes?

Q.4. Do you use an electrochemical series of selected metals during chemistry classes?

Q.5. Do you use a table of dissociation constants of selected acids and selected bases in aqueous solutions at 25 °C during chemistry lessons?

Q.6. Has the teacher shown what other additional information can be found there or in what other situations it is worth using?

Short characteristics of respondents is given in Table 3.

Table 3. Characteristics of respondents (survey).

	University students (first year) N = 159	School students Penultimate class N = 62	School students Last class N = 57
Gender	F: 22% M: 28%	F: 82% M: 18%	F: 82% M: 18%
Age in Years	19 years: 79% 20 years: 8% 21 years: 13%	17 years: 50% 18 years: 50%	17 years: 16% 18 years: 81% 19 years: 3%
Higher education (before an academic year with survey)	Yes: 13% No: 87%	–	–
Town/city	Krakow	Krakow Rzeszów Ostrowiec Świętokrzyski	Krakow Rzeszów Ostrowiec Świętokrzyski
The number of classes	1 – chemistry study 1 – medical chemistry study	3	3

Gender and age of the respondents were not an unimportant variable. I assumed that an important variable for university students is the fact of previous study.

It is quite clear that out of the total respondents (N = 278) investigated for this study, overwhelming majority (76 per cent) of them were females whereas about 24 per cent were found to be males.

Results and discussion

The answers obtained from all surveyed students were added up and converted into percentage. The obtained data are presented in the form of graph with some commentary.

For all graphs, individual symbols A, B and C were used to differentiate groups of responders:

A – school students (penultimate class)

B – school students (last class)

C – university student

Q.1 – The results are presented in Figure 1.

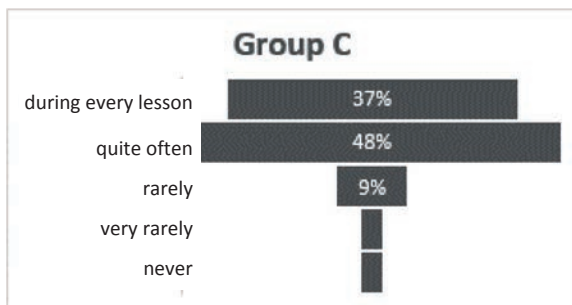
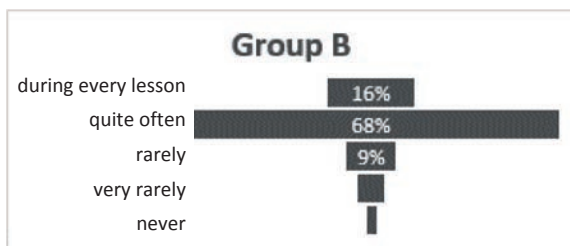
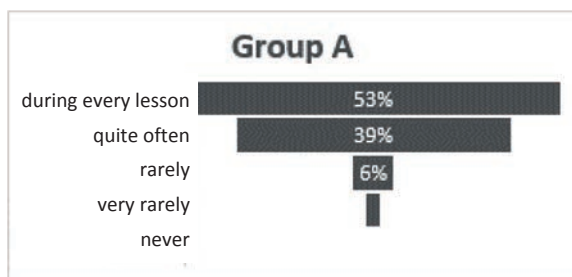


Figure 1. The results for question no. 1 in each group of respondents.

In the majority of surveyed students, these additional materials were used for final exams during every chemistry lesson or quite often. In fact, 3% of the university students and 2% of school students never used such help. This is, perhaps because school teachers never encouraged them to do so. All university students before the academic year with survey (students who have previously studied somewhere) fell into 37% of the respondents (group C) who chose “during every lesson”.

The next four questions (Q.2 – Q.5) concerned detailed information contained in the materials.

The obtained results are shown in Figure 2.

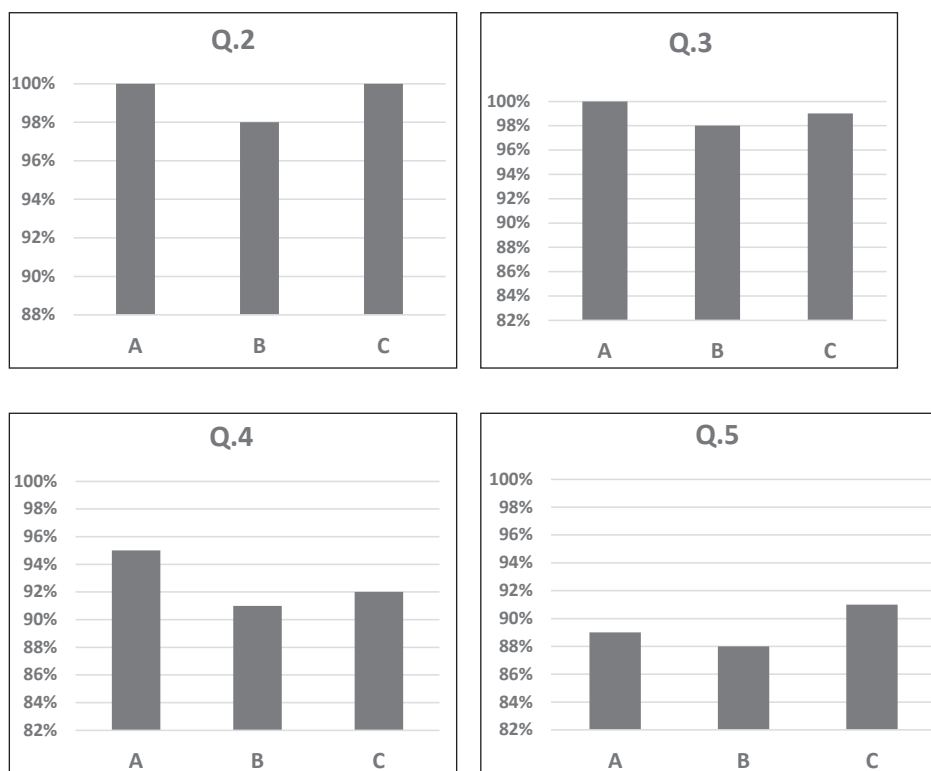


Figure 2. The results for questions no. 2 to no. 5 in each group of respondents.

The results indicate that among elements: a periodic table of elements, a table of solubility, an electrochemical series of selected metals, and a table of dissociation constants, a periodic table of elements had most affirmative answers “yes” and a table of dissociation constants had least answer “yes”. The comparison of A group with B group results indicated that slightly more answers “yes” appeared in group A, perhaps because in the last class (B group), organic chemistry is usually discussed and the use of these materials is less frequent.

Q.6 – Among the upper secondary school students, more than 88 % answered “yes” for question 6, but only 66% university students marked “yes”. Another worrisome phenomenon is the fact that not all teachers demonstrated the usefulness of these materials.

Maybe teachers do not pay attention to the most important content and skills that should be mastered by students.

Based on the obtained data, it can be concluded that students used different elements of these materials. It could be anticipated that we do not know whether students use the proper way.

It is obvious that the proper way of using the reference literature chemistry materials, helps students to be better prepared for the final exam.

In the future, it will be interesting to continue this research by using a special test that will allow me to check students’ problem solving skills based on a proper usage of these materials.

Thanks to the participants of the survey.

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The Periodic Table of Elements and Other Materials for the Final Chemistry Exam; Students’ Opinion

Abstract

All school chemistry teachers, along with their students, realize that the periodic table of elements (and some other reference literature chemistry materials) is one of the most fundamental sources of information in chemistry. School and university students were surveyed in order to collect their opinions on the frequency of use of these materials in the class, together with their judgement on which elements were used. I would also like to know: Do teachers at school teach how to use the reference literature chemistry materials?

Keywords: chemistry, final exam, additional material

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Dalila Kessouar & Emmanuella Di Scala

Comparison of the Representation of Homeopathy from Different Students Audiences



All our thanks to the Deans of the UFR of Medicine, Life and earth sciences and Psychology of the University of Dijon, who agreed to distribute our questionnaires to the students targeted within the framework of the HOMEOCSS Project.

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All our thanks to the scientific committee, chaired by Professor Fabien Medvecky of the University of Otago in New Zealand, for his evaluation and comments on this work.

Composition of the scientific committee (<https://www.projet-homeocss.com/comite-scientifique>):

Pr Bruno Falissard, University of Paris, France
 Dr Manon Knapen, University of Otago, New Zealand
 Pr Fabien Medvecky, University of Otago, New Zealand
 Pr Bruno Pozzeto, University of Saint-Etienne, France
 Pr Pascal Ragouet, University of Bordeaux, France
 Dr Benoît Urgelli, University of Lyon, France
 Dr Empar Vengut Climent, University of Valencia, Spain

Introduction

This study is part of the HOMEOCSS societal research project (www.projet-homeocss.com) and more particularly in OBJ1, an object of study relating to a student audience.

This work is based on a comparative study of the social representations of different student audiences at the University of Dijon, France (Medicine, Life and Earth Science and Psychology) on the subject of “homeopathy”, and will give a first approach to this object of study. The challenge will be to better understand the representations of different student audiences in order to identify if the training curriculum can have an influence on their representations.

Concept of societal controversy

The controversy seems to be, for many authors, a place of compulsory debate structuring knowledge. Controversies are “effervescent moments” as Durkheim tells us (Durkheim, 1900).

“The controversy changes form as soon as the statements circulate in other arenas. We then come out of scholarly controversy to enter the framework of public controversy, controversy and quarrel”, indicates Lilti (2007: 18). But in all cases it aims, as Pestre states (2007: 35), “to an axiological neutrality vis-à-vis the actors and their values.”

Homeopathy is the subject of public controversy that will be characterized as a socio-scientific controversy. Indeed, this object has been and is still very controversial within the academic and scientific sphere. Through its history, homeopathy has always oscillated between challenge and integration (Faure, 2002).

Homeopathy is based on the principle of similarity, set out by Hahnemann in 1810. The new therapy is then accused of many shocking contradictions, many palpable absurdities (Bariety, 1970).

The scandal in the memory of water affair or the Benveniste affair, in the late 1980s and during the 1990s, discredited the work of immunologist Jacques Benveniste and his team at INSERM. The Academy of Medicine once again condemned, in 2004, a “method devised 200 years ago, from unscientific foundations.” This case, which began with the publication of a series of articles in the journal *Nature*, allowed the analysis of the dynamics of the controversial process, namely the succession of three phases of containment, deconfinement and reconfiguration of the debate (Ragouet, 2014). Two arenas were then defined at the heart of the controversy: the academic and media arenas.

The scientific controversy has continued to this day. A certain number of doctors and scientists consider that the controversy no longer exists in the scientific sphere, (Lauche et al., 2015; Hawke et al., 2018) others consider that it remains current (Montagnier et al., 2009; Henry et al., 2016).

Since 2018, news in France have called into question the scientificity of homeopathy, involving the Academies of Medicine and Pharmacy, the High Authority for Health and health professionals from different groups. Homeopathy is equated to a placebo effect, an opinion which is based in particular on the last Australian study compiling the data (NHMRC, 2013), as well as on the report of the scientific council of the European academies of sciences (EASAC, 2017). Defenders claim its scientific integrity, stating that it must be studied in a frame of reference adapted from the normative scientific framework. They are based in particular on the latest Swiss study (Bornhoft & Matthiessen, 2011) going in this direction and on the EPI 3 study carried out from 2006 to 2010, (Grimaldi-Bensouda et al., 2016) for example.

From a more general point of view, the WHO in 2002 (WHO, 2002) differentiates conventional medicines from non-conventional or complementary medicines which are used in parallel in developed countries (Europe, North America). Among the non-conventional medicines (MNC), the most frequent and best recognized at a European level, we find homeopathy. Europe has chosen the term “alternative

medicine” in its official texts. The CAMbrella research study, funded by a European project (CAMbrella, 2012) and carried out from January 2010 to December 2012 in 39 European countries, made it possible to assess the use and regulation of each non-conventional medicine, including homeopathy. Through this survey, we can see that the popularity of these therapies differs greatly depending on the country. Among the MNCs, homeopathy is considered to be the most used in Europe. However, no European law has been passed for the official recognition of homeopathy, which leads to a variability of practices.

A new European legislation regulates the marketing of homeopathic medicines but does not standardize practices across countries. Indeed, The Council of Europe adopted a new resolution on June 11, 1999 aiming to facilitate access to these non-conventional medicines for every European citizen, for a better harmonization to be achieved between each state (European Commission, 1999).

France is the leading consumer and exporter country (CAMbrella, 2012). The latest IPSOS 2018 survey indicates that 77% of French people have already taken homeopathy in their lifetime and that 58% have taken it several times. 76% have a positive image of homeopathic medicine. According to the IPSOS 2012 survey, 56% of French people use homeopathy for treatment, 36% of which on a regular basis.

Concept of social representations

The theory of social representations dates from 1961 and the works of Serge Moscovici (1961). These works were furthered by the works of Abric (2011) on the nature of the central core of the representation. He has indeed enriched the theoretical framework by showing that the representation is composed of a central nucleus or central system and peripheral elements. Representations can be defined as “a set of opinions, informations, values and beliefs about a particular object” (De Carlos, 2015: 34).

The central core has two dimensions (De Carlos, 2015):

- A normative or evaluative dimension: the central elements are constituted by a norm, a social value, a stereotype or a dominant attitude towards the object of the representation.
- A functional or descriptive dimension: the central elements are those which directly concern the accomplishment of a task.

The aim of this study will be to identify the central nucleus of each group of students in order to compare them and to define whether these representations seem distinct or not.

The notion of social representations is integrated into the theory of social thought (Rouquette, 1973). Social representations find their justification in the ideology defined by beliefs, values, norms, and *thêmata*. Ideology would be the most stable and transverse level in the group. Furthermore, social representation seems to be structured through two processes: objectification and anchoring. According to Moscovici (1961), objectification is defined as the phenomenon making it possible to appropriate and integrate knowledge relating to the object, and the anchoring consist in socially rooting the representation and its object in the subject’s value system. “The

anchoring phenomenon operates in different ways according to social groups. The culture and values specific to a group mean that a social object will not be integrated in the same way and that it will take on a specific form for a group" (De Carlos, 2015: 45). This study will try to characterize the ideology which underlies the homeopathy object (norms, values, *thêmata*, beliefs) and to re-situate it in the phenomenon of objectification, within the representations of students, the phenomenon of anchoring requiring a methodology of complementary narrative interviews.

The socio-dynamic models of representations (multidimensional analysis approach and factorial analysis of correspondences) and structural (allowing access to the content of the representation) described in the methodology section will be used in this study in order to approach the core of the representations of the homeopathy object.

Methodology

Anonymity and data security

In compliance with the European GDPR data protection regulations applicable since May 25, 2018, when submitting the questionnaire, a recorded written consent request relating to the anonymity of the data was previously submitted in order to have the agreement of the public studied. The data was made anonymous once it was obtained. The data retention period has been indicated on the HOMEOCSS project website at www.projet-homeocss.com. All sensitive data was secured by Axcrypt version 2.1.1573.0 encryption software coupled with a strong password. The encrypted data was also saved on external media.

The questionnaires submitted

"The questionnaire remains the most widely used technique in the study of representations.[...] Recent methods of analysis reinforce the privileged place of the questionnaire" (Abric, 2011: 76).

In addition, the questionnaire provides standardization, adds Abric (2011), reducing the subjective risks of the collection and the inter-individual variations in the subjects' expression. However, this standardization also determines limits. Abric specifies that the "questionnaire necessarily limits the expression of individuals to the strict questions which are offered to it and which can avoid the subject's own questions" (Abric, 2011: 77). Besides, it seems that "One of the ways to reduce these difficulties is to use more open questions, offering the interviewee a wide range of answers, that is to say, offering him the possibility of implementing his own approach." (*ibid.*)

Hence, two questionnaires Q1 and Q2 were submitted, questionnaires comprising more or less open questions allowing the expression of the student audience. The precise methodology was published in a chapter of book (Kessouar et al., 2020). These questionnaires were offered on the free platform LimeSurvey version 2.65.0 in order to be accessible online. All the questionnaires and responses were recorded on the platform of the University of Burgundy's polling server, which is secure and which hosts this software.

The Q1 questionnaire, with a mainly contextualizing function, will not be presented and analyzed in this study. Within the Q2 questionnaire, three questions were analyzed so as to highlight the core of the representation.

Questionnaire 2

1. List words that come to mind when you hear the word “homeopathy”.
2. Have you ever heard of homeopathy?
3. Do you know what homeopathy is?
If yes, what is homeopathy for you?

Target audience

The target audience is made up of students aged between 18 and 25 from different university departments: students of Medicine, Psychology and Life and Earth Sciences.

The selected departments were chosen based on their links with care, medication and understanding of the body, though each reflecting a different dominant approaches: one mainly related to treatment and care (students of UFR Medicine), the other of a psychological nature, that is to say mainly related to the mind/psyche (students of UFR Psychology), the last predominantly physiological, related to the functioning of the body (students of UFR Life and earth sciences). In order to carry out the data collection and reach the target university audience, a request for agreement with the deans of each UFR was submitted.

Similarity analyzes and factorial correspondence analysis using IRaMuTeQ software – R software (0.7 alpha 2 version)

IRaMuTeQ software is a free software created by Pierre Ratinaud allowing multidimensional analyzes of texts and questionnaires thanks to its interface with statistical software R. It uses analysis keys equivalent to the categorical keys of ALCESTE. It allows an analysis of similarities (ANOSIM) which offers the possibility of identifying the core of social representation and its periphery by relying on a statistical analysis of the Chi-square type. Factorial analyzes of correspondences also relying on an analysis Chi-square statistics (CFA) identify the anchoring of social representation. Indeed, “ANOSIM views corpora in a completely different way. The approach is more local, based on properties of connectedness of the corpus. [...] This algorithm tends to strengthen the neighborly relationships between the shapes.” (Salone, 2013: 2). “The CFA, based on inertia calculations of the word cloud that constitutes a corpus, makes the oppositions or reconciliations more visible. [...] The CFA proposed are performed after lemmatization and are twofold. Their graphical representations of the point cloud are two-dimensional in the hyperplane defined by the first two factors” (*ibid.*). They will therefore be used for this study.

Chi-square statistical test for homogeneity

The objective of this statistical test is to compare several observed distributions. The distributions observed (in our case the students evaluating the homeopathy object differently) will be compared by considering each population as a sample for which a theoretical pseudo-distribution is calculated.

The Chi-square calculation is performed using the formula:

$$Q = \sum_{j=1}^{\text{nombre de cases du tableau}} \frac{(O_j - A_j)^2}{A_j}$$

for which the dof (degree of freedom) will be calculated from the formula $(k - 1) \times (m - 1)$ where k = any number of modalities and m = any number of population.

Q_c is compared to K_{ddl} ; 0.05 according to the Chi-square table according to the degree of freedom and the chosen probability which will be here of $p = 0.05$. If $Q_c < K_{ddl}$; 0.05, so it has not been shown that the distributions differ. If $Q_c > K_{ddl}$; 0.05, then the two observed distributions differ significantly.

The impact of gender and the impact of educational attainment on the observed distribution will be analyzed.

Results – Discussion

Number of participants and profiles

For all of the different courses surveyed, only the complete responses to the questionnaires were kept (Table 1). It appears that 139 Medicine students agreed to answer the Q2 questionnaire entirely, including 103 girls and 36 boys. The levels of education shown vary widely from the first year of PACES to the ninth year of Medicine. It seems that the number of girls in this type of sector is predominant (around 60%), which could explain the greater number of responses from girls. For the Life and Earth Sciences course, 91 students from License 1 to Master 1 preparation for the teaching profession agreed to completely answer the questionnaire submitted, with a proportion of responses once again in favor of girls: 76 girls versus 20 boys. The distribution within the curriculum (between 60 and 70% of girls) can here again explain this imbalance. Regarding the Psychology course, 208 students from License 1 to License 3 agreed to answer the questionnaire entirely, including 189 girls and 19 boys. Once again, the predominant distribution of girls (70 to 80%) in the curriculum may explain this imbalance. However, in the context of this study, the results will be weighted when applying a Chi-square of homogeneity so that the analyzes of gender and of the impact of the level of study are not biased.

¹ chart's number of cells

Table 1: Number of complete responses to the Q2 questionnaire submitted according to the student audience interviewed. Three types of training course have been targeted: Medicine, Life and earth sciences and Psychology.

	Number of participants (complete answers)	Number of girls	Number of boys
Students of Medicine (1 st to 9 th year)	139	103	36
Students of Life and earth sciences (L1 to M1)	91	76	20
Students of Psychology (L1 to L3)	208	189	19

Definition of a common classification criterion for the subjects interviewed

To define a classification criterion for the subjects interviewed, discourse analysis was carried out. It emerges from this analysis that the action of homeopathy is conceived either as a placebo effect, or as a medicine with its own efficacy. These observations made it possible to establish two broad categories according to whether the students perceived homeopathy one or the other way.

Homeopathy representations of the students interviewed

All of the students interviewed say they have already heard of homeopathy around them (Table 2) with the exception of 2 students in Life and earth sciences (1 boy and 1 girl) and 8 students in Psychology (7 girls and 1 boy).

Among the targeted students, a majority believes they know what homeopathy is and are able to define it. A small proportion (Table 2: 14 Medicine students, 16 Life and earth sciences students and 57 Psychology students) think they do not know what homeopathy is and therefore have not defined it. It should be noted that looking at the proportions, only 10% of Medical students feel they do not know what homeopathy is, 17% for Life and earth sciences students and 28% for Psychology students. It is likely that the contribution of medical training on the subject of homeopathy can lead students in this course to feel better able to know the subject and assess it. The same goes for Life and earth sciences students thanks to information or presentations dealing with the subject (as some students indicate in their remarks).

Among those students who felt they knew what homeopathy was, they were asked to explain what it was like to them. The following three similarity analyzes (Figures 1, 2 and 3) indicate results which allow us to identify the core of the representation defined on the basis of the answers to question 3 of the questionnaire. Figure 1 is for Medicine students ($n = 125$), Figure 2 is for Life and earth sciences students ($n = 75$) and Figure 3 is for Psychology students ($n = 151$).

Table 2. Number of responses from students interviewed according to their training course to two questions identified and analyzed on homeopathy from the Q2 questionnaire submitted.

	Students of Medicine	Students of Life and earth sciences	Students of Psychology
Have you ever heard of Homeopathy?	Yes: 139 No: 0	Yes: 89 No: 2	Yes: 200 No: 8
Do you know what Homeopathy is?	Yes: 125 No: 14	Yes: 75 No: 16	Yes: 151 No: 57

- Homeopathy representations of Medical students:

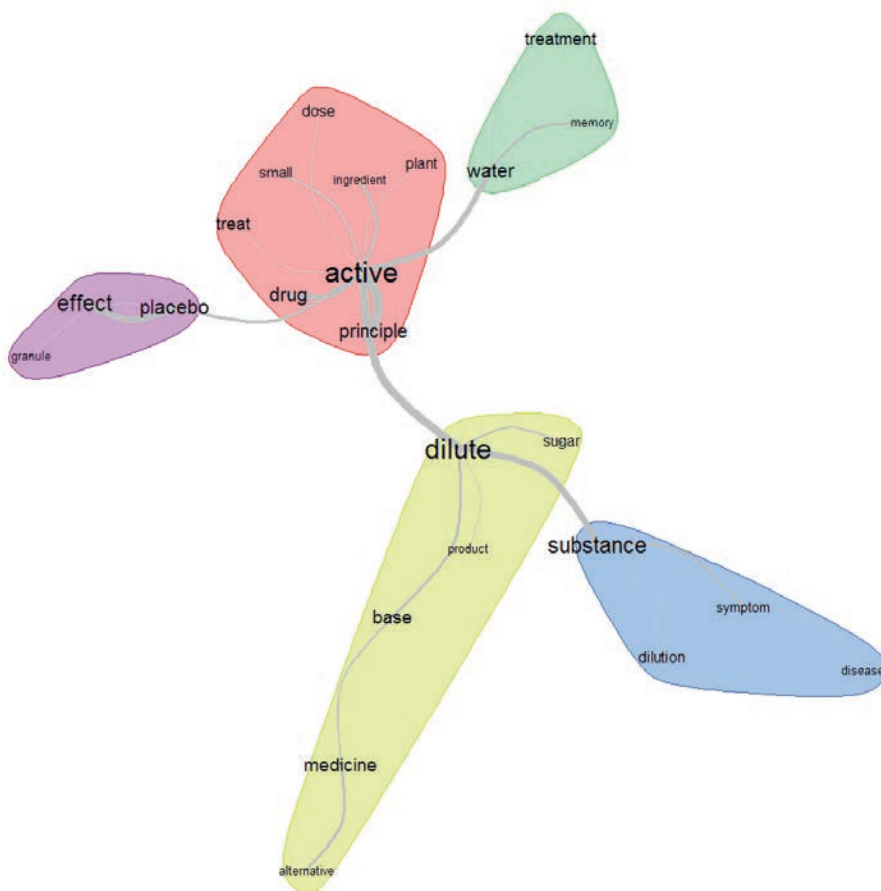


Figure 1. Similarity analysis based on co-occurrences using IRaMuTeQ-R software from Medicine students, $n = 125$. The size of the text is proportional to the frequency related to Chi-square, the thicker the links/edges, the more the more co-occurring words. The lexical communities linked to the co-occurring forces are identified in colored halos. The prepositions and conjunctions have been removed in order to make the figure easier to read.

Table 3. Distribution of the number of Medicine students according to their gender or according to their year of study evaluating homeopathy as an active principle so diluted that its only effect takes place by placebo effect or evaluating homeopathy as a diluted active principle having a clean action via natural medicine. $n = 125$ students interviewed (93 girls and 32 boys). The distribution of students year by year from the second year to the 9th year is not significant. The number of students has therefore been cumulated in order to compare it with the first year with which the differences are significant

	Homeopathy assessment: Placebo effect's action	Homeopathy assessment: Effective natural medicine
Total Number of Medicine students interviewed	60	65
Number of girls	39	54
Number of boys	21	11
Number of 1st year students	22	48
Number of students from 2nd to 9th year	38	18

The students of Medicine evaluate homeopathy according to the forces of cooccurrences found in the analysis of similarity (Fig. 1), in order, like: an active ingredient which has been diluted can be a drug or a so-called medicine, based on the principle of water memory (rightly or wrongly), possibly alternative medicine and/or a substance with a placebo effect.

The analysis of the answers to questions 1 and 3 of the Q2 questionnaire (Table 3), makes it possible to identify the proportion of Medical students evaluating the action of homeopathy as a “placebo effect”, i.e. approximately half of the cohort (60 students who answered) and another half evaluating it as “natural medicine with its own action” (65 students). Excerpts from the remarks illustrate this assessment. It should be noted that students mention having approached the subject within the academical context.

Among the students evaluating homeopathy as an “effective natural medicine”, we find expressions such as:

- “A therapy which is based on the principle of water memory (scientifically proven fact, which should moreover receive greater attention from the medical field). [...] Masaru Emoto’s formidable work on water provides a better understanding of phenomena.”, 2nd year Medical student.
- “A herbal medicine”, 1st year Medical student.
- “It is a tiny dose of an active ingredient”, 1st year Medical student.
- “Soft, natural medicine, based on the administration of granules in a more traditional than scientifically based use.”, 1st year Medical student.
- Among the students evaluating the action of homeopathy as a “placebo effect”, we find words such as:
- “A fake medicine based on an 18th century postulate focused on infinitesimal dilution, never having proven its effectiveness and presenting a public health problem.”, 8th year Medical student.

- “Incredible marketing to make patients believe that this is a gentle and natural method of treatment, when we look at manufacturing with successive dilutions there is really no active ingredient left, and everything is based on the placebo effect”, 8th year Medical student.
- “This is a treatment based on the Placebo effect”, student in the 1st year of Medicine.

Table 3 shows that of the 93 girls who answered, a greater proportion of them (54 girls) rated homeopathy as an effective natural medicine. Conversely, 39 girls evaluate it as a purely a placebo effect with no specific action. It is interesting to note that out of the small number of boys interviewed (32 in all) the proportion of them evaluating the action of homeopathy as a placebo effect is twice as large, 21 boys, against 11 evaluating it as an effective natural medicine.

In order to define if this distribution was not made at random and if a gender effect exists, a Chi-square statistical test of homogeneity was carried out with the objective of knowing whether the distribution of the two populations of boys and girls differs or not significantly according to the evaluation of the homeopathy object. In this context, the number of students evaluating homeopathy as a placebo action and as a natural medicine were considered statistically as two separate samples. The calculation of the Chi-square homogeneity $Q_c = 5.36$ was compared to a $K1; 0.05 = 3.84$, according to the Chi table 2. With a probability $p = 0.05$, it appears that $Q_c > K1; 0.05$ therefore H_0 is rejected and the distributions differ significantly in the two populations. Groups and sexes are therefore not randomly distributed. So there seems to appear here a gender effect on the evaluation of the homeopathy object for which the girls would more likely evaluate it as an effective natural medicine and the boys as an action by placebo effect.

It is also interesting to note that the distribution of students according to their level of study in Medicine differs according to the evaluation of the homeopathy object. Indeed, the students of Medicine evaluating homeopathy as a natural medicine are essentially 1st year students (48 students out of 65), this evaluation being less often found for students of later years (9 students in 2nd and 4 students in 3rd year and very little if at all after). On the contrary, the students evaluating homeopathy as a placebo effect are essentially students whose level is higher than the 1st year of Medicine since cumulatively 38 students evaluating homeopathy as a placebo effect are divided between years 2 and 9 with a peak in the 5th year represented by 10 students. In order to define whether this distribution is significantly different depending on the year of study, in a similar way a Chi-square test for homogeneity was carried out. The same two samples as above were analyzed separately, but this time not according to the distribution between boys and girls but according to the distribution between 1st year and year greater than or equal to 2. A chi2 of calculated homogeneity $Q_c = 17.5$ was compared to a $K1; 0.05 = 3.84$. $Q_c \gg K1; 0.05$, consequently the distributions according to the years of study differ significantly in the two populations between the 1st year of studies and years of studies equal or greater than 2. It therefore appears here that there is probably an influence of the

training provided on the representation of students in Medicine, and in particular influencing their evaluation of the homeopathy object as having a placebo effect.

A composite drawing of the Medicine student evaluating homeopathy as an effective natural medicine would rather be based on this data, a 1st year Medical student girl. Conversely, the typical Medical student boy evaluating homeopathy as having a placebo effect would be a student with a minimum level of 2nd year of Medicine.

- Homeopathy representations of Life and earth sciences students:

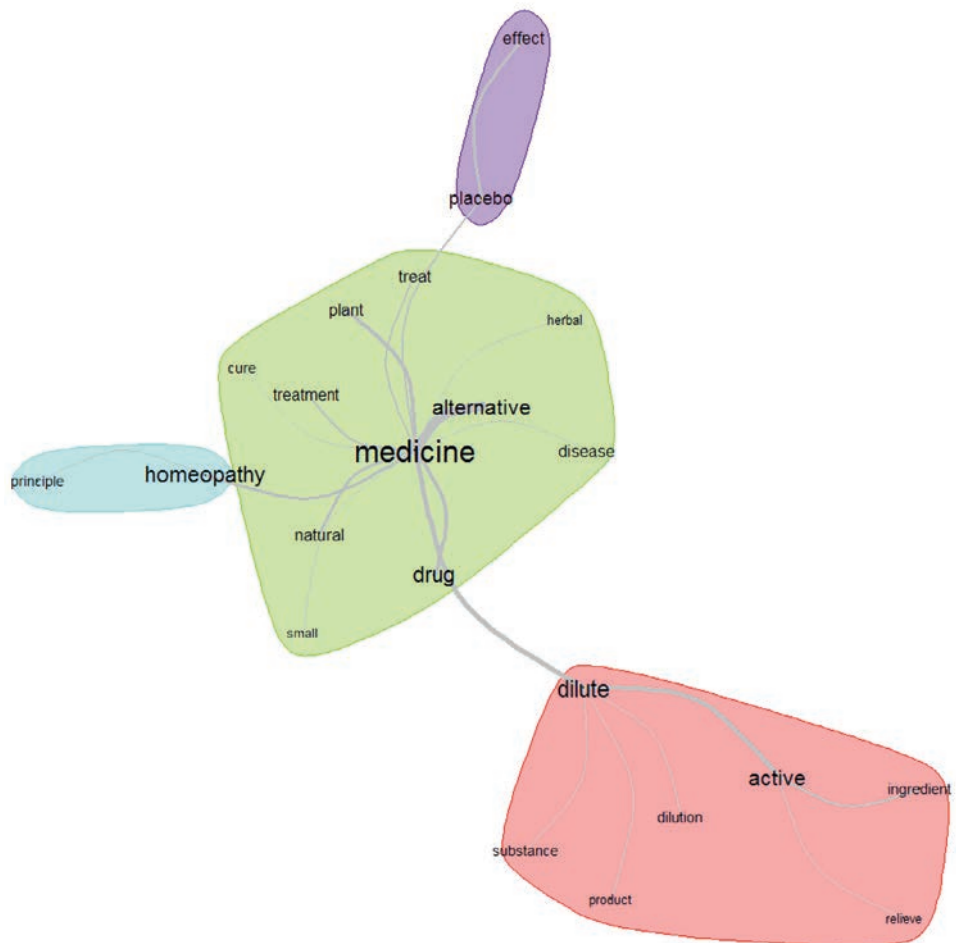


Figure 2. Similarity analysis based on co-occurrences using IRaMuTeQ software-R software from Life and earth sciences students, $n = 75$. The size of the text is proportional to the frequency related to the Chi-square, the thicker the links/edges, the more co-occurring are the words. The lexical communities linked to the co-occurring forces are identified in colored halos. The prepositions and conjunctions have been removed in order to make the figure easier to read.

Table 4. Distribution of the number of Life and earth sciences students according to their gender or according to their year of studies evaluating homeopathy as a diluted active ingredient that its only effect takes place by placebo effect or evaluating homeopathy as a diluted active ingredient having a clean action via natural medicine. n = 75 students interviewed (59 girls and 16 boys).

	Homeopathy assessment: Action by placebo effect	Homeopathy Assessment: Natural medicine effective based on dilutions and/or plants
Total number of Life and earth sciences students interviewed	31	44
Number of girls	19	40
Number of boys	12	4
Number of 1st year students	11	16
Number of 2nd year students	9	7
Number of 3rd year students	10	21
Number of 4th year students	1	0

Life and earth sciences students assess homeopathy based on the co-occurrence forces found in the similarity analysis (Fig. 2), in order, as: an active ingredient that has been diluted, which may be a drug or a so-called drug, being an alternative medicine, based on plants, and/or being a substance having a placebo effect.

The analysis of the answers to questions 1 and 3 of the Q2 questionnaire (Table 4), makes it possible to identify the proportion of Life and earth sciences students evaluating the action of homeopathy as a “placebo effect”, i.e. slightly less than half of the cohort (31 students who answered) and slightly more than half evaluating it as “natural medicine with its own diluted and/or plant-based action” (44 students). Excerpts from the remarks illustrate this assessment. It should be noted that students mention having approached the subject in the form of lectures in the academical context.

Among the students evaluating homeopathy as an “effective natural medicine with its own diluted action and/or based on plants”, we find words such as:

- “A medicine based on similarity and dilution, whose treatment can be personalized”, 1st year Life and earth sciences student.
- “Long-term treatment that relieves certain herbal ailments”, 1st year Life and earth sciences student.
- “Herbal medicines that help the body in different tasks (I take homeopathy when I have aches)”, 1st year Life and earth sciences student.
- “It is to treat with highly diluted drugs, therefore less aggressive, perhaps healthier than real drugs.”, 1st year Life and earth sciences student.

Among the students evaluating the action of homeopathy as a “placebo effect”, we find words such as:

- “Homeopathy is based on several principles: water memory, dilution and similarity. The principle of similarity claims that to treat a disease, you have to inject the same disease (hence the term homeopathy). On the other hand, according

to the dilution principle, the principle must be diluted until it is no longer there (because honestly, with a 10–15 dilution, there is nothing left!), But since water has a memory as well that a Japanese doctor of alternative medicine has decided (in Japan, they have it) and therefore magic, it works! Homeopathic medicines are therefore small beads of water and sugar which, when subjected to the scientific method, did not show any benefit compared to placebo. However, after this severe observation on homeopathy as a science, I have to say that homeopathic doctors have a real contribution because they listen and make their patients think, which is something that many conventional doctors do not do. Therefore, if it is important to emphasize that homeopathy is a religion and not a science, homeopathic doctors are useful like priests are...”, 2nd year Life and earth sciences student.

- “A placebo used to find out if the problem is mental or not.”, 1st year Life and earth sciences student.
- “Homeopathy is a form of inactive treatment that allows people who are hypochondriac or think they are sick to feel better...”, 1st year Life and earth sciences student.
- “A placebo”, 1st year Life and earth sciences student.

Table 4 shows that out of the 59 girls who answered, a greater proportion of them (40 girls) evaluated homeopathy as an effective natural medicine with its own diluted and/or plant-based action. Conversely, 19 girls evaluate it as a purely placebo effect with no specific action. It is interesting to note, as for the students of Medicine, that on the small number of boys questioned (16 in all) the proportion of them evaluating the action of homeopathy as a placebo effect is three times higher, 12 boys, against 4 evaluating it as a natural medicine.

Just as for the Medicine students, in order to define if this distribution was not made at random and if a gender effect exists, a statistical Chi-square test of homogeneity was carried out with the objective of knowing if the distribution of the two populations, boys and girls, differed or not significantly according to the evaluation of the homeopathy object. In this context the calculation of the Chi-square of homogeneity $Q_c = 9.516$ was compared to a $K1; 0.05 = 3.84$, according to the Chi-square table. With a probability $p = 0.05$, it appears that $Q_c > K1; 0.05$ therefore H_0 is rejected and the distributions differ significantly in the two populations. Groups and sexes are then not randomly distributed. Here too, there appears to be a gender effect on the evaluation of the homeopathy object for which girls preferentially evaluate it as an effective natural medicine with its own diluted and/or plant-based action and boys preferentially as an action by placebo effect.

Unlike Medical students, there does not seem to be a training effect here that could influence the evaluation of the homeopathy object. The distribution of students on the different levels of study according to the assessment was not significantly different.

A composite drawing of the Life and earth sciences student evaluating homeopathy as an effective natural medicine with its own diluted and/or plant-based action would rather be according to these data, a student girl regardless of

the year of study targeted. Conversely, the typical Life and earth sciences student evaluating homeopathy as having a placebo effect would be a student boy regardless of the year of study targeted.

- Homeopathy representations by Psychology students

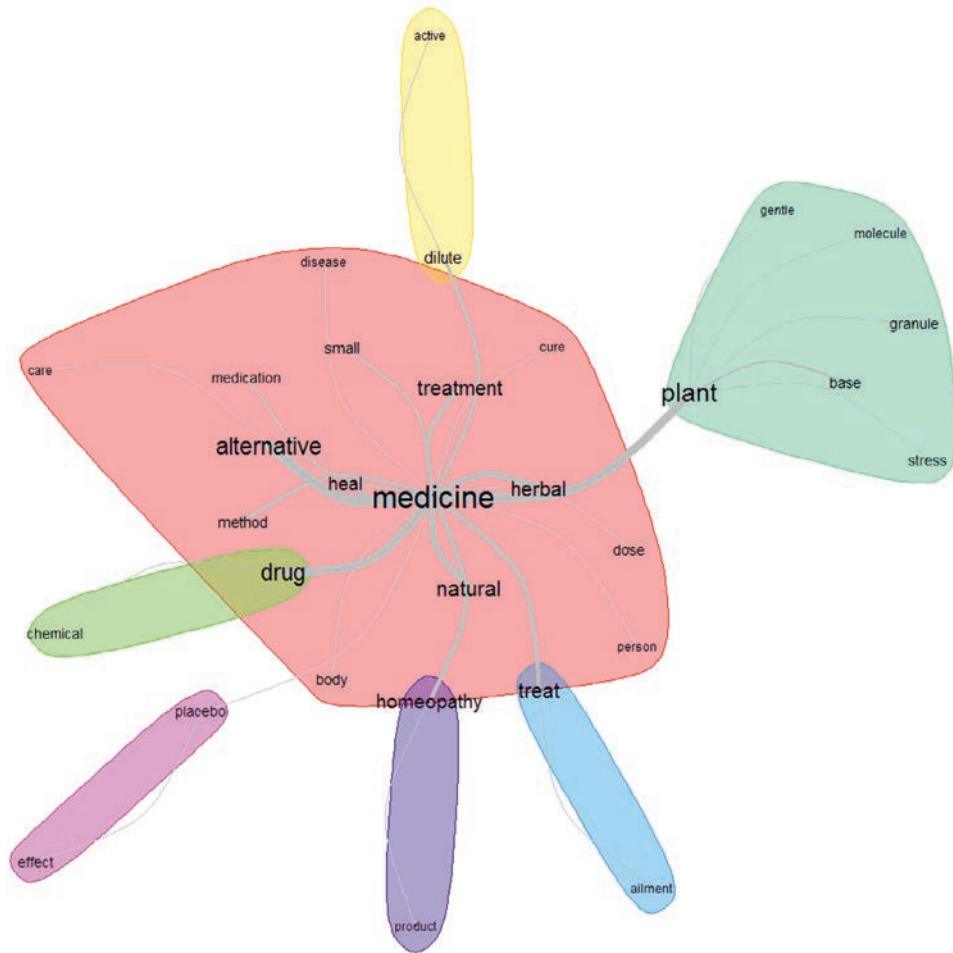


Figure 3. Analysis of similarities based on co-occurrences using IRaMuTeQ-R software from Psychology students, $n = 140$. The size of the text is proportional to the frequency related to Chi-square, the thicker the links/edges, the more co-occurring words. The lexical communities linked to the co-occurring forces are identified in colored halos. The prepositions and conjunctions have been removed in order to make the figure easier to read.

Table 5. Distribution of the number of students in Psychology according to their gender or according to their year of study evaluating homeopathy as an active principle so diluted that its only effect takes place by placebo effect or evaluating homeopathy as a diluted active principle having an action clean via natural medicine. n = 140 students interviewed (128 girls and 12 boys).

	Homeopathy assessment: Action by placebo effect	Homeopathy assessment: alternative medicine/herbal medicine that treats
Total number of Psychology students interviewed	29	111
Number of girls	24	104
Number of boys	5	7
Number of 1st year students	12	58
Number of 2nd year students	5	35
Number of 3rd year students	12	18

Students of Psychology assess homeopathy based on the co-occurring forces found in the similarity analysis (Fig. 3), in order, such as: a herbal medicine and alternative medicine that treats.

The analysis of the answers to questions 1 and 3 of the Q2 questionnaire (Table 5) makes it possible to identify the proportion of Psychology students evaluating the action of homeopathy as a “placebo effect”, ie a very small proportion of the workforce (29 students who spoke) and 4/5 evaluating it as “a medicine and a gentle herbal medicine that treats” (111 students). Excerpts from the remarks illustrate this assessment. It should be noted that Psychology students do not mention in their speech having addressed the subject in the academical context.

Among the students evaluating homeopathy as “a medicine and a gentle herbal medicine that treats”, we find words such as:

- “Alternative medicine that treats with plants”, 2nd year Psychology student.
- “It is a way of healing that responds exclusively to the power of plants and what they have to offer.”, 3rd year Psychology student.
- “It is an gentle and alternative medicine which is based on the fact that our body and our immune systems are made in such a way that they would have the capacity to heal themselves, and therefore homeopathy consists in stimulating the processes of self healing.”, 3rd year Psychology student.

Among the students evaluating the action of homeopathy as a “placebo effect”, we find remarks such as:

- “It is a placebo drug which allows one to believe that it’s treating oneself while it’s not”, 1st year Psychology student.
- “A placebo that heals certain people. However, there is almost no molecule so it is more or less unconscious. It’s a magic medicine”, 3rd year Psychology student.
- “A big placebo effect”, 2nd year Psychology student.

- “Homeopathy is said to be a medicine that relies on “water memory”. In reality it is more a piece of sugar containing no trace of active product as it has been diluted. Homeopathy is therefore, very very expensive sugar”, 2nd year Psychology student.

From Table 5, it appears that the distribution of girls and boys for each of the evaluations of the homeopathy object remains homogeneous, showing no statistical variation in gender effect unlike the Medical and Life and earth sciences students.

Just as for Life and earth sciences students and conversely for Medical students, there does not seem to emerge here either a training effect that could influence the evaluation of the homeopathy object, the distribution of students on the different levels of study according to their homeopathy assessment not being significantly different.

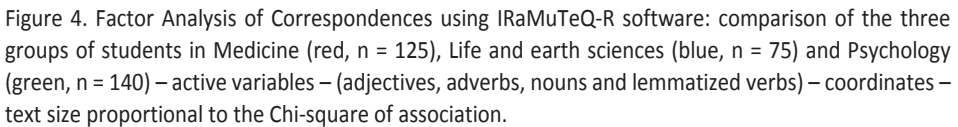
A composite drawing of the Psychology student evaluating homeopathy as “a healing medicine and herbal medicine” would be based on these data, as would the composite drawing of the student evaluating homeopathy as having a “placebo effect”: a student regardless of the targeted year of study.

- Factorial analysis of correspondences of the homeopathy representations of Medicine / Life and earth sciences / Psychology students

The factor analysis is based on the calculation of the differences in independence. It shows that all of the information is reproduced on the hyperplane since in fact the % of information restitution is distributed over the two factors 1 and 2: 87.37% and 12.63% respectively. It makes it possible to highlight the distribution of the nuclei of the representations of the groups of students in relation to each other. In particular, it identifies areas of convergence and divergence.

The distribution of point clouds corresponding to students of Psychology (in green) and in Medicine (in red) shows that their barycenters opposed at 180° reveal an opposition in the social representation of the population groups studied. Indeed, the representation of the group of Psychology students corresponds to an evaluation of homeopathy as a soft medicine acting by plants while the group of Medical students evaluates it as an active principle which has been diluted being able to be a medicine or a so-called medicine, based on the principle of water memory (rightly or wrongly), possibly alternative medicine and/or a substance with a placebo effect. The social representations of these two groups of students therefore seem to be disjointed. If we had been led to compare the individual representations of certain Psychology students and certain Medical students evaluating homeopathy as a natural medicine or even as having a placebo effect, it is very likely that we could nevertheless have found social representations completely joint on a case by case basis for the same evaluation of homeopathy, as shown by the comparison of certain points of the two clouds.

It is interesting to see here that the group of Life and earth sciences students (in blue) is somewhere between the two social representations of Medical and Psychology students. The barycenter of the point cloud being located 90 ° from the barycenter of each of the other two groups, thus mentioning an independence of the population group. However, at least one element present in each representation



of the other two groups is also present in the representation of this group of students. In fact, this population group evaluates homeopathy as an active principle which has been diluted, being able to be a drug or a so-called drug, being an alternative medicine, based on plants, and/or being a substance having a placebo effect. We find both a representation based on plants present in the representation of the group of Psychology students but also an evaluation of a diluted active principle that can be an alternative medicine and/or having a placebo effect found in the representation of the group of Medical students. The representation of the Life and earth sciences students group therefore appears to be partially joint with each of the representations of the other two groups of Medical and Psychology students.

Similarly, if we had been led to compare the individual representations of some Life and earth sciences students and some Medical or Psychology students evaluating homeopathy as natural medicine or as having a placebo effect, it is very likely that we could have found social representations that were totally joint on a case-by-case basis for the same evaluation of homeopathy between these groups, as shown once again by the bringing together of certain points in the clouds.

Conclusion

One of the major challenges of the HOMEOCSS project is to define the central core of the homeopathy representations of different groups. This study, which is part of the OBJ1 of this project and concerning a student audience, allowed us to highlight that the nucleus social representations of homeopathy of three student population groups differ according to their university course. This analysis shows that the representations of the group of Psychology students are opposite to those of the group of Medical students. On the other hand, the representations of the group of Life and earth sciences students seem to be partially combined with those of Medical students and partially joint with those of Psychology students. It is interesting to note that the representations of the group of Psychology students correspond to the representations found in part of the general public (Djouani, OBJ7 publication in progress), that is to say to a representation of homeopathy as “a alternative herbal medicine”. The representations of groups of Medical and Life and earth sciences students seem to be closer to the representations found in a large associative public in favor or against homeopathy (Djouani, OBJ7 publication in progress) or found among actors in the academic sphere (Di Scala, OBJ5 publication in progress), that is to say corresponding to a diluted active principle having only the placebo effect or being an effective alternative medicine based on a principle of high dilutions. The study of the groups of students made it possible to highlight within the groups a different evaluation of homeopathy distinguished as “placebo effect” and “alternative medicine” in each of the groups.

An additional analysis would certainly have made it possible to distinguish sub-categories and further refine the classification of these evaluations. However, the objective of this first analysis was to identify in a comparative way between groups the impact of gender and level of training on representations.

It appeared that gender seemed to have an influence. It was found in male students to more likely lead to an evaluation of the “placebo effect” type of homeopathy while it was found in female students more likely to lead to an evaluation of the “alternative medicine” type within the groups of targeted Medical and Life and earth sciences students. However, no gender effect has been demonstrated in Psychology students. These data are in line with existing research data (Leroy, 2014) showing that women (graduates) are more attracted to homeopathy. Our data on the study of the academic sphere (Di Scala, in the course of publication) point to the presence of the register of care ethics in subjects evaluating homeopathy as a gentle and effective medicine, care being concerned with the well-being and caring. It would then be interesting to identify in our case study if the ethical register mobilized by

the students of the different groups falls within an ethical register of care. It is also interesting to note that the gender distribution seems to be more marked for 1st year Medical students and would seem to decrease or even be erased for 2nd year and older Medical students, since in particular 24 girls out of the 38 girls represented over the 2nd and more years, see homeopathy as a placebo effect. These data suggest that the influence of training could offset the gender effect. However, this proposal will remain hypothetical because of the samples size in this study is not sufficient ($n < 30$) to submit them to a Chi-square of homogeneity. However, if this were significant on a larger sample, it would seem to be in agreement with the results in the course of publication of OBJ6 – medical profession (Malpel, in the course of publication) showing an absence of gender effect on representations of the statutory doctors studied.

It also appeared that the level of study within the training seems to influence the representations of students in Medicine since from the second year the representations of students are mainly oriented on an evaluation of homeopathy as having a placebo effect. This influence of the level of study within the formation is not found for the groups of Psychology and Life and earth sciences students.

Proposals of interpretations could lead us to think that the information and scientific knowledge conveyed in the courses of Medicine and Life and earth sciences on the subject of homeopathy lead the students to have a more precise representation of this object. Indeed, some Medical or Life and earth sciences students interviewed indicated having approached this subject in progress for example in the form of lectures. Conversely, Psychology students with little or no information on the subject (none of whom have mentioned having dealt with it), could forge their representations only from extra-university spheres.

Apart from these cases where homeopathy is explicitly mentioned during the courses, one might think that the general scientific lessons offered in the different courses can also have an influence on the representations of students on this subject. It is also possible that the content of the courses specific to the student's baccalaureate has an influence too. All these elements could indeed contribute to the difference in representation between the population groups studied.

Otherwise, in this sense, it is also observed a significant influence of the level of study and training in Medicine for which from the second year the representations of homeopathy correspond mainly to an evaluation of this object as "placebo effect". Indeed, the academic and official discourse on homeopathy (Academy of Medicine, 2019) mentions that this object can only have an action by placebo effect. From a theoretical point of view, representations are indeed the result of different poles (Clément, 2010), knowledge of which is one of them. It therefore seems consistent to identify an influence of training on the representations of students during their course and especially for Medical students. However, knowledge is not the only pole to come into play in the establishment of representations. Practices, ideology and values are other poles that can influence an individual's representations of an object (Clément, 2010). By focusing on Medicine students for whom training seems to significantly influence representations, it is interesting to note that from year 2, cumulatively,

38 students evaluate homeopathy as having a placebo action and 17 students evaluate it as an alternative medicine with its own efficacy. It therefore appears that the contribution of institutional knowledge on the subject is not enough to influence the representations of all students. In a similar way to the analysis carried out on OBJ5 and the academic sphere, it could be proposed that the sociological anchoring of representation has an importance and conditions this latter. Indeed, the analysis relating to the actors of the academic sphere showed that the subjects evaluating homeopathy as an alternative medicine with its own effectiveness, had a post-modern anchoring at different degrees of roots, this anchoring reflecting a critical view of medicine from modernism. It could be proposed that these 17 students have a more post-modern anchor, mainly influencing their representations of this object. It should not be ruled out that some students evaluating homeopathy as a placebo action could have been influenced by the training provided while having a moderate post-modern anchoring. It would then be likely that once their training course is over, they or a part of them could modify their representations of this object. Indeed, the analysis of the speeches of certain doctors from the academic sphere (cf. OBJ5) seems to go in this direction by mentioning a critical vision of current medicine which goes in the direction of a non-recognition of homeopathy. If they had accepted and adopted this vision during their training, some of them were led to revise their judgment as indicated in this extract from an interview conducted with a homeopathic doctor within the framework of OBJ5 (Subject 9 – Annex 2 (Homeopathic doctor)) “I was very disappointed by the fragmented medical approach: no approach to the person. So I wanted to learn acupuncture while studying medicine. My patients talked to me about homeopathy with a lot of testimonials when I did not believe it based on my studies. Then I followed a training in homeopathy and I started in homeopathy by seeing its benefits. Homeopathy has a humanistic approach to the person, a global approach taking into account the person psychologically, sociologically, respecting the person in order to find the most suitable treatment without side effects.”

It seems that the sociological anchoring of an individual can preferentially influence his representations. It also seems likely, even if the analysis has not shown it, that an individual may, during his life course, change your sociological anchor. A qualitative interview with these students would help to deepen this aspect.

It would also be interesting to compare the representations of Medical students from different French universities. In fact, the Fakemed collective, stemming from the signatories of the tribune against homeopathy in particular (Collectif, 2018), has established on its site a ranking of universities according to their “porosity” to teachings relating to “non-conventional medicines” within the universities in question (Fakemed, 2020). It appears that the University of Dijon, according to their classification, would be little “porous” (with a score of 3/20) but that a university like Lyon-Sud would be very “porous” (with a score of 20 / 20) in particular with regard to the many diplomas and courses offered on homeopathy and other non-conventional medicines. In the context of our study, a comparative analysis between two groups of medical students from so-called “porous” or slightly “porous” universities, would make it possible to identify the possible influence of his teachings during the training course on representations of the students concerned.

Limits

This study did not allow for a deepened and detail the representations of what the students classified as a “Placebo effect” and a “Medicine without side effects” on the subject of homeopathy. Indeed, it could have been interesting to define subcategories in order to know, in particular, whether the practice of homeopathy depended or not on the initial representation and its evaluation as a placebo effect or not. A sub-categorization could have made it possible to define more precise positioning, however the answers provided by the students did not completely allow this information to be extracted for all of the subjects questioned.

The questionnaire analysis allowed a comparison by group of students according to the different disciplinary courses. An additional individual analysis of students from the different groups studied, in particular by semi-structured or narrative interviews, would have made it possible to identify more precisely the possible common representations.

A comparative analysis between students of the same disciplinary course but coming from different universities could have brought additional elements of reflection to the problematic of this article, in particular vis-a-vis the reflexion relating to the influence of the formations on the representations.

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Comparison of the Representation of Homeopathy from Different Students Audiences

Abstract

Homeopathy is the subject of public controversy that will be characterized as a socio- scientific controversy. Indeed, it has been and still is very controversial within the academic and scientific sphere. Through its history, homeopathy has always oscillated between challenge and integration (Faure, 2002). This study of a student audience is part of the HOMECCS societal research project (www.projet-homeoccs.com) which is interested in this controversy and the social representations of homeopathy by various social actors.

This work is based on a comparison of the representations of homeopathy of different student audiences at the University of Dijon, France, and will provide an initial approach to this object of study. The challenge will be to better understand the representations of different student audiences in order to identify whether the training program can have an influence on their representations.

It asks whether the sociological anchoring of an individual can preferentially influence his representations and whether an individual can, during his life course, change a sociological anchoring.

The target audience is composed of students aged between 18 and 25 years old from different university departments: students of Medicine, Psychology and Life and Earth Sciences.

Keywords: homeopathy, controversy, social representation

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Ecological Education as an Antidote to Degraded Nature

Introduction – environmental education in selected teaching models

When preparing for professional work, educators are aware that the key aspect of education is to match appropriate teaching methods to achieve teaching effects. Ecological education is a special issue because one should become aware of the concept of education and compare it with the need to protect the environment due to the degradation of nature. Therefore, later in the article, teaching models are presented with a reference to environmental education.

Jerome Bruner pointed out that education is a “complex process of matching culture to the needs of its members and its members and types for the needs of culture” (Bruner, 2010: 69).

Therefore, it is worth paying attention to the need to protect the environment, which would be included in the culture of Polish society as an antidote to degraded nature.

In order for knowledge to consolidate, it is worth taking advantage of previous educational experience. E. Gruszczyk-Kolczyńska, E. Zielińska (2005) pointed to the scripting of knowledge within the context of the environment. You can somehow implement these insights into issues related to environmental protection. The collected experiments, i.e. educational situations, constitute a script containing primary knowledge, which in turn may allow the implementation of changes in the way natural resources are managed. Teachers or other educator-animators, parents in home-schooling can enrich the experience of foster children, as part of individual experiences or on the basis of practical acquisition of knowledge by other peers. Situational contexts, props that will allow to understand social events – expectations can be repeated (Gruszczyk-Kolczyńska, Zielińska, 2005: 72–73).

Thus, children looking at the surrounding reality (during trips, information about the polluted ecosystem), can better understand the need to protect the environment. Through experiments, learners can cope better in the new situation. In turn, being in a natural setting and being aware of practical forms of improving living conditions for plant and animal organisms (included in biodiversity), over time they may be able to take corrective and preventive measures. Adapting to the new situation, i.e. they will be able to understand and quickly recognize what activities can cause further

environmental degradation. Thus, the script can be a mental scheme that will be repeatable, and based on the personal constructions necessary to define reality, the right response will be possible to achieve the goal (Gruszczyk-Kolczyńska, Zielińska, 2005: 75).

With the help of some kind of a plan, it is possible to refer to the way of education about environmental protection, using the experience of other entities and possibly correct the script of other education and self-education. By the same little effort, it is possible to improve the current way of functioning in a world in which ecological education has so far been a theoretical lesson that has not been implemented in the practical dimension of everyday life among global society.

Therefore, eco-development, i.e. an ecological lifestyle, consisting in the protection of environmental resources (water, air, soil, other species), should be a routine activity that will be inscribed in the subconscious of every human being. Adapting to the new situation requires dosing information to consolidate knowledge and for recipients of education to be able to know and apply it accurately in their activities.

Fun can be a great way to bring new issues related to environmental protection. Perhaps physical activities, talks, and stories about nature protection will illustrate the need for equal involvement of each person, regardless of record age, as in the case of caring for a sick person.

Thanks to such metaphorical education, there is a chance that pupils will be able to understand the value of rebuilding nature so that all organisms can continually function. It will consist in stopping the extermination, i.e. better coping with important life situations related to environmental degradation.

According to Richard Louv (2014), "nature deficit syndrome" is a consequence, that people bear because they are separated from nature. This is manifested by a decrease in the frequency of using the senses, focusing attention on the environment, which in turn promotes the occurrence of physical and mental diseases.

The degradation of nature, and thus the occurring environmental crisis is noticeable in every living space. You can see, among others: desertification of soils, limited mineral resources, the state of famine caused by global warming and reduction of animal and plant species (biodiversity), as well as due to civilization diseases. All this is a reflection of the low level of environmental culture represented by the inhabitants of individual countries and the entire globe (Cichy, 2016).

There are several strands of ecological education. The conservative trend concerns the teaching of the Earth, i.e. the main theme is nature without extending knowledge to social and economic aspects. In turn, the radical current is an aspect of direct human contact with nature (so-called deep ecology) without popularizing knowledge about the environment. That is why moderate nature education is most often used, that is, including specialists in the field of environmental protection and educators, because knowledge is combined with education in accordance with the philosophy of eco-development.

This it is possible permanent learning about the environment while awakening sensitivity to beauty, the richness of nature, and environmental protection (Kiełczewski, 1999: 146).

There are several teaching models. Each of them reflects the most important values that are common in a given community. The subject of this article is motivating to reflect on the legitimacy of existing forms of ecological education in the face of increasing degradation of nature. Perhaps we should look at the characteristics of individual educational models and draw in some aspect inspiration to modify Polish ecological education. Below are selected models that could be used by educators tailored to the educational stages.

According to W. Lenart (2005) in the Swedish model environmental education should be the canon of everyday activities in every home, and the school only extends its scope. Participants very often, as part of educational programs developed by local educators, go on trips to understand the practical dimension of the laws governing and occurring in nature. It is a constant cooperation between pupils and teachers who, as part of voting, choose the thematic area they want to expand and also cooperate to reduce the waste of environmental resources. It is important to teach children and adolescents how to anticipate and see the changes that arise as a result of human activities. All activities are planned to develop respect for nature. In turn, in the Danish model, society generally accepts the principles of using the environment, therefore, residents control their attitudes to maintain a healthy lifestyle, reduce waste, and even make a renaissance, that is, return to traditional ways of farming.

Considering these two models, one could think about important elements of education, which consist in conversation, cooperation between pupils, teachers, their parents to develop long-term responsibility, and not only during one-off pro-ecological actions organized in educational institutions. Teaching aids can support, and above all, motivating recipients by educators to expand contact with nature, not only on holiday trips. Permanent discussion about the environment and the legitimacy of its protection would help unite the entire community in halting the degradation of nature. Maybe to unite children and their parents it is worth proposing taking pictures of nature, it will allow to strengthen family ties and to discover the beauty and richness of biodiversity hidden in nature, which passed without reflection. In addition, families can go on forest wandering and checking the directions of the world on GPS, find among the elements of animate and inanimate nature clues characteristic of the north and south (moss lichen on tree trunks, shape of crowns of trees lit or lacking light, and also pointing to the shape of the anthill's cone)¹. In addition, you can check the shape of the leaf and find the characteristics of trees in parks using mobile applications ("Czyj to liść" application can be used).²

Additional support can be websites with educational videos targeted at adults, as well as children and young people, which are available on the websites of the National Fund for Environmental Protection and Water Management, State Forests and the initiators of the campaign: Air without garbage, which show the legitimacy of conducting experiments among students and teachers to better understand the scale of environmental problems that surround us. In addition, you can use information

¹ www.geocaching.com [accesses: 25.10.2017]

² <https://www.lasy.gov.pl/pl/informacje/aplikacje-mobilne/czyj-to-lisc> (accesses: 04.05.2020)

campaigns dedicated to each age group to better understand the need for ecological education, prepared by: Polish Waters³, WWF⁴.

You can also prepare a coupon booklet with students that will cover outdoor activities. You can use the draw to choose the directions of class trips, because a fishing trip or a day trip ending with star observation will be an interesting alternative to modern IT technologies that do not allow showing the practical skills of a young scout or nature explorer (Louv, 2016: 29).

The initiator of educational initiatives may be an educational leader who would give a direction indicator for the education of children, adolescents and adults, so that the effectiveness of ecology is structured, and not just incidental.

The next part of the article will present the silhouette of an educational leader whose task at present should be showing direction towards eco-development, i.e. such development that will ensure the possibility of social, economic, economic and ecological development of the present and future generation (Constitution of the Republic of Poland of April 2, 1997 Art. 5, Art. 74).

Educational leader as a guide in the reconstruction of degraded nature – conceptual framework

Leadership development is possible when social life exists. Under the concept of social constructivism, man is seen as the creator of the world, so he shapes the meaning and significance of the environment in which we live, thanks to his own interpretation. Therefore, thanks to critical analysis and reflection, the world of values, structures and behavior patterns is crystallized. That is why a leader is defined separately by each local community that adheres to certain rules of life.

The educational leader should work together to ensure social change, i.e. focus on groups rather than individuals. First of all, it is a community learning that is emotionally supported and experienced (Mazurkiewicz, 2011).

Therefore, in present times which require ecological education, society should be included in the teaching process, so that not only the teacher occupies the main roles in the teaching process, but all members have equal positions, to educate responsible citizens and to counteract the environmental crisis (Mazurkiewicz, 2015: 21).

The implementation of the “civic education” principles will serve this purpose, which according to W. Okon, is a subject that provides knowledge about society, derived from scientific sources and everyday experience, and also integrates content from other subjects, such as history, geography, language and literature. Methodological values of civic education are associated with cognitive and educational values” (Wereszczyńska, 2010: 232).

The school plays a significant role in the educational process. As an internal organization, it has mutual relations between teachers, students and educational goals, the curriculum and the technology used. The proper functioning of the school

³ <https://www.youtube.com/watch?v=8D5f12dfbZQ&feature=share> (accesses: 06.09.2019)

⁴ Ekopatrioci <https://www.youtube.com/watch?v=K50G9fleuW4> (accesses: 06.05.2019)

is ensured by the transfer of modern culture resources on a mass scale (Perkowska-Klejman, 2016).

These above words are an introduction to getting to know the profile of the leader of ecological education, which should be appointed in each school in order to develop an appropriate model of education, tailored to the problems of civilization occurring in the 21st century.

Socio-cultural animation provides participants with a transformation of their interpersonal relationships and individual attitudes. It is worth emphasizing that animation is a form of education in action, so it is worth implementing the practice of organizing fun or free time for ecological education. In addition, animation enables the unification of the local community, because thanks to actions taken they can change the reality that surrounds them (Cyboran, 2012: 297, 299).

Local community can be organized thanks to community organizing, as part of social planning, i.e. planning the local community to educate the society through local government and other agencies. Community education provides stimulation of civic activity to achieve overall development. Each person submits his reflective actions. It is necessary to understand the relationship with the environment, to be able to demonstrate an intellectual attitude towards social morality and sensitivity on social problems (Gumuła, 2004: 23–24).

Referring to the above information, it is important to raise the level of ecological education not only at school, but also among adults. Educational leadership is an organizational culture that organizes relationships according to the needs and values of community members. Thanks to this, it is possible to strengthen social participation, servitude and competence, which are manifested in the empathic understanding of people's needs and doing good to others. Thus, it is also a form of orienting a person living in a specific environment, while affecting the general good (Mazurkiewicz, 2015: 29–30).

In view of the problems of nature degradation and current actions aimed at social change, the theory of transactional leadership should be considered, i.e. one that uses interpersonal skills to ensure that all its members identify with the principles of ecological lifestyle as part of transactions and achieving goals undertaken in organizations (Shields, 2009: 53–66).

In the school context, these should be activities that will allow teachers and the school community to develop an innovative education system to minimize existing inequalities in relationships and that everyone be open to the needs of all organisms, not only human but also other belonging to living nature. Thus, each member should be activated, i.e. take actions that will help them to change their degraded world into a better model of ecological management of the environment. This is called distribution leadership (Dorczak, 2015: 40–41).

However, the most suitable type of educational leadership that falls under the issue of environmental education in the face of current pedagogical challenges and inclusion leadership is facing environmental disasters due to the fact that different groups can participate in the educational process to achieve specific goals. In addition, this type of educational leadership is focused on improving curricula to improve its effectiveness. It is important to recognize the educational needs of all

teaching recipients to strengthen the need for the self-education process (Evans, 2009: 45–64). Therefore, educational leadership can act as a guide in actions taken to rebuild degraded nature. The most important is that society, regardless of record age, is ready to learn and improve, to limit the occurrence of ecological disasters, such as drought, floods, which are a consequence of the ecological education deficit. It is somehow aware of the need to change the mind structure so that social processes are open to the needs of animate and inanimate nature (De Corte, 2014: 7–8).

Several people can play the role of the leader of ecological education, but according to Alma Harris there are several reasons that prevent cooperation. This is, among others, the risk of a sense of threat to people sitting in managerial positions (directors), due to creative activities undertaken by lower-level employees, i.e. informal leaders. In addition, the organizational structure of the school limits the role of teachers so as not to fall within each other's competences. That is why it should to support members of the school community and the local community, so as not to hamper, but inspire and motivate to increase the effectiveness of ecological education (Harris, 2004: 11–24).

Referring to the above features of an educational leader, the next part of the article should present the actions taken, on the initiative of top representatives who promoted ecological education. Selected documents were analyzed so that the reader could learn about and identify the differences or similarities of the policy makers of the Capital City of Warsaw.

Practical methods of ecological education – results of qualitative research

Solution-focused education is an approach initiated by Swedish teachers Kerstin Måhlberg and Maud Sjöblom, the author of the Lip-Focus program. This education model is about working with learning without being overly focused on the problem but on a positive change, in addition, the child's resources are strengthened its possibilities to achieve results in the future, apart from its deficits, because the child is an expert in his life (Berg, Shilts, 2004).

John Dewey, in turn, drew attention to the concept of “work school” as a promotion of “learning by doing”. It is important to conduct education in such a way which will enable the release of impulse for grassroots as well as top-down initiatives (Manz, Sims, 2001: 127–136).

As part of the author's own research, the author of this article conducted qualitative research, involving the analysis of documents – strategies for supporting government entities for educational institutions, residents of the capital city Warsaw, whose goal should be to deepen knowledge about nature protection.

Joining the program offered by City Hall representatives was voluntary. Representatives of the city financed materials dedicated to all educational institutions: kindergartens, primary schools, culture centers and housing clubs. The leading topics were: air protection, before the slogan, water protection with an emphasis on rational water management, soil protection along with transformation of the area around the educational establishment for education purposes and rest, protection and shaping of greenery, healthy lifestyle. The undertaking consisted in providing

information materials to the facilities, holding patronage at events and providing the local community with information on the progress of program implementation, e.g. in local media or district committee meetings. After notification teachers received topics from the district program coordinator and examples of ideas to implement the proposed scenarios. Materials with factual information and work cards for students were great convenience so that they would not have problems with consolidating knowledge (Warsaw City Hall, Environmental Protection Office, 2002: 2–4).

The need to conduct ecological education not only at school, but also for adults, has been specified in line with the principles of sustainable development in the City Strategy, which is to be implemented by 2030. Values such as strengthening bonds have been taken into account for strategic purposes and care for each other to jointly decide on the capital's management strategy.

By the same participation, residents could submit initiatives so that the quality of life could be increased in accordance with local needs in the district or neighborhood. Another goal was to enable active leisure time close to home while learning recreation or sport. Among the operational objectives was the point about living in a clean natural environment, i.e. the need to promote renewable energy sources and energy-efficient solutions that protect soil, air and water resources (Warsaw City Hall, 2018).

The need for universal education, including adults, and implementation of the principles of sustainable development, resulted from the fact that individual owners of single-family houses emit a very large amount of toxic substances into the air, that have a negative impact on the life, health and development of all residents.

Legal regulation regarding the type of acceptable fuel and boiler for heating, is specified in the amended Environmental Protection Law of September 10, 2010. Thanks to this provision, local governments decide how they fight for clean air. An additional source of the right to limit the size of the smog problem in Poland is the Anti-smog Resolution, introduced for the first city of the country – Krakow. The content of the resolution clearly states that it is strictly forbidden to burn solid fuels, further restrictions are dated September 1, 2019, and they apply to the elimination of coal and wood burning. Since July 2017, transitional provisions have been introduced to exclude the worst quality fuels. Each voivodeship in its territorial unit may, at a different date, undertake or have undertaken work on draft ratification of resolutions. In October 2017, a ban on burning the worst quality fuels was also introduced in Warsaw (Kropidłowska, 2017).

Educational leadership will be effective if education leaders ensure democratic standards of learning and teaching, and members work together in harmony with specific roles, with their competences. The European Council in 2013 drew attention to the need to improve the work of educational leaders as new career paths, as a dimension of social responsibility for the state of the environment.

Pro-environmental attitudes can be developed regardless of age: children, youth and adults, but it is necessary to provide recipients with: knowledge, skills, motivation and emotions for education to bring results (Kowalski, 2016). That is why it is necessary to appoint a leader of ecological education who will sort out any inaccuracies in the law on environmental protection, in the existing forms and methodology, as well as introduce into the canon principles favorable for ecology.

A synthetic summary of the qualitative research carried out is an invitation directed to educators to look for legal regulations, resolutions in force at the place of employment that allow obtaining additional educational materials in the field of environmental protection. In addition, practical examples of communing with nature among pupils and their families can be an antidote to the degradation of nature.

Practical advice – how to look for pro-health solutions and keep the environment clean?

There are several educational platforms to learn about the health effects of air pollution. Depending on the educational level of the recipients, it is possible to adjust the educational content as part of formal, informal and non-formal education.

For the youngest children, there are videos showing hydration experiments that show that smog is not fiction. An example can be videos on YouTube.⁵

Thanks to songs with rhyming content, it is possible to better remember information on how to protect the air and your health. One example is the Small Orchestra of Our Days – Smog (Stop the nightmare in time).⁶

For older children and young adults, it is possible to use infographics that illustrate the cause and effect sequence of the polluted environment. Making young people aware of the need to protect nature will allow future generations to stay healthy.⁷

In order to understand this information in practice, it is worth showing children and young people modern technologies in teaching – quizzes, thanks to which in the future they will be able to predict the consequences of irrational use of the environment.⁸

As part of the general social form of increasing one's knowledge on environmental education and the impact of the environment on health, there can be experiments dedicated to each age group to understand the negative effects of burning toxic substances in stoves in single-family houses. Organization "Air without garbage" is a YouTube channel created to show the scale of threats.⁹

Another great solution that facilitates joint intergenerational education is watching videos that show the impact of modern technologies on health – asthma, allergy and many other diseases. Here is an example of the basic information contained in the video: *Air pollution. Our air is polluted by cutting down trees, burning wood, burning fossil fuels, smoke from factories and industries, and smoke from vehicles. Due to air pollution, people suffer from a range of diseases such as asthma, bronchitis, and cancer. Air pollution also affects plant growth. Air pollution causes damage to our beautiful monuments. To reduce pollution, we should take some preventive measures:*

⁵ <https://www.youtube.com/watch?v=baJQkO9G6uk> (accesses: 02.11.2020; <https://www.youtube.com/watch?v=cpmacdrzR0> (accesses: 02.11.2020)

⁶ <https://www.youtube.com/watch?v=n7w8OAlDv70> (accesses: 02.11.2020)

⁷ <https://tuptuptup.org.pl/smog-vs-czysta-energia-rozmawiac-dzieckiem-o-ekologii/> (accesses: 31.10.2020)

⁸ <https://tuptuptup.org.pl/maly-quiz-o-smogu/> (accesses: 14.10.2020)

⁹ <https://www.youtube.com/watch?v=YhxtliYW0Ms&t=234s> (accesses: 20.09.2019)

*Plant more trees. Avoid the exploding firecrackers. Use public transport more. Regularly service your vehicles. To reduce air pollution, establish factories and power plants away from residential areas.*¹⁰

Additional support in education and health protection is raising the level of awareness of the problem and the scale of polluted air. For this purpose, mobile applications can be used, which illustrate the state of polluted air in a given city, street with a recommendation, whether the air has sufficient parameters to maintain safety for children, the elderly or those suffering from upper respiratory tract diseases. The following applications are an example: Smok smog, Kanarek.¹¹

Using websites that publish the latest reports prepared by the World Health Organization allows you to systematize your knowledge and understand the need to take corrective actions towards the environment to maintain health in the future.¹²

Contemporary activities of education leaders

Nowadays, an education leader should be an important person in the modern world. Every person has access to knowledge, but not every individual is aware of the practical actions that should be taken to protect the natural environment and the health of society. Therefore, the coaching courses addressed to teachers who would like to indicate a catalog of good practices for other educators, decision makers and the local community were verified. After verifying the available online courses in the last 6 years, it can be observed that the training organizers were most often non-governmental organizations, foundations, organizations and the State Forests.

In 2015, the State Forests offered teachers a course "How to teach about the forest, or workshops for leaders of environmental education". It was organized as part of the project entitled: Educational program to raise the environmental awareness of the inhabitants of the Bug and Liwiec River Basin, implemented by the Łochów Commune, Forest Inspectorate Łochów, Municipal and Communal Cultural Center in Łochów. The classes were free and the teachers were people employed by the Forest Research Institute. As part of the training, the teachers had the opportunity to reflect on the culture-forming role of the forest, which they expressed through art work. Then, the educators were educated in the field of methodology and educational aids, which should be used to teach how to understand the species of trees and flowers. The next educational block was of a workshop nature, it consisted in organizing theoreticians and movement games about the characteristics of animals that inhabit the forest. At the end of the leadership workshop, the tutor conducted experiments and research on the properties of soil, water and wood in order to awaken among educators commitment and real action for environmental protection. Only by referring

¹⁰ https://www.youtube.com/watch?v=sAKyhfxr7s&feature=emb_logo (accesses: 01.10.2020)

¹¹ <https://antyapps.pl/smok-smog-i-krakow-smog-aplikacje-za-pomoca-ktorych-sprawdzisz-zanieczyszczenie-powietrza-w-swoim-miescie-ios/> (accesses: 26.08.2020)

¹² <http://healpolska.pl/zanieczyszczenie-srodowiska-a-zdrowie/> (accesses: 12.08.2020)

to the pedagogy of experience, teachers were able to understand the need to lead children, parents, to protect nature and health.¹³

Another example of popularizing global education were courses organized by non-governmental organizations (Organizing Ecological Activities ODE "Sources") in cooperation with the Center for Citizenship Education as part of the project "Bet on development! Sustainable". Non-profit organizations have invited educators to participate in an online course at the School of Environmental Education Trainers. The aim of these trainings was to make the Leaders, and consequently the entire population living in the rich North, understand about the problems of the inhabitants of the countries of the Global South. These people will be driven by the consequences of consumerism and irrational resource management by economically developed countries. During the training, specialists in the field of global issues introduced the following issues:

- sustainable development in a globalized world: Global North and Global South; the world on my plate or access to food;
- life without water – causes and effects of reducing drinking water resources; the curse of resources – the natural resources of the countries of the Global South; intercultural education and education without stereotypes; human rights and the right development; access to education; causes and natural, social, economic and political effects of climate change; mechanisms governing international trade and their impact on the situation of the countries of the Global South; equality and development – how women change the world; responsible tourism; development and humanitarian aid; responsible consumption and fair trade.¹⁴

At the end of each training section, participants of the school of global education leaders completed a knowledge test to verify how the theory will be put into practice so that it can be passed on to students and their parents.¹⁵ The author of the article trained in one of the editions of training for environmental education leaders in 2019.

The above example of organized workshops for teachers may be a form of appeal to teachers to see the need to combine theoretical knowledge with current anomalies that occur in the environment. Unfortunately, not every person is able to motivate children, adolescents and parents to change the way of managing the environment in their immediate surroundings, which is why ecological workshops and ecological picnics have been prepared in Łódź, so that everyone can motivate people in their environment to take appropriate pro-ecological behavior. The recipients of the training include the community of educational institutions, educational centers, employees of private and state-owned companies.¹⁶

¹³ https://www.warszawa.lasy.gov.pl/rezerwaty-przyrody/-/asset_publisher/1M8a/content/jak-uczyc-o-lesie-czyli-warsztaty-dla-liderow-edukacji-ekologicznej?_101_INSTAN-CE_1M8a_viewMode=view#.X663eshKhPY [accesses: 10.11.2020]

¹⁴ <https://www.zrodla.org/aktualnosci/601/> [accesses: 11.11.2020]

¹⁵ https://globalna.ceo.org.pl/?gclid=Cj0KCQiA-rj9BRCAARIsANB_4ADt-JNG3A0tjo2r7BNgYi6sLJBDief6Cdc6BeFPHdNyi2Ej6zJn8vEaAjvAEALw_wcB [accesses: 10.11.2020]

¹⁶ <http://www.warsztaty-ekologiczne-lodz.pl/klienci> [accesses: 13.11.2020]

In 2019, for the Ministry of Environment, it was important to popularize a leading person – a leader who will indicate attitudes, skills, as well as motivate and change environmental awareness among the society in order to strengthen ecological culture among Poles. It was on the initiative of this institution that in 2019 the competition for the Leader of Environmental Protection was held, which was dedicated to Polish companies (products, services), local government units, and foundations to promote behaviors aimed at improving the quality of life and health of future generations. Among the competition categories, attention was paid to effective, modern, ecological and economical technological solutions that will contribute to environmental protection, which affects the quality of health. The competition was adjudicated in October 2019 during the POL-ECO SYSTEM 2019 environmental protection fair.¹⁷

The last example of a form of promoting the leadership of ecological education is the “Leader of Local Ecology” competition, organized every year since 2009 by the Communal Association of Communes “DolinaRedy and Chylonka”. The aim of the competition is to activate the local community and present in the form of a report the proposed tasks according to the standards of the educational offer in the school year. These are, among others: they conduct eco-interviews, meetings with parents or pedagogical councils, organize field trips, meetings within the facility with specialists in the field of project, leaflet and poster campaigns, school newspapers, prepare school performances, kindergarten environmental knowledge, as well as art and literary competitions. Additionally, the facility has the opportunity to carry out its own, original tasks, according to its own idea but always in accordance with the project theme. Winning institutions participating in the project receive the prestigious title of Local Ecology Leader and a statue and a diploma.¹⁸

To sum up, the leaders of ecological education play a very important role in the process of creating ecological culture. However, they will not achieve anything if people are not interested in their practical gift cards, which they provide during workshops and picnics. Perhaps, if an environmental education leader was appointed, who would indicate ways of solving problems that occur in a specific territorial unit, the local community would obey the proposed actions aimed at improving the quality of the environment. Thus, perhaps they would understand the need to protect the air we breathe in order not to get sick, the essence of good-quality water that we consume and soil, which is deprived of valuable minerals, will not provide people with sufficient food for bone building and proper development. Activities undertaken within the School of Global Education Trainers do not need to be updated. Rather, the optics of society should be transformed in favor of ecology. This will be possible thanks to the popularization of competitions (described above) for an environmental education leader, addressed to every inhabitant of the local society. Anyone can win, it is not about a statue. The most prestigious award will be life with the next generation in an environmentally clean and safe environment.

¹⁷ <https://ios.edu.pl/ogloszenia/konkurs-lider-ochrony-srodowiska/> [accesses: 09.11.2020]

¹⁸ <https://kzg.pl/edukacja/projekt-edukacyjny-lider-lokalnej-ekologii/> [accesses: 08.11.2020]

Arrangements for completion

There are various forms of implementing environmental education. Parents and educators can organize trips for children and young people to establish a bond with nature. You can close your eyes surrounded by nature together to listen to every sound coming from the forest environment and the various features that characterize bird species. It is worth conducting lessons outside, using the surrounding branches, trees, flowers to explain content about the Polish language or mathematics. This will also allow adaptation into the environment. Practical advice on how to conduct outdoor activities and attention of recipients, can be found on the websites of ecological organizations, such as The Nature Conservancy or the David Suzuki Foundation. By interacting with nature it will be possible to reflect on the need to protect the environment. This form of education is associated with the pedagogy of experiences, which is important for shaping the personality and development of each person, regardless of record age.

John Paul II called for action combining “social work ecology” and “family ecology” as a dimension of pedagogization of values from an early age and morals. The need to care for the state of the environment has already been mentioned by St. Pope John Paul II at the beginning of his papal pontificate, at the Encyclical Redemptor Hominis of March 4, 1979, admonishing the public that: “The Creator wanted man to associate with nature as its rational and noble master and watchman, not as a ruthless exploiter” (Dołęga, Czartoszewski, 2000: 163–164).

I encourage all readers of this article to actively look for ways to raise the level of ecological education in order to be able to survive in the world, which is degraded by the irrational and consumer activity of society against the natural environment.

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Ecological Education as an Antidote to Degraded Nature

Abstract

It is common knowledge that life on Earth depends on natural resources: water, air, soil. All organisms are dependent on each other, like in a trophic chain. The need to protect the environment is a necessary measure that can ensure further development in all activities of human activities. The article contains analyzes of qualitative research – verification of documents that presented selected actions undertaken in the Capital City of Warsaw to

show what has been done so far, which can be inspirational for environmental education for preventing degradation of nature by educators and decision-makers in other Polish cities. The publication contains information on teaching about ecology in the context of various educational models. It was important to verify the existing forms of teaching and presented the application of the basic principles of development by adults and children and adolescents. The sources of acquiring knowledge in the field of science education and examples of fun ones that will unite children have been included and their parents and will also help build a bond with nature to include environmental degradation. Community support can be an educational leader, which can be used in a variety of technologies, perhaps it will be able to support environmental policy to the culture of society living in the 21st century.

Keywords: nature degradation, ecological education, education leader, models and forms of teaching

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“Home Spa” Project – Change of Children’s Knowledge and Skills after Participating in the Project

Introduction

Over the past years, there has been a rapid development of informal education in Poland. As part of the informal science education of children, there are numerous Children’s Universities, Explorers’ Clubs and Research Associations. Students according to the instructions provided to them by the teacher base classes conducted in these units primarily on the independent performance of experiments. Universities for children (UCh) mainly run extracurricular activities – this is the idea of combining learning with fun (Janßen and Steuernagel 2003; Nodzyńska and Kobylańska 2017). Classes at UCh should be interesting for students and motivate them to continue independent learning and exploring the world. Although Children’s Universities are a significant part of the education market, research is rarely done to see if such education is effective. Overton (2010: 3878) wrote: “There has been very little research undertaken into aspects of Children’s Universities (CU).” Despite the passage of 10 years, little has changed in this topic. There are studies related to the creation of a children’s university (MacBeath and Waterhouse, 2008) and Overton’s research (2010). However, most publications on Children’s Universities are so-called descriptions of good practice (Van Stam and Wahlberg, 2009). Research is also conducted into children’s satisfaction with various types of activities (Es, 2015). Only a few publications deal with research on the effectiveness of this form of learning (Cakici and Bayir 2012; Moskal and Nodzyńska 2014; Nodzyńska and Kopek-Putała 2017).

Description of the experiment

Wadowice Children’s University (WChU) has been run by the Wadowice cultural center since 2014. Wadowice is a small town, a center of pilgrimages related to John Paul II. There are no secondary (4 level ISCED) or universities (5 and 6 level ISCED) in the town. WChU is attended yearly by about 120 children aged 7–12 from nearby villages and towns. For students, classes at WChU are the only window to the world of knowledge. The Pedagogical University cooperates with the WChU, organizing various types of classes for students.

Goals, research, methods

The hypothesis of the “Home Spa” project was as follows: students during the four-hour practical classes will broaden their knowledge (understood here as news, skills, and attitudes). We were particularly interested in the increase of knowledge among students who did not have any knowledge before classes. To this end, the study was conducted – 65 children aged 7 to 10 participated in the study. These children were students of WChU. During practical classes, students received cosmetics (including soaps) and tested their physicochemical properties.

In accordance with the rules of the project method, students independently chose the topic “Home Spa” from several topics proposed by lecturers. As part of the project, students had a choice of various activities related to obtaining cosmetics and testing their physico-chemical properties. The students themselves received various types: bath balls, hair shampoos, body and lip scrubs, face powder, deodorant and so-called “crystal” soaps. Students studied the solubility of soaps in hot/cold water and hard/soft one, as well as the behaviour of oil in water and soapy water. They also studied the pH of various soaps and cleaning products. In each case, students were free to choose from several recipes that would apply. They could also modify the basic recipe themselves, adding different types of fragrances, colour or dried flowers.

Classes entitled “Home Spa” were conducted using the project method. Practical classes had several purposes:

1. one of them was to show that learning through play is interesting and exciting,
2. showing students that substances known to them from everyday life can be used both as food products and in cosmetology,
3. testing the properties of cosmetics.

In order to examine the increase in students’ knowledge, a pre- and post-test were carried out. They contained 1 open and 4 close-ended questions (1 single selection grid and 3 single choice). The results obtained were subjected to statistical analysis by the rho-Spearman test.

Research results

This article only discusses 4 questions about soap properties. Three questions were closed questions, one question was an open question. The first question concerned information about soap that children knew from everyday life. The second and third questions went beyond the level of knowledge of children at this age, although the concepts of hard/soft water or pH often appear in advertisements. In addition, these concepts were translated in class, children performed experiments and research on these terms.

Underline the right answer:

1. The soap dissolves better:
 - in warm water
 - in cold water
2. The soap dissolves better:
 - in hard water
 - in soft water

3. Which better removes greasy dirt:

- water
- soapy water

Answer to question:

1. What is the pH of the soap?

In addition, students were to assess the entire class on a seven-point Likert scale.

The received student responses were divided into two categories: correct and incorrect (if the student did not answer, it was considered incorrect). In the post-test, the percentage of correct answers given by students is presented in Table 1.

Table 1. Percentage of correct answers to individual questions in the pre- and post-test

Question / Answer	1. The soap dissolves better: in warm water, in cold water	2. The soap dissolves better: in hard water, in soft water	3. Which better removes greasy dirt: water, soapy water	4. What is the pH of the soap?
% of correct answers PRE-test	61.5	35.4	53.8	7.7
% of correct answers POST-test	75.4	52.3	63.1	21.5
increased knowledge	13.9	16.9	9.3	13.8

The results obtained, at first, glance, seem satisfactory – the percentage of correct answers ranged from 21 to 75%. And the increase in students’ knowledge ranged from over 9% to around 17%. The hypothesis was confirmed – after classes there was an increase in knowledge, but during the development of the results, there were dilemmas regarding the increase in knowledge. Analysis of individual student responses showed that students who answered all questions correctly in pre-test and post-test do not affect the average increase in knowledge, and based on their answers, we do not know whether the classes play a positive educational role.

Statistical research using the rho-Spearman test showed a correlation between the correctness of the answers in the pre-test and the post-test (for individual questions the correlation coefficient was: $r_{s1}=0.5$, $r_{s2}=0.3$, $r_{s3}=0.5$, $r_{s4}=0.6$). This means that there is a correlation between the level of students’ initial and final knowledge. So the question arose: Did and how many students who had no initial knowledge learned? However, to be able to examine the impact of classes on knowledge growth, it is necessary to compare the results of pre-test and post-test in individual students.

To research the increase in knowledge, the students’ answers in the pre- and post-test were compared, divided into three types of answers:

1. incorrect-incorrect (which means that the student in the pre-test and post-test gave the wrong answer or did not give it at all),
2. incorrect-correct (which means that the student in the pre-test gave the wrong answer or did not give it at all, while in the post-test he gave the correct answer),
3. correct-correct (which means that the student gave the correct answer both in the pre-test and in the post-test),

The obtained results are shown in Table 2. and Fig. 1.

Table 2. Comparison of correctness of students' answers from pre-test and post-test

Question / Answer	1. The soap dissolves better: in warm water, in cold water	2. The soap dissolves better: in hard water, in soft water	3. Which better removes greasy dirt: water, soapy water	4. What is the pH of the soap?
incorrect-incorrect	24.6%	47.7%	36.9%	78.5%
incorrect-correct	18.5%	26.2%	16.9%	13.8%
correct correct	56.9%	26.2%	46.2%	7.7%

In compiling the results wanted to pay special attention to those students who did not have an initial knowledge about the subject being studied.

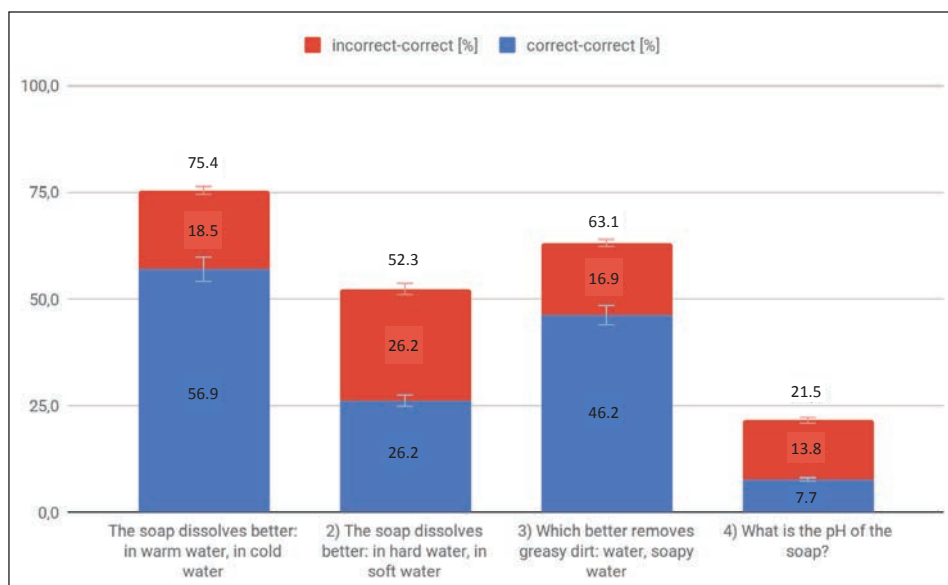


Fig. 1. Comparison of correctness of students' answers from pre-test and post-test

A detailed analysis of the answers shows that students' initial knowledge of individual questions varies greatly. Almost 57% of students know before class that the soap dissolves better in warm water. 47% of students also know that soapy water dissolves fat better. This knowledge comes from their daily lives. Only 26% of students know that soap dissolves better in soft water before class. An even lower level of initial knowledge was found in the fourth question, which concerned the pH of soaps (only about 8%). This knowledge goes beyond the level of school knowledge of students at this age. And it probably comes from advertising.

Knowledge about hard/soft water or its pH is not required at this level of education. However, according to the Wygocki's theory of the "nearest zone development", it seems that the introduction of new concepts that additionally occur in everyday

life (see ads) during non-formal education is needed and correct. On the other hand, testing the effectiveness of this type of education is only possible on concepts not known to children before.

From the point of view of studying the impact of “Home Spa” classes on the increase of students’ knowledge, we were particularly interested in the results of students who did not answer the questions correctly in the pre-test. Therefore, the results of students who answered correctly in the pre-test were removed from the data. Table 3 shows the results showing what percentage of students who did not know a good answer in the test in the post-test answered correctly.

Table 3. Percentage of students who gave the wrong answer in the pre-test and gave the correct answer to the question in the post-test.

Question / Answer	1. The soap dissolves better: in warm water, in cold water	2. The soap dissolves better: in hard water, in soft water	3. Which better removes greasy dirt: water, soapy water	4. What is the pH of the soap?
% of learned children after participating in the project	42.9	35.4	3.4	15.0

The efficiency of the classes, calculated here as the percentage of students who gave incorrect answers in the pre-test or did not give them at all and gave the correct answers in the post-test, is not high. For three questions it ranges between 30 and 40%. And for the question about the soap pH is only 15%.

Perhaps the main goal of non-formal education should not be to increase students’ knowledge, but to show students the beauty of learning and practicing so-called soft competence. It seems, moreover, that the students themselves mainly appreciate the motivational effect of this type of class – assessing the satisfaction with participation in class very highly (Table 4).

Table 4. Satisfaction grade according to students (in Poland 6 is the highest school grade – excellent and 1 the lowest grade – unsatisfactory)

I evaluate project classes with a grade	1 (min)	2	3	4	5	6 (max)	no answer
% answer	1.5	1.5	0	6.2	10.8	60	20

There were no differences regarding the evaluation of classes among students with correct initial knowledge and those who did not have such knowledge. The rho-Spearman correlation coefficient checking the correlation between the answer to the first question and student satisfaction is 0.18, for the following questions it is respectively: -0.21, -0.09, 0.17.

Discussion of results

Comparing the answers to the four questions asked students about soaps, we can see some patterns. Students know the answers to questions 1 and 3 from

everyday life – that is why the pre-test shows a high percentage of correct answers (about 61.5% and 53.8%). However, despite the fact that the terms contained in both these questions are familiar to students from everyday life and apply only to simple observations, the percentage of correct answers in the post-test increases slightly. Since these issues do not seem too difficult for children aged 7–10, it seems that the main reason for the failure was the attitude of students who treat WChU classes as fun and do not try to focus on remembering information.

In the second question, only 26% of children knew the correct answer before class (probably from TV commercials). In this question, new terms appeared for some students: hard water and soft water. However, it seems that these concepts are relatively simple because as many as 26% of students who answered incorrectly in the pre-test answered correctly in the post-test. It seems that students have acquired this knowledge relatively easily.

The fourth question posed the most difficulty for students. The term pH, although it has a difficult definition, often appears in TV commercials. So only less than 8% of students correctly determined the pH of the soap in the pre-test. During the “Home Spa” project, it was explained to children that pH is a measure of whether a substance is more or less acidic and the measure of pH is a colored scale. The concept of pH understood in this way should not be a problem for students of this age (e.g. in geography lessons from the map based on the color of a given area they read its height). However, it turned out that assigning numbers to the color scale proved to be a big challenge. After class, another 14% of students answered this question correctly. In some responses that were classified as incorrect, students wrote words related to the term ‘color’, because they associated it with the colored pH scale placed on the universal papers they used.

The obtained results show that despite the fact that this type of class is very popular among students – the question arises: to what extent they are an effective means of education, especially for those students who do not have initial knowledge.

Conclusion

As part of the study, four-hour activities for children were prepared. Students could independently make various cosmetic preparations and study their physico-chemical properties. As part of the classes, the increase of knowledge and satisfaction of students from the classes was also checked. The research results show that the hypothesis: *A four-hour project entitled “Home Spa” will increase students’ knowledge of the properties of cosmetics* – has been confirmed. However, it seems that the work input made by teachers in the preparation of these classes does not translate into an increase in student knowledge. Admittedly, after the project, between 52% and 75% of students knew the correct answer to three out of four questions, but a significant proportion of students knew the answers to these questions before the start of the project. The increase in knowledge resulting directly from participation in the project (for students without initial knowledge) is only about 30–40% this does not seem sufficient. It seems that the most important achievement is the students’ satisfaction

with this type of activity – as many as 60% of respondents were very satisfied with these activities.

Since, as mentioned in the introduction, the number of scientific studies regarding Children’s Universities is not large, these studies can be considered as a starting point for further research.

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„Home Spa” Project – Change of Children’s Knowledge and Skills after Participating in the Project

Abstract

The subject of the research was to check whether students’ knowledge and skills regarding cleaning products and cosmetics will increase as a result of their participation in the 4-hour-long project entitled the “Home Spa”. For this purpose, research was conducted before and after the “Home Spa” classes, on 65 aged 7–10. As part of the laboratory, students studied the physicochemical characteristics of soaps and cosmetics received from available food products. A practical summary of children’s activities was a box full of cosmetics, while the theoretical added value was the increase in students’ knowledge of the chemicals present in their daily lives. The article discusses only part of the research on the physico-chemical properties of soap. Research results show that the hypothesis – “Home Spa” project will increase students’ knowledge of soap properties’ – has been confirmed. But the increase in

knowledge resulting directly from participation in the project is only about 30–40%, which does not seem sufficient. It seems that the most important achievement of the project is the satisfaction of students with this kind of activity.

Keywords: Project based Learning, Motivation, Cosmetics, Soap

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The Impact of Long-Term Education Projects on the Students' Conceptual Knowledge

Introduction

Practical laboratory science teaching is one of the most effective teaching methods (Stohr-Hunt, 1996: 101–109; van den Berg, 2013: 74–92). This also applies to other methods during which students can be active and express their own opinions (Bilek et al., 2018: 779–799; Freeman et al., 2014: 23; Janštová and Rusek, 2015: 28–33; Kopek-Putała and Nodzyńska, 2015: 95–101). Mostly, however, students do not have such opportunities in formal education. The school practices reproductive thinking, while in everyday life the road from problem to solution is much longer and requires a greater selection of information, dealing with uncertainty and a multitude of possible solutions. In everyday life, it is important to be able to produce various solutions or to search for unusual ways to solve a problem. The weakness of students in Poland is the ability to assess the results of experiments and formulate conclusions. Often, they are also unable to use their theoretical knowledge to solve tasks (they playback messages, but they cannot use them to e.g. analyze the presented situations). It can, therefore, be concluded that they do not lack knowledge – only other competences. Therefore, it can be concluded that instead of the system of knowledge, skills, attitudes, and competencies preferred for years, attitudes and competencies come to the fore, which is associated with new educational needs.

Aim of the research

The long-term educational project was implemented in junior high school in 2016–2018. The assumption of the project was to equalize educational opportunities for children from rural areas. During the classes, students developed selected key competencies:

1. ability to recognize the main features of a scientific study,
2. draw conclusions and conduct observations,
3. ability to organize your own learning,
4. effective own time management,
5. problem-solving,
6. obtaining, processing, evaluating, and assimilating new information.

They also practiced the application of new knowledge and skills in everyday life situations, including the ability to plan projects and lead them to achieve their goals, manage educational projects. And social skills such as group work.

The aim of the study was to examine the impact of a long-term educational project on the increase of students' conceptual knowledge.

Description of project activities

The long-term educational project concerned chemistry classes. The criterion for choosing students for the project was the voluntary principle. Two groups were created out of people willing to participate in the project: one for talented students and the other for students with learning difficulties. Students who received at least a grade – good (4) in chemistry in the first grade of junior high school, were assigned to the advanced group. Students who received lower grades were assigned to the equalization group. (A six-point scale is used in Poland, where “6” is the highest mark and “1” is the lowest). The same teacher ran classes in all groups. 30 hours per year were allocated to chemistry classes for one group – a total of 60 hours for each of 2 groups. Groups could not have more than 12 people. In class, students also prepared the final product “Chronicle of chemistry experiences”, which contained exercise instructions, presentations, and videos. After the project was completed, the school community has presented the results of the students' work. Students also took part in inter-school competitions: “Colorful Chemistry” and “Chemistry and Physics in the kitchen”.

Research results

In order to examine the impact of the long-term educational project on the increase of students' conceptual knowledge, a pre-test was carried out in the first class of the project, followed by the same test after the first year of the project and then after the second. Evaluation surveys were also carried out. Tests for both groups were similar but adapted to the level of difficulty. Both groups also completed an evaluation questionnaire whose results will be discussed in another article. The test for group 1 (with learning difficulties) included 24 tasks. One-third of these tasks were directed at practical skills, related to the ability to observe, draw conclusions from conducted experiments, and knowledge about the characteristic reactions of selected substances, how to detect given substances. Other tasks checked students' conceptual knowledge. These were multiple-choice, true-false, and open tasks.

Table 1. Results of group No. 1 (students with learning difficulties)

	Pre-test	test after the first year of the project	test after the second year of the project	School grade in chemistry before project	school grade after the first year of the project	school grades in chemistry at the end of the project
Student 1	6%	10%	35%	2	2	2
Student 2	13%	28%	44%	2	3	3

Student 3	21%	25%	62%	2	3	4
Student 4	17%	25%	59%	3	2	3
Student 5	22%	55%	70%	3	4	4
Student 6	15%	20%	35%	2	2	3
Student 7	22%	25%	40%	2	3	3
Student 8	25%	25%	45%	2	3	3
Student 9	45%	65%	85%	3	4	5
Student 10	18%	20%	78%	3	3	4
Student 11	29%	35%	75%	3	3	4
Student 12	17%	35%	65%	2	3	3
Summary	21%	31%	58%	2.4	2.9	3.4

The test for group 2 (talented students) contained 20 questions, half of which were problem questions, while the rest concerned the students' conceptual knowledge. These were open questions, multiple-choice questions as well as computational tasks and reaction equations.

Table 2. Results of group No. 2 (talented students).

	Pre-test	test after the first year of the project	test after the second year of the project	School grade in chemistry before project	school grade after the first year of the project	school grades in chemistry at the end of the project
Student 1	45%	75%	95%	4	5	5
Student 2	25%	35%	62%	4	4	5
Student 3	65%	85%	100%	5	5	6
Student 4	35%	75%	89%	5	5	5
Student 5	56%	85%	95%	5	5	6
Student 6	40%	55%	65%	4	4	4
Student 7	35%	55%	85%	4	4	5
Student 8	55%	85%	95%	5	5	6
Student 9	55%	85%	100%	4	6	6
Student 10	48%	65%	90%	4	5	6
Summary	46%	70%	88%	4.4	4.8	5.4

The results of the obtained research confirm that the participation of students in a long-term project significantly influenced the increase of their key competencies and positively affected the level of their knowledge and skills in chemistry. On average, in the group of weaker students the percentage of correct answers, increased three times and in the group of able students twice. However, comparing the increase in knowledge in both examined groups, we cannot forget about the initial results of the group of talented students that were definitely higher than the results obtained

by weak students (21%–46%). In both examined groups of students a significant increase in knowledge (understood here as knowledge, skills and attitudes) was noted. However, analyzing the increase in knowledge in each year of the project, we can see that in the group of weaker students, in most cases, in the first year of education the increase was much smaller than in the second year. This trend was not observed in the group of talented students (see Figures 1 and 2).

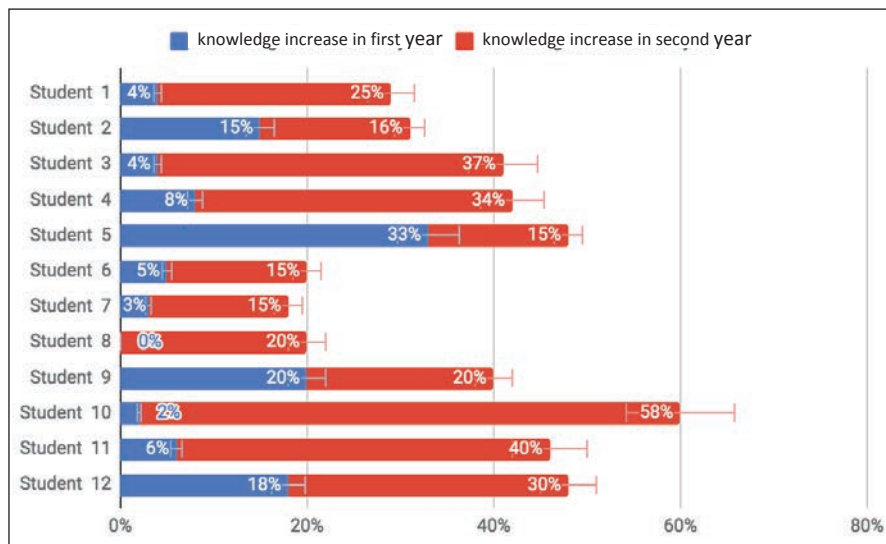


Fig. 1. Increase of knowledge in weaker students in the first and second years of the experiment, source: Baprowska 2019.

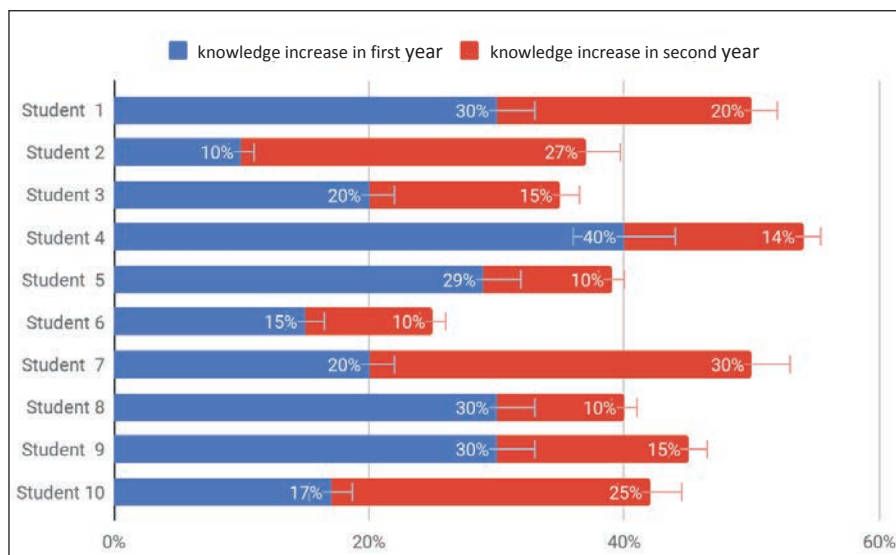


Fig. 2. Increase in knowledge of talented students in the first and second years of the experiment, source: Baprowska 2019.

Conclusion

Participation in the two-year project significantly affected both groups of students researched. In the group of talented students, we notice a two-fold increase of points in the test and in the group of weaker students a three-fold increase of points. The final results of the weaker students came close to the results of talented students – it can, therefore, be concluded that the project evened out differences between students. A significant difference can be seen in the increase in knowledge in both groups studied. In the weak students in the first year of work in the project, the increase in knowledge was small, only the second year of work brought the expected results. Therefore, it can be concluded that only long-term projects have an impact on the permanent improvement of competences – especially for weaker students.

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The Impact of Long-Term Education Projects on the Students' Conceptual Knowledge

Abstract

The article describes research on the impact of long-term education projects on the increase in students' knowledge (understood as information, skills, attitudes). Two groups of students participated in the project which lasted two years: talented students interested in chemistry and students having problems with this subject. The results obtained show that there was a significant increase in knowledge in both groups. The detailed differences between the two groups are described in the article.

Keywords: project-based education, conceptual knowledge, chemistry

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Health Promotion and Health Education at School during COVID19 Pandemic

Education is a multidimensional category, which is diversely linked to other areas of social life. There are many planes on which we can analyze its various components. Participants of numerous discourses on changes in the education system often expect from it primarily to be highly effective, adaptable to the existing reality, and overtake the changes taking place in different areas. As A. M. de Tchorzewski (1999: 34) writes, the crisis of the past,

(...) it is particularly difficult for the teacher, because his personality formation has been shaped in the conditions of the past, and it is up to him to mediate between the "old" and the "new". (...) Therefore, the fundamental duty of the teacher becomes an understanding of the processes of world variability, based on contextual thinking, free from traditional pedagogical thinking patterns, and directed at observation and analysis and exploring areas seemingly far from educational processes. (de Tchorzewski, 1999: 34)

The school is also an educational environment in which statutory activities include care for the proper, sustainable development of children and young people. This institution is the best place to take multi-directional and multifaceted actions in the field of health promotion and health education, especially now when the whole world is operating in uncertain times related to the COVID19 pandemic, which is an infectious respiratory disease caused by SARS-CoV-2 infection. It was first diagnosed and described in December 2019, in central China (Wuhan city), during a series of illnesses brought beginning a pandemic of the disease.

The implementation of health education at school has evolved with a change in the understanding of the concept of health, which is defined according to the socio-cultural context. Health is not just about well-being and lack of illness. Health is a resource that everyone can use in their daily lives, and using its potential allow to achieve a satisfactory life in economic and social terms. Health is also a resource for a society, because according to the WHO, only healthy representatives are capable to create goods, to develop and thus to achieve a prosperity. Because of this, a healthy society is counted as a one of the country's natural resources.

Modern thinking about health is associated with the adoption of a certain paradigm, which is model of health.

There are many health paradigms in the literature depending on sciences types, e.g.:

1. in pedagogy and psychology: biomedical and biopsychosocial paradigm;
2. in sociology: sociomedical and socio-ecological paradigm;
3. in medicine: medical and socio-ecological paradigm, sometimes holistic.

Health promotion is dominated by a biomedical and socio-ecological paradigm.

Teachers most often prefer the biomedical paradigm in their educational activities, which focuses on the individual who is responsible for their own health and who should follow the guidance from experts, determining what behaviors are conducive to health and what are harmful. The concept of health education based on behavioral features, although often used, does not produce the expected high results.

It means that usually healthy people tend not to have a sufficiently strong motivation to give up on their tastes for unattractive behavior leading to distant and uncertain health benefits (Słońska, 1999: 306). In particular, for young people, the long-term perspective of health disorders is not a sufficient argument to change anti-health behaviors related to, for example, diet or personal hygiene.

On the other hand, the socio-environmental paradigm imposes, among other, the need for holistic treatment of human and his health, as well as the treatment of health problems in the broad context of daily functioning (Słońska, 2001: 71).

Educational activities undertaken by teachers in accordance with the above-mentioned recommendations should influence on the health's shaping factors in such a way as to increase the health potential of the individual in all its dimensions: physical, mental and social.

The teacher in the health education process should lead to an increase of students' knowledge level about health, taking into account its socio-economic determinants and knowledge and skills related to a healthy lifestyle in different conditions. Also, very important is the development of awareness about the link between population health and the socio-economic development of the country.

Conferring the most complete ranking of environmental impacts have taken place along with the development of the contemporary vision of health promotion.

In line with its underlying assumptions, effective impact on human health requires not only increasing the level of health knowledge of individuals, but also shaping their life skills which serve health, e.g. the ability to cope with a stress, but also interventional environmental measures aimed at increasing the impact of health support factors and reducing or eliminating those that harm health.

In the development of health promotion's idea, several stages can be enumerated (Słońska, 2001: 72).

The first stage/dimension of health promotion falls in the 1970s. The main educational activities focused on informing about various risk factors or diseases that threaten people. Health education in schools boiled down to providing information on the dangers of smoking cigarettes or diseases resulting from improper nutrition.

In the 1980s, *the second dimension of health promotion* was observed, consisting in the highlighting the importance of state health policy activities and strengthening the individual's respective skills.

The third dimension of health promotion emerged in the 1990s and its greatest value was reaching out to specific individuals through various projects, e.g. a school promoting health, a healthy workplace and finally, the habitat concept of health.

In 2000, it proved necessary to preserve these trends and to highlight *the fourth dimension of health promotion* by moving "from words to action", responding to the global trend of mass social change, which undoubtedly has an impact on the health of individuals and groups (Karski, 2003: 14–15).

The year 2020, when the fight against the unknown and dangerous SARS-CoV-2 virus has begun worldwide, is facing the need to identify *the fifth dimension of health promotion*, in which people should be taught the right attitudes towards the health threat, which is COVID 19 pandemic. Threats that equally affect physical and mental health. Observing the reality of pandemic times, it is possible to identify many aspects of everyday human's life that require health education. These are issues related to changes of behaviors regarding personal hygiene, types of nutrition, physical activity, healthy sleep, social distance or finally coping with a stress.

The results of the study "Remote teaching and adaptation to social conditions during the coronavirus epidemic" clearly show that in all groups of respondents (students, parents and teachers) the level of subjective mental and physical well-being decreased.

Students, parents and teachers say that their current mental and physical well-being is worse than it was before the pandemic.

Among students, parents and teachers there are clearly visible signs of digital media abuse. Overworking, overloading information, reluctance to use a computer and the Internet, and irritability due to the constant use of information and communication technologies are the most common symptoms of digital fatigue. Almost a third of students participating in the study often or all the time felt sadness (28.9%), loneliness (27.4%) and despondency (28.4%) (Pyżalski, 2020).

Too frequent use of digital on-screen tools (smartphone, tablet, laptop, computer) negatively affects the mental and physical health.

The data obtained by J. Pyżalski's research team coincides with the conclusions of a report prepared by the Digital Centre (Centrum Cyfrowe) that the time of the coronavirus pandemic is the time when teachers experience the stress of remote learning (Centrum Cyfrowe, 2020).

Therefore, doctors are recommending everyone not to give up on possible physical activity, eat healthy, limit the time spent tracking the latest information about pandemic's development, try to take care of social relationships with usage of phone or other means of remote communication, and do not neglect an external appearance during remote learning or work.

In order to improve this situation, first of all it is necessary to use gained experience, try and test concepts and tools, which will quickly allow people to learn the appropriate attitudes related primarily to personal hygiene, sanitary regime and digital hygiene. This will not be an easy task due to various habits, which during

a pandemic time become especially dangerous for humans. Adults should be reached through health education accomplished by various health campaigns of the Ministry of Health, sanitary-epidemiological station, and other similar institutions. On the other hand, teachers in schools are faced with the greatest challenge, as they are particularly responsible for promoting health during this period. The direct recipient of these educational activities is a person with varying degrees of health activity and commitment to caring for his own health.

M. Demel (1980: 172–192) distinguished four stages of health education corresponding to typical stages of development:

1. *Stage of hetero education* (period of early childhood), in which the child is a responsive “subject” of protective and nursing procedures. The forms of child behaviors are results of the execution of commands and imitation. The aim of this stage of health education is to introduce into the habit certain physiological mechanisms and certain stereotypes of reacting and acting in the field, e.g. hygiene.
2. *The intermediate stage* (period of pre-school and early school) is characterized by the successive “objectification” of the child. His/her participation in the effort for his own health increases, awareness and a sense of responsibility develop. This stage requires the application of specific rules. Here are a few of them:
 - a) to know the state of health education of pupils/students, which is the result of the influence of the family environment, and if necessary, to undertake re-education, i.e. removal of bad habits, straightening of erroneous terms, correction of defective attitudes;
 - b) to rationally use the rules arising from the laws of educational psychology and didactics.
3. *The stage of self-education* (period of adolescence) is a period of conscious self-upbringing. There are the first symptoms of the life program, criticism arouses, self-control increases. Developed and mechanically established customs, habits and attitudes are now verified in the context of the acquired knowledge about life. The attitude towards oneself, towards one’s body, in one’s psyche, is rebuilt, and the sense of responsibility for one’s own and others’ health increases. During adolescence and juvenescence, systematic, discreet self-education leads to the formation of human, as a conscious co-creator of his health and an active participant in the struggle for public health.
4. *The stage of reverse hetero education* (concerns adults) is characterized by the fact that the alumnus acts as an educator of others: parents, siblings, colleagues. This is about the impact of alumni on their home environment and the wider social environment. This is the highest stage, but it turns out that some elements of this level can already be achieved in kindergarten, as some children can move some behavior’s forms from kindergarten to home and vice versa – from home to kindergarten.

However, a conscious educational role is performed by human only when he understands the meaning of health practices, masters their technique and implements in to them (Demel, 1980).

According to Z. Słońska, the effectiveness of health education's impact depends not only on the provided knowledge, but also on the economic and social context of that message, which requires knowing the characteristics of the collective affected. Therefore, an extremely important role to play in promoting health has school education (Słońska, 2001: 75).

In the Regulation of Ministry of National Education from 2017, in the preamble to the core curriculum for general education the importance of health education was highlighted by writing:

An important role in the education and upbringing of primary school pupils is played by health education. The school's task is to shape health-promoting attitudes, including the implementation of hygienic behaviours which are safe for themselves and others, and furthermore to strengthen knowledge of the proper nutrition and the benefits of physical activity and prophylaxis (...) (MEN 2017).

Based on theoretical and legal assumptions, the school is expected to take multi-directional actions in promoting a healthy lifestyle, not only in communicating of information, but also in a practical and environmental approach. School is, in fact, a habitat where children not only learn, but also participate in various forms of activity. It is well-known that children and young people shape their attitudes by observing the surrounding environment. Therefore, it is extremely important to take care of school infrastructure and the duty to develop a comprehensive and coherent health promotion policy.

Health promotion is carried out at all stages of school education.

It starts in kindergarten and continues in primary and secondary schools. The distributed teaching model obliges every teacher to pursue health education, so it is making them wizards of student health.

The current legislation defines two ways of implementing health education:

1. subject, which is about teaching within the block health education in various subjects,
2. preventive and educational, where the values of a healthy lifestyle are included in the preventive and educational program (MEN 2017).

As an example, in the range of shaping of health-promoting attitudes, within the framework of the science subject, the requirements of the program include appropriate responding of students in the event of the emergence of life-threatening and health-threatening dangers and knowledge of the healthy lifestyle's principles, including healthy nutrition. The specific requirements in the biology core curriculum in the older classes concern knowledge of the digestive system. Within this subject a student recognizes the elements of the digestive system; presents their functions, knows the sources of nutrients' origin (such as sugars, proteins, vitamins, mineral salts, fats), knows their importance for the proper functioning of the body.

To the school's tasks also are included creating proper conditions such as hand sanitizers, adequate length of breaks and places for students, which enable to eat breakfast safely at school.

However, the teacher and the level of his/her readiness to carry out tasks in health education still have an essential role in its system.

Teacher's commitment to promoting health among students is part of his/her professional role. Regardless of the substantive preparation of the subject being taught, his/her task is to bring young people closer to healthy life patterns (Gaweł, 2016: 142). The basic competence of the teacher here is to shape in students' mind ability to take personal choices and decisions about health and health safety. The World Health Organization stresses the need for teachers to be involved in the educational process related to the creation in the younger generation the attitudes and skills related with the preservation and improvement of physical and mental health (Denek, 1996: 9–13) and digital hygiene defined as, a set of actions and activities aimed at optimizing individual somatic, mental and social health in the use of information and communication technologies. Its level depends on self-regulation and control related to internet use and digital on-screen tools, alternatives to the digital world, as well as a developed social backing network. Digital hygiene can be understood as a life attitude resulting from the creative and responsible usage of network resources (Pyżalski, 2020).

In modern health education and its part related to the promotion of a healthy lifestyle in times of pandemic, there is a noticeable change in the pedagogical approach of the teacher. His/her role as a teaching expert gradually takes the form of a guide to health education and an animator of health activities in the field of physical and mental health. This is a role that can be met by teachers who have not only the essential knowledge about health conditioning, but also with their behavior and activities are motivating to similar attitudes.

Undertaken educational activities are adapted to the age, educational stage and subject being taught with usage of activation and interactive methods.

Activation methods are a way of teaching in which the teacher does not pass on ready to serve knowledge, but creates the conditions for self-study (Wojnarowska, 2014: 28).

Getting a new quality in health education requires profound transformations in thinking about education and the role of the teacher. These transformations are somewhat forced by the rate of changes, which are taking place in the reality outside of education. Updating teachers' expectations requires taking into account the multidimensionality of their functioning, as educational reality is intertwined with other dimensions of social, economic and, above all, medical reality. However, there is still a tendency in thinking and analyzing about teachers' competences to idealize the vision of teacher and to list his or her desirable characteristics for the personal development of pupils, society or the teachers themselves.

J. Szempruch defines competences as "the ability and readiness to perform tasks at the expected level, in accordance with standards, and to the professional competence of teachers includes competences: interpretive and communication, cooperation, interaction, pragmatic, information and media" (Szempruch, 2013: 231–232).

According to J. Kunikowski, the most important goal of professional development for teachers is to develop their knowledge and competences. To the main competences of this professional group the author's includes:

1. social and educational competences,
2. praxeological competences,
3. creative competences,
4. communication competences (Kunikowski, 2009: 171–177).

Depending on the adopted classification, it is possible to speak of teachers competences: substantive, didactical, and psychological also called meta-skills of working with other people, pragmatic, interpretive-communication, cooperative, creative, IT-media and self-aggrandizement.

Each of these competences seems to be necessary at a time, when everyone is accompanied by fear for their own health and life, when there are no standards of action, when there are more unknowns than proven information, and when we increasingly ask: what's next? An important element of the teaching competences' typology presented by many authors is the indication of self-education competences. They are among the most important constructs of professional career development of teachers. Continuous education, self-development and self-improvement is an integral part of the professional development of modern's teachers, which determines their daily work, especially during a difficult period of pandemic, when they as themselves also face various health problems.

One may wonder how the accents should be distributed in particular groups of competences in teachers working at different levels of education in order to meet the requirements of health promotion and health education in schools in times of pandemics. Finally, how teachers themselves should take care of their own physical and mental condition.

A well-known sententia says that *“people grow up to the tasks that are given to them”* – it is worth to reflect on that. Contemporary problems related to education and upbringing arise from the fact that these processes, “by their nature (...) cannot renounce either authority or tradition, but nevertheless they must take place in a world whose structure is not determined by authority anymore and is not bound by tradition” (Arendt, 1994: 131).

Anthony Giddens (2007) points out that during periods of tension or so-called watershed moments, there is a growing need for “expert” support to eliminate excess uncertainties and risks” (Witkowski, 2008: 19).

Z. Słowska (2001) stresses that it is necessary to bear in mind that the effectiveness of direct human impact is determined not only by the quality of this influence, which is the way and scope of transmitted knowledge, motivating and shaping skills, but also it depends on the characteristics of the broader context (political, economic, social and health) in which the influence takes place. Therefore, in order to be effective in health education, one must first of all know the characteristics of individuals, the collectivity of organizations affected by the influence, in order to strengthen the young person's sense of agency and responsibility for himself and others.

Currently, in many countries, actions are being taken to professionalize health education and identify necessary competences for practice of health promotion (Woynarowska, 2017: 146–153). Increasingly, it is indicated that the most important competences are hermeneutic competences, which contain a number of components that are not isolated from each other, but rather related in human's action.

The components in question are among others: empathy, empathize with situation, understanding it, seeing and respecting the need for intimacy and distance, verbal and non-verbal communication, acting in a particular situation, inspiring trust, solving specific cases, interpreting educational situations. In addition to these, the ability to reflect, the ability to apply knowledge, self-reflection, oscillation between knowledge and ignorance, seeing the duality of events, acting in conditions of uncertainty (Kaliszewska, 2017: 91–100).

The research conducted by J. Pyżalski's research team clearly indicates that the time of remote education is sometimes difficult, not only because of the new formula of the classes, but above all because of digital fatigue. Prolonged screen time, information overload, as well as isolation from school colleagues can reduce the mental and physical well-being of the subjects studied.

To sum up, health education at school during the COVID 19 pandemic, requires from teachers to use their professional competences in a specific action and in a health-promoting attitudes. In order to do that, it would be necessary to:

1. Using praxeological competences, accurately diagnose the needs of a given environment in the field of health education, effectively plan, organize activities and also evaluate the effects in the educational process.
2. Based on substantive competences, health education should be accomplished through a professional and task-based approach to the value of human health, including care for personal hygiene, physical activity and show the importance of a balanced diet in building the health potential of students.
3. Educational competences (didactical and pedagogical) should help teachers to know the class team and individual pupils in terms of their personal and family situation, which significantly affect the health of the young person. A family member's illness or loss of work undoubtedly cause mental discomfort that threatens health and requires usage of appropriate methods and forms of work with such a student, in order to create patterns of behavior, create a healthy environment and be open to the needs of others.
4. Using social and communication competences during health education classes teachers should pay particular attention to empathy, on the one hand to the social distance recommended by doctors and, on the other hand, to the growing need for contact with others, their own way of expressing emotions, verbal and non-verbal communication with young people, the ability to actively listen, communicate and receive feedback from students.
5. Using smoothly modern sources of information by teachers and their information competences will also allow to start a reliable discussion about negative consequences of the abuse of new technologies. Maintaining an adequate level of digital hygiene – especially during periods of remote education – is key to improving concentration, improving learning outcomes and the quality of teaching itself. One of the necessary changes is to develop guidelines for the time spent in front of the screen by specific age groups of pupils and then adapt to them the tools used in remote learning, whose essence is not solely about the constant contact between the student and the teacher in real time via the Internet (Centrum Cyfrowe, 2020).

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Health Promotion and Health Education at School during COVID19 Pandemic

Abstract

School is an educational environment in which statutory activities include care for the proper, sustainable development of children and young people. This institution is the best place to take multi-directional actions in the field of health promotion and health education, especially now when the whole world is operating in the COVID19 pandemic.

In line with assumptions of health promotion and health education, the effective impact on human's health requires not only increasing level of health knowledge, but also shaping their life skills which serve health, e.g. the ability to cope with a stress, but also interventional environmental measures aimed at increasing the impact of health support factors and reducing or eliminating those that harm health.

School and its teachers are facing the need to create a new dimension of health education, in which people should be taught the right attitudes in the face of the epidemic health threat of the COVID 19 pandemic. Threats that equally affect physical health and prevention of SARS-CoV-2 infection, as well as the threats associated with deteriorating of people's mental health due to prolonged stress and the need of remote work and study, which result in symptoms of digital fatigue.

Teachers have the main tasks in building health-promoting behavioral patterns. The primary competence of the teacher in times of pandemic becomes the ability to shape the right choices for students and make decisions about health and health safety.

Keywords: health promotion, health education, COVID19 pandemic, teachers' competences

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