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Introduction

This volume focuses in general on models in health and the forms of activity undertaken by different entities. By now, a common agreement is shared: social model of health is the model everyone has to refer to, especially when dealing with health promotion, particularly around cancer or the risk of chronic diseases, or wider other pathologies. But are we really sure to share the same content when we say "health communication"? Many scholars assume that a lot of social actors are intervening into this "social act": primary school and biology teachers, journalists, bloggers and community managers, medical staff, patients, and their relatives, scientists, researchers – not to mention social sciences researchers! – through medias and means of communication: TV programs, TV series, digital media, social networks, NGO's, pharmaceutical companies advertisings...

To make clearer the future models of health, beyond "health promotion" standards, we follow the hypothesis that in a world where openness and sharing are becoming central, controversial social issues could be a fruitful means.

The authors would like to contribute to improve our knowledge about this ecosystem by crossing approaches coming from the fields of education and communication as these both fields are participating in the public sphere and knowledge mediation processes. It will cover a wide range of topics such as alternative medicine, vaccinations, antibiotic resistance. Obviously, cancer and chronic diseases are a very interesting field of investigations, but all pathologies can be used to develop health education and communication issues.

The main areas of our interests are the following:

I. Education

Education systems are long-term evolving systems. Any reform needs time to become active. What are the representations and competencies of the teaching staff, future teaching staff regarding new therapeutics, contemporary medical knowledge or health models? Can new teaching processes and their evaluation provide solutions to health literacy?

What about news on "health-knowledge" mediations? What is their impact on health literacy?

II. Policies

Policymakers often launch health promotion campaigns on various topics. A lot of Non-Governmental Organizations are involved in health education as well. Are they acting contradictory? Are they collaborating? Do NGO develop an alternative way of thinking about health issues? How can we understand their positions? How

can we analyze resistances to the directive and normative discourses of all these social actors? Can new policies meet the emerging health challenges?

III. Medias and on-line communications

On-line communities and social media, as well as popular TV series, movies and on-line newspapers undoubtedly participate in the spreading of information and somehow are an essential cog in health education and knowledge mediation processes. Would they be right or wrong, fake or transformed? Do they describe adequately the social health challenges? How do they need to evolve in the roles and practices? How can we analyze and discuss social circulation of this knowledge, from the producers to the receivers and users and backwards? What could be the evolution of social actors' representations and to what extend behaviors can be impacted by these "new media"?

We try to answer these questions, but most of all, to start a discussion…

Katarzyna Potyrała

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SCIENCE, CULTURE, SOCIETY – NEW CONTENTS AND EDUCATIONAL CONTEXTS

Smaragda Papadopoulou

Moral issues of pain language education of children

Introduction

Education in Greece is connected to the value of equipping students with all the necessary knowledge for their professional life in future and their well-being. Unfortunately, in times of crisis such as when the Greek people faced mirrored educational needs for change in management of poverty, refugees' issues in class and discrimination, economic problems, social loss of security in everyday communication, criminality and children's violence at school and at home. This emergency case urged us to provide a methodological tool for teaching language based on how children communicate pain in health issues or out of the hospitals and the doctor's office.

The way that children remember painful situations and the way that they face and control their pain and the pain of others were the basic concern of building a vocabulary for the pain language capable of giving children the freedom to express themselves when they are in pain or the pain that they have endured in the past (Halliday 2010). Pain language as a questionnaire form to fill in their thoughts was abandoned soon. Since they preferred to draw how things happened and then describe in words and play games that was actually symbolic stimulus for them to start talking about the forbidden pain (bulling, abuse, body deformity, the stigma of differences in appearance, voice, behavior or a sickness symptom). In Greek the cultural values differ from other national environments (Zborowski 1952). When we want to talk about cancer we never use the word, because some people believe that talking about it and naming the problem is making the sickness worse and the diseases stronger than the person in pain. Religion is another moral issue. Once you are in pain it is wiser to hide it as you are responsible for the misfortune the pain brings. Pain is the brave behavior of the saints that were tortured to death so as they gain the paradise. Opinions such as these are not realized facts of modern life in the Greek society but there is always a base of moral enrollment to how a person is educated to express or hide the pain. Ancient Greek authors such as Thucydides has taught that it is not nice to show your suffering emotions to your neighbor or to make others feel sorry for you or give them negative emotions. Modern Greek language, proverbs and songs are relevant to this moral attitude. This hidden pain that is not well adjusted to the global moral issues of the right to live in luxury, the potential

and the success of avoiding pain with a single pill for a headache, for example, or the pain of pregnancy with a safe Caesarean section to prefer for a child's birth came to add another management and moral culture to the traditional culture of the Greek language of pain. Although these two voices, the one that says "just pretend everything is fine and hide your pain" and the other that says "just avoid it when you can" look different, but they both have a common characteristic of an immoral management of pain of the individual and the others, the loss of honesty to respect pain, to deal with it and educate people about pain language.

Words may be more painful than any problem itself. The fear of pain can be even more painful as an idea than as the fact. In education we use pictures to explain things, situations, ourselves (Boroditsky 2001). This method could be useful in class with categories of pain language issues. We can teach children how to produce sentences without causing others pain by saying exactly the same thing. Imagine that somebody is a doctor and somebody else is a patient in role-playing games that children play at home and at school. How can you give negative information without giving a hurt attack to the patient? It is a start of dealing with difficult issues from childhood. Childhood involves pain issues anyway. Adults do not explain all of them and not to all of them. This may cause immorality in pain issues for a society.

There are cases that the will of a person to deal with a health problem is related with hope of being positive. This is the reason that many countries have austere laws on the doctor's language behavior of communicating painful information. For example it may not be legal to say that "you have that health problem and next year you will die", but it is legal to say that "if you don't try hard you may not be with us next year because of your health problem". Even when we deal with children that do understand but are under 18 years old it is a moral issue to decide as a legal system, as practitioners, or professionals or just people who care for the certain children how much information we can give to them about their situation, how we communicate, avoid, feel their pain and what are our language educational tools to do so. "The search for studies on moral judgment in healthcare was largely disappointing, even within the literatures on empathy and caring. The literature on difficult clinical relationships is extensive, but moral judgment is at best a secondary focus in these studies" (Hill 2010). Since everybody is going to find himself in the pain of a hospital environment school has to speak the moral language of pain.

The case study Epione[1]

Epione (in Greek Ηπιόνη), in Greek mythology was the wife of the God of Medicine Science, named Asclepius, she was the daughter of Meropas in Kos island. We gave this name to our educational language program of pain management as long as we enrolled to a research with healthy children at three cities in Greece, at public schools and their parents and teachers (children at grades of age 6 to 15). We also worked with special education teachers, children and other people of healthcare in schools at hospitals of three cities in Greece (2012–2018). We interviewed children,

1 To be published (in Greek), S. Papadopoulou, 2018, *Education in the language of pain*, Athens, Armos.

parents, teachers, doctors, nurses, stretcher-bearers, friend and relatives of children in pain. In many cases we found ourselves listening to each person's private pain and memories, many times not relevant in terms of the child involved in our research. This gave us the knowledge that there is a lot of uncommunicated pain that needs to be heard and relieved. Another opponent of this situation is the immoral attitude of media that show the pain of others as a product that shells emotional involvement and excitement and analgesia to the customers as victims of TV impression that pain of others is something that you do while you are eating your lunch at home, for example, or pain can be an athletic attitude at boxing games or a Taurus match show at the arena.

Morality of respecting the pain of other creatures as much as our pain is another case we examined in the Greek society (Wittgenstein 1989). There is a corpus of functions in language that are reflecting pain as an attitude, a cognitive schema or a grammatical metaphor. As a social implication of reference to the complexity of the pain issue: "Several factors have been identified as causes of uncontrolled and unnecessary pain, which deprive patients of receiving appropriate treatments that theoretically they have the right to access. Important factors include (with considerable regional, financial, and cultural differences) the following: 1) failure to identify pain as a priority in patient care; 2) failure to establish an adequate physician-patient relationship; or a teacher-student trust in communication; 3) insufficient knowledge regarding adequate language and behavior in pain issues; 4) concerns regarding "last-ditch" treatments of severe pain; and 5) failure to be accountable and equitable" (Carvalho et al. 2018). Findings such as these make us confront the reality of pain identity for each language and nation since pain is a global language for every human being to communicate and accept as an experience of the self-identity (Czerwiec, Kopańska 2012). Actually, this language answers questions such as who I am, what it means to be alive and well.

Pain language is the alphabet of life's experience, as we assume from our perspective (Bernhofer 2011; Buchman et al. 2016; Papadopoulou 2018).

Pain as love and compassion in Greek

In these terms of our research pain appears as an egocentric issue of the self rather than altruistic in human behavior although as a theory it is respected from children and adolescents. The pain of physical catastrophes such as conflagrations, loss of animals in a flood is less important than the pain of human loss. These moral attitudes are always under consideration for each educational system and curriculum that is responsible to focus on humanities and the studies of a peaceful planet in well-being and respect for each other as much as that of ourselves as persons (Fabrega, Tyma 1976; Te Boveldt et al. 2014). The value of language education concentrated on empathy, sympathy (in Greek *sympathia* from *syn* and *pathos*: passion; symponia means to be wounded together, to feel as you feel no matter what), is our suggestion through the research with children in the program and methodology named Epione in Greece. If children get educated in the vocabulary of pain so that they can express themselves to the specialists and their familiar environment there may be less cases

of non-cooperative patients and more successful doctors, less children at risk of every kind of pain. "Pain language" as Wittgenstein (1989) has mentioned at his *Philosophical Investigations* and as the Australian Linguist M.A.K. Halliday (2010) has defined in his linguistic applications combine a secure theoretical framework which helped our program with children suggest a new methodology of evaluating well-being through the pain as a "friend" reminding us when something is physically or abnormally problematic. Pain is a procedure that is always with us from birth through the crying baby scream till the last breath of death. The moral identity of a school system is rather to explain this procedure as a positive experience and involve language experiences as a play-incidence among school mates. In Greek the word *symponia* (to be together with pain – *ponos* in Greek derives from the verb *penomai* which means 'I am getting tired'), for compassion names the moral opinion we try to apply as a global need for humanity on earth. We should also mention that in Greek the verb 'I am in pain means' that I cause it, 'I do pain' = *ponao*. It also means 'I love somebody' *symponao*, with the protheme *se* – you , *se ponao*, 'I am in your pain – I adore you').

Teaching Activities in pain language

Some teaching games-activities of pain language education that children can work in general strategies are also important to be accompanied by teaching tools – appropriate textbooks, with moral issues in teaching language are applied in our research as described. We give some ideas of this case as we found best practices in pain language, such as:

- Describe pain that you have experienced or … somebody else. Can you imagine something that can be painful, if you can't find something else?
- What would you tell your pain to do so as you feel better with whatever hurts.
- Draw your pain as an animal. What animal would that be? Give three words that look like it.
- Who would you tell about your pain-related situation if you had any?
- What is the quality of a person that you would feel confident enough to talk to about something that worries you?
- Find a painful story from the text that you read. Underline the phrases that show this pain (it can be in a study of real people and well known person's autobiographic painful moments in their life).
- What words would you use to say the same thing? How would you react to this problem? (discussion or diary writing; Synonyms-antonyms, vocabulary enrichment)
- Role playing games: Separate in teams of a fiction story character that faces a realistic problem. Tell the story, what the character what does well and what not so well (reading, experiential expressive language, and theatre as a teaching tool).
- Argumentation and the rhetoric arts in decision making of the story character at certain crucial moments of his/her life. Debate language issues about pain in life (figurative language in pain language semantics).
  Moral issues to be discussed among children and with them:

Examples

- When the expression of the pain of others is a good thing but hurts us.
- The respect of the feelings of others against our will.
- The fear of loneliness against the need to talk about our problem.
- When I know that somebody hurts somebody else but I don't do anything to help although I could try.
- When somebody talks in a way that hurts me, do I DO THE SAME to her/him? Or what do I do?
- Should we compromise with painful situations in order to fulfill other aims?
- To be or honest or to be kind? How can I be both without hurting the feelings of others?
- Friends are just manipulative instruments for me and ways to pass my time? Moreover, when they are in trouble am I there for them?
- Who is an altruist? Can you find a person that is and talk about him/her, behave like him/her?
- What if you were a refugee in a hostile country?
- What if just by incidence, you are not in this case but the problem, any problem of pain is out there.
- Is it ethical to be happy when somebody we don't like hurts?
- What kind of a person am I? Give names of qualities and moral dilemmas that your class would try to answer.

Discussion and suggestions

Consideration of pain language knowledge is an ethical obligation at school, as health education for children, doctors; if not for everybody and special medical training in pain language acquisition for related institutions is an aim of a future moral and a cultural evolution (Distin 2010; Hill 2010). Teachers and parents need to work on children's pain management in a comprehensive language. Teaching activities at this aim is an optimistic perspective of working on vulnerable situations, at modern painful or even sick environments in complicated social realities such as those we live in nowadays. Developing an ethical framework for pain management from childhood will result in enhanced quality of care, linking the epistemic domains of language teaching and human well- being to their anthropological foundations, thereby making them ethically sound. Clinicians, educators, and researchers would rather consider both the legitimate and illegitimate moral appraisals that are apt to occur in pain issues in class and in everyday life.

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Moral issues of pain language education of children

Abstract

The full impact of moral judgment on healthcare relationships and between children and people who deal with their pain in professional settings, outcomes of children as patients, and children's own well-being is still unknown. Education on pain language needs our attention in relation with teachers, parents and supports the private language of pain as Wittgenstein has mentioned it in his philosophical researches. Pain communication in everyday life, education about empathy for adults, pain language as healthcare education are important to our research with children in methodology of teaching. We focus on cultural attitudes of people towards pain, ways that moral issues represent a blind spot that merits explanation and repair. What are the words that a professional or a family person will use to explain that death is a possible fact or a danger to a child? The private language of pain as Halliday has mentioned in his linguistic research give a background of a scientific approach to this quality of language education.

Key words: pain language, teaching methods, values, morality, well-being, education.

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Using an e-health tool for childhood obesity follow-up care: issues in health care pathway

Introduction: the specific care model of childhood obesity and its coordination issues at the local scale

As chronic diseases occupy an increasingly important position in the health area, health systems must find some other models to take care of these numerous new patients. Among them, childhood obesity is a special matter, as it occurs in the young years, but continues into adulthood. Actually, up to 70% of obese teenagers stay obese when they grow up (Haute Autorité de Santé 2011). As a reminder, according to World Health Organization, obesity and overweight are abnormal or excessive fat accumulation that may impair health (Organisation Mondiale de la Santé, s. d.). To measure it during childhood you have to calculate the Body Mass Index (BMI) and to report it on the corpulence curve, so you can see if the kid's weight crosses the IOTF 30 line,[1] depending on the kids' age. The significant prevalence of childhood obesity[2] leads to some reactions from health authorities (Haute Autorité de Santé 2011). They develop some actions on prevention along with care, especially with the Nutritional Health National Program, or with the Obesity Plan. For example, the Health High Authority made recommendations for the follow-up of childhood obesity (Haute Autorité de Santé 2011). Care is divided in three resorts depending on the complexity of the kids' situation. The first one is based on the general practitioner, helped by another professional if needed (such as a dietician or a psychologist). The second one is a multidisciplinary care, with several private professionals. It must be used if the kid is still gaining weight after the first step of care, or if he is in a difficult situation (especially in his family). The third and last resort is necessarily based on a specialized and multidisciplinary team help. These professionals can propose hospitalization or an aftercare and rehabilitation center. The common point is that all these steps must be based on the patient's therapeutic education (PTE) principles. Therapeutic Education Programs represent a specific model of care, based on patients' needs (Haute Autorité de Santé 2007). During these programs, different professionals work together to understand the patient's needs, and his own goals. Then they provide

1 The International Obesity Task Force is the international reference for overweight and obesity limits.

2 In France, 17% of children aged 6 to 17 are overweight and 4% of the same age children are obese.

specific education to improve the patient's autonomy and to help him customize his care to achieve his goals. This care organization in the territory can be difficult. To improve childhood obesity care management, a regional network was designed, the RéPPOP (childhood obesity prevention and care network). It is a city-hospital network, meaning one of the RéPPOP's goals is to coordinate care between hospitals and private professionals. The other focuses of the RéPPOP are to support treatment access for every family, to offer continuity of care and to promote a multidisciplinary approach (RéPPOP, s. d.). To comply with these aims, they develop lots of tools for the care, as well as a therapeutic education program inside the children hospital.

MyMouv': an e-health tool as an answer to the lack of coordination and motivation

According to their expertise, one of the ground issues the RéPPOP's members highlight about care is the lack of continuity in physical activity follow-up: kids are followed by lots of different professionals (doctors, sport teacher, physiotherapist, etc) in different institutions (aftercare and rehabilitation centers, hospitals, sport clubs, etc). There is currently no link between all these professionals and the children have to start from the beginning with each one of them. Another issue they often talk about is the patients' lack of motivation to practice a physical activity at home.

Thus the RéPPOP's coordination team decided to design a specific e-health tool: MyMouv'. This device first consists in a smartphone application for the patients, so they can enter some anthropometric data such as their weight, size, BMI. They can also enter their own physical activity goals and make self-assessment of their practice with imaged scales. The application also proposes some challenges depending on the sport profile the patient chose at the beginning ("I want to be fitter", "I want to have more muscles", etc.). They can follow their progression with graphics. The device also consists of a web platform, for the professionals, so they can follow the activity of the patient, and increment the patient's file with their results, but they can also include their reports about the care. A messaging service allows patients and professionals to communicate. The development of this tool went through three stages over the course of three years. Firstly, the conception (designing) of MyMouv' by the members of the coordination team. To construct the specifications, they conducted some focus groups with patients and professionals so they could better understand their needs. Then, the IT development was made in collaboration with information technology engineers, from spatial medicine, specializing in e-health. And finally, the test phase began with a test version of the device. The coordination team asked some sport teachers[3] to try this device with their patients, in real care conditions.

Research problem and methodology

Our study focuses on this development process, from the conception to the test phase. We wanted to understand how an e-health tool can be integrated into a specific health model, like the childhood obesity care pathway. Our first research problem

3 Around twenty sport teachers were asked, but only six tried the device.

was: what are the issues surrounding the development of MyMouv' in the health care pathway? Obviously, choosing to develop an e-health tool is a decision took in a specific context regarding specific issues, as this device questions in a frontal way the impact of e-health on the health care pathway, specifically with children. We also wanted to know what are the engagement and coordination modes during this development? In order to do this we borrow the notion of "commitment" from Becker (2006). His definition explains the coherent trajectories of professionals' activities, which are based on the realization of a subsidiary bet: that the use of MyMouv' can help them following their interest, which is to improve the care. Being committed in the design and the use of this tool depends on different factors that we wanted to highlight. First, the effects of socialization influence the actors' approaches of this tool (Darmon 2016). Second, the practices also depend on the situation, and especially on the coordination modes (Dodier 1993). We consider that human actors, like ground professionals, patients, the coordination team, and non-human actors like e-health tools, evolve in a socio-technical network (Callon, Ferrary 2006). It is important to know who the involved actors are, how they are involved in the process, and also how they can be recruited, so that we understand how they can be resources or constraints (Akrich, Callon, Latour 2013). That is why studying the issues and the engagement modes can help us understand the ways of introducing e-health in a specific health model. We will demonstrate that the minimalist coordination modes between the actors during each step of the development did not allow a smooth integration of MyMouv' in the users' practices.

This survey is based on ethnographic observations (150 hours) made inside the RéPPOP's coordination team during various working times concerning the development of the device and setting up (meetings, conversations with adapted physical activities teachers, etc.). As well as semi-structured interviews (32) conducted with four RéPPOP members, two IT engineers and nine adapted physical activities teachers tested this device. Some of these interviews were reproduced during the different development stages.

Results

Designing MyMouv': hopes and difficulties surrounding the tool's conception

First, we will describe the hopes and difficulties surrounding the conception of MyMouv', as it provides numerous questions in the introduction of an e-health tool in the actual childhood obesity care model.

Using digital technology in the follow-up of obese children can be seen as a paradox. The coordination team actually highlight that one of the most important problems in the kids' behaviors is that they overuse screens, of all types like mobiles, television, tablet, etc. This intense consumption leads to a sedentary lifestyle and a lack of physical activity. MyMouv' intends to change those behaviors, but it puts children in front of a screen to achieve it. Some RéPPOP's members, but also field professionals, express their resistance or their interrogation about this method, which is at the opposite of their care speeches.

But, according to the coordination team members, using this type of tools can also be seen as obvious, as it's supported by the PTE principles. We can see that this device is the repository of RéPPOP's members' hopes. The RéPPOP actually defends its project with some promises MyMouv' could hold. First, it could allow for a long and close follow-up, as the device allows the professional to have a look at the child's practice at home. In this way, they could avoid breaking the link with their patients, especially thanks to the messaging service. Then, this device could also permit to adapt the care to the patient's needs, by defining personalized goals and encouraging the children with challenges; therefore customize the care. Finally, it could be a solution to improve the involvement and the autonomy of patients. As the child practices alone, at home, without the control of the professional, he must find the motivation to move. But, he also has to understand the rules of a good physical activity, to manage his effort. To help him in this process, he could follow his progression by self-assessment, with scales and questionnaires included in the application. Those features designed with the principles of therapeutic education in mind could make the implementation of the device easy in this type of care. But we will see in the second part of this article that using this tool is not that simple.

The RéPPOP supports the MyMouv' development with lots of hopes and promises, but the coordination team members are also confronted with a number of issues and difficulties in the whole health system during the designed and IT development of this tool. First, there are coordination issues between the clinical and the technical sides of the project. As we saw above, the coordination team hopes to improve the care of childhood obesity with MyMouv', by following therapeutic education principles. But these clinical concerns come into conflict with technical issues and constraints. Indeed, all the codes need to put the facts into boxes. Computer scientists need to code "reality", but care is not as simple as boxes, so it could be difficult to contain it in technical objects. For example, it is easier for the IT engineers to focus on simple quantitative data to follow the practice, as weight or size, than on more qualitative aspects, as self-esteem or the pleasure during practice. Moreover, clinicians and engineers do not speak the same language and it is not easy for one party to understand the other. As a consequence, the exchanges during MyMouv's development were more focused on the understanding of technical constraints by the coordination team, and less on the ways to introduce their health model into this tool. Then, there are ethical issues linked to health democracy. The current health model does not make a big room for patient words. The RéPPOP is trying to change that, but it is actually difficult to let the patient have a role in his care, as there is a traditional asymmetry of knowledge and power between the patient and the healer, which leads to a paternalistic relation (Pierron 2007). And especially with children, who are still dependent on their parents. Moreover, the RéPPOP has an important issue to handle, linked with health democracy, being the promoter of therapeutic education programs against bariatric surgery. Here again, there is the RéPPOP's will to base the care on prevention, first care, and education rather than on surgery and cure, which are the traditional cares at the hospital. Then, there are lots of institutional issues that can impact the health care pathway, such as the hardly compatible temporalities of the different institutions involved in this project; which are the financing foundation, the

hospital where the RéPPOP is based, and public institutions to which the RéPPOP is submitted, since this network is an association. All these institutions have different roles in the MyMouv' project, so they can influence its development. For example, the RéPPOP needs the approval of a public institution, the CNIL (Informatics and Liberties National Commission), to store data and to use them. But, the agreement to their device will take months, slow down the process, and delay the test phase of MyMouv'.

The financial means are also a big issue for the RéPPOP as all the financing for the development was a donation from an association "Hôpital Sourire". The budget was really small for the IT engineers to design an e-health tool so it did not allow the RéPPOP to create all the features they wanted. They had to renounce to several specifications, like the transformation of this application into a serious game or the connection with activity trackers. Even if both of the teams of the RéPPOP and of the IT engineers took on their own budgets (mainly working time) to help finish this tool, they had to make various sacrifices.

Therefore we can see that the coordination can be difficult in the health care pathway during the tool designing, between the institutions, but also between the different professionals.

Using MyMouv': using technology in the childhood obesity care pathway, professionals and patients' resistance

The designing phase is not the only one that was challenging; using an e-health tool can be as well. Several factors can impact the commitment of the users of MyMouv', both patients and professionals. We will see that the lack of coordination between all the actors in the conception and IT development stages leads to appropriation difficulties for the users in the test phase. The needs integration deficiency actually reveals some users resistances.

First, we emphasize the influence of the professionals' socializations and especially their conception of childhood obesity and its care. The results of our interviews show that the sport teachers using this tool the most are the professionals who have a bio-physiological conception of obesity and its care, based on the energetic scale, i.e. on physical activity and diet. Some others give more importance to the psycho-social care, which focuses on the consideration of the patients' environment and situation. Given that the MyMouv' device deals only with physical activity follow-up, some professionals with a wider concept of care can be frustrated that it does not go into the other sides of the care in depth. Moreover, commitment to the use of the device also depends on the professionals' concept of the physical activity care. In that case, we can see that the ones who use MyMouv' the most are the ones who have a performance conception of physical activity. Actually, this tool, as a smartphone application on the patient's side, shares some values of others connected health tools, like the increase of performance, the practice control with numbers and somehow a moralistic value, whereas lots of sport teachers encountered in the childhood obesity care are more interested in the patients pleasure during practice, and working on others values like team work, the increase of self-esteem, etc. Yet, all these aspects

cannot be followed by using MyMouv'. This explains why some professionals,[4] even if they are really interested in the idea of having a close follow-up with their patients, do not commit to the use of this application.

Another challenge in incorporating this device in the health care pathway is that it comes into conflict with current professionals' practices. First, there is the matter of social status, because lots of the testers work as volunteers, half time jobs or replacements. As a consequence they have difficulties managing their schedule, especially if they do not have financial help to include the use of the device in their work. Some of the sport teachers interviewed highlight the fact that they do not have time during their practice to test MyMouv', so they have to do it during their free-time. Financial promotion is an important issue in e-health especially as understanding and integrating these new tools is time-consuming, and they often do not replace old tools, but become an additional task (Méadel, Akrich 2010). Moreover, in health institutions each act is coded and equals a financial value in the financial software, but e-health is not equivalent to any code (CATEL 2014). So the professionals cannot add value to their work by using this kind of tool.

The type of follow-up model used by sport teachers for the care is a third factor that influences the commitment in the use of this tool. The sport teachers who follow patients in therapeutic education program see them only for two consecutive days; since they do not handle the long term follow-up, this tool seems useless to them. There are also some testers who work in aftercare and rehabilitation center care, in this case, they see the children once or twice a day, for two weeks up to two months. But then they do not do the long term follow-up either, so this tool can be seen as a burden, as they have to manage the follow-up of the children who left the center and who are cared by other professionals outside. The sport teachers highlight the fact that it could become an enormous work load for them. Finally, the sport teachers who seem to be the more concerned by this device are the ones who lead adapted physical activities workshops. These sport teachers take care of their patients during their lessons, which take place once or twice a week throughout school year. With MyMouv', they can follow the practice between sessions and improve the patients' motivation, especially during holidays for example. They are the ones who commit the most easily to use MyMouv'. With this focus, we understand that it seems essential to define when and how the sport teachers must use the device. The coordination team has to define how it can be included in the health care pathway, in which step of the care. It is supposed to be used in the therapeutic education model but no instruction was given about the type of professionals who can use it (trained to PTE or not) or about the type of care (PTE programs only, or during all the care's steps).

Finally, all these factors are influenced by the professionals' closeness with the RéPPOP coordination team. Indeed, the sport teachers who commit the most to using MyMouv' are the ones who work the most with the members of the coordination team, who share other projects with them. In that case, the testers also share some goals and values, and better understand the issues surrounding the development

4 Three out of four professionals who have a bio-physiological conception tested the device, but only one out of three professionals who have a psycho-social conception did.

and the use of MyMouv'. These exchanges raise awareness among sport teachers and increase their commitment. We can see with these results that grabbing the interest of professionals is easier than federating them or involving them in the real test phase. But we can also highlight the importance of integrating the sport teachers into the development of this kind of tools, as the closeness with the team and the project is a factor influencing strongly their commitment. We can see that maximalist coordination modes, discussion with the users and their integration in projects, can improve this process.

Using MyMouv' can also be challenging according to the patients' situation. Epidemiology researches show that in obesity, and childhood obesity, patients are from precarious social classes, with lower incomes and lower school levels (Charles 2010). According to the sport teachers interviewed, several difficulties ensue. First, the children do not always have the correct equipment to use this tool: a powerful smartphone with an Internet access to download and use the application. They can also be discouraged by all the exercises descriptions written and detailed in the device, because they require good school skills such as reading comprehension.

So even if the designers thought that using a smartphone application was a way to involve lots of kids and teenagers, based on the assumption that they would be familiar with this technology, we can see that they did not take into consideration the socio-economic characteristics of this population.

Testing and using MyMouv' is also a source of disillusions. Professionals and patients had lots of expectations regarding the device, but as it is in testing stage, it is subject to technical malfunctions. Plenty of bugs can discourage the users, especially synchronization issues, passwords glitches, or incompatibilities with some smartphones. Moreover, patients expected to use this application in a way close to those they already use and know; but they were disappointed when they discovered it because of some missing functionalities, for example of the lack of social interaction as there is no discussion group or connection with other users, or the absence of notifications. As a result, they have to make a willing step to use it, which requires a lot of motivation. In the same way, MyMouv' is not playful, and is not built as a game, which calls for more patients' motivation.

In this case, we also understand the necessity of integrating the users, both patients and professionals, in the designing of this kind of tool, to pinpoint better their needs, and so to build an application which fits the users' expectations and situations.

Conclusion: a lack a coordination in the development which leads to a lower appropriation of MyMouv' and a lack of integration into the health care model

We saw with this study that designing and using an e-health tool is not self-evident. Several factors must be taken into account during the development of a specific tool like MyMouv'. Lots of constraints can appear during the development process and can complicate the users' commitment in its usage. We saw that the minimalist coordination between all the actors leads to the creation of a tool which does not fit the users' practices. The lack of users (both professionals and patients) integration in the design process actually leads to misunderstandings and then disappointments.

Moreover, we saw the important influence of health model. First, in the design of this tool, as it is built on the therapeutic education model principles. In this way, it requires some specific competences: on one hand, from the coordination team, as they have to think the tool through all these principles; on the other hand, from the testers, who have to master this kind of care, so they can use MyMouv' in the way thought by the designers. Then, the health model is also essential in the using phase, as we saw that some professionals cannot commit to it as their care model is distant from the MyMouv' model. It is paramount in that case to think about the role of e-health tools in the health care pathway.

On the whole, in a therapeutic education model, introducing an e-health tool appears really challenging, and must be considered as such. It brings lots of questions: what place do the RéPPOP want to give to e-health? How can it do it serve PTE? Do we want to integrate this tool and e-health in the health care pathway, or is it just a tool at the service of the professional, in defined situations?

To understand better this process, we are pursuing our research on this tool, but also others e-health tools designed by the RéPPOP so we can study the multiple issues undermining the development of these devices. We would like to clarify the structure of the social and technical network, to understand the links between all the actors and their roles at the different stages of development and how it can impact at the same time the development, the final tool and its use.

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Using an e-health tool for childhood obesity follow-up care: issues in the health care pathway

Abstract

Our study focuses on MyMouv' device, a follow-up tool of the physical activity practice for obese children and teenagers, conceived by the RéPPOP (Prevention and Care of Paediatric Obesity Network) in Midi-Pyrénées, France. It aims at optimising the children health care pathway in physical activity and for supporting motivation to move. This device questions in a frontal way the impact of e-health on the health care pathway, especially with children. Indeed, such a tool leads to some issues about its place in the care, particularly about ethical, social and clinical topics linked with its use. We question the effective realities of this display but also the actual impact of 'non-humans' on the health care pathway and logics with the increasing development of e-health devices. We show that using this e-health tool in the patient health care pathway is not self-evident, by studying its development and test stages.

Key words: e-health; pediatric obesity; coordination; appropriation; application; health care pathway

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Talking about dietary supplements

Introduction

A dietary supplement, known also as nutritional product or food supplement, is intended to provide nutrients, that may be missing or may not be consumed in sufficient quantities in a person's diet. They are defined as foods in some countries, while in others – as natural health products or even drugs (http://healthywellbeing.info). Dietary Supplement Health and Education Act (DSHEA) defines dietary supplements as: a dietary substance to supplement the diet by increasing the total dietary intake (e.g. tissues, enzymes secreted by organs or glands), a vitamin or mineral, an herb or other phytochemical, an amino acid, or a concentrate, metabolite, or extract. Summarizing, dietary supplements are not meal or food substitutes in occurring in natural form. The DSHEA permits only sorts of statements on tags of dietary supplements such as: nutrient content (e.g. "rich in magnesium"), "structure-acting" or nutrition assistance, e.g. "vitamin C (ascorbic acid) averts scurvy" or "zinc strengthens nails", and diseases claims. Food and Drug Administration (FDA) authorizes only that last, based on a scientific research. Furthermore, the statement: "This statement has not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, mitigate, or prevent any disease" must be placed on the dietary supplements label (Mechanick 2003).

The proper diet of healthy people provides properly balanced nutritional components of daily intake of foods. Only in the event of occurrence of some disorders, hyponutrition or malnutrition there is a need to correct the physiological or metabolic imbalance to re-establish homeostasis. Nutritional deficiency that could come into during illness, malnutrition resulting from eating disorders or hyponutrition from excessive physical effort may be corrected through the intake of dietary supplements. People who are malnourished as a result of for example cancer may benefit from some supplements to complement deficiency in essential biomolecules, e.g. people suffering from incorrect stool composition may increase their intake of fiber through supplements rather than eating volume quantities of meal. Sportspeople who exposed their organisms to intensive physical training and effect injure, benefit from supplements containing mainly protein to rebuild damaged muscle, mineral and vitamin to optimize restorative processes and align

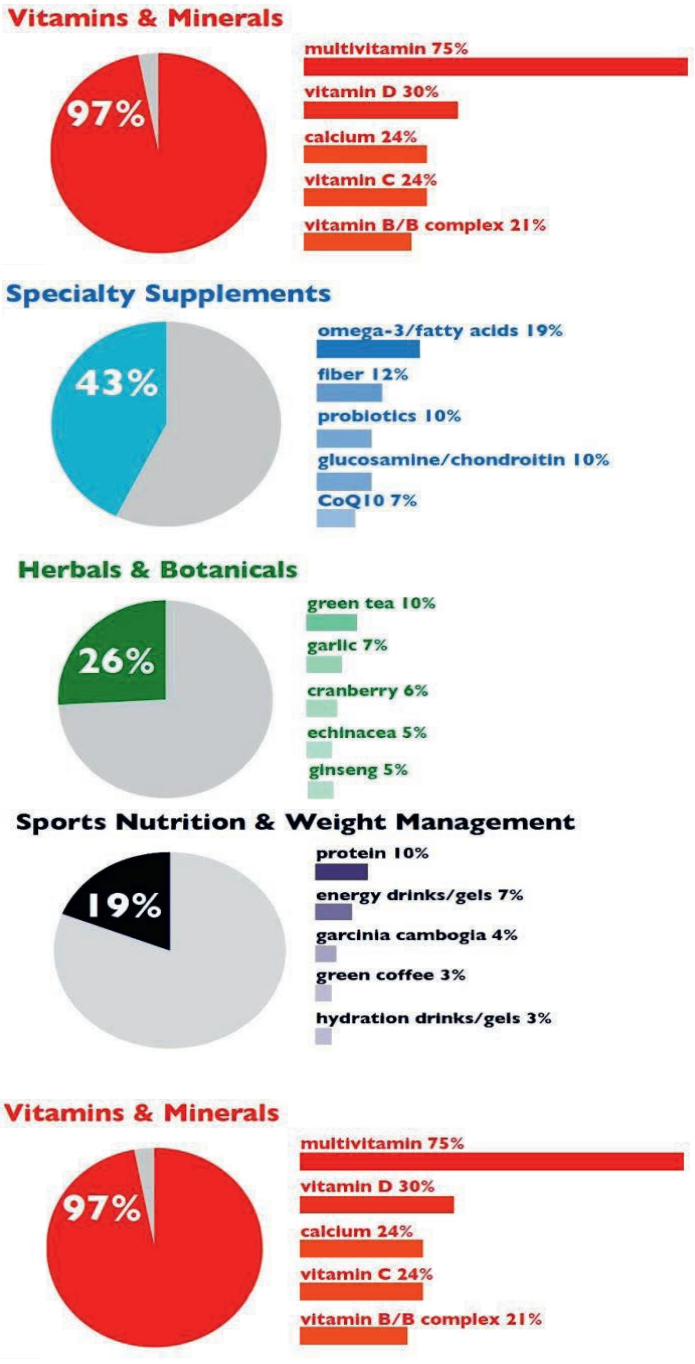
for the decline of minerals via excretory pathways (i.e. sweat or urine). Thus, under special conditions, dietary supplements can be an alternative to ingesting sometimes intolerable quantities of food (www.mwdicalwellnessassociation.com).

The dietary supplements are defined as products composed of nutrients, treated as a supplement to usual diet, located on the market in a shape that allows dosing. The form of dietary supplements, and pharmacy – a place of purchase, may insinuate a strong connection with the drug. Meanwhile, according to European Union legislation, dietary supplements were not and are not medicine! In Poland, The Chief Sanitary Inspector, not the Chief Pharmaceutical Inspector and the Office for Registration of Medicines and Biocidal Products in Poland as is the case with medicines, is responsible for the admission of dietary supplements to the market (www.krsio.org.pl/pl).

Currently, supplements can consist of minerals, vitamins, amino and fatty acids, herbals and/or botanicals enzymes, and many other substances. They may be in various dosage forms e.g. capsules, tablets, powders, as well as energy drinks and bars. They are not drugs and are not used to cure, treat or prevent diseases. Dietary supplements are food products intended to complement the diet. If the diet is deficient in certain nutrients, some supplements can help to get appropriate amounts of substantial aliments. However, it should be remembered that supplements cannot replace a balanced diet (http://ods.nih.gov).

Consumption of dietary supplements

In the 1990s, a significant demand for supplements was observed. Nearly 100% Between 1992 and 1996, sales of dietary supplements increased by nearly 100% – from 3.7 billion to 6.5 billion $. In 1999, the industry grossed an assessed 15.4 billion $. Over 1,500 manufacturers produce dietary supplements (by the FDA). Nowadays, dietary supplements are commonly available in pharmacies, grocery stores with healthy food, and on the Internet (www.dhhs.gov/oig/oei). In the United States (US) most adults consume one or more various dietary supplements (either occasionally or every day). Roughly 6 in 10 Americans consume some kind of dietary supplement, and approximately 1 in 6 eats herbal remedies systematically. The variety of manufacturers and production processes, as well as quality control matter are tremendous (Gershwin et al. 2010). The consumer reaches for compliments to support or improve health (maybe to lose weight, supplement a vitamin and minerals deficiency, or support organ action) frequently believing them to be quite natural, pure and powerful than food or drugs. Dietary supplements with claiming a broad range of health benefits are widely available, and the consumer may think that they have been proven potent. Their labels do not have to list risks or contraindications, and the consumer may posit that they are safe. Unfortunately, in some case the recipient may be mistaken (www.health.ny.gov/regulations/task_force/docs/dietary_supplement_safety.pdf). Many people select to take supplements, but taking too much or taking them for too long could be harmful (figure 1).


Vitamins & Minerals
97%
multivitamin 75%
vitamin D 30%
calcium 24%
vitamin C 24%
vitamin B/B complex 21%
Specialty Supplements
43%
omega-3/fatty acids 19%
fiber 12%
probiotics 10%
glucosamine/chondroitin 10%
CoQ10 7%
Herbals & Botanicals
26%
green tea 10%
garlic 7%
cranberry 6%
echinacea 5%
ginseng 5%
Sports Nutrition & Weight Management
19%
protein 10%
energy drinks/gels 7%
garcinia cambogia 4%
green coffee 3%
hydration drinks/gels 3%
Vitamins & Minerals
97%
multivitamin 75%
vitamin D 30%
calcium 24%
vitamin C 24%
vitamin B/B complex 21%

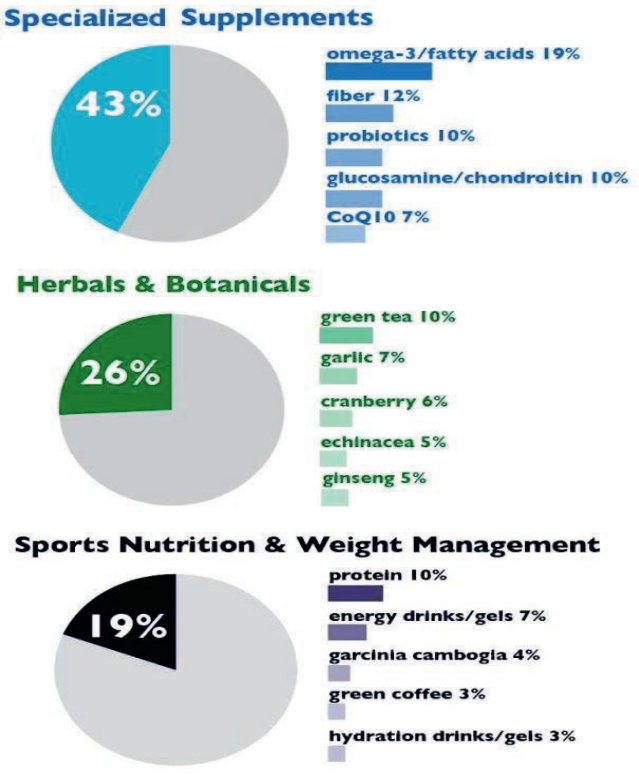


Fig. 1. The percentage of preparations in the most popular categories (www.crnusa.org/CRNconsumersurvey/2014)

Legal regulations

Quality of all prescription drugs are adjusted in the United States by the FDA. As unit of its duty to monitor supplement safety, the FDA look after reports of malady, harm, or side reactions from supplements (www.cancer.org/treatment/treatments-and-side-effects/complementary-and-alternative-medicine/dietary-supplements.html). Supplements are considered more like particular foods. Because supplements are not drugs, they are not subject to the same exact safety and efficacy requirements that medicines are. All the drugs that people can get even without a prescription, must be proven secure and potent, but dietetic supplements do not. When the FDA affirms the drug, it must be manufactured under carefully monitored conditions and packaged with complete information on the best portion, way and schedule. The attached information must also include conditions the drug has been proven to cure, certain incidental effects, contraindications (special conditions under which using

the drug should not be used because it would cause too much risk), and hazardous interplays with other consumed drugs.

The DSHEA, in 1994, designated dietary supplements as a section of food, which puts them under separate regulations than drugs. They cannot claim none of them has "a significant or unreasonable risk of illness or injury" when the supplement is being used as directed on the label, and also with proper use if there are no directions on the tag. Manufacturers are not required to test new matters or supplements in clinical tests, which would help discover hazards and vital interactions with medicines and additional substances. When the FDA demonstrates that a dietary supplement constitutes an important risk to people's health, DSHEA gives the FDA permission to stop a manufacture from making a dietary supplement. This way, they are risky only after they provoke harm. Producers have to inform the FDA (at least 75 days) before marketing products containing new dietary substances, stating that a product containing the new dietary component that will rationally be prospective to be safe. The FDA must prove that a dietary product is unsafe, it can take action to limit, or remove the dietary supplement from the market (The Johns Hopkins University 2006).

Dietary products are ordinarily self-prescribed, so there is no controlled network for analyzing side effects and adverse reactions. If a dietary supplement has strange effects or interactions with foods, drugs, or other products of supplement, they are not surely to be discovered as quickly as new medicines (www.cancer.org/treatment/treatments-and-side-effects/complementary-and-alternative-medicine/dietary-supplements.html). Authority to control medicines and foods is divided between the governments (federal and state). In the US the Federal Trade Commission (FTC) and the FDA adjust food supplement labeling, announcement and marketing. The FDA takes primary responsibility for product labeling, both food and supplement, while the FTC aligns its marketing and advertising. For supplements, the most important amendment is DSHEA. In 1994, the Congress adopted DSHEA grounded on the reason that "legislative action that protects the right of access of consumers to safe dietary supplements is necessary to promote wellness" (www.dhhs.gov/oig/oei). The provisions of DSHEA designate and enlarge the sense of dietary supplements and its ingredients, institute a new organization for evaluating safety, draft guidelines for writing displayed where supplements are sold, yield outlines for the use of claims and nutritional assistance statements, demand component and nutrition labeling, and give the FDA the control to establish good manufacturing experience regulations. Furthermore, DSHEA demands the creation of an executive level Commission on Dietary Supplement Labels and an Office of Dietary Supplements (ODS) within the National Institutes of Health (NIH). Deficiency of DSHEA are the impossibility to address the lack of scientifically based reference about safety, observed virtual to causing damage, absence of suitable scientific reason of clinical advantage, DS/N manufacturing process. Patients have to be alert to the eventuality of deceitful products, which are often named by pseudomedical slang as a new discovery, purify, detoxify, energize, or a secret, miracle and cure. The DSHEA does not claim demonstration of efficacy and safety, and also no regulatory

method exists for quality control and that is no procedures inspect that the correct volume or even the proper constituent has been manufactured (Mechanick 2003).

Federal adjustment of food supplements is far away from versatile. Albeit some dietary products are generally more like drugs than foods, they are commonly adjusted as foods. Given the absence of effective federal oversight of the production process, dietary supplements are adjusted less precisely than typical foods. Producers make claims that supplements act or support the functioning and structure of the human body, and can ensure a benefit related to cure of a standard nutrient deficiency illness, and promote global well being, without the need to provide substantiating data to the FDA (www.health.ny.gov/regulations/task_force/docs/dietary_supplement_safety.pdf). According to DSHEA, supplements may affect the structure or/and function of the human body, but not to prevent, treat, cure, mitigate disease, e.g. "retains urinary tract health" is permitted, but "treats urinary tract contagion" is not, and that is why it is often hard to distinguish the two sorts of claims. Major unfriendly reactions with food supplements have been reported. The FDA may issue warnings to consumers and require from the to issue a recall of a product, but producers are not obliged to withdraw a product from the market unless it is shown to be a "near hazard" to consumers (Harris 2000).

The DHHS (Department of Health and Human Services) guidelines require that supplements follow standard procedures named Good Manufacturing Practices (GMPs). It means, that supplements have to be manufactured in a quality manner, not include any impurities and contaminants, be labeled with the substances that are truly in the product.

The US Pharmacopeia (USP) is an independent framework dedicated to quality control for the strength, quality, and purity of pharmaceuticals. In the 1997, USP started publishing patterns for supplements, which focus on the quality, purity, strength, labeling and packaging. Producers of dietary products are not required by law to follow USP standards, but many of them have chosen to do so. Manufacturers are expected to follow FDA recipes, but the USP sign indicates that they choose to follow higher quality norms (www.cancer.org/treatment/treatments-and-side-effects/complementary-and-alternative-medicine/dietary-supplements.html). In European Union (EU) countries, the European Commission is the body responsible for creating the law related to the pharmaceutical sector. European Commission works with the European Medicinal Agency (EMA) and the European Food Safety Authority (EFSA). The EMA is mainly responsible for protecting and promoting human and animal health, evaluating medical products for human use, and for veterinary purposes. On behalf of the EMA, Committee on Herbal Medicinal Products deals with the topics and problems of plant medicines, created as part of the EMA.

In Poland, the body that evaluates medical products is a Chief Pharmaceutical Inspectorate (GIF) and Office for Registration of Medicinal Products, Medical Devices and Biocidal Products. Whereas, the market for dietary supplements, which belongs to the food category, is supervised by Chief Sanitary Inspectorate (GIS) (Baraniak, Kania 2015). Other organizations were also established, such as The Polish Council for Supplements and Nutritional Foods (KRSiO), which actively cooperates with the Ministry of Health on the shape of planned changes in the market for dietary

supplements. A competent team at the Ministry of Health deals with the amendment of food law in the field of dietary supplements. It proposes to create a transparent administrative procedures for reporting and verification of dietary supplements, which will organize the dietary supplements market in terms of eliminating marketing illegal products (www.krsio.org.pl).

Hazards associated with the consumption of dietary supplements

The dietary supplements should be used mainly by healthy people, the purpose of the products is not to treat illnesses (www.krsio.org.pl). Albeit dietary products have a long history of providing good to extraordinary benefits for health, for people who take them, they provide no health profit at all (Wheatley, Spink 2013). Many supplements contain active components that can give strong effects in the body. The properties of ingredients used in the production of supplements vary widely, some of which may have adverse effects if consumed in too large quantities. It is therefore very important to know the safe doses of each ingredient (www.krsio.org.pl).

People should always be aware of the possibility of sudden side effects, especially when they take a new supplement. Moreover, a lot of interactions can arise between drugs, herbal medicines and daily food leading to serious clinical implications (Baraniak, Kania 2015). Supplements are most probable to cause harm or side effects, especially when people consume them instead of prescribed drugs or when people take many various products in combination. Some of them can increase the risk of bleeding and if someone takes them before or after surgery, they can affect the anesthesia, while vitamin K can reduce the capacity of the blood thinner Coumadin® to prevent blood from coagulating. Eating more than people require is always more costly and can also pick up the risk of experiencing side effects, e.g. taking too much vitamin A can cause liver damage or headaches, birth defects or reduce bone strength (http://ods.nih.gov). Consumers' safety can be at venture due to flaws in the EU and domestic legislations. They are exposed to potentially major side effects, deceptive evidence and to the endangering of wasting money for creations that do not live up to the engagements they make (Passarani 2016).

Most people are capable of getting all the substantial nutrients from a balanced diet. Minerals and vitamins are important nutrients that human body needs in reasonable amounts to work properly. However, if people already choose to take supplements containing mineral and vitamin, they should be conscious that taking them for too long or too much can cause some harmful effects (http://healthywellbeing.info). The use of dietary supplements is common among people doing sports. Athletes should be informed that some dietary supplements can match the excessive performance and health claims, that are frequently posed for them. A few dietary supplements may have something to give in terms of health security or yield increase, but cannot equate an adequate diet. The venture of an unfavorable outcome, in particular, a positive doping test, remains real, and the hazards of dietary supplement use must be put versus the virtual rewards (Maughan 2011).

Advantages and Disadvantages

Various studies on dietary supplements are designed to provide beneficial effects and thus do not assess complete safety information. Albeit there is agreement that dietary supplements should be estimated in light of present knowledge of medical and pharmaceutical chemistry, there is a common lack of interest in herb and drug interactions within both pharmaceutical and herbal industries. The deficiency of research can also be ascribed to narrow funding for clinical tests. For consumers that do not eat diverse meals, selected food supplements, including minerals and/or vitamins, can be taken to guarantee adequate consumption of needed nutrients. It is substantial to note, that not all dietary supplement use correlates to incomplete dietary consumption. Data on the profits and hazards of dietary supplements is frequently unavailable and inconclusive. The lack of proof of injury does not necessarily indicate that a food supplement is safe but rather that there is no data to the contrary. The FDA does not assess the quality, efficacy and safety of food supplement products and its constituents. Consequently, consumers, who frequently think that natural is synonymous with safe should be taking food supplements at their own risk. Excessive consumption, delaying conventional medical cure, the concomitant use of supplements and pharmaceuticals, and contraindicated use are potential dangers associated with common dietary supplements. Therefore, because the preparations are not subject to standardized quality monitor measures, contamination, falsification and dosage inconsistency. Although the curative effect of supplements hinges on their potency, there are no federal standards for dosage and purity, and the dose studies that are mandatory for pharmaceuticals are seldom, if whenever, done. For many dietary supplements, active substances have not been identified and the quantity required to have an impact has not been checked. Inferior processing training can lead to inaccuracies in product labeling; products may include lesser or greater amounts of constituents given on their label, and the concentrations of active substances can vary among and within brands. Consumers may not know how much of any individual ingredient they consume (www.health.ny.gov/regulations/task_force/docs/dietary_supplement_safety.pdf).

Botanicals is a division of dietary supplements which is often in question because many botanical supplement ingredients are not derived from plants commonly used for meal, and safety and efficiency often have not been set with randomized, and controlled with using placebo clinical experiments (Camire, Kantor 1999). Botanicals, as well as herbals, have been used medically for thousands of years. Once it was considered “traditional medicine” used by aboriginal and ancient cultures, herbal medicine has become a popular alternative, complementary and supplement of modern medicine. Despite the natural descent, these substances should be taken with wariness, as their intake may have side effects (www.ext.colostate.edu). The accumulation and schedule of phytochemicals in medicinal vascular plants varies in the fruits, roots, flowers, stems, leaves and also vary during the cycle of growth or season. Moreover, plants or connected species similar in appearance may have greatly miscellaneous chemical compositions, e.g., the composition of ginseng grown in Korea (Panax ginseng C.A. Mey) is separate from that of the native American plant (Panax

quinquefolius L.). This may form difficulties in formulating botanical supplements with consistent ingredients and potencies and presents challenges for untrained plant pickers (Camire, Kantor 1999). The impurity of raw plant tools and completed products with pesticides, bacteria, molds, fungi, and mycotoxins constitutes another question with potentially heavy health consequences (Gershwin et al. 2010). Many people trust that any food and food supplement in its present occurring, unprocessed condition is safer and better than those that is manufactured. This is not necessarily accurate. Some of the most hazardous substances in the world exist naturally, e.g. toxic mushrooms and poison oak or ivy are extraordinarily poisonous to people but are totally natural (www.breastcancer.org/tips/nutrition/supplements). The huge majority of botanical supplements mark only slight promises such as healthy hair, nail, joints etc.

Whatever the gradation of the popularized improvement it is essential to warrant that clients can trust the claims on dietary supplements. They should not spend their money on manufactures bearing false promises. Accordingly, botanical claims exactly like other claims on foods should yield a rigorous research assessment according to the highest eventual standards (Passarani 2016).

Summary

Consumers take dietary supplements for various reasons, commonly connected to their health. They expect these will improve vitality, limit the signs of ageing, prolong life, treat particular complaints and reduce the risk of a chronic illness (e.g. cancer). The main cause is, for general, health and well-being (www.nhs.uk). Particular factors contribute to the progressive intake of dietary supplements. People are drawn to supplements because of their nonprescription availability, publicity straight to consumer, and the perception that natural products are practically safe. Furthermore, prevalent media attention to dietary supplements forwards the open message, that they may self medicate for in a number of cases. Unluckily, most consumers are mistaken about the low regulation of supplements, trusting that they must be accepted by a government office, that producers can make claims about effectiveness and safety only if there is reliable scientific proof to back it up, and that warnings about potential side effects or hazards are required (www.health.ny.gov/regulations/task_force/docs/dietary_supplement_safety.pdf). Before purchasing a dietary supplement consumers should be informed by a competent person (doctor or other health care providers) about how to buy a safe and healthy product.

Recommendations for consumers interested in purchase and the safe use of dietary supplements:

- investigate before you buy or use;
- if you are shopping for a botanical (herb or other plant-based supplement), find a product that uses only the part of the plant that is thought to be helpful;
- avoid products that claim to be “miracle cures,” “breakthroughs,” or “new discoveries,” as well as those that claim to have benefits but no side effects, or are based on a “secret ingredient” or method;

- try to avoid mixtures of many different supplements. The more ingredients, the greater the chances of harmful effects;
- if you have any surgery or procedure planned, including dental surgery, talk with a surgeon about when you should stop taking supplements;
- during pregnancy or if you are breastfeeding, take only dietary supplements prescribed or approved by a doctor;
- do not take any self-prescribed remedy instead of the medicine prescribed by doctor without talking about it with him;
- do not depend on any non-prescription product to cure cancer or any other serious disease,
- follow the dosage limits on the label. Overdoses can be deadly;
- never give a supplement to a baby or a child under the age of 18 without talking to the child's doctor;
- avoid products that claim to treat a wide variety of unrelated illnesses (www.cancer.org/treatment/treatments-and-side-effects/complementary-and-alternative-medicine/dietary-supplements.html).

You must remember:

I. Dietary supplements do not cure!

II. Consult your doctor or pharmacist on the selection of dietary supplements. Find out if the purchased preparation is a dietary supplement or a drug!

III. Dietary supplements are food!

IV. If the deficiency of important health components caused the disease, then you need a drug, not a supplement!

V. Supplements can come in drug interactions hazardous to health and life!

VIII. Dietary supplements can be overdosed!

IX. Dietary supplements are not subject to strict supervision! (www.izba-lekarska.org.pl).

No matter what type of cure you are choosing, it is always safest to ask your doctor about the kind and constituents of each dietary supplement you want to test. Do this before you buy it or begin taking anything new (www.cancer.org/treatment/treatments-and-side-effects/complementary-and-alternative-medicine/dietary-supplements.html).

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Talking about dietary supplements

Abstract

Nutritional deficiency that could occur during illness, eating disorders or hyponutrition from excessive physical training (in athletes) may be corrected through the intake of dietary supplements. The proper diet of healthy people provides correctly balanced nutritional

components of daily intake of foods. Only in the event of some disorders or malnutrition there is a need to correct the physiological or metabolic imbalance. Under special conditions, dietary supplements can be sometimes an alternative to ingesting intolerable quantities of food. In many countries a dietary supplements are define as foods, which complements a diet with a healthy ingredients e.g. vitamins, minerals, amino and fatty acids, herbals and/or botanicals enzymes, and many other substances. These are defined as products composed of nutrients, treated as a supplement to usual diet, located on the market in a shape that allows dosing. The form of dietary supplements, and pharmacy as a place of purchase, may insinuate a strong connection with a drug. Nevertheless, they are not drugs and are not used to treat or prevent diseases. These are food products intended to complement the diet. For this reason supplements are not subject to the same exact safety and effectiveness requirements that medicines are. When the controlling organizations (such as FDA) affirms the drug, it must be manufactured under carefully monitored conditions and packaged with complete information on the best portion, way and schedule. The attached information must also include conditions the drug has been proven to cure, certain incidental effects, contraindications (special conditions under which using the drug should not be used because it would cause too much risk), and hazardous interplays with other consumed drugs. Such information is not required in the case of supplements. However, it is very important that the consumers, before buying dietary supplement, are informed by a competent person (doctor or other health care providers) in order to buy a safe and healthy product. Especially since consumers take dietary supplements for a variety of reasons, commonly associated with their health and improving the condition of the body.

Key words: dietary supplements; nutritional deficiency; application safety; consumer awareness

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Health and its determinants. Literature review

Introduction – the problem of health

The increased interest in the issue of determinants of health occurred as a result of socio-economic changes, known as health revolution and following the developments in the field of broadly understood health risks associated with the development of a holistic health paradigm and as a result of transformations in the field of broadly understood health, related to the development of a holistic health paradigm (Dolińska-Zygmunt 2001).

Health revolution that took place in highly developed countries at the turn of the 19th and 20th century contributed to gradual changes in the perception of health determinants, in particular in the context of its connections with human behavior. First of those revolutions, called industrial revolution, was associated with the progressive processes of urbanization and transformations of the traditional society into the more modern, industrial society. These transformations led to the multiplication of consumer goods available for the individuals, but – on the other hand – started unfavorable changes in the natural environment leading to the emergence of infectious diseases and circulatory system, cancer and strokes. This situation forced the undertaking of preventive actions, which medicine focused on the environment, and the individual was treated objectively in this process. However, these treatments proved insufficient to the uncontrolled increase in mortality due to civilization diseases.

Helplessness of corrective medicine against growing problems and health threats resulted in searching for new approaches to the health determinants problem, leading to the second health revolution – a trend referred to as behavioral medicine. It initiated interdisciplinary research on health and contributed to the extension of the existing biomedical model to include social factors and to treat human as a biopsychosocial unit (Wrona-Polańska 2003). Scientific discoveries of behavioral medicine clearly indicated the necessity to look for sources of health in the lifestyle of societies, and the behavior of the individual was considered a significant element in the genesis of preventing civilization diseases (Ziarko 2006).

Progressing transformations in the field of scientific and technical discoveries, as well as the development of holistic-dynamic psychology initiated the third health

revolution, which has not been completely done to this day (cf. Nowakowska 2010: 45). The health promotion movement, known as the science and humanist revolution, was initiated in Poland in the second half of the 20th century by the eminent physician and humanist Professor Julian Aleksandrowicz. Actions taken as part of the third Health Revolution were aimed at increasing individual and social awareness of health and pointed to the need to give health the highest value that should be promoted. For this purpose, interdisciplinary cooperation between specialists in various fields of science is necessary. Those specialists should incorporate education into health in the teaching and educational process (Wrona-Polańska 2003, 2011).

The genesis of links between the health and health behaviors should also be found in the evolution of the concept of health over the centuries. Nowadays, the dominant role of the biomedical, holistic model and salutogenetic orientation in the perception of health and its determinants is indicated (Dolińska-Zygmunt 2001).

The dominant paradigm in the medical sciences at the turn of the 19th and 20th century, referred to the biomedical model, grew out of the positivist pattern of scientific cognition based on the Cartesian-Newtonian philosophy, which was reflected in the mechanistic vision of the world and Man (Ślusarska, Dobrowolska, Zarzycka 2013). In this approach, health is an objectified category, defined by the use of medical indicators, on the basis of which disorders in the biological functions of the organism and the mechanisms of its regulation are excluded or confirmed (Wrona-Polańska 2003). The assumptions underlying the biomedical model popularized the view that the initiation of health-protecting activities begins only at the moment of its collapse and recovery is possible only through the interactions of doctors, whereas man is only passively subject to all kinds of medical procedures (Dolińska-Zygmunt 2001).

Dissatisfaction with the health care system and the harsh assessment of traditional medicine that does not take into account the needs of the ill person led to the emergence of a holistic-functional health paradigm. According to its assumptions, the individual is an inseparable whole and its health determines mutually related dimensions – physical, social, mental and spiritual (Wrona-Polańska 2003; Binkowska-Bury 2007; Kowalski 2007). At the same time, the human body perceived systemically is an integral part of a larger whole (Heszen, Sęk 2007). Considering the complicated connections between humans and the environment contained in the ecosystem model called Mandala of Health (Słońska 1994), it is assumed that the closest system affecting the person is the family and the most distant – biosphere and culture (Wrona-Polańska, 2003). There are mutual interdependencies between the various systems, as well as mutual penetration (Wrona-Polańska 2011). The ecological model of health is therefore a multi-dimensional view of a man who, being part of the world, is subject to the laws, but at the same time constitutes a functional and autonomous whole (Wrona-Polańska 2003; Dolińska-Zygmunt 2000). What constitutes the individual's uniqueness is its subjectivity, and thus the ability to manage and create one's own health, life and self in relation to the requirements of the environment (Wrona-Polańska 2003).

In the holistic-functional sense health is understood as a process in which a person strives to maintain a dynamic balance of the body in the face of changes

occurring both in the environment and its interior (Dolińska-Zygmunt 2001; Gunia 2010). This approach clearly indicates that the health level is determined by biological, social, natural and psychological factors that interact with each other and consisting of the subjective dimension of man and his health (cf. Wrona-Polańska 2011: 93). Among the various determinants of human health, the most important is attributed to the specificity of health behaviors practiced on a daily basis. This crucial for a holistic health model assumption originates from the concept of Lalonde's health fields, according to which lifestyle plays a major role in health care.

Nowadays, the issue of health behaviors is the subject of interest in health psychology and health promotion. This area is also important in modern health education programs whose main goal is to promote healthy lifestyle and health knowledge, especially among children and adolescents (Heszen, Sęk 2007).

Health behaviors – conceptualization of the idea

Recognition of behavior as a significant factor in the etiology of counteracting civilization diseases and health prevention has led to a wide-ranging initiative which aim was to make each person responsible for their own health (Czerw 2012). The issue of health links with health behaviors has also become the subject of extensive analyses conducted both on the basis of medical sciences and social sciences, which led to the development of a relatively coherent way of perceiving the role of lifestyle in the life of a person (Dolińska-Zygmunt 2000).

There are many attempts to conceptualize the concept of 'health behaviors'. Today, three main areas of recognition of the importance of health behaviors are indicated: purposeful, functional and purposeful-functional (Dolińska-Zygmunt 1996, 2000; Wrona-Polańska 2003; Heszen, Sęk 2007).

The purposeful understanding of health behaviors means any form of the individual's activity, which is conscious and aimed at protecting or improving health (Czerw 2012). An example of such an approach may be the definition proposed by Sęk (2000: 539), who defines this term as "reactive, habitual and/or intentional forms of human activity that remain on the basis of objective knowledge about health and subjective belief – in a significant relation to health". Wrona-Polańska (2003) also refers to intentional conceptual approaches. She uses the term *health-promoting behavior* to describe health behaviors. Under this concept, the author understands any activity of an individual having the character of a conscious and intentional activity aimed at creating the so-called 'health potentials' (cf. Wrona-Polańska 2003: 66).

The second group of currently formulated definitions of health behaviors focuses on the health effects of decisions made. This means that health behaviors can have beneficial or adverse effects on human health. This approach is best reflected in the definition proposed by Puchalski (1990: 49), who defines the term "health behavior" as "those behaviors in which there are fundamentally unquestionable assumptions or evidence that positively or negatively affect health". In order to distinguish between behaviors conducive to or threatening health, reference should be made to the results of epidemiological studies. They strive to indicate the direction of the relationship between a particular behavior and the functioning of the body (Ziarko

2006). The most comprehensive list of health-related behaviors was presented by the European Health and Behavior Research Survey (Wardle, Steptoe 1991). These include: a healthy diet, physical activity, non-smoking, limited alcohol consumption, safe sexual behavior, avoiding stress and the ability to deal with it, moderate exposure to the sun, adherence to the rules of road safety and performing preventive test.

The third group of definitions combines a teleological approach – referring to the individual's awareness of a functional and objective approach (Wrona-Polańska 2003). In this approach understanding the concept of health behaviors is primarily conditioned by the way in which knowledge and health behaviors are linked (Ziarko 2006). This relationship between behavior and health may concern the impact of behavior on the body or the impact of behavior on the concept of health. These dependencies can take many forms (Ziarko 2006; Czerw 2012):

- person's subjective knowledge about relationships between behavior and health decides what behaviors will be taken;
- person's subjective knowledge regarding the importance of health and its determinants motivates a person to undertake activities aimed at health protection;
- objective knowledge about the impact of behavior on health decides about taking specific health-related behaviors;
- objective health concepts (biomedical and holistic-functional) encourage the individual to undertake health behaviors.
- Puchalski summarizes this analysis (1990: 56) by formulating the following definition of health behaviors: "chosen by the observer or (and) the subject of behavior (or types of behavior), which on the basis of a certain knowledge system (e.g. colloquial beliefs, some scientific concept, social ideology, etc.) remain in a significant – as defined in the accepted option – relationship with health, captured in the meaning set in this system of knowledge".

Characteristics of health-related behaviors

Running a pro-health lifestyle means practicing targeted health-oriented activity and eliminating factors that threaten it (Ostrowska 1999). The list of these activities and behaviors is diverse and depends on the level of objective knowledge and on the health awareness of the society. Data collected over the last decades indicate four classic groups of behaviors that have been linked to health on the basis of scientific research, such as diet, physical activity, smoking and alcohol consumption (Ostrowska 1999; Ziarko 2006).

Practicing physical activity comes from the natural needs of people and is an inseparable element of its healthy functioning at every stage of life (Bielski 2005; Kowalewski 2006). The benefits of practicing physical activity have also been clearly highlighted in the new version of the healthy nutrition pyramid, the basis for which is the proposal to take various forms of physical activity. World Health Organization recommends that an adult should have moderate physical activity for at least 30 minutes 5 days a week. Undertaking systematic physical activity plays a significant role in the prevention of cardiovascular diseases, cancer, osteoporosis, type 2 diabetes, metabolic disorders and helps maintain proper body weight, protecting against

obesity (Ziarko 2006; Kowalewski 2006). Physical activity leads to the improvement of mental fitness, memory and concentration, as well as increases resistance to stress and fatigue (Górski 2001; Binkowska-Bury 2009). In addition, examples from the literature confirm that regular physical exercise reduces the probability of taking risky behaviors such as smoking, excessive alcohol consumption or drug use (Mazur, Woynarowska 2004; Sadowska-Mazuryk et al. 2013).

The diet is an example of another behavior, whose relationship with health scientists try to determine. The role of dietary habits as factors conducive to health, but also increasing the risk of incidence of various diseases, has been broadly discussed in the literature (Gniazdowski 1990; Sheridan, Radmacher 1998; Kolanowski 2000). Providing the right amount of vitamins, minerals, carbohydrates and proteins, as well as limiting the intake of excessive amounts of fats, sugars, sodium and cholesterol-rich products is of great importance in the prevention of health (Charzewska, Wajszczyk 2008). Irrational nutrition leads to an increased risk of coronary heart disease, hypertension, obesity, diabetes, liver cirrhosis, cancer (including breast, uterus, stomach, large intestine, rectum, pancreas cancer), bone disease, or overactive thyroid gland (Sheridan, Radmacher 1998; Gniazdowski 1990, after: Ziarko 2006).

Smoking is one of the leading examples of behaviors that make up a risky lifestyle. Since the second half of 20th century reports are continuously published on the relationship between smoking and the risk of disease (Ziarko 2006). The relationships between smoking and the following groups of diseases have been proven: cancers (including cancer of: lungs, larynx, throat, oral cavity, bladder, kidney, pancreas, stomach, liver, cervix), non-cancerous respiratory diseases (chronic obstructive pulmonary disease, asthma) and diseases of the vascular system (coronary heart disease, stroke, increased risk of hypertension) (Maziarka et al. 1983; Dębiec et al. 1993; Żołnierczyk-Kieliszek 2002; Kułakowski et al. 2003, after: Binkowska-Bury 2009). The negative consequences of tobacco smoke are not limited to smokers, but also to those who live in the smoker's environment. Passive smokers have an increased risk of stroke, lung cancer and ischemic heart disease (Gniazdowski 1990, after: Ziarko 2006). There are also indications of serious disorders in the course of pregnancy (spontaneous miscarriage, premature birth) and fetal development (low birth weight) in women who smoked during their pregnancy (Gniazdowski 1990, after: Ziarko 2006; Polańska, Hanke 2004).

In addition to smoking, a serious threat to human health is alcohol abuse, the effects of which are visible in the physical, emotional and social sphere. Research on the harmfulness of alcohol consumption is not conclusive. It turns out that taking small amounts of alcohol (about 30 ml per day) can positively affect the cardiovascular system at the same time improving the health condition (Suliga 2004; Ziarko 2006). However, excessive and regular consumption of alcohol, exceeding 40 ml per day, leads to negative health consequences, among which are indicative of fatty liver, alcoholic hepatitis, liver cirrhosis, acute and chronic pancreatitis, esophagitis, acute and chronic gastroduodenal and duodenitis, changes in the cardiovascular system, anemia, impaired immunity, and fetal alcohol syndrome (FAS) (Gniazdowski 1990; Tacikowski 2001; Jarosz 2001; Kolanowski 2001; Erhardt 2002, after:

Binkowska-Bury 2009). Negative consequences of long-term alcohol consumption are visible not only in the somatic sphere, but also in the form of emotional, and social sphere dysfunctions.

In contemporary epidemiological studies, attention is paid to further categories of behaviors that may be closely related to health. An example of such connections can be the problem of stress and dealing with it. Research shows that experiencing chronic stress is associated with lower physical activity, deterioration of diet and the coexistence of metabolic disorders and its components (O'Brien, Van Egeren 1991, after: Miśkowiec et al. 2013). Long-term stress may also affect other psychosomatic disorders, such as chronic fatigue syndrome, irritable bowel syndrome and dermatological problems, as well as numerous vegetative symptoms (Ścigała 1993, after: Tylka 2000).

Health behavior of students

The results of research on the functioning of young people studying at Polish universities indicate that due to their lifestyle, this group is particularly vulnerable to deterioration or loss of health (Binkowska-Bury et al. 2010; Ślusarska et al. 2012; Puchalski 1997; Ogińska-Bulik 2006). Irregular lifestyle, poor nutrition, low physical activity, inadequate coping with stress, using psychoactive substances and at the same time increased intellectual effort related to studying are just some of the factors that are significantly associated with the deterioration of the health of the young generation (Ziarko 2006; Wrona-Polańska, Kaczor 2012; Zalewska-Puchała 2013; Rogo 2016).

The research, in which the students' health behaviors were the subject of analysis, indicate that particularly disquieting phenomenon in the student environment is the low level of physical (Gaweł 2003; Nowak-Zalewska 2004; Gacek 2004). In numerous studies and research reports it is indicated that only from a few to a dozen or so percent of students declare regular physical exercise (Popławska et al. 1997, after: Binkowska-Bury 2009; Kowalewski 2006; Sochocka, Wojtyłko 2013). Similar results were reported in studies conducted with the participation of Swedish students, which show that 35% of respondents represent low level of physical activity and every third respondent described his effort as irregular (Bothmer 2005). This unfavorable trend was also noticed in the results of studies published in 2017 by the Polish Ministry of Sport and Tourism, which indicate that only every seventh (16.01%) Pole aged 15–69 meets the standards regarding the level of physical activity.

Youth who study at the universities also present numerous deviations from the principles of rational nutrition. The literature primarily draws attention to: limited consumption of milk and its products and cereal products, including dark bread, frequent consumption of salt and sweet snacks, as well as the use of fast-food meals (Brojek 2000; Gacek 2001; Gaweł 2003; Suliga 2004; Borzucka-Sitkiewicz 2009). Students eat irregularly and limit the number of meals to three during the day (Suliga 2004; Binkowska-Bury 2009).

Another issue addressed as part of the health behavior of students is the issue of avoiding stimulants. Research results show that alcohol consumption is the most

widespread among students. There is a relatively large variation in the results of research on this phenomenon and depending on the study varies from 67% to even 100% (Kowalewski 2006; Szczerbiński, Karczewski 2011; Smoleń et al. 2012). Beer is the most often consumer type of the alcohol by students (Brojek 2000; Włostowska 2001, after: Binkowska-Bury 2009), and the main reasons for using this type of stimulant include celebrating success (Binkowska-Bury et al. 2014), participation in social events and the desire to relax (Klimowicz 2004). A slightly lower prevalence is characterized by student health behaviors related to smoking nicotine. Numerous studies show that the majority of academic youth do not smoke cigarettes (Gaweł 2003; Rasińska-Nowakowska 2012; Smoleń et al. 2012; Binkowska-Bury et al. 2015).

Another important problem discussed by the authors is the phenomenon of drug use. From the research presented by Klimowicz (2004, after: Binkowska-Bury 2009) – results that 12% of the surveyed students from the Medical Academy and 27% from the Białystok University of Technology had contact with drugs. Interesting data was also provided by research conducted by Brojek (2000), which revealed that 67% of responding students admitted to drug use. Also boosters are becoming popular in the student environment. Nearly a quarter of students had contact with them (Garus-Pakowska et al. 2012). Academic youth declares using drugs most often during social gatherings, and drug initiation occurs following a peer group proposal (Pach et al. 2005).

The period of study is inseparably connected with experiencing stress, which affects the health level of the young generation (Wrona-Polańska 2003). Research indicates that the majority of students experience stress each day (Grzywacz 2012; Kriener et al. 2016), and its main sources are: examination session and improper organization of teaching (Piątkowski 1995; Grzywacz 2012). Students copes with stress by listening to music, using the Internet, drinking alcohol and searching for social contacts (Romanowska-Tołłoczko 2011).

Summary

In recent decades, there has been a significant increase in interest in issues related to health behaviors and their links with human health, as evidenced by extensive literature in this area (Dolińska-Zygmunt 2000; Ziarko 2006; Ozimek, Dąbrowska 2016).

The important role of human activity to strengthen his health is now an indisputable fact. Creating a healthy lifestyle, also among the younger generation, is reflected in the activities and initiatives undertaken both on the basis of sociological, psychological and pedagogical sciences, and – what is the most important – is the basis for comprehensive and long-term activities at the international, national and local level. An example of such impacts may be the guidelines included in the National Health Program scheduled for 2016–2020, indicating a list of factors decisive for maintaining health and improving related to it the quality of life. The main objective of the project defined as "Improving the nutrition, nutritional status and physical activity of society" aims to raise public awareness of the importance of a well-balanced diet and the benefits of taking regular physical activity in the prevention

of lifestyle diseases. The project also includes undertaking in various social groups informational and educational activities that encourage people to take a healthy lifestyle.

Raising the awareness of the young generation in the field of health and its conditions may be an important step towards a gradual departure from the biomedical approach and leading a generation to health, understood in a holistic-functional approach (Wrona-Polańska 2003). This is particularly important due to the fact that students, as future health educators, will shape the awareness of future generations about health and pro-healthy lifestyle. For this purpose, it is necessary to promote health from the youngest years of human life and at every stage of education, from kindergarten to university, in order to create positive health convictions and activate for health (Wrona-Polańska 2011).

Health promotion should be a basic tool to popularize knowledge in the field of health and aim to strengthen the students' sense of responsibility for their health. For this purpose, it is necessary to construct and implement educational programs aimed at:

- motivating young people to take more care for a good physical condition, rational rest and a balanced diet;
- developing the abilities, passions and talents of the young generation;
- strengthening the personal resources: positive self-esteem and strong sense of coherence;
- developing skills to deal with difficult situations;
- developing health-oriented ways of organizing working conditions and free time;
- encouraging to organize health-related activities at the universities to promote individual responsibility for systemically perceived health.

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Health and its determinants. Literature review

Abstract

Apart from medical care, medical biological equipment or physical environment, the biggest impact on our health have our behaviors. We can influence them so they will help our health, influence in a positive way our emotions, help in relations with others or in the longer run develop our social and personal resources (Wrona-Polańska 2003).

On the basis of the research analysis and literature it can be concluded that an important practical direction is to develop from a young age health awareness, i.e. knowledge about what health is and how we can influence it to develop it. Education should aim at continuous development of knowledge of health and its conditioning, promote a healthy lifestyle expressed in conscious activity aimed not only at avoiding a certain group of behaviors (e.g. smoking cigarettes, drinking alcohol) but above all developing health potentials (e.g. sensitizing young people to art, music, beauty of nature in order to trigger positive emotions that mobilize the body to deal effectively with everyday challenges).

These actions are necessary so that a holistic, functional approach to health can gradually penetrate into the ordinary consciousness of young people and consequently lead to their conscious control and regulation of their own health.

Key words: health, health behaviors of adolescent students, education

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Cultivation of faculty staff health value practice

Internationally higher educational institutions have been seen as an important setting for health promotion for many years, since education and health are closely linked and higher educational institutions (HEI) teachers have an integral role as promoters of health. HEI teachers are in a unique position to promote the health and well-being of young people, through teaching personal, social, health and economic education.

Nowadays most HEI staff professional development focuses on curriculum delivery. However, their health value orientation is gaining more attention. HEI teachers are a key part of the wider public health workforce worldwide. Research has shown that teaching is one of the most rewarding professions, but it can also be one of the most stressful and this can lead to HEI teachers suffering from burnout. High levels of stress are affecting HEI teacher health and well-being, causing professional burnout, lack of engagement, job dissatisfaction, poor performance, and some of the highest turnover rates ever (Lambert et al. 2006). For centuries, teaching has been characterized as a profession that is "emotionally taxing and potentially frustrating" (Frank et al. 2013). Therefore, the rate at which HEI teachers leave the profession is significantly higher than the departure rate in other professions. This causes instability among faculty staff, students, and the community. Stress not only has negative consequences for teaching staff, it also results in lower achievement for students and higher costs for HEI.

The above-mentioned issues determined the aim of this paper, which is to analyze the ways of stress reduction among HEI faculty staff in modern reality. The tasks of the paper are: to ground the factors of stress among HEI faculty staff; to identify the level of job related stress on the example of Ukrainian HEI faculty staff at S. Kuznets Kharkiv National University of Economics; to outline the ways of cultivating health value practices among HEI faculty staff.

To begin with, it is necessary to define the notion of stress. The word 'stress' is defined by the Oxford Dictionary as 'a state of affairs involving demand on physical or mental energy'. Job stress can be defined as the harmful physical and emotional responses that occur when the requirements of the job do not match the capabilities, resources, or needs of the worker. It can be caused by too much or too little work,

time pressure and deadlines, fatigue from physical strains of work environment, excessive travelling, long hours, having to cope with changes in work. Above all, job stress can lead to poor health including psychological and physiological symptoms (such as depression, anxiety, poor sleep patterns, etc.) and even injury.

Factors leading to stress and burnout are often related to the characteristics of being effective or highly qualified and the pressures related to achieving those goals (Frank et al. 2013). However, those are not the only factors that contribute to the stress of the teaching profession. In this paper, we outline four main sources of high school teacher stress and health disorder, based on literature review conducted (Lambert, Frank, Weare et al.) These are HEI organization; job demands; work resources; teaching staff's personal resources and social-emotional competence.

Let us consider them in detail. The first and foremost source of stress is HEI organization. Unsatisfactory relationships with administrators, colleagues, or students may increase HEI teacher stress, lower job satisfaction and commitment to students. There is also a relationship between HEI teacher turnover and senior staff turnover. Frequent senior staff turnover results in lower faculty staff retention rates. This may lead to lack of communication and agreement between HEI administration and teaching staff.

The next source is job demands. Continued high demands on the job are a key predictor of HEI teacher stress. Limiting HEI teachers' control over the content and pace of their own work, and increasing threats of HEI faculty staff termination contribute to their stress and fear. Managing students with behavior problems is another demanding interpersonal challenge that produces chronic stress and leaves HEI teachers more vulnerable to depression. It can be an obstacle for HEI teaching staff to maintain professional skills and responsibilities at sufficient level.

Thirdly, insufficient work resources, support, and autonomy in decision-making may contribute to HEI faculty staff stress. When senior faculty staff create opportunities for decision-making and collaboration among faculty teachers, the latter feel empowered and have higher satisfaction. Retaining high quality faculty teachers means ensuring they have a voice in decisions at institutional level, and not subjecting them to unrealistic expectations. Above all, the lack of co-worker support and job control are key issues in causing teaching staff stress. This prevents them from being more objective in decision-making process.

Finally, HEI teaching staff personal resources and social-emotional competence are crucial when considering factors that contribute to their stress. When high job demands and stress are combined with low social-emotional competence and classroom management skills, poor teaching staff performance increases. A HEI teacher's own social-emotional well-being is a key factor influencing student and classroom outcomes. Yet, few faculty teachers have training opportunities to develop their own social-emotional competence. If a HEI teaching member of staff is unable to manage their stress adequately, their instruction will suffer, which then affects student well-being and achievement. In contrast, HEI teaching staff with better emotion regulation are likely to reinforce positive student behavior, and support students in managing their own negative emotions. HEI teachers with high

social-emotional competence usually report higher job satisfaction and a sense of personal accomplishment.

According to the survey conducted at S. Kuznets Kharkiv National University of Economics majority of faculty staff members suffer from professional burnout (mental and physical exhaustion caused by work). We used a validated burnout test, developed by Christina Maslach, one of the leading researchers in the field of burnout. Data collected shows that out of 60 (100%) members of faculty staff, who handle different academic subjects, at least 40 (66.6%) members suffered from medium level of stress, 10 (16.5%) had low amount of job-related stress and were not likely to burn out, and the remaining 10 (16.5%) had the higher degree of stress. The majority of staff emphasized the lack of access to a social-professional support groups, expressed dissatisfaction with rigid application of rules without considering more creative solutions in teaching process and having to deal with rapid program changes. Furthermore, they complained about getting angry and irritated easily and always feeling tired, even when getting enough sleep. Therefore, it may be concluded that there is a correlation between reasons for job related stress expressed by the surveyed members of faculty staff at S. Kuznets Kharkiv National University of Economics and factors that contribute to job related stress identified above.

Having analyzed the sources of HEI teaching staff stress, we can list its possible consequences: stress negatively affects HEI teachers' physical health; HEI teacher stress can be linked to poor teacher performance and poor student outcomes; HEI teaching staff turnover caused by high level of stress leads to instability and lower effectiveness in higher educational institutions. Based on the findings of the literature review and the opinions of the faculty teachers surveyed, the following ways of cultivating health value practices among HEI faculty staff can be outlined for due consideration and timely and suitable action by the bodies concerned.

Thus, educator's health is committed to be treated ethically and with sensitivity in relation to various social, cultural and environmental issues. The findings above support the need to reduce stress and improve HEI teaching staff well-being and performance by enhancing their teaching by promoting awareness, presence, reflection, and inspiration – the inner psychical and physical resources they need to help students succeed, socially, emotionally, and academically.

Our study focuses on ways of reducing HEI teaching staff stress and promoting their social-emotional competencies, well-being, health and performance. Having analyzed researches on preventing teaching staff stress (Lambert, Frank, Weare, O'Donnell, Kusherman, and McCarthy), we can outline three broad types of health promoting approaches: organizational approach; organization-individual approach; individual approach.

Firstly, let us consider organizational approach. Organizational interventions are directed at enhancing the organization's culture and work practices. They involve promoting a participatory environment, open communication, supervisor and peer support, reducing workload, training, worker health policies, etc. The goal of an organizational intervention is to prevent stress from occurring, which is considered to be more effective than individual interventions alone. There is some evidence to support organizational-level interventions in other service professions,

with documented benefits in reducing job related stress, increasing job satisfaction and reducing turnover. For instance, at the department of pedagogy and foreign philology of S. Kuznets Kharkiv National University of Economics the project teams have been organized to undertake outlined tasks. The members of these teams then shared their positive experience. Therefore, they saved their time and effort and managed to maintain healthy and friendly working environment and as a result, the teachers overcome difficult and stressful job related situations in more comfortable for them way.

Organization-individual approach can focus on building co-worker social support and skills training for HEI teaching staff and students. There are some ways when HEI teachers can be assisted in gaining health awareness and cultivating healthcare values.

Given the high rate of HEI teaching staff turnover in the first years of teaching, programs that seek to provide technical and social support to beginning HEI teachers through orientation, guidance, and mentoring programs have spread. Common activities include mentoring from senior teaching staff in the same subject area, regular opportunities for supportive communication with administrators, seminars and workshops, time management, and team building. It is generally accepted that supports for beginning HEI teachers lead to: higher satisfaction, commitment and retention; better classroom instructional practices; higher student scores on academic achievement tests. At our department the most topical seminars have been on the usage of ICT in daily educational practice.

Another helpful approach to addressing HEI teaching staff health and well-being is the implementation of workplace wellness and mental health programs. Such programs target lifestyle changes to reduce health risk behaviors, improve health and reduce absenteeism. Coaching programs can help HEI teaching staff manage emotions and find joy and satisfaction in teaching. These programs can help new members of faculty staff reduce job related stress and raise retention, which improves classroom instruction and management. Various coaching programs that were developed particularly for faculty staff were offered at different levels and for different purposes at the department of pedagogy and foreign philology at S. Kuznets Kharkiv National University of Economics.

Coaching programs focused on student behavior and social and emotional learning can benefit HEI teaching staff and support classroom learning. According to our analysis the members of teaching staff that trained and supported in implementing social and emotional learning programs have lower job-related anxiety and depression. Members of HEI teaching staff receiving coaching focused on improving the quality of their interactions with students can be guaranteed a significant increase in student achievement, suggesting that systematic and sustained coaching supports may be a critical component of social and emotional interventions for educators (Borova 2012).

Approaching the individual level is the most common way of dealing with job related stress. Such interventions may include psychological relaxation or meditation, cognitive behavioral approaches to improve active coping skills, and goal setting. Stress management based professional development programs foster HEI teaching

staff's ability to focus their awareness in the present moment in a non-reactive manner, connecting to their own experience and to others with ease, patience, and kindness. These skills are to be taught using sequenced exercises such as body scans, breath awareness, meditative movement, greater emotional awareness, and the cultivation of positive emotions and values towards self and others (Frank et al. 2013).

The evidence shows that successful health initiatives should be well-designed and grounded in tested theory and practice; linked to the higher educational institution, home and community; address the ecology and environment; combine a consistency in behavioral change goals through connecting students, educators, family and community; foster respectful and supportive relationships among them; use interactive and blended learning and teaching approaches; exercise individual approach to each student. Communities will be at the forefront of addressing health needs and health inequalities in their areas, and higher educational institutions are an important setting to help address these inequalities.

Many scholars assert that professional preparedness is critical for engaging HEI teaching staff in the promotion of positive health in their daily interactions and routines with students. Having introduced these ideas into practice during the academic year, we could observe positive dynamics in cultivation of faculty staff health value at our department (approximate level of job related stress has decreased by 7% among examined faculty staff). Our research suggests that aside from their major instructional content areas, they may not feel equipped to apply positive health practices. Many scholars assume that all pre-service HEI teachers should be given knowledge in demonstrating competencies in the delivery of positive health approaches. This knowledge includes: understanding the specific role that all members of HEI teaching staff play in the prevention of mental physical and health problems of students; possessing skills to design and carry out instructional approaches aimed at creating positive classroom environments, promoting healthy peer relationships, and enhancing students' self-concept; having curriculum expertise to create learning activities that link students' strengths with academic content to enhance their engagement and motivation for learning.

Hence, our research suggests that with healthy HEI faculty staff students are more likely to learn more effectively; health promotion can assist universities to meet their targets in educational attainment and meet their social aims. Young adults who feel good about their university and who are connected to significant adults are less likely to undertake high risk behaviors and are likely to have better learning outcomes. Thus, HEI can be worksites for the teaching staff and settings that can practice and model effective worksite health promotion for the benefit of all academic staff and ultimately the students.

To conclude, cultivation of HEI faculty staff health value practices is a promising way to help them create and maintain a positive learning environment, avoid burnout and enjoy their work and ultimately achieve positive learning outcomes. Health education promotes core skills and dispositions, which research and teaching staff need to create and maintain supportive learning environments while retaining their well-being and passion for teaching.

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Cultivation of faculty staff health value practice

Abstract

Teaching is one of the most rewarding professions, but it can also be one of the most stressful. Worldwide, education and health are inextricably linked. Thus, there is a need to help educators reduce stress. This paper analyzes the ways of stress reduction among HEI faculty staff in modern reality. It grounds the factors of stress among HEI faculty staff; identifies the level of job related stress on the example of Ukrainian HEI faculty staff at S. Kuznets Kharkiv National University of Economics; and outlines the ways of cultivating health value practices among HEI faculty staff.

Key words: HEI staff, job related stress, professional burnout, health promotion, job satisfaction

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POPULARIZATION OF KNOWLEDGE – NEW EDUCATIONAL AND SOCIAL IMPLICATIONS

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Empathic mediation of information: online forum for cancer patients

Introduction

When fighting cancer, patients find medical responses formulated by health professionals and given by other patients, especially on the Internet. Patients are looking for information that will help them live better with the disease, treatments and their side effects. Some prefer an easy to understand analyses of their test results, others seek advice to keep their hair during chemotherapy, but most of them want to benefit from the experiences of other patients to prepare for what can happen to them, and thus reduce their fears. Patients go online to find an empathically mediated information, something that it is still hard to find within eHealth services.

eHealth consist of 3 key elements: 1) data obtained from the patient, 2) electronic transfer of data over a distance, and 3) patient-tailored feedback from a health care professional (Elbert, van Os-Medendorp et al. 2014). Communication in eHealth interventions is personalized and interactive in contrast to patient information websites on health and disease. Interaction among patients is not included, not even consider useful for patients. Therefore we research forums – one of the oldest forms of communication on the Internet. How digital communication supports, also known as on-line communities, can provide social bonds which can help patients and relatives as caregivers?

Our research seeks to understand how patients could obtain information and help through the use of online health communities. Knowledge mediation processes in online communities are laced with empathy and curation from individual experiences with the disease. First, we detail our methodology, deeply grounded in ethnographic approaches, then we present our results with the motivation to visit online forums, the power in helping others and the coping strategies gain with the patient to patient information.

Methodology

Qualitative research aims to understand people's points of view, to discover how they make sense of their experiences (Kvale, Brinkmann 2008). The interview is the most common way to do this. A conversation between researchers and participants

often build knowledge that is more relevant than simply observing a reality (Kvale, Brinkmann 2008). The original meaning of the word conversation means "to wander with" in Latin, so with the interview, the researcher spends time with the participant to glimpse their points of view.

Interviews were conducted via telephone or Skype for geographical reasons, so audio recording is self-evident. Many free software programs are available for recording and correcting audio quality. This way, all team members have the same audio files and can take notes and start the analysis without waiting for the transcripts. We chose to make an initial individual and then collective analysis in order to pool the interpretations of each researcher. To do this, several free software programs are available such as word processing (Miron, Dragon 2007) or Sonal "[which] thus transforms the chronology of transcription work, returning to the boundary between sound and written work. A transcribed interview takes the form of a series of both sound and text excerpts, which can either be reread or replayed, opening up new methodological perspectives" (Alber 2010).

In a qualitative study, the presentation of results will be descriptive. Further analysis remains to be carried out in order to derive a more refined conceptualization. We will essentially present the perceptions of the participants, because our process of knowledge construction is based on an empathic understanding of the representations of the subjects (or participants).

We circumscribe our research areas to online forums, because "in France, the sharing of experience between patients takes place notably in the forums and secondarily in the form of comments placed on blogs. Forums are provided either by commercial publishers or by patient associations" (Silber 2009). We have selected two forums. The first Doctissimo, being the most known and used as a general health forum and the second, the impatient ones, being a forum specialized on a type of cancer. We present in a synthetic way these two fields, inscribed in two different organizational logics: one, Doctissimo, is inscribed in a "lucrative" logic, the other, Les Impatientes, in a "non-lucrative" with a "deinstitutionalized" logic.

Doctissimo, created in 2000, has been the subject of several studies because of its popularity (Thoër 2012) on the development of online market content (Romeyer 2008), and on the search for information (Battaïa 2012). The site is ranked among the most visited in France, with 6.24 million unique visitors per month in 2008 (Romeyer 2008). Doctissimo is part of a business model focused on financing through advertising and operates on the basis of an articulation between a logic and economic actors (the Lagardère media group, private advertisers), and a logic and community actors (the multiple forums managed by a small team and an army of volunteers), all being supported by a software platform (Thoër 2012).

With regard to community animation, "on a forum such as Doctissimo, the self-regulation described is redoubled by the existence of five professional moderators, assisted by volunteer facilitators who have the possibility of deleting abusive messages, advertising, or giving contact details of doctors, and can report reprehensible behavior for punishment" (Akrich, Méadel 2009). Thus, the volunteer facilitators testify of an acute form of online empowerment that seems to participate for the patient of an asset to live well his disease and the side effects of the therapy.

However, as on most forums, the doctinautes (the members of the Doctissimo forums) only read the testimonies left by more active users (Romeyer 2012). But this does not mean that readers do not benefit from the testimony of contributors to move towards a better life and a form of resilience (patient education). However, it is difficult to assess the actual degree of empowerment for ordinary readers. In Doctissimo, interventions are complex, combining questions and answers (Clavier, Manes-Gallo et al. 2010).

In order to contact the moderators and doctinauts, we have created a profile. We initially preferred to send private messages to forum members according to several criteria. First, the date of the last messages sent. Some "sons" date back several years, it is difficult to know if the person is still active, even alive knowing that they are people with serious illnesses. Second, the type of cancer to study gender differences (breast cancer/prostate cancer) and also with other specialized forums such as the Impatients. Third, the degree of involvement of the doctinauts that is indicated under the pseudo of the person in terms of rank. Thus, a regular and a "golden doctinaut" do not have the same relationship with the forum.

The second forum, les Impatientes, was created in December 2001 by a computer engineer, Karine Sabatier after her mother's death from breast cancer. Her goal was to publish practical and concrete information, and to allow women to talk to each other about breast cancer. The forum has more than 10,000 enrollments in almost sixteen years of age lead a thematic forum for women affected by breast cancer. If the "files" section of the site has not been updated for several years (the moderators do not seem to be active on the site since 2014), new registrations are held every day and maintain the dynamism of the forum.

With a long immersion in the two forums, hours of in depth interviews, we extracted findings that resonated with other research and bring new light in how information is transmitted in health forums.

Beyond the search for information

One of the many reasons for cancer patients to visit online forum is to reduce anxiety due to lack of information or social connection would contribute to psychological well-being[1] which, in turn, would contribute to patient life satisfaction. Integration into online communities is part of a form of patient well-being. This is why information research is a major theme in health and the Internet (Li et al. 2015), as patients reduce their concerns through information found on the Internet (Lee, Hawkins 2016). But the medical professional is concerned that patients find information of uncertain quality (Ebel, Stellamanns et al. 2015).

Online information can be used to gain more knowledge about the disease, treatments or how to cope with stress and emotional distress, especially it can affect how individuals perceive their loved ones' diagnosis (Lauckner 2015). However, not all patients and their families are prepared to decode the scientific and medical information available online. Most websites are too difficult for the general public

1 Psychological well-being is considered an indicator of happiness and satisfaction (Keyes, Shmotkin, Ryff 2002).

to read (Storino, Castillo-Angeles et al. 2016). Patients go online not to seek medical information in the strict sense, but to share their experiences with the disease. In the light of the exchanges available on the online community provides a form of temperance or even a grid for reading symptoms that are not always interpretable. This is as much for patients who have already been informed of their pathology as for future patients trying to find answers to their concerns and who can extract alarmist testimonies that put them in an anxiety not conducive to well-being. The possibility of requesting information therefore becomes essential and functions as a collective filter that can avoid the sometimes anxiety-provoking dimension of online information.

Thus, Internet users seek information filtered by individual experience and not objective information. This experiential knowledge helps patients understand their disease and create new empirical knowledge (Akrich, Rabeharisoa 2012), but knowledge from the disease experience, especially that of other patients. Thus, an impatient woman (S) discovered the forum by chance, looking for "breast cancer" more than fifteen years ago. At first she had gone to the cancer league forum, then she kept looking and she came across the essentials, which she liked more because it is more personal. The league forum[2] offers medical answers via moderators. She found this interesting, but it did not meet her expectations. For her, as for many others, the impatient represent a community.

Online communities of patients, rooted in empathy, allow them to solve each other's problems, share information, express emotions, support each other (Demiris 2006). Concretely, forum discussions are categorized into five main groups – everything related to 1) support, 2) medical, 3) emotions, 4) privacy, and 5) economics (Blank, Schmidt et al. 2010). These five groups are found in the criteria of well-being knowing that it is a complex set of environmental, professional, intellectual, emotional, financial, physical, spiritual, cultural and social elements. These criteria for well-being are grouped into three broad groups as defined by the World Health Organization (WHO) in 1945: "Health is a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity". Online communities respond to these three characteristics of well-being: 1) physical with advice drawn from experiential knowledge of the disease and treatments, 2) mental through emotional support and the opportunity to express themselves, empowerment, and 3) social with a community of other patients to break isolation and find social support.

Empowerment in Empathy

Empowerment can be found on three levels which are individual, organizational and community (Groen, Kuijpers et al. 2015). On the individual level, Groen, Kuijpers et al. (2015) identified five main attributes of patient empowerment: (1) being autonomous and respected, (2) having knowledge, (3) having psychosocial and behavioral skills, (4) perceiving support from the community, family, and friends,

2 https://www.ligue-cancer.net/forum

and (5) perceiving oneself to be useful. The latter two were specific for the cancer setting.

Individual or psychological empowerment refers to an individual's ability to make decisions and exercise control over his or her personal life. Like feelings of efficiency or self-esteem, empowerment emphasizes the development of a positive representation of oneself (self-concept) or personal skills. The empowerment process is defined as "the ability of an individual to make decisions when faced with a specific situation or problem, alone or in interaction with resource persons, with the aim of adapting to that situation and exercising control over his or her own situation and personal life" (Brouard et al. 2014).

Empowerment is actively mobilized in public health discourses with the patient as an actor in his or her health. Patients cannot build their empowerment alone, they need health organizations and patient communities especially online. Not living near their oncology center, or too weak to travel, online communities are a viable alternative for patients, especially when they face their disease and the often harmful effects of treatments. At this point, e-health practices seem to us less understandable as manifestations of patients' desire for emancipation than as an expression of a program for shifting public health costs from states to citizens (Casilli 2011). Therefore, online forum is a free, always available source of comfort and knowledge for patients.

One impatient explained she does not always dare to say how she feels to her family; because she has the impression to complain constantly. She worried that her fears will be received as too great a burden. So, she unloads her troubles on the forum, where she can express herself, be understood, and help others. Indeed, feeling able to bring something to others offers an empowerment that may seem lost in the face of illness. Providing social or emotional support is just as rewarding for the person who receives it as it is for the person who offers it.

Resilience in mediating knowledge

Discussion forums provide spaces for self-help and discussion, where everyone can express their fears, doubts and hopes (Akrich 2010). Emotion-focused adaptation is necessary to treat negative and uncontrollable events such as cancer (Turner, Grube et al. 2001). Several impatient mentioned reading blogs from other Forum members a way to reduce their anxiety when facing heavy cancer treatments. "Findings indicate that blogs function primarily as tools for emotion management and information-sharing rather than as tools for problem-solving or prevention and care" (Chung, Kim 2008). Despite the scary testimonies visible on the forum, the impatient S continues to read the new messages. She relates her own path in the disease by telling herself that she is not yet at that stage, and that she is lucky. She realized that she was afraid to leave behind those around her, her granddaughter, but at the same time she wants to see if her third daughter will have a baby. The forum helps people in accepting their mortality and helps them live with the burden of disease.

It is easier to cope with the disease with the hope of remission. This is the goal that the impatient E gave himself by testifying of his remission, and by answering

systematically to the other testimonies of remission "it has been 8 years that I had not come on the site, but it is to say that I am always in remission". Exchanging with people in the same situation helps to cope with life's depression and anxiety during and after treatment. social support (tangible and affectionate support and positive social interaction,)may be fulfilled by the patient's loved ones, whereas emotional and informational support involves others who can relate to and understand the patient's experience (Kalbfleisch, Cyr et al. 2015). Our research corroborates the findings of and demonstrates the importance of online communities to patients.

Conclusion

Our research has shown that patient engagement in health forums meets richer and deeper needs than simply seeking information. Through discussions and meetings on the forums observed, patients meet their needs to talk with other people with cancer (preferably the same) and thus break their isolation and give meaning to what happens to them. While remaining anonymous and at home, forum members help and support each other in difficult times.

Online forum in health seems to participate in the well-being of the patient, by allowing them to become actor of their informational care and by opening the way to autonomous forms of education in health on line (Nambisan 2011). Patients learn to gain resilience and fight loneliness. Health professionals and institutions can no longer simply advise to avoid the Internet, they must now find info-communication devices to integrate community uses of the Internet in health care pathways. Most importantly, online forum cannot provide information without mutual support (Potts 2005).

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Empathic mediation of information: online forum for cancer patients

Abstract

In this paper, we describe our research about cancer patients' use of the Internet, especially online forums. Many studies in health communication have focused on the benefits of online communities for cancer patients, but few have looked into how the group contribute to the individual and vice versa. This paper offers a detailed review of the current issues with e-health and a discussion of theories and concepts helpful in understanding the phenomenon of online communities. It follows with the methodological approaches considered in order to study such a delicate subject. Finally, we shall discuss the gap between official discourse and the reality face by cancer patients. Health organizations have an economic incentive to promote patient empowerment. Medical professional and health care facilities could benefit by including online forum in their treatment protocols, but it is not the case. Patients are warned not to go online, which they do because too many questions are left unanswered, feeling overwhelm by the treatments and how to deal with side effects. This paper shows that patients gain much more than information, they gain an empathetic group of other cancer patients. And the search for information is more efficient with empathy and social and emotional support.

Key words: on-line communications, forums, cancer patients, knowledge mediation processes

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"What can be done to avoid cancer" in the students' mind

Introduction

Cancer and representations

Social representations are products of thought, which are related to an object, an idea, a concept. Representations which are shared by a large part of the population result from the influence of knowledge, beliefs and practices (Durkheim 1967; Moscovici 1989; Clément 1994). The cancer disease is known since antiquity and its connotation built over centuries has led to images of terror and angst, which are the origin of popular beliefs. Cancer used to convey the social representation of an incurable disease with no hope for a cure. It has been often associated with the negative image of "the plague of the modern world". Contracting the cancer disease was considered shameful and people did not talk about it at home. Cancer conveys also the image of the "bad dead" in the collective imagination: the announced dead with endless sufferings, the body putrefaction…

Cancer is an object of particular interest, in a communication point of view, because its strong impact on society, its frequency and gravity make it ubiquitous in everyday life, notably in the media, despite a certain kind of taboo around this disease. Today cancer has become a major societal issue. It is less taboo and one can evoke it more easily, as exemplified by prevention campaigns, information relays, in order to demystify the disease and remove its negative image.

The issue of the causes of cancer remains a controversial issue. "Cancer is perceived as a consequence of the modern way of life in secular thinking" (Herzlich, Pierret 1991). The different modern ways of life show that the individual has broken with nature and accommodates "chemical" food (Gregg, Curry 1994), full of toxins, pesticides, preservatives, a "tampered" food, "rigged" (Herzlich 1969). After chemical food, come the waves (transformers, High voltage lines, computers, cell phones, magnetic fields, etc) (Barreau 1999). In addition to toxic substances such as tobacco and alcohol, the "rich" food is reproached (animal fats, meats), another consequence of the modern way of life. Stress is also raised to challenge the modern way of life and the rhythm of life it imposes on individuals. Finally, risky behaviors also appear as one of the possible causes of cancer in secular explanations. It seems that general opinion on this subject has significantly changed over the last decades: indeed, several studies report that the general public has long pointed to individual causes,

risky behaviors, indicating that patients had some responsibility for their illness (Alby 1999; Dany 2008; Chapple et al. 2004). But more recently, people are more focused on a collective responsibility, pointing to societal and environmental causes, as the Cancer Barometer 2010 points out (Beck 2012).

Background and objectives of the research

In previous studies, we showed that cancer is the most present disease in the minds of young students. It is also the most cited disease among lethal diseases.

The main objective of this study is to explore the representational fields of cancer and the diversity of these representations from a young scholar audience (from the year 9 level to the Master level. In this article, "year 9" and "year 12" will refer to the English levels nomenclature). Thanks to it, we try to underline the importance of these representations to promote a better understanding of the disease. In addition, cancer is virtually absent from scholar curricula, at least in France. Indeed, cancer is not really studied at school: awareness of the consequences of smoking on health is often carried out in the middle class or at the end of primary school. The genetic origin of cancer, its physiological functioning and its consequences are taught thereafter only to science specialized year 12 students. The role of school seems however essential to improve population's health and for prevention. To reduce inequalities in the prevention of cancer requires to have realistic representations on the issue and probably to develop the curricula in this direction.

In this context, we study the answers given by students from different levels to the question "What can be done to avoid cancer?". This question reveals in the first place what should be done, in the students' mind, if we want to avoid cancer. It also tells us what students consider to be important risk factors that should be avoided. Finally, we will also see that a significant part of students consider that there is nothing to do to prevent cancer, fatalism that has already been noted by other authors, with general public (Baromètre Cancer 2010: 50).

The abundance of the students' productions, will allow us to study their representations from the perspective of the practices, the values and the used knowledge. Indeed both behaviors and attitudes towards the disease, like the use of tests or health professionals and the involved knowledge will be evaluated. According to the age of the studied public, we will determine which constituents of the KVP triptych seem to be preferred and orient their positioning.

Otherwise, as the relation to health and disease has an important gendered dimension, we will investigate whether this dimension is manifested with this young audience.

The interest of the gender and health issue

Questioning the relationship between gender and health is of particular interest. Indeed, if various studies are interested in inequalities or gender differences in areas of society such as work, family or sport (Segalen, Martial 2013; Singly 2017), the topic of health is still poorly explored. So far health has been widely studied from a biological point of view to the detriment of the social aspect. And yet, studies in

anthropology show the need to take into account the weight of representations and gendered practices to fully understand this "total social fact" (Mauss 1925, 2007).

There is a link between gender and health, as attested by many publications (Vidal, Salle 2017; Touraille 2008; Löwy 2015). In particular, studies on gender and health have shown that certain biological traits that are considered to be innate may also be the result of social construction. For example, based on the models of evolutionary sciences, Priscilla Touraille (2008) argues that the gap in size between men and women is likely to have evolved under the constraint of gender-inegalitarian diets that structure all of the known human societies.

Gender stereotypes still tend to link health disparities to differences in the constitution between men and women (Arbogast 2018; Vidal, Salle 2017; Polton 2016; Löwy 2015; Touraille 2008). Thus, the body of women is marked by their sexual affiliation (e.g. diseases related to pregnancy and childbirth, cancer of reproductive organs) and by their gender affiliation (e.g. stress related to cognitive overload, physical and psychological violence). The history of male bodies also refers to the weights of biology (e.g. male sexual organ cancers) and gender ratios (e.g. alcoholism, smoking (Polton 2016; Salle 2013; Bloomfield et al. 2006). This variable is thus involved in many diseases, to the detriment of the other gender. For example, male osteoporosis is less studied and less looked into among older patients, just like the symptoms of heart attacks, which differ for women, are far less known than those of men (Arbogast 2018).

In addition, health inequalities are characterized by the fact that women appear to be favored, with higher life expectancy. However, as Dominique Polton points out (2016), however, they spend more years than men in poor health and face different morbidity rates, at different ages and for many pathologies.

Cancer appears to be a relevant indicator of social gender relations and it is in this perspective that we analyzed cancer incidence among academic and school populations in a gendered logic.

Methodology

Participants

The studied population comprised 220 students, from the region of Dijon (Burgundy, France), spread over three school levels: 102 from year 9, 80 from science specialized year 12 and 38 master students. Students were interviewed in the classroom using questionnaires during the 2014–2015 school year.

Questionnaires

After a first very open questionnaire on the diseases they were aware of, a second questionnaire focused more specifically on cancer (see Malpel et al.; Andres et al.). Among others, there was the question "what can be done to prevent cancer?".

This open question allowed the students interviewed to give several answers. The multiplicity of these responses was suggested by the layout of the document that was given to them. Indeed, following the statement of the question, followed a series of dashes inviting to multiply the answers.

Categorical analysis of representations

After being collected, the students' answers were first analyzed from a lexical point of view. In a first large category of answers, we grouped the answers expressed using action verbs (e.g. "do", "eat", "wash") in the affirmative form. From a semantic point of view, we then grouped in this first category, which we called "do", all the answers that express an action that can be carried out to avoid cancer. In a second large category of answers, we have grouped the answers that contain the verb "avoid", and answers that express dangers (for health) and imply the word "avoid". We have also grouped in this category the answers expressed using a negation (e.g. "Do Not Smoke", "do not expose ourselves to the sun"). We have sometimes considered equivalent responses from the same semantic register (e.g. "Avoid smoking" and "Do Not Smoke"). The semantic analysis of the data also allowed us to identify a category "Nothing to do" and to define several sub-categories.

Analysis of the results according to the level of study

To allow comparison between the studied levels despite the different sample sizes, and to avoid bias linked to significant differences in the number of answers provided, we expressed the proportions of answers, in the different Categories and sub-categories, as a function of the total number of answers of the considered level. Statistical comparisons were performed using chi-squared tests, with the actual numbers of answers being compared to the expected theoretical numbers of answers, taking into account the total number of answers of the level.

Analysis of results based on gender

For the gendered analysis of the data, we took into account the answers of 194 students, including 104 girls and 90 boys, as the gender of 26 interviewed students could not be determined from the questionnaire. Statistical comparisons were also carried out by chi-squared tests, always taking into account the total number of answers of the considered group.

Results

Global analysis

From the answers given by the students of the 3 levels, we have listed 77 different answers. After inventory, the categorical analysis of these answers allowed to end up at a system of classification into main categories and subcategories (Table 1): indeed, we found that some answers related to, first, (1) what should be done to avoid cancer in the minds of the students surveyed (36.5% of the responses). That means, how to act, how to behave on a daily basis to limit risks. In this broad category of responses, we can distinguish two thematic clusters, which determine two subcategories: on the one hand, the answers which are related to the medical community (14.6%), in particular to prevention and on the other hand, those related to daily life (22.4%), lifestyle habits and in particular those related to hygiene, food or sport.

Secondly, (2) a large part of the answers correspond to what should not be done ("avoid" category) or what should be avoided to avoid cancer (51.8%). It should be

noted that we do not necessarily expect this type of response to our questionnaire, since the question asked here was: "What **must be done** to avoid cancer?". It may be assumed that the question in fact implied that it was possible to answer in a negative way by advocating what **not to do**, since more than half of the answers formulated fall into this category. In this broad category, we distinguished three thematic clusters, the responses that relate to individual behaviors: risk behaviors (8.6%, e.g., exposure to the sun) or addictive substance use (26.0%, i.e., tobacco, alcohol, drugs), and secondly, responses that are related to environmental factors that ideally should be avoided, but to which we are more or less exposed (17.6%, e.g., waves, chemicals, pollution).

Finally, some answers do not fall into either of these categories and indicate that some students think that there is nothing to do, that nothing can be done or simply that they do not know what could be done to avoid cancer. We grouped all of these answers into a third category (3) "nothing to do" (10.9%).

Table 1: Breakdown of student responses between identified categories and subcategories. The percentages are averages on the three levels studied. Total number of replies: 629.

Do	**37.0%**
Medical prevention	14.6%
Life style	22.4%
Do not do (avoid)	**52.1%**
Environmental factors	17.5%
Risky behaviors	8.6%
Addictive substances	26.0%
Nothing to do	**10.9%**

Different representations depending on the level of education

The first observations of the data allowed us to organize the results and to produce a conceptual map for each level in order to represent the answers formulated by the students based around the categories and subcategories identified.

- Year 9 level (Fig. 1):

Students gave a slight majority of answers in the "avoid" category (51.3%). There are few references here to environmental factors (7.6%), e.g. carcinogens, chemicals or electromagnetic waves. Some answers are related to risky behaviors (3.8%), such as "sun exposure" or "mobile phone use". For these young students, the main risk of cancer is linked to smoking (32.4%) and alcohol consumption (6.5%). Another large part of the answers is with regards to "what should be done" to prevent cancer (37.9%). In this category we find, in equal proportions, answers relating to medical prevention (18.4%, e.g. tests, hospitalization, protection) and lifestyle (19.5%, e.g. "playing sports", "eating a balanced diet", as well as more surprising answers such as "personal hygiene" or "using condoms"). It may be noted that about 10% of the answers can be interpreted as "there is nothing to do". In the opinion of the students, cancer might be a fatality. Indeed, some of them do not hesitate to state that "it cannot be avoided", and for others "it is just bad luck" or that it depends on genetic factors. Finally, some others say, quite simply, that they do not know.

- Year 12 level (Fig. 2):

For these students and in the "what should be done" category (38.7%), there are no significant changes from the year 9 classes, with again some naive answers (e.g. "washing hands"). In the "avoid" category (52.4%), we can observe an increase in the "environmental factors" sub-category (18.4%), which is close to that of "addictive substances" (24.2%). There were also slightly more answers related to "risky behaviors" (9.8%). In line with the year 9 students, we can find the category of "nothing to do" answers (9.0%).

- Master level (Fig. 3):

For the Master degree students, "environmental factors" are more important (26.6%), while "addictive substances" are less (13.8%). In particular, "smoking" has decreased to 8% of the total number of answers at the Master level, while it was 32.4% at the year 9 level. In fact, it is surprising to note that about 60% of Master degree students did not mention that smoking should be avoided. It is, however, likely that these students in the biology section know that tobacco is one of the first causes of cancer. But they may also consider that other factors are just as important. This assessment seems to be consistent with the many environmental factors they cite (e.g. carcinogens, radioactivity, pollution). It can also be assumed that their opinions regarding tobacco may have changed over the years. We can also note that the "lifestyle" category represents 25.5% of the answers. Finally, a similar proportion of answers were found in the "nothing to do" category. It seems so that an equivalent proportion of students consider cancer as inevitable. At this level, opinions may be linked to the knowledge of genetic predispositions relating to certain cancers.

- Comparison of the 3 levels

A comparison of the three levels (Year 9, Year 12, Master) reveals significant differences and a correlation between health and environmental factors. Table 2 presents the frequency of responses by sub-category.

Table 2: Frequency of responses by sub-category. * : $p<0.05$. *** : $p<0.001$.

	Total number of answers	Medical prevention	lifestyle	Environ-mental factors	Risky beha-vior	Addictive substances	Nothing can be done
level		*		***	*	***	
Year 9	185	18.4	19.5	7.6	3.8	40.0	10.8
Year 12	256	16.4	22.3	18.4	9.8	24.2	9.0
Master	188	9.0	25.5	26.6	12.2	13.8	12.8

What seems most remarkable when comparing the three levels of education is the gradual increase in the number of answers in the "environmental factors" sub-category. The difference between the three levels is very significant ($p<0.001$).

It seems that with age, students increasingly consider the harmful elements of the environment as determinants of the risk of cancer.

At the same time, students also seem to attach more and more importance to people's lifestyles. The number of answers in this category, relative to the number of students surveyed, is very significantly different between the three

levels ($p<0.001$). There is a strong correlation between variations in the two subcategories "environmental factors" and "lifestyle" ($r = .988$). It can be noted that most answers in the "lifestyle" category correspond to what should be done to avoid the environmental factors that may cause cancer (e.g. "eat healthy", "lead a healthy life"). There is, therefore, some consistency between the parallel increases in these two types of answers. On the other hand, the frequency of answers in the sub-category "addictive substances" appears to decrease with age, with a very significant difference between the three levels ($p<0.001$). It is strongly inversely correlated to the frequency of answers in the "environmental factors" category ($r = -.995$). Similarly, the importance of "medical prevention" seems to diminish in the minds of older students ($p<0.05$).

Transformation of the representations of the causes of cancer, according to the level of study and the gender

Table 4. Comparison of girls' and boys' proportions of responses by sub-category. * : $p<0.05$

	Total number of answers	Medical prevention	Life style	Environmental factors	Risky behaviors	Addictive substances	Nothing to do
Gender						*	
Girls	299	16.7	23.4	18.4	9.4	21.7	10.4
Boys	257	13.2	21.8	16.3	8.2	30.7	9.7
Gender/ level interaction			*				

- What can be done

Girls generally give more answers than boys in relation to medical prevention and lifestyle. For medical prevention, this difference is significant in the case of year 12 students. This result is consistent with various studies in public health which, for example, show that women consult more easily and more regularly with doctors than men (Vidal, Salle 2017). A number of responses relate to the need for "(screening) tests". This can be interpreted as the weight of gender stereotypes related to status and gender roles assigned or incorporated by young girls and boys. For example, "healthy eating" and "body care" refer to societal concerns as feminine. It should also be noted that the fight against cancer has focused on women (Löwy 2013), which clearly puts gender to the center of health issues. This seems less true for younger students, as in year 9, boys give even more answers in relation to lifestyle.

- Avoid

Only the responses related to addictive substances are prevalent in boys. This is consistent with studies demonstrating the differentiated relationship of men and women towards risky behaviors, including the use of psychoactive products such as alcohol, tobacco, etc (Vidal, Salle 2017; Le Breton 2011; Leclerc et al. 2008).

Discussion

Transformation of the depictions of the causes of cancer, according to the level of education and gender

The question we asked the students here was not directly about the causes of cancer. However, their answers provide us indirectly, with information about what students assume these causes to be. Indeed, in the "avoid" category we can find the most at risk factors, known or suspected, which cause cancer, starting with tobacco and alcohol, chemicals, carcinogens, asbestos, electromagnetic waves...

Among these possible causes, our results show a very strong increase in the mentioning of risks related to the environment, between the fourth grade and the Masters level. In particular, several terms appear in this subcategory, among the Masters students, which were not present in the other grades (e.g. additives, pesticides).

How can this transformation be explained? It may be assumed that nowadays, with the influence of the media, young people are increasingly aware of the need to protect the environment and the impact of pollution on health (Dab 2007). This is certainly becoming a major concern for many young French people who, because of this, will later turn to organic farming for their food.

Having said that, our results indicate that this concern for the environment is less pronounced among younger students. On the contrary, they are more aware of the harmful effects of tobacco or alcohol. In this case, the media and the family probably contribute to this awareness, but school certainly has a relatively important impact, thanks to anti-tobacco campaigns that are often proposed to year 6 or year 8 classes in France.

A partial parallel effect can be seen between this transformation in the student depictions of the causes of cancer and that observed in the general population in recent decades (see Introduction 1.1). Indeed, young students seem to have an initial depiction, corresponding to an archaic vision of cancer that would depend mainly on individual behavior (e.g. tobacco or alcohol consumption) pointing to the individual's responsibility for his or her illness. Their depiction appears to evolve at a later stage, when questioning society as a whole, via the environmental causes that are brought to the fore by older students (e.g. pollution, chemicals), as is the case nowadays within the general population.

Is this change in perspective a reflection of a certain freedom from guilt on the part of individuals? Several students use tobacco (not documented here), which is the main risk factor for cancer, but by listing the risk factors linked to the environment, students somehow dilute their own responsibility within that of society as a whole.

It could be interesting to correlate, in a future study, the perception of the risk of cancer linked to tobacco with students' actual consumption. Do students naturally tend to minimize the risk when they are consumers? A corresponding result is highlighted by the 2010 cancer barometer for the general population (Guignard et al. 2012). Indeed, this study shows that the perception of the risk of cancer associated with tobacco is linked to the smoking status of the respondents. Occasional smokers

and regular smokers (<10 cigarettes per day) are less likely to consider that there is a definite link between smoking and cancer than non-smokers and heavy smokers.

With regard to gender, without generalizing our findings, we can provisionally conclude that this variable is not neutral in the depictions related to cancer. The differences observed may refer in particular to the traditional distribution of roles between women and men. This distribution of roles results in women consulting physicians more frequently for themselves and also managing children's health more frequently than men. Being present in a medical environment makes them acquire knowledge that is often ignored by men. These social roles tend to guide how women and men are exposed to health problems differently, how they perceive the conditions that affect them, how they use or do not use the health care system, how the responses given by health professionals are constructed differently according to the gender of their patients. These findings seem to be reflected in the social depictions of cancer by the audiences interviewed.

It appears, therefore, to be difficult to address the issue and public health policies in general, and cancer in particular, without taking aspects of gender into account. Awareness and relevance of this factor is now generalised both at the scientific and the political level, within national and international bodies.

Is cancer a fatality in students' minds?

The proportion of responses in the "do nothing" category remains essentially the same at all levels. This is surprising, as one would expect young students to be more unfamiliar with cancer risk prevention issues than adults, especially biology students. So, in fact, young students make fewer different proposals than Masters students yet the frequency of "nothing can be done" responses remains relatively high. This result can be compared to another part of our cancer research in relation to students, where we asked, "How is cancer treated?" In reply to this question too, we obtained a relatively high proportion of responses such as "we can't treat it" (about 20% of responses in the 4th grade), and "I don't know" (up to 43% of responses in the 5th grade, these percentages being lower in higher grades, handwritten in preparation). It therefore seems that both the young and old continue to view cancer with a certain fatalism. The incurable and ineluctable nature of the disease seems to be quite often present in people's minds, despite a reality out of step with regards to medical progress. This observation had already been made in adults. Despite the cure rates that can today be quite high for certain cancers, especially when they are detected early enough, a large part of the population has kept this very negative image of cancer, of a disease that can always come back, with little hope of survival (Moulin 2005), and the medical profession, which often prefers to use the term "remission" rather than "cure", is probably not completely foreign to this depiction. Furthermore, this fatalism, this way of considering that "nothing can be done", is perhaps another way of coping with guilt. Those types of expression "it's pure luck", used by students of all ages, seem to mean: "Why do something, since you can't do anything about cancer?". These opinions could be a pretext for inaction.

Gender-linked differences

With regard to the gender dimension, and without generalizing our findings, we can temporarily conclude that the gender variable is not neutral in representations of cancer. The differences observed can refer in particular to the traditional distribution of roles between men and women. The consequence of this distribution is that women consult doctors for themselves and deal with their children's health more frequently than men. Their participation in the medical environment enables them to acquire knowledge that men are not aware of. These social roles tend to guide how women and men are exposed to health problems differently, how they represent the conditions that affect them, how they use the health care system or not, and how the responses given by health professionals are constructed differently according to the gender of their patients. These findings appear to be reflected by the representations of cancer of our studied public, as the educational sphere is probably influenced by the social representations of gender (family, media influence...).

It is therefore difficult to deal with this question and with public health policy on a general basis, and more particularly cancer, without taking gender aspects into account. The awareness around this issue and its relevance is now global, both at scientific and political level, in local and international authorities.

Conclusion

It appears in this triptych KVP, constituting the depictions, that the knowledge and information "K" mobilized with age regarding risks linked to the environment, and their associated practices "P", make it possible to change the depictions of the subjects by displacing them from more individual depictions to more collective and shared social depictions. Conversely, this study also shows that "V" beliefs linked to the fatality of the disease, despite the progress observed in medicine, remain omnipresent regardless of age. Inaction "P" behavior, associated with these beliefs, also remains anchored at all age levels studied. It therefore seems here that the depictions of the public studied are the product of two interactive duos KP and VP, Information-behavior regarding environmental risks on the one hand and beliefs-behavior regarding the fatality of the disease on the other hand. A complementary analysis could make it possible to identify, through interviews for example, which interactive duo really prevails over the other and guides the position taken by the individual studied. However, as a result of this research, we can suggest that, in addition to raising awareness regarding environmental risks, a greater awareness allowing for beliefs to be changed faced with the fatality of the disease could make it possible to change an individual's depictions of the disease.

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"What can be done to avoid cancer" in the students' mind

Abstract

Cancer is one of the most known and impressive diseases. It is considered by the largest part of the population as the most frightening disease. It is also strongly associated with death in people mind (Guilbert 2005). Otherwise, the question of the factors responsible for cancers is still under debate. In student population, the representations of cancer have been poorly explored. It is very intriguing to know the representations of young pupils about cancer because this topic is almost not treated, at least in France, in all school levels until science specialized year 12.

In previous studies, we found that cancer is the disease the most present in young pupils' mind and the most associated with death (Malpel et al. 2016).

In this study we explore the representations of students, more specifically about "what can be done to avoid cancer", using questionnaires, considering age and gender as influencing factors.

Our results indicate a large variety of representations in relation to different variables: namely the academic level and the gender. This latter aspect is interesting regarding the well-known different relation of adult men and women to the disease (Salle, Vidal, 2017).
Moreover, we found that all students' answers can be categorized into "what should be done", "what should not be done" and "there is nothing to do".
In the second category, our results indicate that the relative importance of individual dependent factors versus environmental factors change according to the age of students.
Attention to the environmental factors becomes more important in older students' mind to avoid cancer.

Key words: social representations, disease, school, pupils, gender

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"Transnational Youth Initiatives" of the Erasmus+ program for the development of the entrepreneurial attitude of young people, based on the example of the "Open Minds Studio" project

The future of Europe depends on young people, and yet the life chances of many of them are limited. The biggest problem of young people are difficulties in accessing the labor market. The European Union sees the need to act to support young people so that they can fully participate in social and civil life. It implements initiatives aimed at strengthening the potential of young people and supporting their individual development, providing them with tools necessary for functioning in a rapidly changing world. The aim of the article is to present the effects of developing the entrepreneurial attitude of young people through non-formal education using one of the instruments implemented by the European Union under the Erasmus + "Transnational Youth Initiatives".

Youth as a subject and theme of European Union activities

Almost 100 million young people live in the European Union, constituting one-fifth of its citizens. Despite the unprecedented educational opportunities offered by modern Europe, young people face huge difficulties in the access to the labour market. According to Eurostat unemployment statistics, the average youth unemployment rate (up to 25 years of age) in European Union countries in June 2016 was 18.8%, with the unemployment rate of 7.6% among the older active population (aged 25–74). The highest youth unemployment was in Greece (47.7%), Spain (45.2%) and in Italy (37.2%). At the same time, according to the statistics of the Labor Market Department of the Polish Ministry of Family, Labor and Social Policy youth unemployment in Poland was 14.4%, which was 3 times higher than the total unemployment rate (4.5%). Young people tend to have more difficulties finding a job, more often they are covered by uncertain forms of employment, including fixed-term contracts, and the share of income from work of younger age groups is reduced.

Youth not only incurs financial consequences of staying without work, but long periods of unemployment also have a negative impact on future employability, increased risk of poverty, social exclusion and marginalization of its role in society, and their talents and skills may not be optimally used. The high unemployment rate

also has a negative impact on economic growth and productivity and is a serious economic burden on society as a whole (Employment and Social Developments review, European Commission).

The aim of the European Union policy is to provide young people with equal opportunities in education and employment and enable them to participate fully in all spheres of social life. Youth policy is part of the competence of the member states, the European Union only supports and complements their activities in this area, providing a forum for cooperation and exchange of information and experience on issues of common interest. Various measures are used to achieve this goal, in particular establishing a dialogue with young people and the Erasmus+ program.

Youth, as a group of citizens with specific needs and unique meaning, appeared in official Community documents as a subject of interest and a separate political entity only in the 1990s. Treaty on the Functioning of the European Union introduced the chapter "Education, Vocational Training, Youth and Sport" (Consolidated version of the Treaty on the Functioning of the European Union, 2012/C 326/01).

It mainly indicated the need to take action to increase the international educational exchange of young people. Over the following years, actions were taken to diagnose the socio-economic situation of young people, the foundations of the European Union's youth policy, as well as the mechanisms and tools for its implementation were developed. The shape, assumptions and objectives of the EU youth policy was adopted by the European Commission in "A New Impetus for European Youth – White Paper" in 2001 (A New Impetus for European Youth - White Paper. COM (2001) 681 final, 21 November 2001. [EU Commission - COM Document]). It was followed by more works, including the "Revised European Charter on the participation of young people in local and regional life" (Revised European Charter on the Participation of Young People in Local and Regional Life, Congress of Local and Regional Authorities of the Council of Europe, 2003) adopted by the Congress of European Local and Regional Authorities in 2003 and the "European Youth Pact and promoting active citizenship" (Communication from the Commission to the Council on European policies concerning youth, Addressing the concerns of young people in Europe – implementing the European Youth Pact and promoting active citizenship {SEC (2005) 693}, COM(2005) 206 final) adopted by the European Council in 2005.

The current objectives of youth policy have been set in the European strategy for youth for 2010–2018 (Council Resolution of 27 November 2009 on a renewed framework for European cooperation in the youth field (2010-2018), 2009/C 311/01) and in the "Work Plan for Youth for 2016–2018" (Resolution of the Council and of the Representatives of the Governments of the Member States, meeting within the Council, on a European Union Work Plan for Youth for 2016-2018, (2015/C 417/01).). The priority is to create larger, yet equal opportunities for young people in the field of education and the labour market, and to promote active citizenship, social inclusion and solidarity among young people.

Youth policy is also included in other areas, including the "Europe 2020" A strategy for smart, sustainable and inclusive growth (Europe 2020: the European Union strategy for growth and employment Communication from the Commission – Europe 2020 A strategy for smart, sustainable and inclusive growth (COM(2010) 2020

final, 3.3.2010)). The strategy places the emphasis on smart, sustainable and inclusive growth as a way to overcome structural weaknesses in the European economy, improve its competitiveness and productivity, and strengthen a sustainable social market economy, and youth issues have been included in almost all its objectives and leading projects, and the "Youth on the Move" program is directly devoted to it (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, Youth on the Move. An initiative to unleash the potential of young people to achieve smart, sustainable and inclusive growth in the European Union, COM(2010) 477 final). Its aim is to raise the level of education of young people and increase their employability by adapting education and training to the needs of young people, encouraging them to take advantage of opportunities offered by EU scholarships for education or training abroad, encouraging EU countries to take action that will help young people transition from the education system to the labour market.

At the end of 2018, the Council of the European Union adopted a resolution on a new youth strategy (Resolution of the Council of the European Union and the Representatives of the Governments of the Member States meeting within the Council on a framework for European cooperation in the youth field: The European Union Youth Strategy 2019–2027 (2018/C 456/01)) that will set the priorities of EU youth policy for 2019–2027 and will be a guide for member states that should implement their youth policies based on its indications. The main assumptions of the strategy are:

- strengthening the potential of young people and supporting their individual development, providing them with tools necessary for functioning in a rapidly changing world;
- encouraging them to actively participate in public life at the local, national and European level, teaching civic and solidarity attitudes;
- effective implementation of youth policies that meet the needs of young Europeans;
- including the most disadvantaged groups in youth activities, preventing poverty, exclusion and discrimination against young people.

The authors of the resolution emphasize that in order for the above-mentioned assumptions to be implemented, it is necessary to develop a network of contact points where young people could get information about development opportunities and help in implementing their own initiatives. Youth information points are to support young people entering adulthood, starting their careers on the labour market and seeking ways to continue their education and develop their skills in non-formal education.

The European Union pursues the objectives of youth policy through dedicated instruments. Currently, these are:

- the European structured dialogue with young people and youth organizations, namely consultations under the eighteen-month cycles that aim to reflect on the priorities, implementation and monitoring of European cooperation for the youth;
- Erasmus+ program for education, training, youth and sport, which aims to support countries' actions to effectively use European human and social capital,

while also consolidating the principle of lifelong learning principle by combining formal, non-formal and informal learning across education, training and working with youth;
– the European Solidarity Corpus – enables young people to participate in volunteering or professional development projects (funded under eight EU programs; currently, works are taking place on the regulation that provides uniform framework for action).

The European Union emphasizes the role of non-formal education (learning within courses, training) and informal (learning outside the organized framework, e.g. by developing interests or solving problems in the organization). This type of education is the domain of non-governmental organizations. Naumiuk (2006) indicates that educational role of such organizations is based primarily on giving people the chance to act, which allows them to develop in the manner, at the pace and conditions that suit them best. And as the social theory and practice prove, people can learn and grow throughout their lives through action and experience. Research of Naumiuk (2003) shows that this science concerns both knowledge and skills, as well as shaping character traits and attitudes.

Educational activities of the ProHarmonia Education Center

The ProHarmonia Education Center is one of the non-governmental organizations operating in the local community in the field of non-formal and informal education. The organization was founded in 2005 by a group of young university teachers and students of Kielce universities, who have combined the passion for action for the development of civil society. Currently, most of them no longer have contact with the university, perform various professions, in various positions, but are still connected to the Center and are socially involved. In the organization, they use competences and skills acquired in their professional work, exchange their experiences and continue to learn from each other, from beneficiaries of projects, from people cooperating in the framework of the undertaken activities. In response to local needs, they undertake various educational activities, complementary to formal education. In ProHarmonia, learning always takes place through practice and action, and the overriding goal of each project is the harmonious development and continuous self-improvement of all participants. People associated in the organization create and run their own programs, thus fulfilling their passions. These are, among others:

"Future Capital" is a series of classes in economic education for children aged 7–10. Participants learn how value is created, where money comes from, what is earning and what is rational spending, responsible consumption and saving. Classes are conducted in the form of fun, which makes the message attractive, activate children and allow interaction with the educator. The basic tool used in the classes are blocks, enriched with electronic components, motion and colour sensors, and engines. They are also used for the production of films promoting broadly understood "economy". Participants playing with the blocks and creating framed animations, in a natural way, with curiosity characteristic for this age, get to know the unknown world of economics and finance.

"Around the world" is a program of intercultural education addressed to children interested in the world. A person who knows a foreign country well and can talk about it takes children on a journey. S/he gives them knowledge about the diversity of the world, shows similarities and differences between life in Poland and abroad, supports them in building an attitude open to the world and people with different skin colours, language, origin, religion, tradition and lifestyle. "Around the world" also includes workshops on global interdependence and fair trade.

"Hala Lata" is a program promoting active leisure time with the family in the open air. People associated in the organization realize their passions including their own children and friends, acquaintances and their children. Together, they travel and learn about new places, cultures and people. They often choose places that are attractive in terms of nature, still a little bit wild, but they do not avoid visiting major cities. Together, they roam, ride bikes and ski, go canoeing, organize games, bonfires and camps with tents. Family tourism, recreation and sport allows them to take care of health and physical condition together, strengthen relationships and deepen mutual relations and shape the qualities and attitudes desirable in social life.

"Fables for **Robots**" are robotics classes, during which participants construct and program robots using special sets of Lego Education WeDo and Lego Mindstorms. First of all, during the classes, the participants have great fun, and in addition they develop interest in science, improve logical thinking, spatial imagination, creativity, and creative problem solving. They create robots in pairs or in three-person teams and learn to organize work, so that each participant had an active part in it, learn the difficult art of reaching compromises and learn to present and argue their arguments, while listening to others.

In addition to their permanent programs, members of ProHarmonia support young people in the implementation of their projects, e.g. youth exchanges, youth initiatives, European Voluntary Service as part of the EU Erasmus + program, and earlier the "Youth" and "Youth in Action" program. ProHarmonia accepts, following European Union's educational programs, that youth are people aged between 13 and 30.

International exchanges of young people are meetings of at least two groups of peers from two different countries in order to implement a joint project. The topic of the meeting can be any, chosen and agreed by the participants themselves based on their interests and passions. In ProHarmonia, the youth realized sports, journalistic, radio, photographic, theatre, ecological, painting, as well as civic society and democracy projects. Activities took place in Poland and abroad. The last completed youth exchanges are the "SeeMe" and "Express Yourself!" projects, both co-financed by the European Union under the Erasmus+ Youth program.

Young enthusiasts of street theatre from Poland, Estonia, Italy, Portugal, Romania, Macedonia and Turkey met at the youth exchange "SeeMe" to jointly prepare and stage a performance that deals with the problem of tolerance, encouraging reflection on the stereotypical perception of others and on the diversity and universal equality of all people. Young artists participated in a series of activities developing the actor's workshop, they worked on the voice and diction, movement expression, body awareness, developed emotional expressiveness, music and sense of rhythm, and

learned the interpretation of the text. The effects of the work could be seen on the streets of Zakopane in September 2015, where they appeared with the message of the need to build in themselves an attitude of openness to others, striving to get to know and understand another person.

The "Express Yourself!" project concerned personal development. Young Poles, Macedonians, Romanians and Portuguese took action to build a sense of self-efficacy, self-esteem and distance to each other. They sought self-acceptance and increased self-confidence. They learned to better manage their time and tasks, learned the techniques of arousing and maintaining internal motivation to act. The youth worked on the development of interpersonal communication skills and assertiveness. It learned techniques of coping with stress and achieving inner peace. During the meeting, young people took part in the photo session for the calendar, which was to be a driving force for them to act in 2017. The background of the session was the Holy Cross Mountains, and the theme – the motivation to act, constant striving for a better understanding of themselves, other people and the surrounding world, striving to become better in the selected fields, crossing their own boundaries and overcoming their weaknesses.

The European Voluntary Service (EVS) was a program that helped young people to develop their sense of solidarity with others through participation, individually or in groups, in social work outside their own country. (In 2018 EVS was replaced by a new initiative of the European Solidarity Corps). ProHarmonia was a coordinating organization, sending and accepting volunteers in this program. One of the projects carried out a workshop in Bolivia, in Cochabamba, two volunteers conducted workshops in management and leadership for local leaders and social activists, classes on European politics and culture for students of the local university and workshops for school youth about cultural diversity. And in Portugal, in Cascais, during the six-week project "The Volunteering Is Calling!" two people from the Association, along with 150 other volunteers from all over Europe, helped organize the World Sailing Championships. They worked, among others, in the accreditation office and press office of a large international event.

National Youth Initiatives were one of the Actions in the "Youth in Action" program. They were directed to those who wanted to change something in the surrounding reality and act pro-socially. The projects were prepared, implemented and coordinated independently by a group of young people with a view of the local community, in which they lived. Acting within the National Youth Initiatives enabled young people to actively participate in the life of the local community, use their ideas, as well as search for their own, independent ways to solve local problems. The center supported young people in the implementation of two projects of National Youth Initiatives within "Youth in action" program, the "Almanac" project and the "Kids with passion" project.

The "Almanac" arose from the questions: How to get involved and start working? What is so great about volunteering? Why is it worth to associate? How to do this? Whom can you join? What youth organizations operate in the Holy Cross province? What do they do? Seeking answers to these questions, the youth conducted research in the environment of youth non-governmental organizations and among

young volunteers operating in the Holy Cross province. Collected materials about undertaken initiatives, on the experience and involvement of the members of the third sector, have been developed by young editors, prepared for printing and published in the form of an "Almanac". In the publication, they promoted peers' activities for other people, described the benefits of social work, especially in the aspect of self-development. The idea of volunteering and association in the associations was also promoted at the "Festival of Non-Governmental Organizations" organized in order to summarize the project. As part of the project, the youth has prepared materials and conducted workshops for pupils – editors of school newsletters.

The "Kids with passion" project was prepared and run by a group of young people consisting of future teachers, educators, culture animators and great Lego enthusiasts. Young people, under the supervision of experienced educators, have gained professional experience in working with children, including children with special educational needs. For young Lego enthusiasts, they organized workshops during which they built fantastic constructions and put them into motion with the use of Lego WeDo sets. They familiarized the children with the technique of the frame animation and helped them prepare films with the Lego City heroes. The participants organized an educational trip for children to Lodz, where in the Museum of Animation SE-MA-FOR they got to know the history of animation and created their own episode of "Flapper&Friends" and took children to the Targi Kielce's International Fair of Plastics and Rubber Processing Plastpol, where they saw how plastic objects are produced.

One of the last projects of the Association was the Transnational Youth Initiative "Open Minds Studio". Transnational Youth Initiatives (TYI) are one of the possible actions co-financed by the Erasmus+ program, Youth, Action 2 Strategic partnerships (The Erasmus+ Programme Guide). These are initiatives for the local community, co-created and implemented by young people in at least two countries.

The "Open Minds Studio" project as an example of the Transnational Youth Initiative

The "Open Minds Studio" project was carried out for 19 months, in 2016–2018. The ProHarmonia Educational Center was the leader of the project, and the Portugal Escola Técnica de Imagem e Comunicação Aplicada (ETIC) from Lisbon was its partner. It was an extension of the mentioned National Youth Initiative "Kids with passion" which was a huge success for the people involved. According to the information obtained from project evaluation questionnaires, developed data from participant observation and interviews with participants of the "Kids with passion" project, thanks to this project, the participants developed a range of personal and social competences, developed their interests, gained faith in their own abilities, felt important to others. The project was also very well received by the children with whom the youth taught classes and highly assessed by the parents and guardians of the children involved. Completing the implementation of this local project, the youth decided to undertake efforts to be included in the international actions and conduct the TYI project, to test themselves in working in the international team, gain new experiences, establish relations with peers from other countries and develop

photographic, IT and pedagogical passions. Young people decided to continue working for children and to carry out activities influencing the development of their personal and social competences, as well as civic competences. It also decided to use the form of work with children established in "Kids with passion" – playing a film studio and producing movies in the frame animation technique. Partnership in the project was proposed to the organization that ProHarmonia met during a study visit – a Portuguese vocational university ETIC, which educates students in arts, including animation and photography, and educates not only at the headquarters of the school, but also in the field, in the activity involving students in projects for the local community and non-profit institutions. ETIC presented a proposal to implement an international project to its students and employees. The initiative gained approval, so an international team was formed, which prepared the concept of the "Open Minds Studio" project and applied for its funding for the Erasmus+ program. After positive evaluation and signing of the contract, the youth proceeded to the implementation of the planned activities.

The creators of the "Open Minds Studio" projects were 20 people, 10 from Poland and 10 from Portugal, aged 18–30, studying in various professions and at different levels (10 vocational school students, 5 high school students, 1 university student), 2 unemployed people and 2 people who performed unsatisfactory jobs below their qualifications and ambitions. The data compiled on the basis of surveys examining the motivations and expectations of participants carried out at the beginning of the project shows that participants were connected mainly by the desire to experience something new, establish international contacts and try their strength at work in an international team (100%). In addition, the participants strongly combined the willingness to work for the local community, in particular children (100%) and common interests (photography, film, animation) that they wanted to develop and share their skills with others (100%). Participants expected that they would gain professional experience that would enable them to get a satisfactory job (90%) or will facilitate their own business (10%). They wanted to check in practice whether the selected course of study is right for them (40%). They assumed that by implementing the project, they would develop competences, in particular civic (100%) and social (90%), initiative and entrepreneurship (80%), communication in English (65%), cultural awareness and expression (65%) and IT competences (20%).

The common goal of international youth activities was to create an Internet platform with materials that can be used in formal and non-formal civic education, as well as to conduct a series of classes according to scenarios developed as part of international cooperation. The youth planned that they would use the game element of a film studio and produce animations referring to active citizenship during classes and organize a film competition for young creators and children will report their animations, and the best ones will be presented at the film festival. The international children's festival of animated films will be organized and conducted simultaneously in both countries and broadcast through the Internet, so that the youngest participants will also experience the international character of the project. The implementation of these goals and assumptions was aided by all activities planned and undertaken later by the participants.

The project began with an organizational meeting in Kielce, Poland, in October 2016, with the so-called international project meeting. In addition to the representatives of the youth, participants of the project, representatives of the organizations involved took part in it. The team polished the details on project management. Meetings of the international team for management, monitoring and evaluation took place two more times. The next one, in June 2017, was used to evaluate the existing activities and to arrange details of work organization in the next stage. The last international project meeting was organized in September 2017, in Lisbon, to summarize and evaluate the project and to specify cooperation plans within the framework of the partnership aimed at developing innovative education methods in the field of social entrepreneurship in the area of creative industry.

In the first weeks, the youth worked mainly in two groups, separately in Poland and Portugal. Leaders have emerged, participants divided the responsibilities and duties among themselves regarding the performance of individual tasks. Young people took part in project management classes run by practitioners from non-governmental organizations and from the world of business. Once they had gained basic knowledge about managing the international project, the participants organized an online meeting of the entire Open Minds Studio team and commenced joint activities. First, they took part in classes in the field of civic education, which raised topics related to common European values. The cycle of classes conducted in a separate Polish and Portuguese group ended with a joint webinar.

Then, the participants set about creating an educational platform. They searched the Internet resources of Polish and Portuguese institutions in search of interesting proposals in the field of civic education for ten-year-olds. In the "moodle" platform, they established the "Open Minds Platform" and placed links to selected websites with educational materials and project descriptions that have been implemented with children recently. Currently, the platform is open to educators providing classes in civic education, seeking inspiration and materials for didactic work. The platform is a place of information about available materials, implemented projects, a place where educators can place their materials and exchange experience.

After gaining additional knowledge about civic activity and after getting acquainted with good, educational practices of other institutions, the youth started working on their own scenarios of activities for children. The scenarios covered such topics as: active citizenship, attitudes and actions of a responsible citizen, including solidarity, freedom, human rights, equality and globalization.

When working on the platform and creating scenarios, the youth remained in constant contact thanks to social media. When concluding this stage of the project, the participants met for the first time within the so-called mixed mobility of young people. The meeting took place in April 2017 in Łódź, Poland. The choice of the place was dictated by the film traditions of this city and the studios and the SE-MA-FOR Animation Museum that provided the opportunity to organize professional workshops in the creation of animation films. In Łódź, the youth worked in a professional studio under the guidance of professional animators. The participants were already interested in animation before and had some experience in film making, they improved their skills in Łódź, which affected the development of their

passions and talents, as well as the quality of their later work with children. During this meeting, the youth also participated in activities in the field of intercultural education and European citizenship conducted in Łódź institutions of culture. During the meeting, the youth conducted classes for the first time according to the scenarios they prepared themselves. Members of the project team were both the lecturers and the participants of the classes. As a result of activities, the youth refined some elements of the classes. The meeting and all classes were conducted in English. After the actions, young people translated the scenarios into Polish and Portuguese and conducted pilot classes with children. They exchanged experiences during the Internet conference.

In June 2017, in Lisbon, Portugal, the second international meeting of the youth related to learning took place. During this meeting, the youth participated in the training course to improve their competences before conducting classes with children. Participants developed verbal and non-verbal communication skills, recognizing and communicating emotions, learned persuasive strategies and techniques, practiced assertiveness, learned the secrets of the group process and discovered their own style of working with the group.

From July to December 2017, young people conducted classes in their countries in non-formal and formal education institutions. 250 children aged 8–10 took part in the classes. The classes in the "Open Minds Studio" consisted in the preparation of a stop motion animation film. During the classes, the participants learned the history of the animated film, the basics of its creation, they learned how to build a script, what a storyboard is, they made the scenography and characters themselves, and later animated the story they invented. They used various techniques, for example, animation made of blocks, cut-out and using modeling clay. Thanks to animation, they discovered new possibilities of expressing their own creative interior, developed their imagination and had a great time at the same time. The subjects of all film stories prepared in the "Open Minds Studio" concerned values that are the foundation of the democratic system. They were inspired by the classes on freedom, solidarity, human rights, equality and globalization, which were conducted on the basis of the scripts written as part of the "ABC of Democracy" project. "Open Minds Studio" was a creative space, so each meeting was different, the final shape was given by the leaders and creatively involved participants.

The youth prepared and conducted a competition for children for film animations "ABC of Democracy". The best productions were watched by the participants, along with the invited guests, during the festival organized during the project – "Open Minds Festival 2018". The event was broadcast via the Internet, so beneficiaries from Poland and Portugal could participate in it. In February 2018, the last direct meetings of the youth took place, at the same time, with two participants from Poland and from Portugal went to the partner to co-run the Festival and meet with children in class.

The works in "Open Minds Studio" were directed by young coordinators, one in Poland and in Portugal, and they were supported by an international team for project management. Their work was complemented by a team for monitoring and evaluation, which collected and analysed information on an ongoing basis for efficient management and assessed the quality and efficiency of operations. Monitoring and

evaluation were carried out at the national and international level. The team acted on the basis of prepared procedures, according to a set schedule, using a variety of tools. (The description of the monitoring and whole evaluation process is not the subject of this article). Both teams has young people supported by experienced representatives of the involved institutions.

During more than one and a half years of work, the youth completed all objectives set at the stage of project preparation, both those related to products (platform, scenarios, classes, competition, festival), and those relating to the development of their key competences (Recommendation of the European Parliament and of the Council of December 18, 2006 on key competences for lifelong learning (2006/962/EC)).

Evaluation of the entrepreneurial attitude of the participants of the "Open Minds Studio" project

The development of entrepreneurial abilities of European citizens and organizations is one of the key objectives of the EU and Member State policy. In 2006, the European Commission recognized the "initiative and entrepreneurship" as one of the eight key competences necessary for a knowledge-based society (Recommendation of the Council of May 22, 2018 on key competences for lifelong learning (2018/C189/01)). Due to the rapid and profound changes in society and the economy, and taking into account lessons learned from the discussion on the future of work at a time of increasing automation and the role of technology and public consultations, the Commission updated the recommendations on key competences, including entrepreneurship (EntreComp: The Entrepreneurship Competence Framework, JRC Science Hub, 2016) and adopted the "The Entrepreneurship Competence Framework" (EntreComp: The Entrepreneurship…).

Entrepreneurship is a cross-sectional competence, it applies to all spheres of life. It enables citizens the constant personal and social development, facilitates entering the labour market, either as an employee or as a self-employed person and allows them to undertake cultural, social or commercial activities. Entrepreneurial competences include the ability to use opportunities and ideas and transform them into value for others. Entrepreneurship is based on creativity, critical thinking and problem solving, initiative taking, perseverance and the ability to work together to plan and projects that have cultural, social or financial value (EntreComp: The Entrepreneurship…).

The author conducted the qualitative evaluation of the development of the entrepreneurial attitude of the participants based on data collected on an ongoing basis during the implementation of project activities in the form of surveys and individual participant observation cards and interviews conducted with six participants after completion of activities.

The conducted research shows that the participants, when joining the project, demonstrated an entrepreneurial attitude on the intermediate and advanced level, depending on the area and individual component competences. The intermediate level means that the participants were at the stage of building their own

independence, took action on their own responsibility and together with their peers took responsibility for it. Yong people have discovered and used the opportunity to develop themselves through activities in the Erasmus+ program. They created the project and included their peers in action. While working on the concept of the project, young people analysed the ideas in terms of their purposefulness. They decided to put in a lot of effort to create values for others while implementing their own passions. They developed a plan that allowed them to achieve their goals.

During the implementation, the average participant took actions and demonstrated an attitude a tan advanced level of entrepreneurship, that is, he assumed responsibility for the created value that was used to describe products and results in the project. Each participant took an individual part in it and achieved individual effects. Everyone has developed an entrepreneurial attitude, but to a different degree and in different compositional competences. As a group, they transformed their ideas into ready-made solutions, making a number of strategic decisions to make the most of the participation in the project. The participants built an international team of people with different skills and complementary competences. They were able to show their strengths in action and further develop them, e.g. coaching, organizational and communication skills. Young people were able to plan the costs necessary for the implementation of individual stages, and later carried out the adopted budget (e.g. as part of the mixed mobility of young people). Participants included others in the creation of products (e.g. they were able to involve teachers to co-run classes for children). Young people were able to adapt their plans to changing circumstances. They estimated that there is a high risk of failure of the Festival, when cooperation in its performance is based solely on communication via the Internet, so they changed the date and the program of the last mobility, to watch over the course of the event on the spot.

The development of the entrepreneurial attitude of the youth implementing "Open Minds Studio" was influenced by their initial attitude, previously shaped by life experiences, family, school and out-of-school environments, including the activities in the ProHarmonia Educational Center. The development depended primarily on self-awareness and participation of the youth in the process, and the role of the involved institutions was supportive.

Summary

The conducted research and direct experience of the ProHarmonia Educational Center show that Transnational Youth Initiatives in the Erasmus+ program are an effective route leading to the development of participants, but at the same time very demanding, both for young people and for the organizations involved. They are suitable for young people who already have experience in working for the benefit of the local community, e.g. the work in non-profit governmental organizations, undertake cooperation with non-profit institutions in the form of volunteering or voluntarily engage in school initiatives for its environment. If it did not undertake such activities in the past, it shows a very open attitude towards new experiences and has strong relationships with someone who already works and joins the project. The

strong interpersonal relationships that give the effect of inclusions into action are the easiest to gain in peer environment, but the inclusion can also take place through the direct contact of an experienced employee of the institution (without age limits) with the youth. In this case, the position of this person in the youth environment is important. It is crucial that it is a person perceived by young people as open to them and their needs, charismatic and acting with passion.

Because the project is created on the basis of common interests of the participants, so young people who want to create an initiative, already have their own hobby, want to develop it and share it with others. Therefore, it is necessary to create conditions for children and young people to discover talents, search for and develop interests, and this should be a task not only of the family home, but also of the school and its surroundings.

Young people get involved in the activities of the organization, which they know from previous cooperation or which is recognizable and well perceived in the youth environment and offers young people institutional and personnel support at a high level. Such an organization has a network of contacts with environmental institutions, thanks to which young people receive additional support during the implementation of tasks, e.g. substantive help in conducting classes, promotion of activities, access to infrastructure. It conducts activities in a cross-sector partnership and uses the experiences of other entities. It maintains contacts with organizations abroad and helps to choose a trusted partner suitable for a given group of young people. The organization involves a person whose task is to support young people in the implementation of their project. This person assumes responsibility for providing help from the moment the idea for the initiative is created, through looking for a partner, preparation of the application, implementation of activities, to the report and the final evaluation of the activities. Such a person is characterized by high personal and social competences and constantly strives to acquire knowledge and self-development. He has extensive experience in working with non-formal education methods and is able to apply them in the implementation of various topics. This skill can be gained, e.g. by carrying out local activities and shorter international projects, such as youth exchanges, which gather a few partners and give the opportunity to see them in action and learn from them. He can also benefit from the support offered by the Erasmus+ program, i.e. take part in thematic webinars, foreign trainings, and study visits dedicated to youth workers. A person supporting young people can find the necessary information in the "Erasmus+ Program Guide" and knows the formal requirements and procedures related to Action 2 of the Strategic Partnership. He has experience in project management, including the international project, even as a partner. International experience can also be gained by implementing less complex undertakings, e.g. trainings, study visits or the already mentioned international exchanges of young people. Of course, there is no need for one person to have all this knowledge and all the above-mentioned skills. The organization can build a team in which people complement each other with the desired knowledge and skills and pass them on to young people.

Transnational Youth Initiatives Action should be available for as many young people as possible, especially for those with lower competences, at risk of social

marginalization. Their participation will be possible if they advance the need for self-development earlier. They can be supported by the school which is a basic educational environment as well as specialized non-governmental organizations.

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"Transnational Youth Initiatives" of the Erasmus+ program for the development of the entrepreneurial attitude of young people, based on the example of the "Open Minds Studio" project

Abstract

The paper presents the idea and objectives of the youth policy of the European Union and one of the instruments of its implementation, namely Erasmus + Transnational Youth Initiatives. The main aim of the article is to present the effects of developing the entrepreneurial attitude of the "Open Minds Studio" project participants. The results of the implemented initiative show that such initiatives are an effective form of non-formal education and can be applied in various areas of youth activities depending on its needs and expectations.

Key words: youth, youth initiatives, entrepreneurship, non-formal education, non-governmental organizations

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The televisual framing of organ transplantations in France, from the 1960s to the 1980s

Introduction

Since the first successful organ transplants in humans, television has represented a means of making public and popularizing a surgical operation that is not self-evident in scientific terms or in terms of social acceptance. This is especially true for heart transplants, which were by far the most publicized operations in the 1960s and 1970s. Also, in a 1968 news programme, the American Norman Shumway, the main competitor of the South African Christian Barnard in the race for the first cardiac transplantation, argued that the increase of the number of voluntary donors "will be one of the beneficial effects of the total coverage of this event [the first heart transplant] by the press and television" (Schiller, Désiré 1968). From this period onwards, the construction of the TV discourse on organ transplantation has resulted from interactions between doctors, journalists and institutions. Television first contributed to the recognition of a practice that broke certain taboos. Then, it helped gain public support by establishing a virtual link between the public and the field of transplantation. Doing so, television has constructed narratives or stories depicting social images of a sophisticated medicine, of functioning and dysfunctional bodies, of life and death, and of solidarity.

As part of this positive relationship between television and organ transplants, the French case is peculiar. Although the links between the media and organ transplantation were quite strong in other countries, they were not necessarily going in favour of the practice of transplantation. For instance, Nathoo (2009) analyzed the early interaction between the media and the heart transplant field in Britain in the 1960s. The press and the television quickly took over the field, but they painted quite a negative picture of heart transplant through destructive reporting on transplant failures and premature death of patients. This breach in the media's handling of transplant surgery culminated in the BBC TV programme "Tomorrow's World" on February 2, 1968, when Christiaan Barnard, author of the first successful heart transplant, had to "face his critics".[1] According to Nathoo, this publicization

1 This TV show was entitled "Barnard faces his critics". The criticism not only drew on emotions, but also concerned medical and political aspects: it insisted, for instance, on the fact that the first South African donors were black whilst the recipients were white.

of criticism about Barnard was decisive in stopping heart transplant in Britain for a decade, the technology being considered unsuccessful.

Inversely, in France, television fully supported organ transplantation since the late 1960s. Admittedly, discordant voices appeared on the TV screen, particularly with regard to cardiac transplants, for which the survival of patients at one year was at that time far from assured. Nonetheless, the operation appeared as a success story of medicine, and the actors of the transplant (surgeon, patient, families) were presented as true heroes.[2] Furthermore, it appears that, at least in France, the core of the graft narrative produced by television was peculiarly stable over time: it focused on the operation and on its positive consequences, on the talented and human surgeon, and on the grateful recovered patient.

This persistence of a positive narrative staging heroic characters is intriguing and needs further investigation. This paper intends to show how this narrative has been constructed through time in France and how contextual element may have affected it. We will examine the premises and the founding elements of the graft narrative in French TV. First, we will describe the four periods of graft represented on screen in France. Second, we will focus on the "actors" of this story, the surgeon, the patient, the donor and later the organs, and discuss the part they played in the construction of a public image of organ transplantation. Finally, we will show how stable these elements are, but also how their staging has been adapted according to the televisual, institutional and sociological changing contexts. For this part, we will focus on the televisual shaping of transplant from the 1960s up to the 1980s in France.

Method

To carry out this study, we have viewed documents from the National Audiovisual Institute (*Institut National de l'Audiovisuel* – INA). INA gathers archives from the national radio and TV channels or those having a share of French funding. It provides descriptive notes that generally present a fairly complete description of TV programmes, be they magazine or news programmes. These notes contain information about the status of the programme or of the clip (title, authors, producers), its broadcast (channel, date and time of broadcast) and describe their content through a summary and several key words (called "descriptors"). In a previous search (Chavot, Masseran 2001, 2011), we used the *Mediacorpus* database developed by the INA. We looked at descriptive notes related to three types of programmes: TV news programmes, magazines and fiction. We identified more than 900 TV news clips dedicated to organ transplant over the period 1950–2000, and about 450 videos related to other programmes (television shows, news magazines, TV movies). We viewed about 20% of these productions, selected first by means of core sampling,

2 The French press was not as unanimous on the benefits of heart transplants as French television. For example, after the death of Father Boulogne, who survived 17 months after his heart transplant, the journalist Pierre Rouanet (1969) signed an article in the weekly *Nouvel Observateur* entitled "The damnation of Father Boulogne". There, he described the "physical and mental martyr" that the patient suffered after his graft.

and then in relation to historical and thematic angles. This first approach helped us construct a periodization of graft on screen.

This first work has been supplemented by a more detailed analysis of the 1967–1982 period within the frame of the BodyCapital programme. We made use of the new INA *Mediapro* online database, which includes regional collections and allows watching TV programmes online. We identified 310 descriptive notes related to organ transplants for that period, which we have processed and recoded via the Atlas. TI discourse analysis software. Then, we conducted a double analysis: a quantitative treatment of the frequency of certain angles (first medical, science popularization, sensitisation campaigns, testimonies) and "actors" (human and non-human). Finally, we watched a selection of clips to study the foundation of narrative elements and their evolution according to contextual elements (technological developments, TV evolutions, legal and institutional transformations).

Periodization

Based on our analysis of the INA archives, we propose to distinguish four periods, which take into account changes in the staging of actors and those driven by contextual factors (evolution in medical practices and of television, societal and legal breakthrough, for instance).

The first period is that of the medical advances, culminating with the first heart transplant in December 1967. It is a pioneering period, as much for television, which was becoming more democratic and was "bringing science" into the living room (Nelkin 1987), as for graft surgery, whose long-term success and even social acceptance had not yet been achieved. During this period, television focused on medical achievements and on science heroes. These heroes are the surgeons, but also the organ donors and the few patients who survived the operation. In this case, 1968 was a significant peak in media coverage (Fig. 1). More than a hundred heart transplants were performed worldwide and five in France. Therefore, and from that moment on, transplantation entered the TV agenda (McCombs, Shaw 1972) and a master narrative has gradually taken shape (Chavot, Masseran 2011).

A legal transformation opened the second period. The 1976 Caillavet bill established the principle of presumed consent and of anonymity for organ donation.[3] Then, the television staging insisted on the rational aspect of the graft, presented as a mechanical repair of the body. At this moment, organ transplantation, and in particular kidney transplantation, was presented as a "routine" operation. The surgeon is at the service of medical procedure that is becoming sustainable since the legal-social difficulties (the removal procedures) and the medical ones (the rejection of organs[4]) were about to be resolved. However, over the same period, several dysfunctions were

3 **Bill n°76-1181 of 22 December 1976 on organ removal.**

4 Cyclosporine was experimentally used in organ transplants to reduce the risk of rejection in the late 1970s. Its use, combined with a deeper knowledge of the HLA system, largely contributed to the success of heart transplant: in 1985, 83% of patients survived a year after a heart transplant (Colombo, Ammirati 2011), while only 15% of those grafted in the 20 months period following the first heart transplant survived 6 months.

intensely publicized, especially in the 1980s and 1990s: international trafficking of organs, disrespectful treatment of the donor's body, problems in organ allocation, etc (Campion-Vincent, 1997). These cases were an echo to the scandals that distorted the public image of the biomedical sector, such as the contaminated blood scandal of 1991. Hence, while the "routinization" of transplant was scenarized, malfunctions of the transplantation system were pointed out in the media.

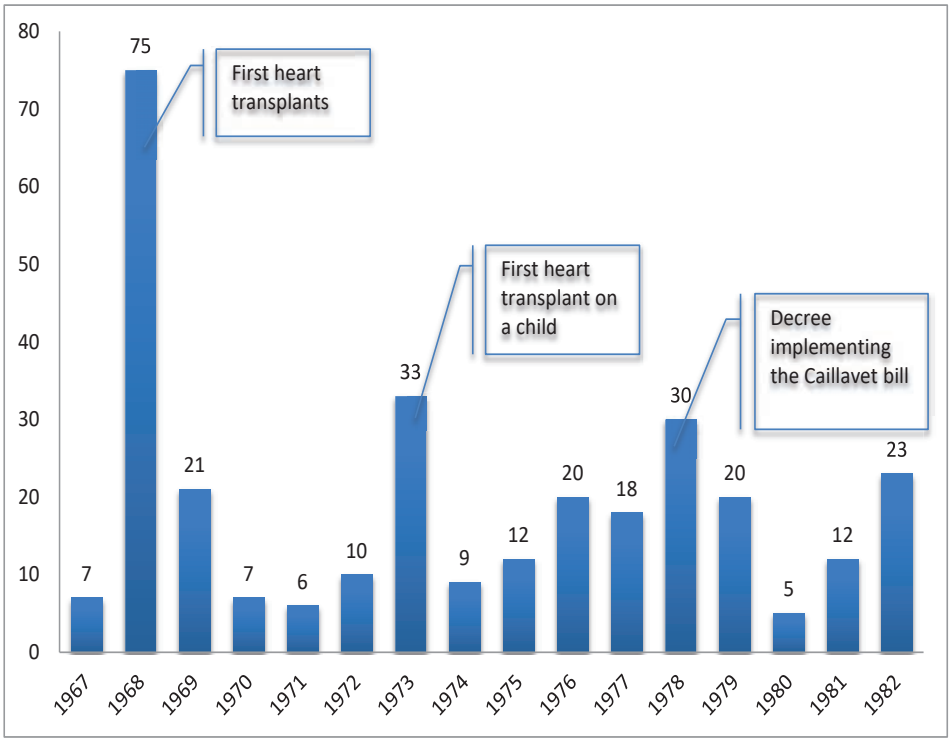


Fig. 1. Number of video clips or programs devoted to organ transplants on the three French TV channels 5, 1967–1982 (n = 310).

The management of these dysfunctions by the State opens the third period. The 1994 bioethics laws[6] provided a new framework for organ removals and transplantation. They recommended, in particular, to collect the testimony of relatives in order to establish what could be the opinion of the brain-dead person regarding organ donation. In addition, they set up a state body, the *Etablissement français des greffes*, to coordinate the activity of transplantations and manage communication to the media and the general public. The challenge was to face the "organs shortage". And as a consequence, most television reports of that period focused on patients waiting for a graft and on the difficulties they faced in daily life.

5 The third French TV channel had been instituted in 1972.

6 **Law no. 94-654 of 29 July 1994** on the donation and use of elements and products of the human body, medically assisted procreation and prenatal diagnosis.

The contemporary period does not really break with the previous one but reinforces its pattern: state commitment was consolidated by the creation of the Agency of Biomedicine in 2005, which manages communication with the media and develops new sensitization campaigns (Masseran, Chavot 2014). However, the first spectacular non-vital transplants – such as face and hand transplants – in the 2000s added new dimensions to transplant stories (Chavot, Masseran 2015).

The way in which TV reports on organ transplantations has not only been affected by the transformation of the medical, legal and ethical contexts. It was, over time, also influenced by the transformations of television techniques, genres and practices. This may change the framing of transplant stories: for example, while the talk shows of the 1970s highlighted the confrontations between experts and laymen, the "television of intimacy" (Mehl 1996) of the 1990s refocused on patients' lives. Finally, it should be noted that all television genres have devoted subjects on transplantation: news programmes, news magazines, talk shows, science popularization broadcasts, fictions, documentaries and debates. The integration of transplantation into these very different genres has favoured its societal integration. In addition, the emergence of digital recording in the 1990s led to a plethora of images being shot. These recordings truly enter the intimacy of patients or of hospital life and have contributed, through significant extracts, to the construction of lifelike stories.

The founding elements of the narrative

The television staging of organ transplants in the 1960s and 1970s was rather one-dimensional, partly because of the historical formation of French TV. Indeed, in the 60s, the French Television Broadcasting (*Radio télévision française* – RTF) offered only two channels, the third channel having been created in 1972. All three were public channels. It was only from the mid-1980s that the number of channels increased significantly. Nonetheless, from that time on, only a few channels – and among them the German-French channel ARTE – provided alternatives to the master narrative on organ transplantation. This narrative includes four elements.

The surgeon and the donor

In the 1960s, television was still a "novelty", a relatively rare object very respected in the household (Jeanneney 2011; Bourdon 2017). At that moment, the media were building the first public significations of organ transplantations. In 1967–1968, French television presented a dozen reports or interviews on the first two cardiac transplants performed by the South African Christiaan Barnard. The staging gives a heroic image of the surgeon. In the report, "The heart: Cape Town – these doctors at the end of the world", broadcasted in the *Panorama* programme in January 1968 (Larriaga 1968), science and humanity come together to form a coherent narrative whose meanings are not negotiable: heart transplantation is not only portrayed as a major medical advance, it is presented as a culturally acceptable approach. Television, as a symbol of modernity and object of desire, reinforces the influence of this narrative.

Several features of this report help ensure the acceptability of transplantation. First, the television staging shows a positive narrative, far from the myth of Frankenstein or certain negative cinema fictions of the time.[7] It is a matter of showing that it is possible to give one's own organs. Thus, this 1968 report begins with the interview of the donor's wife surrounded by her family. She explains the decision she made to give her husband's heart to help another person (Fig. 2).

Fig. 2. Testimony of the donor's wife surrounded by her family (Larriaga G., 1968, *Le cœur: le Cap – ces médecins du bout du monde*, [in:] *Panorama*, 1ère chaîne, 12 January).

Later in the report, Professor Barnard explains to the journalist how he asked the donor's wife:

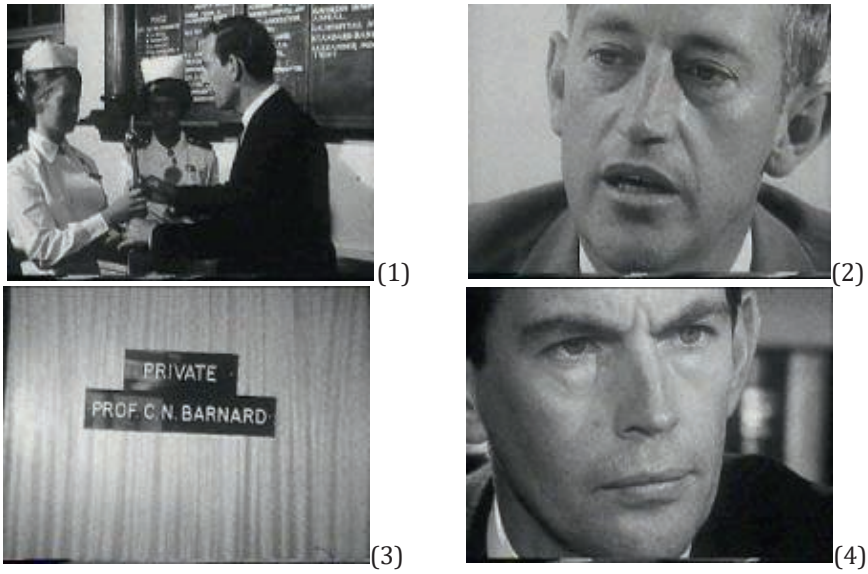
> Barnard: "I have treated the donor as far as I can, I have no more treatment left. And now you could do a service to humanity by donating his heart. I have no more feeling about it, I have done my best for the one patient and now what I want to do is my best for the next patient" (Larriaga 1968).

Hence, in this report, the donor family is involved in the graft narrative just as the hero surgeon. And for some time to go, the donor would systematically be integrated into the television staging, either through the testimonies of his/her relatives or through the filming of his/her burial.

Second, in this report, Professor Barnard appears both as a talented and as a deeply human surgeon. He expresses his talent through surgical techniques, and his humanity through his determination to help and save lives. This point is clearly underlined in his brother's testimony (Fig. 3).

> Barnard's brother: "My brother is a doctor. […] I would say that the only reason for that present success is that he is first of all a doctor, and then a surgeon. For him every patient is something special, somebody that needs him and somebody whose life is in danger" (*Ibid.*).

7 Such as the movies *The hand of Orlac* (Greville 1960), staging a pianist who had been grafted the hands of a recently executed murderer, and *Eyes without a face* (Franju 1960), staging a plastic surgeon determined to perform a face transplant on his daughter.



(1) (2) (3) (4)

Fig. 3. Human and family ties, presentation of Professor Barnard (1,4) by his brother (2) (ibid).

The patient: central actor of the celebration of the transplant success

During this pioneering period, the French cameras particularly scrutinize the life of the patient/recipient: it is the living proof of the necessity and of the success of the transplant. Hence, he/she becomes a public figure, just like the surgeon. For instance, the picture of the first cardiac transplant recipient Washkansky on his hospital bed has appeared around the world, but he died prematurely, eighteen days after the graft. The main indicator of the success of the operation is the health status of the patients: those of French recipients were presented in news programme, either through health bulletins or press conferences. More generally, any indication of the grafted person's return to a normal life would be filmed as a sign of success. And when contact with the patient turned out to be impossible, the journalist asks the nurses about the contents of his/her meals, for instance

In this context, special attention is paid to Dr. Blaiberg, the second of Barnard's patient to be grafted in January 1968. He has been interviewed on his hospital bed a few days after the graft. Later, after leaving the hospital, his residence is taken over by spectators and journalists, to the point that police was requested to protect him from the crowd. However, although the transplant is successful, the patient refuses to play the game of television communication, his wife having signed an exclusive contract with a Hollywood firm.[8] A March 1968 TV documentary (Bernadac 1968) stages all his displacements and comments them, as it would do for a country's

8 This is the explanation given by the journalist when facing the impossibility of interviewing Dr. Blaiberg. Nathoo (2009) largely comments on the war opposing American and British media to make a film of Barnard's second heart transplant.

president (Fig. 4). And the camera can sometimes put on a critical look, taking for instance by surprise his driver and his wife smoking cigarettes on the way to the city.[9] It focuses as well on the difficulties that Blaiberg faced to climb a few steps at the entrance of his building.

Fig. 4. Dr Blaiberg and his wife getting out and back to medical visit in Cape Town (Bernadac C., 1968, *Quelques pas avec Blaiberg*, [in:] *Panorama*, 1ère chaîne, 22 March).

The same narrative line appears in one of the first successful French heart transplant. In the report "Father Boulogne a year after" (Bourget 1969), broadcasted in May 1969, two complementary messages are developed. First, the staging shows an operation whose success seems total. Father Boulogne's body is filmed as proof of the effectiveness of the transplant. It is in this perspective that we can understand the scene during which Father Boulogne climbed stairs (Fig. 5). During the narration of the story, he makes a physical effort without his heart getting tired. The operation works, since the body/heart works:

> "Journalist: Do you climb these stairs often?
> Father Boulogne: No, I don't often have to. But, it's definitely easier now.
> Journalist: You don't find it tiring?
> Father Boulogne: No, I climb them quickly. So, I'm short of breath, but I can't feel the heart. The biggest fears of a heart patient are the stairs. There's always the concern that the slightest effort will give them trouble.
> Journalist: You don't have that worry anymore?
> Father Boulogne: No, I don't. I have another concern though. When I climb stairs with patients who haven't reached this stage yet, it's always a bit embarrassing, you know?" (Bourget 1969).

Secondly, Father Boulogne is presented as a true hero. The report insists on the personal choice he made and his actions to raise awareness about organ donation and transplantation: transplant is part of his life, or more precisely he has put his life at the service of transplantation. He is not reduced to the graft, he has integrated it, he makes it a significant element of his daily life: he is a hero and a witness. However, the

9 At that time in France, medical discourse encouraging the population to limit cardiovascular risk factors (tobacco, alcohol, fat food) is largely relayed by the media.

graft does not leave the body and the soul intact. When Father Boulogne is asked, "If you had to do it all over again, would you?" The patient is cautious or even reluctant:

> Father Boulogne: "Maybe, if I had known how high the price to pay was. I don't know, as a human, what I'd have done. With the grace of God, maybe. But, I can't answer, because, you know, it would be preposterous on my part, to say yes, straight away. I agreed and so it is, I endure it with all my heart. Would I do it all over again? That's something else" (*Ibid.*).

Fig. 5. Stairway scene (Bourget P., 1969, *Le père Boulogne un an après*, [in:] *Panorama*, 1ère chaîne, 8th May).[10]

Fig. 6. Emmanuel Vitria (dressed as a cyclist) involved in a cardiac disease prevention day (Unknown autor, 1977, *Journée nationale de la bicyclette en faveur de la cardiologie à Marseille*, [in:] *Journal télévisé*, 3ème chaîne, 13 June).

Throughout the television story of the transplant, the image of the patient hero would reappear, giving to see an even more perfect picture. Thus, Emmanuel Vitria, who lived nearly 19 years after his 1968 heart transplant, was regularly staged in news programmes as having a "happy" life that seemed to be of a "miracle", as some journalists put it. As a mark of gratitude for medicine, Vitria get deeply involved in sensitization campaigns for blood donation and the prevention of cardiovascular disease (Fig. 6).[11]

10 A first report broadcasted in 1968 stages the stairs climbing in the same way, but without comments from father Boulogne.

11 Emmanuel Vitria appears in 53 documents out of the 310 listed over the period of 1967–1982, i.e. one out of six documents.

If heart transplant is still a delicate operation and post graft rejection is far from being completely controlled,[12] this ordeal is however rewarded by post-transplant life.

The diagram below (Fig. 7) summarizes and traces the evolution of the surgeon-patient-donor triptych. We note that the two curves "surgeon/doctor" and "patient/recipient" evolve the same way, according to the progress of medicine and of legal transformations. However, the "donor" disappears from TV staging after the application decree of the Caillavet law on presumed consent in 1978.

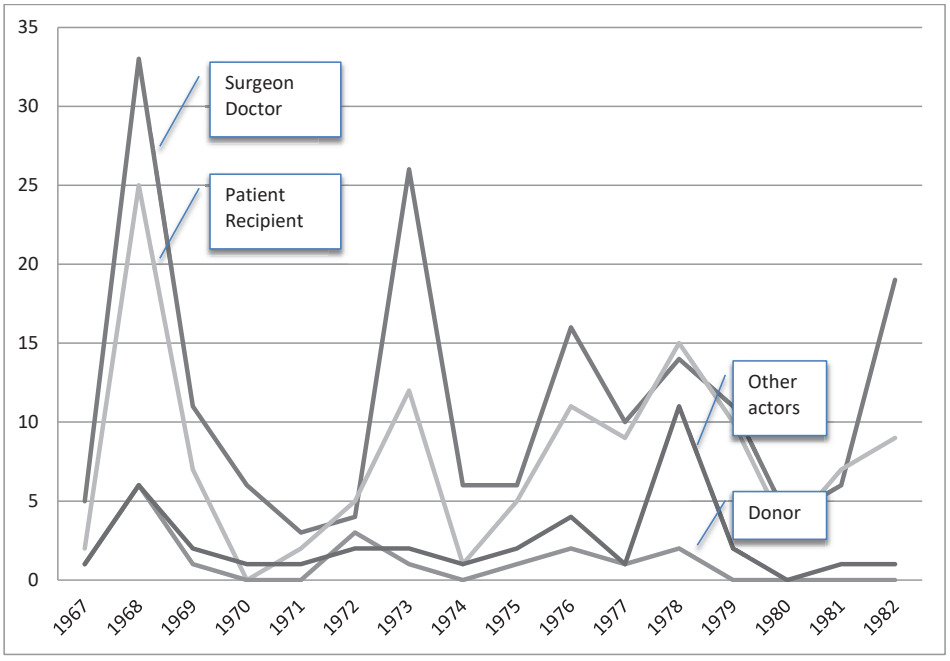


Fig. 7. Number of mentions of transplantation actors per year in INA descriptive notices (1967–1982).

The organ – the link between the donor and the recipient

The doctor-donor-patient triptych dominates television staging until the mid-1970s. In this context, transplantation appears as a human story resulting from the commitment of extraordinary individuals. Accordingly, images of the operation or of the organ to be grafted are seldom presented. Everything goes as if transplantation should stay a human story and as if television has to avoid pictures that could lead to a social "rejection" of transplantation. Hence, the few images of surgery that are shown are those of experimental works on dogs, animals on which doctors often practiced before proceeding to human transplants (Fig. 8).

12 In the 1970s, several French hospitals stopped doing heart transplants due to repeated failures. But others continued. This is an important difference between the French case and the British case

Fig. 8. Heart transplant on a dog (Bourget P., 1967, *Washkansky n'est pas mort pour rien*, [in:] *Panorama*, 1ère chaîne, 22 December)

A radical change in television staging occurs in the mid-1970s. At that time, human transplant is more and more practised, especially kidney transplant. Near to 300 kidney operations were practiced per year, but a thousand could potentially be achieved. The main obstacle for these grafts was family reluctance to organ removal. A bill voted in 1976, the Caillavet bill, intends to set aside the family testimony by instituting the principle of presumed consent: according to this bill, any person who does not oppose to organ donation during his life becomes a potential donor. The application decree of the law would be signed 15 months later, in April 1978. Interviewed during a retrospective programme in June 2000, Senator Caillavet underlines the idea that laws must accompany progress and help science bypass supposedly irrational misgivings:

> Henri Caillavet: "I said simply: because when in a conscious state, a person does not say that it does not want to give their organs, for that very reason, it is supposed, presumed, organ carrier, therefore organ donor. […] Who is silent consents" (Cros 2000).

On November 20, 1976, the day after the first Senate vote of the Caillavet bill, a 6-minutes report on organ transplants (Cornet 1976) is presented in a news programme. It focuses on the organ and on the surgical operation. The report shows a set of shots of a waiting aircraft, the rapid intervention force in action, the cool box protecting the organ, the surgeons ready to proceed and, finally, the grafting of the patient (Fig. 9). The staging is spectacular and accentuates the urgent nature of the organ transport and of the transplant. The message is clear: organ donation makes transplantation possible and the whole of society stands with organ transplant.

This staging is the prototype of a transplant story that would last until the 2000s. In this story, families or relatives of brain-dead donors do not appear on the screen.[13] Indeed, the Caillavet law establishes the free and anonymous donation and, consequently, the donor or his relatives are out of the TV staging of organ transplantation. From now on, it is the organ that makes the link between the donor and the patient. The 1976 TV report was about kidney surgery, a field where graft shortage is most prevalent. The narrative insists on this shortage, on the dependence of patients upon medical machines, and relies

13 Relatives of the donor would reappear in the late 1980s, when several transplant-related scandals broke out. They are also staged after the adoption of the 1994 bioethics laws, which require the testimony of donor relatives for post mortem removal.

on patient testimonies to encourage organ donation. However, even if kidneys are the most grafted organs, heart remains the chief symbol, the main actor of surgical operations focused on by the camera (Fig. 10). At the end of the 1970s and especially in the 1980s, in numerous reports we see some or all of the following storyline: a surgeon taking the beating organ, placing it in a container with a liquid that stops heart beats; a few shots later, the organ is removed from the container, grafted, and comes back to life in the patient's thoracic cavity.

Fig. 9. The transport of the organ (Cornet F., 1976, *Dossier : les greffes d'organes*, [in:] *Le Journal de 20h*, Antenne 2, 20 November).

This storyline embodies several facets of transplantation. First, the donor's body is no more than a neutralized reservoir. Second, the heart holds life, it stays in it. Third, surgeon skills and technical perfection appear at the center of the staging. The surgeon seems to be able to give life or to withdraw it. The technique, meanwhile, reminds us that this power draws on science. Thus, a sequence of some pictures based on the organic functioning of the heart could become a real scenario, with a beginning, a middle, an end, and integrating human and non-human actors, a mission, suspense and action. This type of sequence where an inert heart manages to give life to a patient symbolizes the effectiveness of the entire field of transplantation. That sort of staging would be recurrent until the 2000s. At the same time, discourses about the possibility of transplantation tend to spread to all organs, with an increase of reports featuring liver, pancreas, lungs and, later, face transplants (Fig. 10).

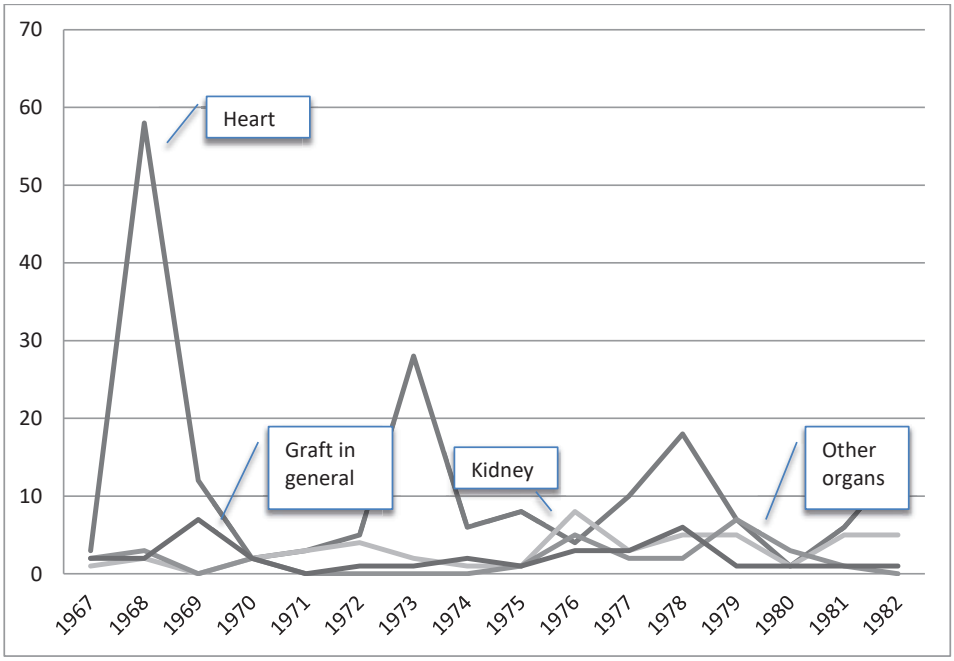


Fig. 10. Number of mention of organs (heart, kidney and others) per year (1967–1982) in INA descriptive records. It can be seen that when the TV reports favoured the heart, kidney transplants disappeared from the TV screen. Moreover, the heart is much more mediatised than kidney.

Concluding part – some evolutions of graft images

The extension of graft to all organs and the increased success of the operation through the use of cyclosporine in the 1980s gradually lead to the construction of standard television scenarios dealing with transplantation. How is the surgeon-patient-organ triptych evolving from the 1980s to the 2000s? The founding elements showed several evolutions depending on the contexts.

The surgeon remains visible through the filming of the operation and of his/her "art" work. He/she embodies the transplantation. However, in the 1980s, the transplanter's humanity becomes secondary, it appears as a disembodied actor. It gives way to the television fascination for technical mastery. The adoption of bioethical laws in 1994 required doctors to collect the family's testimony prior to any organ removal. This legal evolution underlines the reluctance of families towards organ donation. In this context, the part played by television to raise awareness about organ donation is strengthened. Many reports highlight the usefulness and effectiveness of transplantation. They are enriched by new actors (nurses, coordinators). These reports show the work in hospital and insist on the transparency of the system: transplantation becomes a story of solidarity and of teams all engaged in the same effort.

Patients waiting for a transplant are filmed through their dependence to the machines that are keeping them alive. By contrast, the camera follows transplanted people in their new life: the staging of their body demonstrates a perfect functioning. They are sporty persons, hyperactive, numerous shots show their *joie de vivre*. On the other hand, very few televisual reports focus on the constraints associated with the graft, particularly medications and opportunistic cancers. Everything goes as if television would show the body of a grafted person as a "super body", even better than the body of a normal healthy person (Fig. 11).

Fig. 11. Idaline resumes "normal" activity after a heart transplant (Giuliani D., 1996, *Greffe: état d'urgence*, [in:] *Savoir plus santé*, France 2, 16 November).

And, as in the case of Father Boulogne, the patient shows his/her gratitude to the donor in order to better encourage citizens to donate, such as Idaline, interviewed in November 1996.

> Idaline: "The first time I did sport, I got up at once, I heard my heart beat, normally, without a breathlessness. Uh, oh really I was very moved, I shed a tear, I thought it's not possible, I rediscover a normal life, it is great. [...] It's nice to be able to give your organs so that someone can continue to live, I really thank, really, people who say yes. That's why I'm here." (Giuliani 1996).

In contrast, testimonies from people who refused organ removal from a close family member that had just passed away are publicized, but to a much lesser degree than other patients. These people express regret and feel guilty, a staging that reinforces the strength of the calls for organ donation. Thus, the televisual narrative

of transplantation imposes once again a normalization of solidarity between organ donors and recipients.

This analysis of the evolution of the constituent elements of transplant stories highlights the robustness of the TV narrative on transplantation in France on two levels. First, it seems obvious that the TV staging of organ transplants does not propose a mere account of the facts. Everything goes as if this staging would accomplish several missions: to sensitize the population to organ transplantation, to call for organ donation and, *in fine*, to sketch what is a normal behavior (to say yes to organ removal from a relative, for example) and an abnormal behavior (to refuse organ removal). On a second level, this monolithic narrative contains several shortcomings: the constraints weighing on the transplanted people are not well shown (medication, difficulty to get work again, insurance issues), in order to bring to the fore the "beautiful story" of (almost) healing and the patient's gratitude to the doctors and the donor. These two plans come together to anchor a story that is difficult to challenge.

Nonetheless, if we take the pedagogical role of television seriously, since it tends to be sensitizing people to organ transplant and donation, one must ask if this unified narrative does not overshadow other lived realities, and if this narrative is really convincing for all. Indeed, in France, and for twenty five years, whatever the efforts undertaken, a third of the relatives of a brain-dead person still refuses organ removal (Assemblée Nationale 2017). Also, one may wonder about the part that less positive stories may play in the construction of the social imagery of organ transplantation, i.e. the "stories" of many patients who do not play by the TV communication approach and of those who refuse organ donation.

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The televisual framing of organ transplantations in France, from the 1960s to the 1980s

Abstract

Since the first successful human organ transplants of the late 1960s, television in France has represented a means of publicizing and then popularizing a surgical operation that is not self-evident in scientific terms or in terms of social acceptance. This paper intends to show how the televisual narrative on organ transplant in France has been constructed through time and how contextual elements may have affected it in the 1960s up to the 1980s. It describes the four periods that organ transplant went through on screen. It then focuses on the main "actors" of the French televisual narrative: the surgeon, the patient, the donor and, later on, the organs, and the part they played in the construction of a public image of organ transplantation. The conclusion shows that these elements are stable over time and underlines the shortcomings of this televisual narrative. The research is part of the ERC programme "The healthy self as body capital: Individuals, market-based societies and body politic in visual twentieth century Europe" (https://bodycapital.unistra.fr/), and is based on an analysis of the archives of the *Institut national de l'audiovisuel* (INA).

Key words: television studies, science popularization, organ transplantation, France, heart transplant

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Active interdisciplinary research training context for developing innovative competence in chemistry

Introduction

Research training implementation requires the development of effective mechanisms that would allow the evolution from knowledge to experiment and from research to innovation. It depends on the teaching staff mastery at what stage and how to develop the research competence in school/university subjects. To develop successfully the research competence at the university level it would be desirable to train pupils with investigative activities at the school one. In the Republic of Moldova the subject of Chemistry at pre-university level is taught in the 7th-12th grades with a total volume of 442 academic hours of direct contact for the real profile. Only 36 hours (8.14%) of these are reproductive experimental activities which aim to consolidate the theoretical knowledge. Experimental activities of creative and scientific nature are not stipulated in the Curriculum. This situation leads to the excessive matter theorization in Chemistry and the lack of necessary evidence of the practical usefulness of the taught knowledge can create the impression of an unnecessary subject which diminishes the training level of young people to solve real situations in their daily life.

One of the ways to increase the attractiveness of Chemistry is to use the knowledge to solve specific situations of daily life. This field is characterized by an interdisciplinary approach because the phenomena in nature are subordinated to the laws of Physics, Chemistry, Biology, etc. A field in dynamic development is the use of IT in the training process [1–3]. The realization of the studies at the interdisciplinary boundaries highlights the most interesting phenomena and matter properties possible to be used in the elaboration of new technologies with higher characteristics than the existing ones.

Interdisciplinary studies are also valuable by involving research and interpretation methods from various fields, by using new technologies in new conditions and adapting them to specific requirements. As the energy status of molecular systems is of great importance for the proper development of chemical reactions, the use of quantum calculations proves to be a good exercise for determining the process likelihood and an efficient method for developing interdisciplinary research competence.

One of the interdisciplinary domains of Chemistry is Coordinating Chemistry, which allows the complexation of the inorganic and organic components generating new molecules with properties different from the initial substances. From the point of view of the practical applicability of the transition metal oximates, several directions are clearly emerging where the representatives of this class can be successfully used: the elaboration of artificial models of some vital biological molecules; development of biotechnologies for the targeted synthesis of microbial enzymes with wide use in various branches of the food, pharmaceutical and medicine industries; synthesis of materials with valuable physical properties (semiconductors, photo luminescent, dielectric, anticorrosive materials); obtaining systems used in hydrogen production, etc. [4-8]. One of the important tasks of the contemporary didactic methodology is to identify the links between education and research to create premises for implementing the research results in teaching and involving young people in the research process. A good solution would be to implement in the training process the methods that can be applied in both areas. The use of quantum calculations to determine the energy of some chemical systems and the process likelihood is a valuable element in motivating young people for training and research in Chemistry. The didactic method of studying molecules and phenomena within the school/university course as well as the use of more complicated study methods can be based on the use of several programs, one of them being GAMESS that contains different computation methods starting with those of molecular dynamics and mechanics, semicircular methods, *ab initio* methods based on Hartree-Fock theory, or methods based on functional density theory, and can be used to compute a very wide range of molecular properties [9].

The acquisition of quantum-chemical methods creates prerequisites for autonomous training, formation of a personalized style of thinking, and elaboration of some special solutions in a problem situation. Using the computer-based quantum-chemical methods we obtain an efficient and attractive interdisciplinary model: molecule/phenomenon – information technology support – quantum-chemical studies - motivation for training and development of specific skills in Chemistry and Computer Science.

Methods and materials

The new coordination compounds (complexes) were synthesized as a result of the interaction of inorganic salts with organic ligands in solutions with temperature and agitation according to the method [10]. The composition and structure of the coordination compounds were determined on the bases of elemental analysis, IR spectroscopy and X-ray diffraction [10]. Elemental analyses were performed on an Elementar Analysensysteme GmbH Vario El III elemental analyzer. The IR spectra were obtained in Vaselin on a FT IR Spectrum-100 Perkin Elmer spectrometer in the range of 400-4000 cm^{-1}. The crystalline structure of the coordination compounds was determined on the diffractometer Xcalibur CCD “Oxford Diffraction”.

For quantum-chemical calculations it was used the GAMESS computational program [9] containing a modern software package to state the electronic structure of the molecules to be studied. This program is used to investigate the structural

properties and those determined by the electronic structure of molecules or complex molecular systems.

The electron structure and geometry of the ligand molecules in the respective nuclear configurations were modelled and optimized *ab initio* using the SCF method in the ROHF approximation using the 6-31G basis for atomic functions [11]. The quantum chemical parameters such as *EHOMO* (energy of the highest occupied molecular orbital), E_{LUMO} (energy of lowest unoccupied molecular orbital), ΔE (energy gap) and Mulliken charges were calculated and discussed.

As models, there were used molecules of zinc coordinate compounds based on 2-pyridinaldoxime and other auxiliary ligands. Both the energy status of some chemical systems and the energy profile of some intermediate reactions have been studied. There have been analyzed the coordination compounds $[Zn(CH_3COO)_2(paoH)_2]$ (**1**), $[Zn(paoH)_2(DMSO)_2][BF_4]_2$ (**2**), $[Zn(NCS)_2(paoH)_2]$ (**3**), where paoH is 2-pyridinaldoxime and DMSO is dimethylsulfoxide.

Results and discussions

In order to elaborate an efficient model of innovation competence development, it was analyzed the study mechanism of coordinating, i. e. composition, structure, energy status and biological properties to follow the path from simple chemical substances to complex molecules with various useful properties. An important objective was to use quantum-chemical calculations to study the energy state of the system, to develop the pupils and students' ability to use tools based on experimental and theoretical physico-chemical methods to modify the molecular design of the final substances and to forecast their properties and practical scope. These qualities would allow the development of the *Chemical Engineering* field with specialization in *the development of new materials with predicted properties*.

Coordination compounds differ in the wide spectrum of shown properties and zinc as a bio-element can confer biological properties to these complex molecules. In addition, the inclusion of organic molecules can enhance the action of these coordinating compounds on the physiological processes in different organisms. Both zinc, as a metal generating coordination compounds, and the used ligands offer broad diversification possibilities for the molecular composition and design of new compounds allowing the evolution from mononuclear complexes to coordination polymers with different physical, chemical and biological properties [12–15]. Thus, this paper-work purpose has an interdisciplinary character: the synthesis of new coordinative compounds with bio-stimulating properties, the investigation of their influence on some organisms, the study of the energetic state of the molecules and the identification of implementation methods of the results in the training process to develop the competence of research, innovation and practical application of scientific results.

As a result of the interaction of zinc salts ($Zn(CH_3COO)_2$ in case **1** or $Zn(BF_4)_2{\cdot}xH_2O$ in case **2** and **3**) with 2-pyridinaldoxime, there were synthesized mononuclear coordination compounds **1–3** (Fig. 1), in which the zinc ion coordinates the oxime ligand chelating bidentately and the other ligands bind monodentaly.

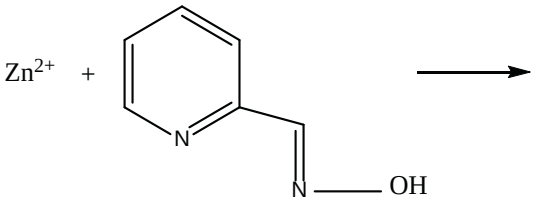


Fig. 1. Scheme of synthesis reactions of coordinative compounds 1-3.

Theoretical results

Geometric structures. The molecular and electronic structure for compounds **1–3** was investigated using *ab initio* calculations in S=0 spin state and C_1 symmetry. The calculations reproduce the almost octahedral symmetry of the metal centre also observed in the decipherment of X-ray structures while the geometric parameters are close to small deviations from the crystallographic data. The stable geometry and geometric parameters of coordinative compounds **1–3** are shown in Figure 2 and Table 1.

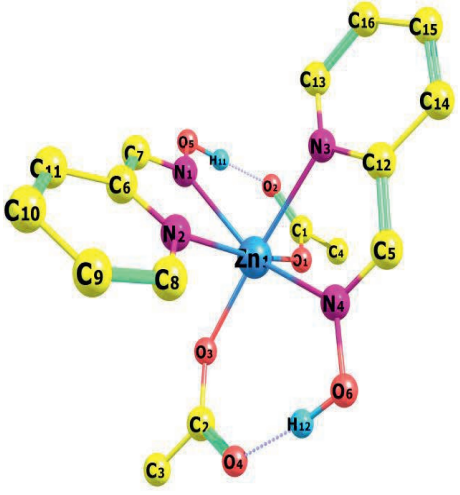
The distance values between the central ion and the O and N atoms through which the ligand is bound in compounds **1–3** are shown in Table 1, where the experimental values are also presented. At the same time, in the table below are shown the values of the total energies for these studied systems.

Table 1. Selected geometric parameters by X-ray and theoretical calculations at HF/6-31 of compounds **1–3** on the basis of paoH (theoretical/experimental [10]).

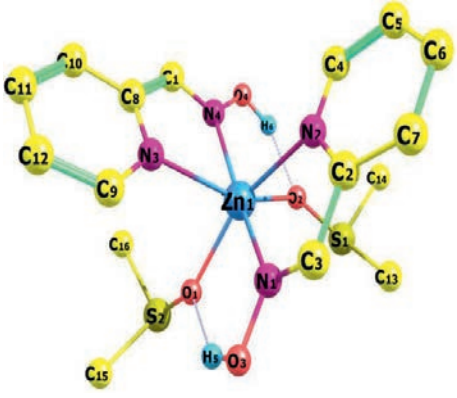
Compound	R(Å), (theoretical/experimental)			Etot (a.u.)
	Zn-Nox (Zn-N1, N4)	Zn-NPy (Zn-N2, N3)	Zn-L	
1	2.27/2.15; 2.16	2.37/2.21; 2.26	1.99/2.04; 2.03 (Zn-O1, O3)	-3060.38
2	2.16/2.12; 2.13	2.30/2.29; 2.17	2.15/2.09; 2.05 (Zn-O1, O2)	-3708.51
3	2.21/2.33	2.38/2.12	2.15/2.05 (Zn-N5, N6)	-3585.62

Analyzing the parameters obtained both experimentally and theoretically, we observe a fairly tight correlation with small deviations. Theoretically, the distances between the central ions and the Zn-N1, Zn-N4 oxime nitrogen atom, Zn-N2, Zn-N3 pyridine nitrogen atom and Zn-L are equal, but for experimental data the bond lengths are slightly (insignificantly) different due to packing the compound in crystal and as a result of different interactions.

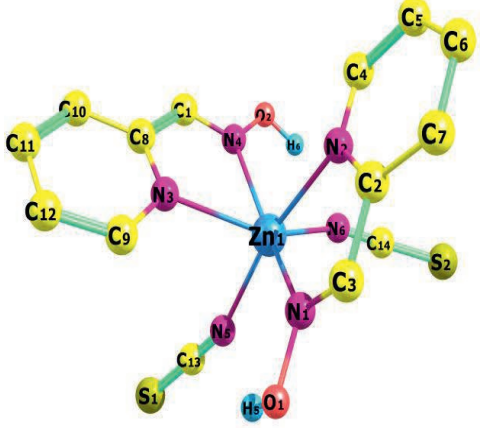
HOMO–LUMO energy gap and related molecular properties. For coordinative compounds **1–3** it was calculated the distribution of electrons on border orbitals HOMO and LUMO and they were presented respectively in Figure 3. The energy values of OM and gap-energy are shown in Table 2. For coordinative compound **1**, HOMO and LUMO are located on 2-pyridinal doxime ligand.



Compound **1**



Compound **2**



Compound **3**

Fig. 2. Molecular structures of coordination compounds 1–3

The study of molecular areas for the two types of molecular orbitals (HOMO and LUMO), Figure 3, shows the contribution of atomic orbitals to their formation. The E_{HOMO} energy value is associated with the ability to donate electrons to a molecule, and respectively with its oxidation tendencies.

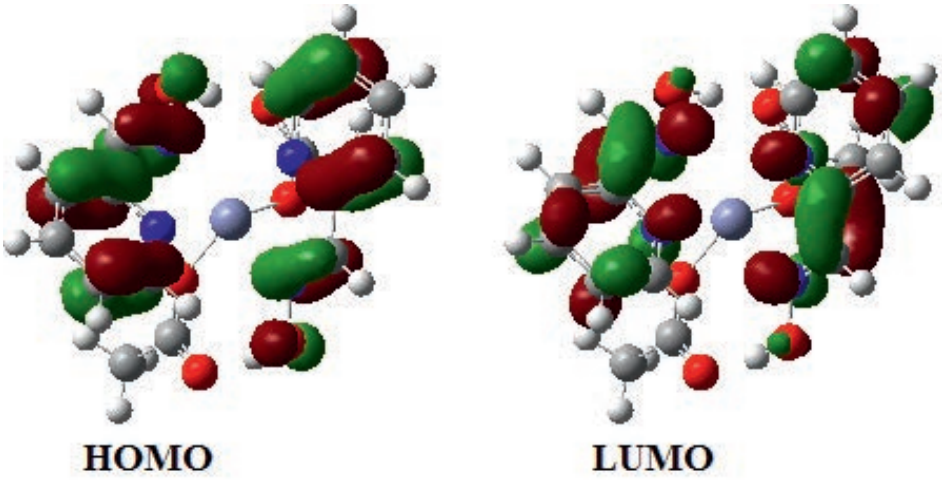


Fig. 3. Schematic representations of HOMO and LUMO molecular orbitals of the studied coordination compound 1 at the 6-31G.

Instead, E_{LUMO} energy value is related to the electron affinity and respectively to its reduction tendencies. The ability to bind the ligand to the central ion (the metal) increases while increasing HOMO energy values. The calculations show that the parameters obtained for compound **1**, the HOMO and LUMO levels are equal to -9.62 eV and 1.53 eV.

The energy difference between HOMO and LUMO levels ($\Delta E = E_{LUMO}-E_{HOMO}$) is also a chemically important molecular descriptor explaining the coordinative compound stability. A low value indicates that the molecule is extremely reactive. From the values presented in the table, the most stable is coordinative compound **1**, having ΔE = 11.15 eV (Table 2).

Table 2. Calculated HOMO and LUMO energies and HOMO-LUMO gap energies in eV calculated at the ab initio level using the 6-31G basis set.

Compound	E_{HOMO}	E_{LUMO}	ΔE
1	-9.62	1.53	11.15
2	-15.11	-4.05	11.06
3	-8.04	0.71	8.75

The obtained results are consistent with similar coordination compounds [16].

The sum and difference of the boundary molecular orbital energies are correlated with the chemical reactivity of the molecules by generic quantum descriptors: absolute electro-negativity (χ), absolute rigidity (η) and softness (σ) Table 3 [17–19]:

$$\chi = -\frac{E_{LUMO} + E_{HOMO}}{2}$$

$$\eta = \frac{I - A}{2} \; and \; \sigma = \frac{1}{\eta}$$

where: I – ionization potential;

A – electronic affinity.

According to Koopman's theorem [20] I and A are the energies of border orbitals as follows:

$$I = -E_{HOMO} \text{and} A = -E_{LUMO}$$

results:

$$\eta = \frac{E_{LUMO} - E_{HOMO}}{2} = \frac{\Delta E}{2}$$

The electron yielding tendency is described by the electro-negativity. Hardness is a measure that describes the opposition of an atomic or molecular system to the electronic density variation in the system.

Another molecular parameter resulted from quantum-chemical calculations is the electrical dipole moment (μ), which reflects the partial separation of the electrical charge into molecules:

$$\mu = \frac{E_{HOMO} + E_{LUMO}}{2}.$$

The dipole moment (μ) is another parameter of electronic distribution in a molecule that can be related to the dipole-dipole interaction of molecules and metal surface. This parameter is a measure of the molecular system polarization.

Using μ and η, it can be calculated the general electrophilicity index (ω) that was introduced by Parr [21]:

$$\omega = \frac{\mu^2}{2\eta}.$$

According to this parameter, electrophilicity index value (ω) measures the chemical species sensitivity of accepting electrons. So, the low values of (ω) suggest a good nucleophile, while higher values indicate the presence of a good electrophile.

Table 3 shows the absolute electronegativity (χ), the absolute rigidity (η), the softness (σ), the dipole moment (μ) and the electrophilicity (ω) for the studied molecules.

Table 3. Absolute electronegativity (χ), absolute rigidity (η), softness (σ), dipole moment (μ) and electrophilicity (ω).

Compound	χ	I	A	H		μ	ω
1	4.05	9.62	-1.53	5.58	0.18	-4.05	1.47
2	9.58	15.11	4.05	5.53	0.18	-9.58	8.30
3	3.67	8.04	-0.71	4.38	0.23	-3.67	1.54

Mulliken atomic charges. The value calculation of Mulliken atomic charge has an important role to play in applying a quantum-chemical study for a molecular system such as the dipole moment effect, molecular polarization, electronic struture, and a multitude of properties of molecular systems. The distribution of the charge on atoms suggests the formation of donor and acceptor pairs involving the transfer of the charge into the molecule. Atomic charge is used to describe processes of electronegativity equalization and charge transfer in chemical reactions. Mulliken atomic charges were calculated for each compound and presented in Table 4.

Table 4. Mulliken atomic charges calculated by HF/6-31G method.

1	2	3
q_{Zn}=1.47	q_{Zn}=1.53	q_{Zn}=1.46
q_{N1}=-0.31	q_{N1}=-0.39	q_{N1}=-0.32
q_{N2}=-0.74	q_{N2}=-0.79	q_{N2}=-0.74
q_{N3}=-0.74	q_{N3}=-0.79	q_{N3}=-0.74
q_{N4}=-0.31	q_{N4}=-0.39	q_{N4}=-0.32
q_{O1}=-0.84	q_{O1}=-0.98	q_{N5}=-0.78
q_{O3}=-0.84	q_{O2}=-0.98	q_{N6}=-0.78

By comparing Mulliken atomic charges on the ligand atoms connecting to the central ion and obtained from the optimized structure, the highest negative value is located on the oxygen and nitrogen atoms connecting to the central ion (Table 4). So, these atoms act as electron donors and in all cases there is an electrostatic attraction between the metal surface and the ligand molecules.

Thus, using the quantum-chemical calculations, three coordinative compounds were optimized. The main descriptors, such as ionization energy (I), electron affinity (A), difference HOMO-LUMO (ΔE), dipole moment (μ), hardness (η) and softness (σ) were derived out from DFT calculations and used to identify differences in the stability and reactivity of the studied compounds. Even if the calculations are performed in the gas phase and the experimental data are for the solid state, where the effect of the crystal field can affect the relative energies and geometric structures, the obtained quantum-chemical modelling calculations have a good correlation with the experimental ones.

Biological properties. As a result of microbiological tests it was found out that compound **1** at concentrations of 5-10 mg/L may be used as a biosynthesis stimulator of ordinary amylase (pH 4.7) by the micromicete *Aspergillus niger* CNMN FD 06 [10]. The introduction of coordinating compound **1** into the cultivation medium stimulates the enzyme genesis processes by 35.63% on day 5 and 33.85% on day 6.

Conclusions

The mechanism of developing innovative competence in Chemistry, along with the acquisition of new compounds useful in various fields, requires the involvement of a complex system based on experimental and theoretical methods. There has been proposed a model for integrating the synthesis of the new compounds and their study by various methods, particularly by quantum-chemical calculations, which can reflect a number of aspects of the energetic state of the molecular systems and allow development prognosis of some processes, the stability of compounds in different environments, the possibility of performing some substitution processes, etc., as well as the determination of some areas of practical utility.

We have described the synthesis and the characterization of zinc compounds (**1**-**3**). Structural data for these compounds revealed that single coordination geometry is favoured, by at least several a.u. Theoretical data, which were in good agreement with the experimental ones, indicated that the preference for creating a single coordination geometry was due to both steric and electronic effects. Quantum chemical calculations have been carried out and there is a good correlation between the quantum chemical calculations and the experimentally obtained results.

The analyzed model can be proposed as a compulsory one to be studied in the Chemistry university programs, as well as optional for the gifted pupils in pre-university education. This mechanism allows a more efficient integration of the Education-Research fields and motivates for conscious and co-interested training developing specific Chemistry and Informatics competencies. On the basis of this methodology differentiated and individualized instruction can be promoted for effective exploitation of the intellectual potential of each pupil/student.

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Active interdisciplinary research training context for developing innovative competence in chemistry

Abstract

The development of motivation mechanisms for training is an important objective of contemporary didactics in the field of exact and nature sciences. Effective integration models of the fields of Education, Research and Practical Application are required in order to involve pupils and students in the study of Chemistry. It is proposed a model which describes the

algorithm from chemical synthesis to the study of composition, structure, energy state and determination of practical application areas. These stages/operations develop specific skills in Chemistry and motivate for fundamental and conscious interdisciplinary training.

Key words: research training, quantum calculations, interdisciplinary study, zinc compounds.

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FORMAL AND NON-FORMAL EDUCATION – NEW ENVIRONMENTS AND CONDITIONS

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Application of the Design of Experiments theory in laboratory classes for future science teachers

In the teaching of chemistry, at all levels of education, the most valuable methods are those in which learning occurrs through discovery (Lazonder, Harmsen 2016; Cheung 2011). Teaching chemistry should be a reflection of the research process and should be based on experiments performed by students (Sandi-Urena et al. 2011; Balim 2009). The Inquiry Based Science Education strategy based on a constructivist research cycle, also assumes, putting research hypotheses, planning experiments and their execution, collecting experimental data, and organizing and verifying them (Ctrnactova, Zamecnikova 2017).

Nevertheless, chemical teaching is dominated by 'chemical exercises' that are only a group of technical activities that lead to a specific effect. Students usually perform chemical exercises based on the diagrams and instructions given to them by the teacher. In Poland, students rarely have the opportunity to independently plan and carry out experiments, which in addition to performing manual activities also requires the experimenter's intellectual preparation and the ability to use the results of the experiment. Therefore, at the Pedagogical University of Cracow, it was decided to introduce a new subject "Designing Chemical Experiments" (DChEx). It is a course designed for science master studies – future teachers of biology and chemistry. The course is the opportunity for learning various aspects of planning scientific research process on the bases of planning chemical experiments. DChEx is the course that requires from students working alone from the beginning to the end. Moreover the course teaches the students how to cope with nonstandard problems and prepares them to solving complex tasks.

Description of the course

The course includes: 10 hours of lectures and 30 hours of laboratory work. The course is supported by materials on the Moodle platform (http://moodle.up.krakow.pl/course/view.php?id=114; password 'Planowanie'). The course is allocated with 2 ECTS points.

The lectures – theoretical part

During the lecture students will become familiar with DOE principles (*Design of Experiments*). DOE is a discipline of mathematical statistics that deals with data collection in a situation where the information obtained is accidental. A well-designed experiment allows us to judge the causal effects of interventions. The Basics of Modern Theory of Experimental Planning was interpreted by Ronald A. Fisher in 'The Design of Experiments' (Fisher 1996).
The main ideas of experiment design are:

- Comparison – In order to assess the effect of the intervention, it is necessary to compare the objects exposed to this intervention and objects exposed to it (the so-called control group).
- Randomization – Selection of units to be observed, exposed to different types of intervention, respectively, will be included in the control group, must be based on probability selection.
- Replication (multiple repeat) allows you to evaluate the random variability of the measured quantities and thus determine the accuracy of the measurements.
- Block design, stratification – The distribution of experimental units into blocks or layers that show similar properties will reduce the impact of variability sources that are not subject to investigation.
- Factorial arrangements – The experiment can examine the effect of several factors (different interventions) at a time, including their synergistic effects.
- Orthogonality – A factorial experiment should be designed to allow an independent assessment of each individual factor.

Laboratories – practical part

In this part of the course students must invent, design and then perform 10 different experiments and after that prepare documentation of those experiments. They basically work individually however they can cooperate, help and advise the rest of the students in the group and teacher. Each student is free to carry out any kind of experiment, however they have to follow some guidelines. Each experiment has to include at least three variable factors (students usually choose: temperature, concentration of reagents, material fragmentation, type of substance) which should be changed five times. This gives us 125 cases to explore! Because it is not feasible to perform them during 3 hours of laboratory classes – students must apply the DOE principles.

Usage of the DOE rules are not the only requirement to pass the course. The student should design his experiments using different techniques of executing the experiments. The individual techniques are described in detail below.

Description particular techniques

The main goal of the course is to teach students how to independently plan chemical experiments and perform independent research. However, each of the aforementioned 10 techniques has its own additional purpose.

The first experiments carried out by students in the laboratory are so-called '**home experiments**'. They are simple experiments that do not require specialized laboratory equipment and reagents are available in the household (for example foodstuffs, cleaning products, medicines, etc.). The aim of these laboratory classes is to familiarize students with the practical application of the DOE theory – in a simple situation known to them from everyday life.

The second laboratory classes are experiments in **SSC** (small scale chemistry) or **MCE** (microscale chemistry experimentation). This method consists in conducting chemical experiments using small amounts of solid substances (several dozen to several hundred mg) and small volumes of liquid (up to approx. 1 cm^3). It is characterized by the fact that during the performance of experiments the used equipment deviates from the standard equipment, techniques known among others from microbiology are used. The aim of these classes is to draw students' attention to environmental protection and remind them of the rules of green chemistry. During these laboratory classes, students change traditional chemical experiments for experiments in SSC or MCE.

Drop (touch) analysis is also a kind of MCE experiments. In this case single drops of test solutions are used, therefore, reactions must be very sensitive. Drop analysis is not performed in tubes but on filter paper and also on laboratory plates, foil or other substrate. The purpose of these exercises is to guide students to the 'drip analysis' technique. And to draw attention to how you can replace the classic chemical reactions in test-tubes with 'drop' reactions. Most often, students use this technique to plan experiments on topics: analysis of cations and anions, pH test, precipitation reactions, paper chromatography.

Experiments under a microscope – the microscope is commonly associated with biology research and the basic application of a microscope in chemistry is the observation of the shape of crystals of chemical compounds (i.e. using it in crystallography). Currently, however, it is increasingly used as one of the MCE methods. In this case, the course of the chemical reaction (and the formation of crystals) is observed directly under the microscope. Students most often perform: reactions of formation of sediments and reactions of metals with salts.

Application of the **overhead projector** or **visualizer** to visualize the course of the reaction, allows you to show chemical reaction for greater number of recipients (e.g. students), without using a macro scale, or allows you to take good quality photos documenting the course of the experiment. In this case, the reactions take place in Petri dishes. The same chemical reaction looks different when we use test tubes or Petri dishes. Although the reaction mechanism is the same, when we use Petri dishes we can also observe physical phenomena (e.g. diffusion). In this case, the students' favorite experiments are the reactions of precipitating the sediments that they call 'jellyfish'. (We pour water into the Petri dish; on the opposite sides of the dish, we add some salt e.g: Na_2CO_3 and $MgSO_4$; observe the nascent sediment – it looks like a jellyfish!)

Experiments in a microwave oven shows students how microwave heating can be used instead of traditional heating with a burner. The use of microwaves affects the acceleration of chemical reactions and has a positive effect on the efficiency of

the reaction. It also change the reaction conditions – e.g. use of diluted acids instead of concentrated ones. This technique allows in many cases to conduct experiments in accordance with the principles of green chemistry. Students use a microwave oven mainly for reactions in the field of organic chemistry, but sometimes they use it for reactions in the field of inorganic chemistry or to perform the so-called **home experiments**. Currently, microwaves are often used in organic synthesis – in this exercise students gain experience in using microwaves in chemistry and prepare for the future work of the researcher.

Experiments with using sensors and probes (we use Vernier sensor). Sensors enable automatic recording of measurements performed during a chemical experiment, therefore students do not have to perform tedious manual measurement registration. Thanks to this, students can focus on the chemical aspects of the process and in the final stage on the interpretation of the results. Nowadays, most researchers use computer sensors, so the ability to apply them to research planning is very important for students. In their research, students use temperature sensors, pH and visible spectrum sensors.

There are two ways to use the **Internet to simulate chemical experiments**. The first is the use of existing on-line laboratories (e.g. http://www.chemcollective.org/vlab/vlab.php, http://www.virtlab.com/, http://www.onlinechemlabs.com/, https://phet.colorado.edu/cs/, https://latenitelabs.com/chemistry/) and proposing simulations of experiments that can be carried out in them. In online laboratories, the selection of reaction substrates and setting the reaction conditions and viewing the animation of the reaction takes very little time. Therefore, the student can perform many online experiments in a short time. The main advantage of online laboratories is that the student on his own chooses reaction substrates and reaction conditions – this increases the students' inventiveness and also increases their activation and motivation. Another advantage of online laboratories is that each student designs and performs virtual experiences themselves, which results in the individualization of teaching. Online laboratories also ensure students' safety. Students can perform such experiments online that are dangerous in the real world.

The second possibility of using the Internet for the presentation of chemical experiments is the use of existing films from chemical reactions (e.g. from YouTube). Students using existing movies and computer programs (e.g. MovieMaker, LearningApps or EDpuzzle) create a coherent experiment with research questions.

Shows – experiments for XXL scale – currently, 'chemical reaction shows' are a permanent element of museum exhibitions, "Open University Days" or "Science Festivals". Because the experiments' demonstrations are aimed at encouraging the study of natural science that is, they must be effective. Therefore, students should be able to do this type of experiment. For 'show' type experiments, particular attention should be paid to health and safety rules.

Planning outdoor research. Outdoor research is a return to the roots of the natural sciences. Initially, the world around us was studied and described in field, and then the research were 'moved' to laboratories. Until today, some research cannot be done differently than by taking samples from field tests. Soil research, clean air or

water – these are typical field (outdoor) studies. Students should be able to plan and perform this type of research.

Summary

The classes "Designing Chemical Experiments" allow students not only to become familiar with the theory of DOE but also to learn how to apply this method in practice. Various experimental techniques cause that laboratory classes are not boring – students highly appreciate the satisfaction of these activities. In addition, the ability to plan experiments as well as to perform them with different techniques is necessary for a chemistry teacher.

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Abstract

The article describes innovative classes for biology and chemistry students – future teachers. The classes "Designing Chemical Experiments" comprise of ten hours of lectures and thirty hours of laboratory classes. During lectures, students become familiar with the theory of DOE. During laboratory classes, however, students apply the DOE theory in practice. As part of the course, students must independently plan 10 chemical experiments and then perform the experiments they plan themselves. During laboratory classes, students also practice various experimental techniques from microscale to macro scale.

Key words: DOE theory, Designing Chemical Experiments, laboratory

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Competences of pre-school teachers for working with students' families

Introduction

School and family are the two basic environments for the child's development and upbringing. The effectiveness of the interaction between the school and the family is determined by mutual and close cooperation. Home, school and community are 'overlapping spheres of influence', where members should collaborate for student's benefit through six types of involvement: parenting at home; communicating; volunteering; learning at home; decision-making and advocacy; and collaborating with community (Epstein 1995).

Proper, clear cooperation between teachers and parents should lead to the integration of didactic and educational activities. Teacher's cooperation with parents is a prerequisite for successful didactic and educational work. Teacher and family partnerships contribute to mutual understanding and cooperation for children's academic performance and well-being in school (Denessen 2009; Desforges et al. 2003; Epstein et al. 2002; Fan et al. 2001; Jeynes 2005).

The importance of developing a good relationship between parents and school cannot be overlooked. A good relationship between parents and a school teacher is the basis for successful development of children's potential. Cooperation of parents and school in raising children, regardless of its forms and practices, always benefits children. The most popular forms of cooperation in this field include volunteering, interactive works, lifelong learning, etc. Teaching and raising children requires good will, understanding of the other side, proper communication, agreement and philosophy of cooperation based on a deeply thought-out idea of educational community, taking responsibility for the process of education and upbringing by all those interested in it (Mendel 2007). Teachers and parents are natural allies, partners sharing common experiences and having a common goal – a child's success. Parents want to learn their role, be responsible and participate in building a civil society and civic participation, among others, by entering the role of a pupil's parents, different from the one they had before they enrolled the child in school. School education of a child is an element of the public sphere on which parents' identity is built. Therefore, parents and teachers should get to know each other, see

the meaning of joint activities, cooperate with the pupil's closest surroundings to meet the requirements of modern education.

There are a number of studies which focus on family-school cooperation issues in teacher education (Bruïne et al. 2014; Kroeger et al. 2011), and this issue is highlighted in the national educational policies as well (Dusi 2012; Evans 2013; Lehmann 2016; European Commission 2008).

The Netherlands, for example, have formulated the national standards for teachers' competences in communicating with parents (Denessen 2009).

Good practices in creating parents-school partnership are demonstrated by the National Parents-School Associations functioning in several countries. The US and the UK are reported to have the biggest successful experience in this field. The activities of these Associations resulted in developing National Standards for Family and School Partnerships, which include three steps: 1. Raising awareness of the power of family and community involvement; 2. Taking action to cultivate involvement through specific programs and practices; 3. Celebrating success as your school sees increased involvement and its impact (National PTN 2009).

Developing productive relationships with families is the number one point of attention for scholars, teachers and teacher educators, but unfortunately this topic is still challenging and problematic (Evans 2013; Bruïne et al. 2014; Egger et al. 2015). A lot of studies have shown insufficient attention of teacher education institutes to preparation of prospective teachers for family and school partnership (Epstein et al. 2006; Denessen et al. 2009; Miller et al. 2013). Many novice teachers express the need in special preparing to work with parents (Hornby et al. 2010). Teachers still feel unprepared for partnership with families (Ewan 2013, Epstein et al. 2006).

This article is an attempt to analyse the research into the readiness of students – future teachers – for communicative interaction between the actors of educational process in school. Formal curricula and information from focus groups with a total of 120 respondents were analysed.

The research was conducted by a team of researchers from the Pedagogical University of Cracow eager to better understand how their institution prepares future teachers for cooperation with students' families.

Despite a solid theoretical background about family-school cooperation, novice teachers still do not feel well prepared for collaboration with families.

The purpose of our research has been to study the level of preparedness of students as future teachers for professional activity in a modern school. The main objective was also focused on the curricula and educational teacher training programs taking into consideration the importance of their adequate professional training and realization in universities.

Polish educational system towards family–school interactions

The Polish educational system has also accumulated some experience in development of cooperation between school teachers and parents. There were a few European projects realized on this topic, for example in the framework program Life Long Education; a lot of research was done into the general issue on building partnership

relations between a teacher and the student's parents, which resulted in numerous scientific and methodological articles, scientific degree theses and practical guidelines for teachers (Hernik et al. 2015).

In Poland, crossing the school's threshold is perceived as a situation in which the focus is exclusively on students. Meanwhile, parents are also the participants of this process. The ritual of starting education in a Polish school is often associated with the absolutely unnecessary detachment of children from parents. Therefore, it is necessary to change this ritual by including parents into the adaptation programs at school and involve them in the educational process aimed at adapting them to their new role of the student's parent. Mutual rights and duties of parents and school are the content of legal regulations, and their polemics and current problems are available, inter alia, on the Internet. In general terms, when talking about the legal situation, it should be noted that parents in Poland are part of the school society – they are, like students and teachers, a part of the community, which in the social sense is the school. Polish teachers often know little about their students. Therefore, they do not organize enough activities that allow students to get to know each other, their personalities or interests. Meanwhile, cooperation with parents in terms of diagnosing, sharing knowledge about the child and experiences related to supporting their development are among the easiest ways to shape well-functioning student communities (Mendel 2010).

Many Polish researchers (Winiarski 2000; Mendel 2005) show that parents do not regard the school as a friendly place – they do not feel comfortable while being at school and only come there when they have to. Hence, the researchers refer to the so-called "parents' pro-school passivity" and try to find out its conditions. Consideration of these conditions from different perspectives is mainly related to the permanent failure to meet parents' and school's expectations, the lack of active listening to each other, as well as the progressive pauperization of society on the one hand and growing consumerism on the other, and, finally, the changes in the family lifestyle. Nalaskowski (2002) adds that the school space "speaks" and it is doing so in a certain tone indicating the power relationship that characterizes this reality, e.g. the school space "orders" a teacher and the principal to treat a parent as a student, infantilizes, for example, by forcing parents into children's chairs too small for them during the parent-teacher meetings. Therefore, the phenomenon of parents' pro-school passivity may take place and it is the result of close relationship between the student's and the parent's activity, and the place that they occupy in the classroom – the school room. In addition, it is also necessary to consider the goals of parent's visit to the school – usually they come to see the area where his child is staying (classroom, common room) or they have an appointment with the teacher, principal (teacher's room, principal's office) or to talk with the custodian (cloakroom). It leads to the situation when a parent comes to school because of a child and a teacher, even without a second parent, or to meet with other parents who form a school community (Nalaskowski 2002). There are also schools in which teachers organize various forms of participation in the educational process of children, including parental participation in conducting certain activities, parents' help in accomplishing educational plans of the teacher (most often assisting in activities

with children). In addition, the developed method of student assessment is based on a descriptive assessment in which parents also participate. In this type of action, both parents and teachers recognize that joint diagnosing of a child's development and sharing knowledge about it, agreeing on common behavior towards the child and co-deciding the educational plans are important for the development of their child's personality. Parents' cooperation with the school's principal in the decision-making process concerning the teaching staff, changes in the curricula, and introduction of extracurricular classes is also important. Many parents are looking for schools that meet their requirements related to their values and needs, as well as a sense of shared responsibility for the school's affairs, knowledge of the child's educational concept, a sense of co-deciding about the organization and functioning of the school, a sense of connection between their own and school's aspirations, recognition of cooperation with teachers (Mendel 2005).

Teacher training programs in Polish educational environment

By now, there are five Public Pedagogical Universities in Poland (tab.1) (Ministry of Higher Education of Poland 2018). But only a few of them provide end-to-end teacher education for all school levels (kindergarten, primary and secondary) and only the Pedagogical University of Cracow offers teaching specialization as an additional selective program after graduating which provides teacher's license.

Table 1. Public Pedagogical Universities in Poland

Name of university	site	Region of Poland
The Maria Grzegorzewska Pedagogical University	http://www.aps.edu.pl	Warsaw, central Poland
Jan Długosz University in Częstochowa	http://www.en.ajd.czest.pl	Częstochowa, South-Western Poland
Pedagogical University of Cracow	www.up.krakow.pl	Krakow, Central-Southern Poland
Pomeranian University in Słupsk	https://www.apsl.edu.pl/	Słupsk, Northern Poland
Siedlce University of Natural Sciences and Humanities	https://www.uph.edu.pl	Siedlce, North-Eastern Poland

In some of the Polish pedagogical universities secondary teacher education is organized at university level, but not by the special unit – Institute of Teacher Preparing like in The Pedagogical University of Cracow.

As a matter of fact, there is no national curriculum for Teacher specialization, but there are National Qualification Framework (2011) where they gather the basis of the main professional competencies and the curricula requirements. Regulations are just on a formal level.

At the kindergarten and primary school level, the curricula are designed as three-years-Bachelor studies. A master diploma is required for teachers at the secondary school level. Students major in two school subjects, at least.

The Educational Teacher Program conducted in the Institute of Teacher Training of Pedagogical University of Cracow was created according to the National Qualification Framework (2011) and was amplified by some additional directives

of Polish Minister of Science and Higher Education. On the whole, it consists of pedagogical and psychological module (10 ECTS) and didactical and practical module (15 ECTS). Pedagogical and psychological module is implemented by the theoretical courses like Basics of Psychology (the main course and the special course for primary school) – 4 ECTS, Educational Conceptions and Practices (the main course and the course for primary and secondary schools) – 5 ECTS, Safety and Hygiene of students and teachers working – 1 ECTS. Didactical and Practical module is realized by the theoretical course Didactic (the basic course and the course for particular school subjects) – 8 ECTS and the school training practice – 7 ECTS (Tab.2).

Table 2. Analyses of Teacher Training Program at the Pedagogical University of Cracow

Modules	Courses	ECTS
Pedagogical and psychological module (10 ECTS)	Basic of Psychology (*main course and course for primary schoo*l)	4
	Educational Conceptions and Practices (*main course and course for primary and secondary schools*)	5
	Safety and Hygiene of students and teachers working	1
Didactical and practical module (15 ECTS)	Didactic (*basic course and course for particular school subjects*)	8
	School in-field training	7

As a result, after completing the Teacher Training Program students acquire teacher's competences (specified knowledge, teacher skills and abilities). After completing such program in the Institute of Teacher Training at the Pedagogical University of Cracow, students receive license for secondary school level teacher.

The Study

The present study reports the first data or rather statements from an ongoing study (n=150) piloting large scale longitudinal qualitative student interviews between 2018–2019. The first part of the research started in 2018 with the aim to get better understanding how Polish pre-teachers are ready to work with future students' parents and local communities and how teacher education programs address this topic.

Methodology

To achieve research goals, the surveys and document analysis were carried out. Students of different specializations of the Pedagogical University of Cracow (Poland) were examined (tab. 2). The research was focused mostly on bachelor and MSc/MA students who completed the first part of the teacher training program which they do in parallel to their major program. The sample was organized in accordance with convenience-voluntary sampling scheme (Gravetter, Forzano 2010; Weathington et al. 2010). The sample included participants who: (1) provided a written consent to participate in the study; (2) were students of any field of study but only in teaching profile, i.e. profile that prepares graduates to work as teachers.

Table 3. Overview on returns by the respondents

Program	Specialization	Number of the students
Bachelor	Biology and nature protection	30
	Mathematics	15
	German Philology	40
	Philosophy	10
	Animation of culture	15
MSc/MA	Mathematic	10
	English Philology	30

The data were collected from analyzing the student's eases with their self-evaluation as future teachers. The main points which were explored dealt with how well the students – future teachers are prepared for working with parents; their self-assessment of the level of preparedness for family-school partnership and how future teachers assess their preparation for cooperation with parents in their training programs?

To assess the curriculum content of the teacher training programs, relevant course documents have been collected as well as the additional information on the content and aims of the training program.

Results

In this article, we present some preliminary results on certain aspects of the study. Our respondents confirmed the results of other authors (Lehmann 2016; Kroeger 2011) about the importance of the topic Family-school partnership in teachers' pre-service training (tab. 4).

Table 4. Analysis of surveys based on studying the eases with student self-evaluation as future teachers

Questions	Answers (%)		
	Yes	Rather yes	No
Is family-school cooperation an important professional topic for future teachers?	95	5	-
Is it difficult for you to organize some meetings and/or discussions with parents of your future students?	65	20	15
Is it important to demonstrate communicative skill with parents during practical training in school?	15	40	45
Should family-school cooperation play a more important role in teacher curriculum	25	60	15

However, only 15% of the respondents stated that it is very important for students to demonstrate this skill during their practical training in school, whereas 40% viewed it as moderately important; 45% do not have an opinion on this issue. Addressees were also asked if the subject of family-school cooperation should be more prominent in their future curricula, either as a full course on the topic, or integrated with other topics in the course, or in any other form. Only 25% of the

respondents agreed that "Family-school cooperation should play a more important role in their curriculum".

Some essays demonstrate students' opinion on their expectation about Educational Teacher Program: "(…) Such topics like cooperation with parents should be more strongly emphasized in optional courses and should be offered by the Institute of Teacher Training"; "I feel a bit nervous before starting teaching activity, and I suppose I could change my mind after getting some practical experience", "I'd like to be more confident in *working with parents, my future students' family and community*. The practical training could be useful, particularly direct and indirect interaction with parents. If possible, they should be comprehensive and prolonged."

Assessment of the curriculum content of the teacher training programs showed that there were no specific courses on the topic of Teacher-School Cooperation in Educational Teacher Program in the Institute of Teacher Training of the Pedagogical University of Cracow. But elements of family-teacher cooperation occurred in a few elective courses. A close examination of the courses reveals that little attention is paid to communication. For example, in the course on Educational Conceptions and Practices, the general competencies concerned only teachers' ability to communicate with parents in order to inform them about their child's progress or the school program.

There are other important issues in the program of Basics of Psychology (conflict management and assisting families with special needs children). Preparing for family–school cooperation is also an important issue during in-field-training. Despite these efforts by the Teacher Training Institute of the Pedagogical University of Cracow, none of the respondents considers that preparation of teacher candidates for family-school cooperation is really good.

Conclusion

In this explorative study, preparation of students-future teachers for communicative interaction between the actors of educational process in school was examined within teaching specialization as an additional selective program for the students of different specializations of the Pedagogical University of Cracow (Poland), who wish to get a license for secondary school level teaching. The study indicated that preparation for parents-school cooperation is integrated in different courses of Teacher Training Program. Attention is mainly focused on theoretical knowledge connected with family-school cooperation with big emphasis on parents educational competences training (e.g. communication, psychological aspects of adolescent, influence of ICT and media on children development, some elements of health education, etc.). Unfortunately there is no attention to the models of parents-teachers interactions in the school or underlying power relationships or barriers as well as assessment on this topic. In the Polish University teacher training programs more attention is paid to theoretical preparing for cooperation with parents than to teaching practices for collaboration with families.

Students-future teachers considered family-school cooperation as an important professional topic, but quite difficult to establish. In their eases they often described

future communication with parents as frightening and hardly predictable. Finally, all respondents felt preparation for cooperation with students families like an inadequate. They called for dipper attention to receiving competences for parents-school interactions and more practical experience in this area. In the view of the respondents, teacher novices do not feel well prepared for family-school cooperation. Nevertheless, the universities are still reluctant whether to give family-school cooperation more importance in future curricula or to plan other changes in the curricula concerning preparing for family-school cooperation.

In this explorative study, there were only 150 candidates for getting a license for secondary school level; therefore, no generalizations can be made to all candidates at the Pedagogical University of Cracow (Poland), or to all practical teacher novices in Polish secondary schools. Nevertheless, the lack of attention to parents-school cooperation in the curricula in this study and the insufficient preparation for this topic as perceived by respondents are consistent with other studies (Epstein, Sanders 2006; Denessen et al. 2009; Miller et al. 2013) and seem to confirm that preparing students-future teachers for communicative interaction between the actors of educational process in school is a difficult, constant and extensive problem.

There is a necessity to conduct a comparative international research aimed at finding and implementing the best practices of Teacher Training Programs including various ways of developing student skills for building *partnership between school, home and community.*

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Competences of pre-school teachers for working with students' families

Abstract

The aim of the research was to explore the competences of students-future teachers to cooperate with their students' families and local community. The main objective was also focused on the teacher training in this area due to the importance of partnership in the contemporary school.

To achieve these goals, the surveys and document analysis were carried out. Students of different specializations of the Pedagogical University of Cracow (Poland) were examined. The preliminary findings have shown that the University's teacher training programs put emphasis on theoretical knowledge regarding family-school cooperation. However, the results also showed that students do not feel well prepared for practical activities in this area. The analysis of teacher education programs specified that the teacher's practice and communication skills in the field of cooperation with parents of students are under-emphasized. The article is an attempt to propose new ways of teacher training in the field of communication and social skills, as well as cooperation with students' parents and local community.

Key words: pre-school teachers, teacher training, students' parents, contemporary school

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The study of basic everyday chemical knowledge of undergraduate students of non-chemical branches of natural sciences

Introduction

Colloquial and scientific knowledge of students, misconceptions and their impact on understanding and learning new content;

Colloquial knowledge is the oldest genre of knowledge. It can be characterized with following features:

- Vagueness and lack of precision;
- Low level of abstraction;
- Poor argumentation of beliefs, low information content.
- It is not a result of a conscious use of research methods, it can be understood as a side-product of practical people's activity.
- The criterion of colloquial knowledge is common sense.

On the other hand, scientific knowledge is based on strong rule of rationality: the degree of conviction with which one propounds some claims should correspond to the degree of its justification. That differentiates scientific knowledge from the colloquial one. Moreover, scientific knowledge is:

- the result of the use of certain scientific methods and seeks to explain the various phenomena;
- theoretical – it examines the characteristics of things and the laws that govern them;
- highly structured, has predictive power, the heuristic power (detection of new facts and relationships between facts).

Psychological aspects of colloquial knowledge: ***negative transfer, generalization of the stimulus***

Psychological research on the techniques of learning and memorizing information indicate the influence of previously mastered theories, definitions, skills or behaviors on the acquisition of later parts of material (Buchodolska, Włodarski 1977; Włodarski 1971). This impact can be positive, because thanks to earlier actions one can remember a new material easier – **a positive transfer**. There may also be a negative effect. It takes place when the earlier parts of the material "block" the understanding of new knowledge. It is called a negative transfer. This overlap of previous experiences with new ones may be manifested in a direct way

(so-called *specific transfer*), when the transfer refers to a specific, single activity that is transferred.

In chemistry, a negative specific transfer occurs when information known from autopsy of everyday life gains new chemical meanings (e.g. kitchen salt – spice widely used at home. It has a salty taste, is soluble in water, it forms white crystals. On the other hand, salts are family of chemical compounds, often not salty, not always water soluble, and with different colors, finally their chemical properties often are different than properties of the kitchen salt.).

Negative specific transfer also occurs when introducing concepts in environmental and nature lessons in primary school (Sawicki 1981) when a teacher refers to colloquial, common connotations of that concepts instead of earlier correct defining those concepts basing on scientific knowledge. Finally, the negative specific transfer can occur when a new, more detailed, more difficult and more complicated theory is introduced instead of another simplified one introduced in the previous stages of education. Therefore, it was decided to investigate how the functioning of chemical concepts in everyday life and using them without proper defining in the lessons (e.g. "nature") interferes with the process of their proper functioning in chemical education?

Non-specific transfer – refers to the methods and techniques of learning. The impact of the earlier stage of education is greater when the exercise consists not in the mechanical mastery of the elements of knowledge, but on the understanding of the general principle. Non-specific transfer in chemistry occurs when constructing definitions of new concepts, students build them on the basis of schematics of the terms previously known (e.g. the definition of salts students try to build often based on a known scheme of acid or base definition). In psychological studies, concerning the impact of the originally mastered terms, or imaginations, on the understanding of subsequent parts of the material, there are two more terms: proactive inhibition and transposition.

Proactive inhibition occurs when two different reactions are responsible for the same stimulus. This situation obviously causes a negative transfer, the greater the more varied these reactions are. In chemical education, proactive inhibition often happens, for example, when for one stimulus – term – a definition, chemical and physical properties, methods of obtaining, and common connotations of a given concept are assigned.

Transposition is a reaction not to specific stimuli – notions, but relations, and dependencies between them. In the process of chemical education, we often refer to relationships or relations that appear between the discussed terms. However, it has not been studied so far as this process takes place in the minds of students in chemistry classes.

Generalization of the stimulus – a phenomenon in which the response conditioned by an experimental stimulus also manifests itself in relation to many other stimuli present in the experimental environment (which the experimenter may not even realize, while the animal notices them). Counteracting this phenomenon, if necessary, the experimenter performs conditioning differentiating to the moment when he is sure that the expected reaction occurs only on the proper stimulus. The

lack of differentiation conditioning leads to paradoxical behaviors described as magical dependence.

Kahoot! as an examination tool

After numerous attempts with various forms of online tests to check students' knowledge, the Kahoot was chosen (https://kahoot.com). It is a widespread and free game-based learning platform that makes the learning process fun – it may be useful for learning any subject, in any language, on any device. Its main advantage (which decided about the choice) is the fact that it is not necessary to have a lot of computers within the classroom for testing because students can use their own smartphones, tablets and notebooks to answer. Since every remote controller (i.e. smartphone) is assigned to a given student (by entering the student's name), all information (about the answers and the time of answering) is registered in the system, individually for each examined person. Questions are displayed using the projector on the screen, and the answer symbols are displayed on the students' remote controllers – smartphones, tablets (Fig. 1.).

The system gives immediate feedback. The correctness of the answer is displayed to the student on his cellphone immediately after answering the question. Additionally, on the general board, a ranking is displayed after each question (the sum of the previous correct answers and points for the response time – the faster the student answers the question, the more points he gains). This introduces an element of competition to the exam or test. After the test the teacher can analyze the test results. The data collected during the test are stored in a spreadsheet and pre-designed statistically. Those data can also be processed later using Excel or other spreadsheet. This makes it easier for the teacher to analyze the test result.

Kahoot allows to be set in one of two modes:

- Individual work – each student works on his own,
- Group mode – students can work in groups; then one phone/tablet is used by several students.

Although Kahoot seems to be the most friendly from the market, it also has its drawbacks. The most important advantages and disadvantages of Kahoot are discussed below:

advantages

- Kahoot test database contains more than 13 million ready to use tests (the number of tests is still growing). These tests are mostly in the public domain so the teacher can just use those available tests as they are or prepare own test by changing those ready to use test. Those ready tests can also inspire a teacher while creating his own test from the beginning.
- Ease and speed of test creation.
- Possibility of using upper and lower indexes (priceless for chemists).
- Possibility of setting the response time (from 5 seconds to 120 seconds).
- Possibility of adding a photo or a video (or its fragment – the user can set the time from which the video starts and when it should end while presenting it to

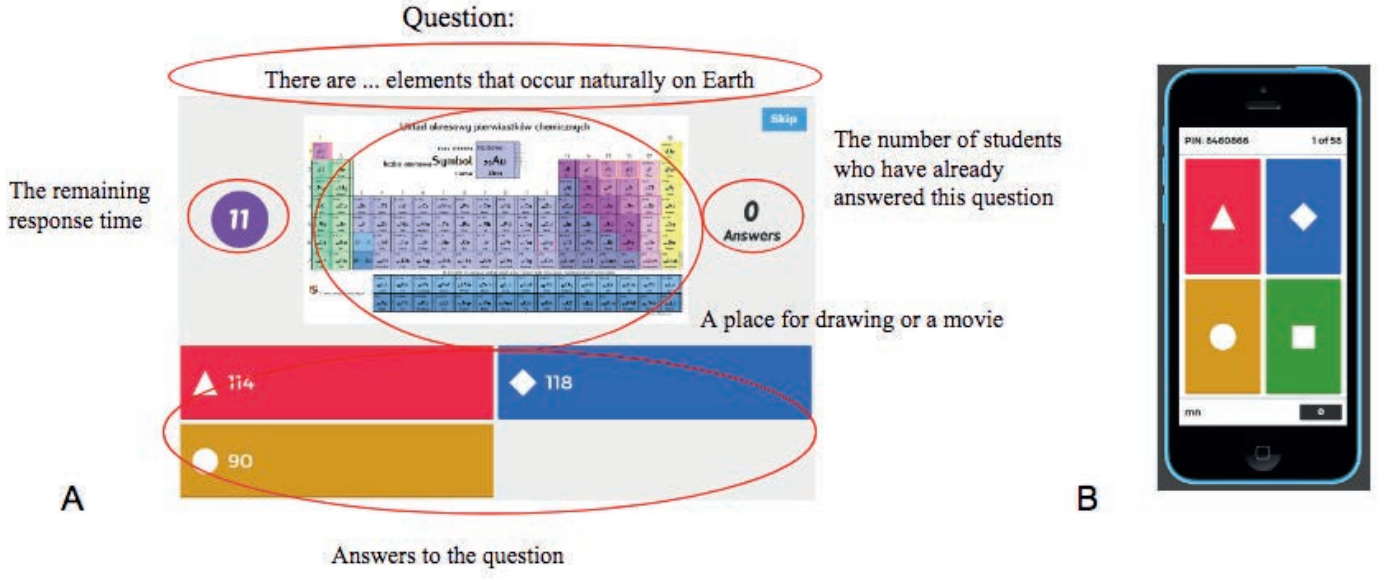

Fig. 1. a) question displayed on the screen; b) answer panel on the student's remote controller.

the students – time of presentation of the film is not included in the response time) from YouTube.
- It is possible to analyze the students' responses (both individual students results as well as their response time for particular questions). The initial analysis is carried out by the program itself.
- Through the usage of traditional tests it is difficult to check the laboratory skills of students - the ability of observing and drawing conclusions based on those observation. The hardcoppied versions of tests usually contain a verbal description of the experience, based on which the student has to make conclusions – the accuracy of such pseudo-laboratory tests is doubtful. It can be assumed that such tasks at first check the ability of understanding written text. In contrast the use of films presenting experiments (including image and sound) in the Kahoot tests creates a task similar to the one in real laboratory – the situation for pupils in which they were able to answer the same questions however really based on observations.
- Possibility of importing questions from spreadsheet.
- The results of the test are available immediately.

disadvantages

– Difficulty of checking the skills for which open type of questions is required, for example, checking the ability of writing equations of chemical reactions, drawing structural formulas.

– Element of competition (after each question a list of 10 top is displayed) – not every student feels well with it, especially during the exam.

– Students need to answer the same questions at the same time. Some prefer to quietly bend over the test and solve tasks in preferred order instead of compulsory one.

– Difficulty in assessing how much time students will need to answer the individual questions

– The need of using electronic devices during the exam.

The research

As stated above it was decided to investigate how the functioning of chemical concepts in everyday life and using them without proper defining in the lessons (e.g. "nature") interferes with the process of their proper functioning in further science education?

The research were carried out using a kahoot test. The questionnaire contained 13 closed questions and required choosing the correct answer from 2 or 4 possible. The questions are presented in table 1.

The research group consisted of 91 students of various non-chemical branches of studies, such as biology, geography, physics, and pedagogy (prospective teachers of early education)

Table 1. Questions presented to students in frame of the test.

Question	Time for answer	Answer 1	Answer 2	Answer 3	Answer 4	Accompanying medium
Q1: Are all acids acidic?	10 sec	YES	NO			The picture of oil (including oleic acid), and apple (contains malic acid)
		Incorrect answer	*Correct answer*			
Q2: The picture shows boiling water. Gas bubbles within a liquid containing bubbles of...	20 sec		oxygen	water vapor	carbon dioxide	The picture of boiling water, inside the liquid gas bubbles
		Incorrect answer	*Incorrect answer*	*Correct answer*	*Incorrect answer*	
Q3: Is salt always salty?	10 sec	YES	NO			
		Incorrect answer	*Correct answer*			
Q4: The drawing and description of the experiment are shown below. Which of the given explanations is correct?	60 sec	Candle consumed oxygen from the air and water took its place	CO_2 formed in the reaction dissolves in H_2O better than O_2.	Drawings and description are incorrect, water cannot rise up.	The heat of a burning candle sucks in water.	The picture of showing the experiment.
		Incorrect answer	*Correct answer*	*Incorrect answer*	*Incorrect answer*	
Q5: Do the following description of the physical characteristics of glucose affects all sugars?	20 sec	YES	NO			A list of physical properties of glucose
		Incorrect answer	*Correct answer*			
Q6: Water vapor can be observed in the picture shown below ...	60 sec.	As gas bubbles in a vessel (erlenmeyer flask)	Over the vessel.	Both answers are correct.	None of the answers is correct.	The picture showing boiling water in an erlenmeyer flask
		Correct answer	*Incorrect answer*	*Incorrect answer*	*Incorrect answer*	

Q7: Is the construction (shape) of a snowflake related to the shape of the water molecule?	10 sec	YES	NO			The photo of a snowflake
		Correct answer	*Incorrect answer*			
Q8: What is burning in the figure below (what is responsible for the visible flame)?	10 sec	melted paraffin	candlewick	Paraffin vapors		The photo of a burning candle
		Incorrect answer	*Incorrect answer*	*Correct answer*		
Q9: Do you know why ice density is lower than water density? (for the substance is the other way round)	5 sec	YES	NO			
		Correct answer	*Incorrect answer*			
Q10: Does the magnet attract all metals?	5 sec	YES	NO			
		Incorrect answer	*Correct answer*			
Q11: There is a glass full of water and ice. What will happen after heating and melting the ice?	60 sec	Water will pour out of the glass.	The glass will be full of water.	The water level in the glass will drop.	It depends on the amount of ice in the glass.	**Photo** presenting the situation described in the question.
		Incorrect answer	*Correct answer*	*Incorrect answer*	*Incorrect answer*	
Q12: What does the movie show?	30 sec	Syringe is leaky, air enters inside	Water boils under reduced pressure	Mixing of air and fluid	Two answers are correct	**A video** showing a boiling water under reduced pressure
		Incorrect answer	*Correct answer*	*Incorrect answer*	*Incorrect answer*	
Q13: Is combustion possible only in the presence of oxygen?	30 sec	YES	NO			**A video** showing underwater burning.
		Incorrect answer	*Correct answer*			

Results of the research

For each correct answer, the student received 1 point. The maximum number of points that students could obtain in the test was 13. The average result of the test is 4.8 of correct answers to 13 questions, which is 36.8% of the possible number of points. The detailed analysis how many of researched persons achieved particular number of points i.e. how many questions they answered correctly is shown in figure 2. One person did not score any point. No-one had more than 9 points.

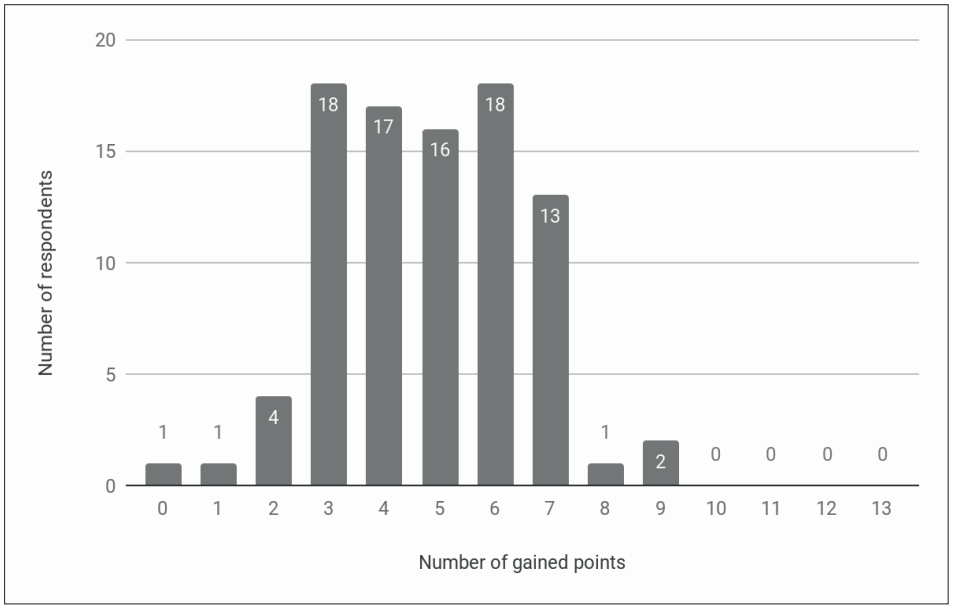

Fig. 2. Number of persons who received particular number of points in the test.

Figure 3 shows the percentage of respondents who answered correctly to specific questions. The results show that only two questions were answered satisfactorily. Less than 38% respondents answered correctly eight of the thirteen questions, including 4 questions they answered at the level less than 13%. A comparison of the answers given to questions Q9 and Q11 shows that the declarative knowledge (Q9) of students sometimes deviates significantly from the actual one (Q11). Questions Q7, Q10 and Q13 required one of two responses, so the results may be overstated due to the higher probability of giving the correct answer in a random way.

Conclusions

Considering that most of the questions related to the situation in everyday life, the obtained results show a very low level of chemical knowledge in the subjects. Respondents usually indicated answers that matched their colloquial knowledge – learned at the early levels of education, when definition of some concepts is incomplete and superficial. The colloquial knowledge is much stronger than scientific one. This knowledge has not been transformed, i.e. a negative transfer took place. Research

has shown that it is important to investigate what is the relationship between the formulation of the definition and its mastery and understanding by the students.

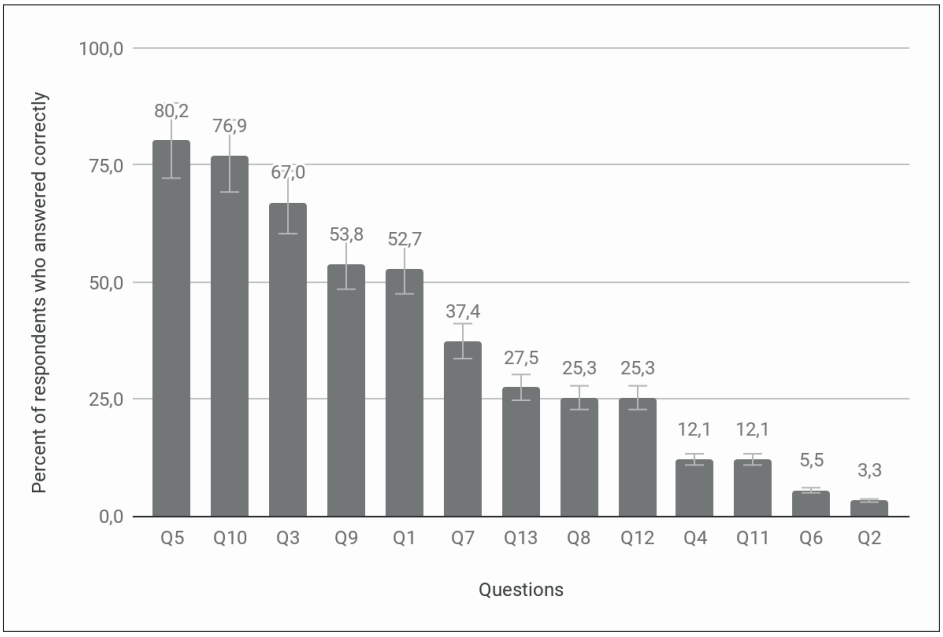

Fig. 3. Percent of respondents who answered particular questions correctly.

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The study of basic everyday chemical knowledge of undergraduate students of non-chemical branches of natural sciences

Abstract

As colloquial knowledge may have significant impact on understanding and learning new content it was decided to investigate how the functioning of chemical concepts in everyday life and using them without proper defining in the lessons (e.g. during natural science lessons) interferes with the process of their proper functioning in further science education.

The research was carried out among students of biology, geography, physics, and pedagogy using Kahoot tests. The results revealed that colloquial knowledge is much stronger than scientific one at the examined area and negative transfer took place.

Key words: scientific knowledge, colloquial knowledge, negative transfer

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School relations and online activity – Internet vs. social participation

Introduction

According to the data from 12.04.2018, provided by the Ministry of Science and Higher Education in the Science in Poland portal, one in five teenagers (about 20% of the teen population) is addicted to access to information (Tomczyk, Selmanagic-Lizde, 2017). This addiction may take different forms, from online shopping, through gaming, to online gambling. Another interesting phenomenon is the so called fear of missing out (FOMO). This should alert teachers and automatically evoke questions how can we use this fact and turn this, somehow, pedagogical failure into a success. One of the frequently discussed issues is the change in participation culture and social participation, based mainly on the potential of new information and communication technologies (for example, Stunża, 2018). When mentioning the participation culture, we use the definition by Jenkins (2008), that it is a culture where fans and other consumers are invited to active participation in creating and redistributing the new content. In the context of popularity of social networked services and group relationships built via them between members of a "meeting" in the new media space, Stachura and Stunża (2016, p. 8) write about individualism *built on own paths of reading during hipertextual wandering through information nodes.* This may be a threat to the *development of culture in the spirit of wide access, joint participation and information exchange.* The above mentioned authors see this situation as a barrier for social interactions and, referring to selected scholars, they point out that real participation requires many conditions to be met (Jenkins, Ito, Boyd, 2015), such as ability to understand social situation in order to be able to engage constructively, ability to initiate contacts or deal with negative comments in the Internet. Media can play a significant role in education and socialization process. The more so, as they provide entertainment and enable social contacts. For 86.45% of the young people, access to movies and music is important, and 94% have their profiles in social network services. Stunża (2018) argues that digital technologies may facilitate peer relationships and respond to young people's needs in this area: many people cannot understand that young people want to be in touch constantly, and digital technologies enable them to do exactly that. The so called "fear of missing

out", seen by some as a disease symptom, is something completely normal if we consider the nature of teenagers and access to instant communication technologies.

Digital technologies transformed relations among students, between students and teachers, students and parents, and parents and teachers. The way teachers and students communicate must follow the development of new communication channels, and must do so in the atmosphere of trust and openness to changes. However, James E. Ford (2017) writes: *Teachers don't respect relationship-building as an important part of their praxis*. Traditional schools that focus on achieving the learning objectives, have got lost in the jungle of competency tests, popularity rankings and external evaluation. There is no place there, to develop relationships, empathy and culture of participation. But in these traditional schools everyone has a smartphone in their pocket, and this smartphone is no longer just a phone but a "human extension" — a repository of knowledge (links and training resources), contact directory and a set of tools to build one's identity. Ban on smartphones in schools means forbidding students to be themselves and forcing them to become someone else; someone who is not a subject but only a cog in the factory production supervised by the school. At the same time, many teachers complain they are not able to teach anymore because "phones have become a real plague". Students just wait for the teacher to turn away for a moment, to take their phones and use them. They are concentrating on social networks instead of knowledge they are being taught. André Giordan (2018) asks: *Are there "good" reasons to forbid smartphones in schools completely?... Why should we get anxious, concerned or even scared? What if we look at this tool again? Why not make it an object of our studies instead? Or maybe, we will include smartphones in school curricula...? Working on free social networking services is a great way to understand the times we live in.* Giordan emphasizes that new technologies allow students to cooperate as they publish and design digital content to complete their educational projects, they also enable interactions via online messaging tools. He also mentions workshops which help to develop right attitudes towards the risk connected with new technologies. Both, teachers and students, have to ask themselves about the meaning and importance of information. Who is the author of information? Why? What are the problems? Information control is an important objective of modern education. There are many good applications which may serve educational purposes (Potyrala, 2017). New technologies may be a pretext for questioning changes, or even progress, in the society. What has been changing? If technological progress is to improve the society, then what is the role of smartphones? What are the limitations? And what about saving our planet? Another question refers to the shift in attitudes towards success and fame. Some Youtubers every day gain international popularity which would never be possible without these new technologies. Are they heroes because they have millions of "posts" and "likes" in the Internet? (Giordan, 2018).

In the discussion about modern school, traditional school is often presented by referring to the Prussian school model. This bipolar approach shows that school is often looked at in extreme categories. In this case, both extremes have mainly opponents and, surprisingly, it seems that modern school, associated with new media, has more of them. This results from the fact that tools are viewed as strategies

and methods, and we forget that tools (educational media) are only the means to implement strategies and methods, not educational objective in itself. Just like the goal of having smartphones is not to carry it in our pockets or even dialing a contact numbers, but to initiate communication.

In this context, Stefan Hrastinski from the Uppsala University proposes an interesting approach based on the theory of online education as online participation. He begins with the common belief that the key e-learning challenge is to encourage students to learn. He analyzed the concepts and research approaches, which underlie the research into participation in the Internet by investigating e-learning settings. He came to a conclusion that the research are dominated by low-profile concepts of online participation, which are based on frequencies as indicators of participation. However, some researchers focus on studying more complex dimensions of participation, for example, whether users feel they take part and engage in a dialogue This is reflected by combining perceived and real measurements of participation. To summarize, there is a definition of participation in online learning, which covers its more complex aspects such as doing, communicating, thinking, feeling and belonging. Hrastinski suggested an initial theory of online learning as online participation. He thinks participation in online learning is, among others, a complex process of participating and maintaining relationships with others. The consequences of this theory are simple: if we want to improve online education, we must increase online participation.

Based on his previous reflections, he began to train tutors in online participation. Teachers play the key role in e-learning and, in addition to their expertise, they have to have the proper set of skills. The research conducted by Hrastinski showed that teachers face the following challenges: balancing private activities, reflection upon their tutoring skills, social activity and communication with students. Carol K.K.Chan i Yuen-YanChan (2011) conducted a study on students' opinions about their online collaboration. Their analyses showed that students who believed their activity was more adequate to build knowledge based on collaboration, more often exercised a deep approach to learning. There was also a correlation between students' views of collaboration and their effective participation in the Internet. We need to emphasize that during the last 20 years, social participation of young people has been growing in importance, what is reflected in the scientific literature, as well as among the decision-makers. Active participation of youths in their social and civil behaviors is, by default, viewed as a sign of positive development and well being of young people, and promotion of these behaviors has become the main goal of youth policy in different countries (Cicognani et al., 2008).

Methodological assumptions of the research

The goal of the research was to investigate how do teachers and students view the possibility of co-creating the culture of participation through engaging in educational-social projects, thanks to the new information and communication technologies.

The survey focused on the following research problem: According to teachers and students, to what degree does virtual environment used in school didactic process contribute to estblishing a communication platform between students and

teachers, to help them engage in educational and social activities? In the context of the theoretical background presented above, an interesting hypothesis is that mobile devices may facilitate building the platform of communication between students and teachers, so they can engage in educational projects and social activities together. We have formulated this hypothesis on the basis of the previously quoted research results indicating that students use mobile devices to support, share and organize their complex identities. If we fail to understand this and meet students half way, the present educational system will continue to disturb relations between different groups of formal education participants. However, we have also assumed that teachers are not really willing to take up the challenge of teaching in the virtual environment. We verified this hypothesis using the method of the diagnostic survey and the questionnaire technique. The survey was conducted among 400 students and 400 teachers from upper secondary schools.

It focused on 3 following aspects:

1) forms of participation, like: preparing information materials, developing project principles, project implementation, engaging in activities for the local community, contact/communication with the teacher during work on the project, popularization of knowledge about the project, preparation of evaluation tools, presenting the project results, efforts to maintain the project sustainability;
2) participation spaces: real and virtual environment;
3) participatory behaviors: reactive, pro-social, anti-social, organizational, cognitive, passive, aggressive, assertive, impulsive, compulsive.

Each respondent was asked to evaluate, using the Lickert scale (1-7), to what degree do mobile devices used in school teaching process contribute to establishing a communication platform between students and teachers, to help them engage in educational and social activities. To ensure that all statements in each category measure the same construct (internal consistency of declarations), Cronbach's alpha for each category was calculated (understanding: alpha = 0.80, acceptance: alpha = 0.82, accuracy: alpha = 0.89). All values show acceptable levels of reliability, alpha = 0.7. The level of understanding, acceptance and accuracy of the statements turned out to be representative for all the students and teachers, who participated in the survey. This determined the use of the research tool. The tool was based on the modified social presence scale, originally developed by Gunawardena and Zittle (1997). Independent variables were modified by extension, in order to focus on the perception of the process of learning social activities during implementation of projects by students and teachers.

In this research, a correlation model was used. Continuous variables included teachers' and students' view of online learning by students and their social presence (participation). One of the project limitations was the fact, that while the correlation method may describe dependiencies, it cannot identify the causal relations between the correlated variables. Pearson's correlation coefficient (r) was used to determine to what degree the variables are interdependent. An absolute negative correlation was assumed for the values from -1, through 0 (no correlation), up to +1 (absolute positive correlation). We checked how answers in one category may be connected with the answers in other categories.

Open-ended questions were asked after the second part of the questionnaire. The students were asked which participatory activities with the use of new media are the most beneficial to their relations with one another and with their teacher. Teachers, in turn, answered the questions about the indicators of "real participation" of students in the social life mediated by new media. In total, we have analyzed 400 answers given by the students and 400 answers given by the teachers to 4 open-ended questions.

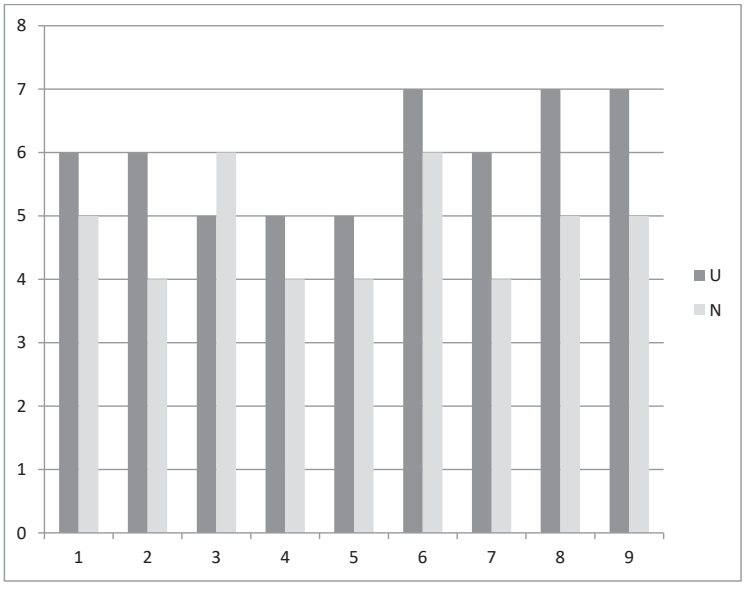
Results

The research results indicate the following dependencies (Graph 1):

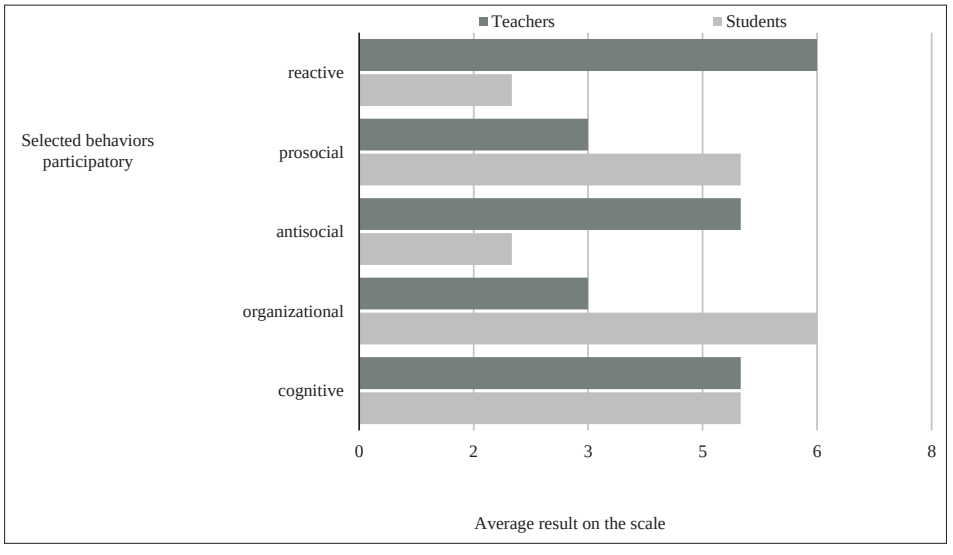
- teachers and students positively evaluate the role of new media in preparations of project information materials,
- the majority of the respondents think that developing project hypotheses must be supported by new media,
- most of the teachers think that project implementation does not depend on new media, whereas the majority of the students think otherwise,
- online activities for the benefit of local communities are evaluated positively by most of the students, and negatively by most of the teachers,
- communication with teachers during collaboration on the project is evaluated positively by all the students, but only by half of the teachers,
- the use of new media to promote the project is evaluated positively (the majority of positive opinions among the teachers),
- students evaluate preparation of project evaluation tools positively, whereas for most of the teachers it does not matter,
- presentation of project results and activities to maintain the project sustainability by using new media is very highly rated by all the students, and viewed as neutral or negative by the majority of the teachers,
- none of the teachers sees the need to use new media in their didactic work in the real environment; students rate such possibilities exclusively as 5-7 in the scale (positively).

In terms of participatory behaviors, the results were as follows (Graph 2):

- reactive behaviors (stimulus-response) are, to a large degree, associated by the teachers with new media,
- pro-social behaviors facilitated by new media are only recognized by the students; teachers see new media as the source of anti-social behaviors,
- organizational behaviors supported by new media are rated higher by the students than teachers,
- cognitive behaviors are evaluated highly by both groups,
- according to the teachers, new media promote passive and aggressive behaviors (as for the latter, students declare the same),
- students think new media teach assertive behaviors (teachers think otherwise),
- teachers think new media teach impulsive and compulsive behaviors (students think otherwise).



Graph 1. Evaluation of the forms of joint participation in projects by teachers and students.
1-9 Investigated aspects of collaboration:1 - preparing information materials, 2 - developing project principles, 3- project implementation, 4 - engaging in activities for the local community, 5 - contact/ communication with the teacher during work on the project, 6 - popularization of knowledge about the project, 7 - preparation of evaluation tools, 8 - presentation of the project results, 9 - maintaining the sustainability of the project.



Graph 2. Evaluation of participatory behaviors by teachers and students.

The level of acceptance of the virtual environment by the teachers does not correlate (r=0.6) with the possible forms of joint participation in project activities and participatory behaviors in the virtual environment (Table 1).

By default, teachers deny the value of virtual environment as educational environment, even though they recognize it enables building relationships between participants of pro-social projects in the Internet.

Table 1. Level of acceptance of the virtual environment by the teachers (A), in connection with possible actions enabled by the Internet (B1-B3). Expressed as an average degree in Lickert scale (L) and Pearson's correlation coefficient (r).

Level of acceptance of the virtual environment by the teachers (A)	Level of acceptance of the Internet as an environment facilitating pro-social activities (B1).	Level of acceptance of online communication during teacher's and student's work on the project (B2)	Level of acceptance of activities connected with implementation of the project in the virtual environment (B3)	r
L=3.5	**L=5,5**	**L=5**	L=5,5	r=-0,6

During the analysis of evaluation of participatory behaviors by teachers (N) and students (U), correlations between answers in different categories were determined. It turned out that the highest correlation coefficient (positive correlation) and, simultaneously, quite strong dependence were found for teachers' view of: cognitive behaviors in the virtual environment and reactive, stimulus-response behaviors (r=0.7), and passive and anti-social behaviors (r=0.9) in the Internet. The survey also revealed (**Table 2**) that students with high general view of social participation got high results as for the need to act for the benefit of social environment by using the opportunities provided by new technologies (r=0.8). In addition, the general perception of social presence by students contributed significantly to prognostic reasoning regarding the general view the students have of participatory activities expressed as online interactions, individual engagement in the project and popularization of project ideas.

Table 2. Students' view of social online participation through (A), expressed by average degree in the Lickert scale (L) and Pearson's correlation coefficient (r), and students' needs to act for the benefit of social environment and online interactions during project implementation (B1-B3).

Students' perception of social participation through the Internet(A)	Students' needs regarding activities for the benefit of the social environment (B1)	Students' needs regarding social interactions with online content (B2)	Level of acceptance of activities connected with implementation of the project in the virtual environment (B3)	r
L=5	L=5.5	L=6.5	L=5.5	0.8

The average value for declarative social participation through new technologies during the work on social projects was 5 in the seven degree Lickert scale (1 =

I strongly disagree, 7 = I strongly agree, 4 = I have no opinion). The analysis showed the correlation on the level 0.8 ($p<0.01$), which means that students recognize the potential of virtual reality and their own opportunities to engage in social activities in this environment (absolute positive correlation).

Qualitative data gathered from the open-ended questions confirm the results obtained from the quantitative data. Table 3 shows the frequency and percentage values for the open-ended questions where students listed activities which support the most their relations with one another and with their teachers. Table 4 presents the frequency and percentage values for the open-ended questions in which teachers identified the indicators of "real participation" of students in the social life mediated by new media.

Table 3. Frequency and percentage values in the open-ended questions (4) where students identified (n=400) activities which support the most their relations with one another and with their teachers.

Activity	Frequency	%
online activities for the benefit of local communities	135	34
communication with teachers during collaboration on the project	133	33
maintainin the project sustainability	82	21
- implementation of a group project	50	12
Total	400	100

Table 3 shows the activities which, according to the students, support the most their online learning. These activities are viewed as beneficial in the area of building relationships in the school. Number one is online activity undertaken to benefit local community, second is communication with the teacher during collective implementation of the project.

Table 4. Frequency and percentage values collected from the open-ended questions (4) with teachers' declarations as for the indicators of "real participation" of students in the social life mediated by new media.

Participation indicators	Frequency	%
- understanding the social situation	208	52
- ability to initiate interactions	40	10
- ability to deal with negative online opinions	88	22
- active engagement in social affairs	64	16
Total	400	100

The analysis of the frequency of answers given by the teachers to the open-ended questions (Table 4) indicates that for the majority of them, the sign of real participation in social activities in the virtual environment, is when students understand the social

situation. Then there were *ex aequo*: ability to deal with negative online opinions and active active engagement in social affairs.

Discussion and conclusions

The study confirmed that social participation is viewed as positive by youths who recognize new opportunities provided by the online tools to initiate and engage in certain activities. According to Richardson and Swan (2003), direct conduct of teachers and the presence of other people are particularly important issues for people engaged in online education. Therefore, teachers' skepticism expressed in the survey does not inspire optimism when it comes to students' view of learning and satisfaction from collaboration with teachers. Despite collective social interaction with online content, social participation means individual involvement of each member of the social group, which is the highest level of development leading to social presence. Slightly lower on the list will be the individual interactions in the Internet, that serve social purposes, or individual interactions enabled by the Internet (Potyrala, 2017, p.293). The surveyed students declare they want to engage in such activities. We need to agree that educational community is on the brink of new age of online learning. Online learning is promoted as more cost-efficient and comfortable than traditional educational environment. It also provides more opportunities to continue education (Richardson i Swan, 2003, p. 67). Social presence theory, a sub-area of communication theory, postulates that a critical factor of a communication medium is its "social presence," which is defined as the "degree of salience of the other person in the (mediated) interaction and the consequent salience of the interpersonal relationships". Today, we can confirm that modern communication media are interactive media that significantly affect interpersonal relationships.

Cicognani and his team (2008) studied relation between social participation and sense of community among young adults, and the impact both of these variable have on the social well being. Hughey et al. (1999) argued that participation strengthens the sense of community. Social participation offers the opportunity to nurture social bonds with people outside their families and peers from different environments, and thus, helps them to find their sense of belonging and reinforce their social identity and identification processes (Cotterell 1996). In our survey, the students declare their willingness to collaborate. It seems that teachers too, once they overcome their biases regarding the possibility of real involvement of the students online, would be willing to use online environment to improve mutual relations during project implementation. McMillan and Chavis (1986) proposed z four-dimension model of social participation, with the following components: membership, influence, integration and fulfillment of needs, and shared emotional connection. Membership refers to the sense of being part of a community, and identification. Influence is the individual opportunity to participate in social life, individual contribution to mutual relationships. Integration and fulfillment of needs refers to the benefits people draw from their membership in the community. Emotional connection is based on the awareness of shared history, and bonds develop with time thanks to positive relationships with other community members.

In general, students have positive opinion about the role of IT tools in creating the space for relationships during work on educational projects. Teachers' view is slightly different. However, based on the result obtained, we can conclude that mobile devices and virtual environment may facilitate establishing the platform of communication between students and teachers, so they can engage in educational projects and social activities. It is possible under the following conditions:

- teachers and students must recognize the opportunity for collaboration by means of new media, not only for information and promotion purposes, but also:
  - during completion of shared educational tasks,
  - during implementation of projects focused on out-of-school community, or groups gathering individuals with common interests or cognitive goals,
  - to build trust between teachers and students, and develop relations that facilitate communication regardless of the communication tools used,
- teachers must improve their information competencies
- teachers must increase their level of the following competencies regarding digital tools which may support students participating in projects:
  - combining new and old media in the educational process,
  - development of competencies in the area digital pedagogy,
  - development of social competencies in the context of IT,
- development of education regarding responding to aggressive online behaviors and online behaviors in general,
- development of new media didactics that would include not only the methodology of teaching but also teacher-student, student-student etc. relations. We need new didactics that addresses educational objectives in terms of interpersonal relationships, communication and teaching the science.

Feedback and engagement are critical here as social interactions are very important for people. Our survey leads to a general conclusion that students view the presence of other people (friends and teachers) in their educational experience as important part of this experience. For them, virtual environment is a natural space for collective pro-social activities. School should use these abilities, as they are considered critical in the knowledge-based society. It should not ignore students' needs regarding the ways of learning and building relationships.

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School relations and online activity – Internet vs. social participation

Abstract

Using new technology tools in education process and presence of smartphones in schools raises many controversies. Addiction of children and youth to information and social networks is often emphasized. FOMO and different forms of bullying are the relatively new phenomena. Authors of the paper discuss the possibilities of using information and communication skills in school practice, asking to what degree mobile devices used in school didactic process contirbute to building a communication platform between students and teachers, to help

them engage in educational and social activities. Method and technique used to verify this hypothesis were diagnostic survey and questionnaire. A seven-point Lickert scale was used, together with a survey questionnaire with open-ended questions, addressed to students and teachers. The sample consisted of 400 students and 400 teachers from upper secondary schools.

The study focused on three aspects, such as forms of participation, areas of participation and participatory behaviors of students. The results show relations between the way teachers evaluate participatory behaviors of students and how they view the forms of joint participation in projects. As for students, there is a high correlation for general perception of social participation and the need to act for the benefit of social environment, using the opportunities provided by new technologies. The research results are discussed based on the subject matter literature. They can support the idea of education supported by mobile devices and ambition to build stronger relationships in schools, both between teachers and students, and between students.

Key words: school relations, Internet, youth, ICT in education,

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Theoretical study of some phenomena and processes in the course of organic chemistry

Introduction

In the context of increasing the pace of development of science, which contributes to the rapid accumulation of new knowledge and the development of materials and technologies of another generation, it is necessary to connect the processes in the educational system to the society evolution in order to prepare people adapted to the labour market conditions which are in a permanent change. These processes call for qualitative changes in the field of education whose primary objective is to synchronize research and technology transfer. Based on this, it is necessary to integrate the information and communication technologies in the training-educational process. The new demands of the school curriculum on Chemistry and the desire of pupils as well as teachers to use modern information tools in teaching-learning-assessment in Chemistry require a new configuration of the modern didactic design [1]. There appears a need to develop a new concept that would ensure the development of formative training with the use of modern technologies to help young people (pupils/students) discover the mysteries of the exact and natural sciences also with the help of information technologies - a motivating contemporary trend in education. Achieving a successful integration of training with research involves deep inter- and trans-disciplinary connections [2].

Today, modern chemistry is an area whose specific results contribute substantially to the development of human society. An important role belongs to organic chemistry, which develops in a stormy way, holds the largest share of compounds and deals with the establishment of the structure of the compounds it studies. Respectively, the composition-structure-property relationships, as well as the energy state of the molecules, require a profound and multilateral study. In order to propose specific examples of the study of the energy of organic molecules, there have been made theoretical researches of the isomeric phenomenon of some representatives of the hydrocarbon series and the condensation process of some aldehyde amines. The methodology can be used in the pre-university Chemistry course. For the specialties in the field of Chemistry at university level the methodology is mandatory, as well as in the context of scientific research on molecules and chemical phenomena.

Theoretical research methods

The results obtained in the modeling of the geometric structures of the studied isomers are based on the Density Functional Theory (DFT) with the exchange-correlation hybrid function B3LYP (Becke with the functional correlation of three parameters, Lee, Yang and Parr) [3, 4].

The calculations were made using the modern set of software GAUSSIAN 09. For all calculations the space symmetry C1 was used. Upon optimizing the structures of the five isomers of the hexane, the exchange-correlation hybrid function B3LYP was used and the standard basic sets 6-311G for carbon and hydrogen atoms.

Results and discussions

Theoretical study of the phenomenon of isomerism

Within the discipline of Chemistry, both the gymnasium cycle (form IX) and the lyceum (form XI, XII) [5, 6] it is studied Organic Chemistry where the students acknowledge with some physical and chemical properties, different methods of production and fields of use of organic compounds. The large diversity of organic compounds is conditioned by the phenomenon of isomerism, which consists in the existence of several combinations with the same molecular composition, but different structure and properties [7].

When studying the classes of organic compounds, the following types of isomerism are encountered:

a) Flat isomery (flat formulas are used): *chain isomery* (of structure); *positional isomery; functional isomery; tautomerism*.
b) Space isomery (stereo-isomery): *geometric (cis-trans); conformational; optical.*

Studying the phenomenon of isomerism gives students certain skills related to:

- establishing the causes that lead to the emergence of different types of isomerism;
- acquiring information about the concept of isomerism;
- skills and competences of material and graphic modeling of different isomers and of predicting some properties;
- understanding the need to study the notion and phenomenon of isomerism which explains the diversity of organic compounds.

The phenomenon of isomerism can also be explained by the use of certain notions in Physics, Biology, mathematical relations, which will form a complex thinking in pupils and will finally introduce them into the problem of the interdisciplinary approach and will teach them the ability to selectively use information from other related domains. These aspects will form the basics that will form in the pupils:

- the ability to use some notions and knowledge from tangent domains;
- the orientation in the field of research leading to deciphering inter-dependence between composition-structure-properties;
- the spirit and ability to select and analyze;
- the ability to formulate some hypotheses, to draw conclusions and, most importantly, to form the scientific conception about the surrounding world.

Chemistry as one of natural sciences with an experimental character has also accumulated quite a large theoretical background. Respectively, the correct and profound understanding of this background of theoretical knowledge can only be done with some specific means which in correlation with a minimal intellectual effort can lead quickly and efficiently to the goal achievement. One of these successfully applied methods in recent years at different levels of knowledge is *modeling*. Modeling as a learning method contributes to the brief acknowledging of the essential and characteristic peculiarities of objects, phenomena and processes, thus contributing to an active learning with conscious participation of the pupils by engaging them in logical and creative thinking and developing intelligence, thus becoming an agreeable and effective learning method. The use of computer quantum calculations allows pupils/students to determine the energy of chemical systems to conclude which theoretically possible isomers are stable and represent the real spatial structural configuration of the chemical compound.

Pupils' learning based on modeling develops creativity. When pupils are in new situations, the intellect begins to investigate and the investigation is a complex mental process characterized by the manifestation of seeking, analyzing and acquiring new information. The contemporary training-educational process must be focused on a heuristic spirit that enables pupils to discover unknown relationships and characteristics, to be active and accept algorithms and concepts dictated by the teacher to obtain new information and knowledge [8].

Future society needs personalities capable of adapting to new changes, self-taught, creative, initiative and investigative because science and technology will gradually reduce the difference between physical and intellectual work giving it the possibility of permanent and continuous training.

This study is based on the theoretical aspects of the phenomenon of isomery, which also describes some exact ways of organizing modelling learning by using the programs of calculating the energy state of the isomers and determining their stability. In both school and university, most of the time only the possible isomers of an organic compound are examined, but not the geometric structure and their energy state. From the multitude of theoretically analyzed isomers only the one with the most energy-efficient molecular configuration exists, but in most cases the teachers do not have the possibility to calculate the energetic state of the molecular system and to predict their existence. The proposed method may enable Chemistry teachers to bring compelling arguments by suggesting pupils/students practical activities to calculate the energy state of the molecular configuration.

As an object of study it has been proposed the theoretical study of the geometric structure and total energy of an organic combination with C_6H_{14} molecular structure (hexane) which possesses 5 chain isomers.

Optimization takes place in several stages, where for each coordinate change, it is calculated the electron energy in the given nucleus configuration (Table 1).

Table 1. Total energy (e.a.u.) and gap energy ΔE (kJ/mol) of the studied hexane isomers.

Nr.	Isomer	E_{tot} (e.a.u.)	$\Delta E=E_{LUMO}-E_{HOMO}$
1	n-hexane	-237.0794	9.71
2	2-methylpentane	-237.0790	9.62
3	3-methylpentane	-237.0775	9.56
4	2,2-dimethylbutane	-237.0770	9.39
5	2,3-dimethylbutane	-237.0787	9.49

According to the obtained results (Table 1), the relative energy curve of the studied isomers was elaborated starting from the structure of hexane by diminishing the main chain to four carbon atoms (Figure 1).

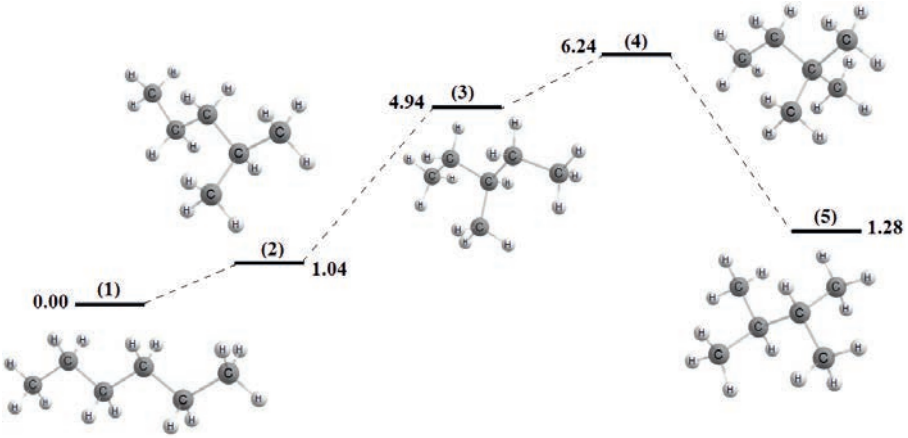


Fig. 1. The stabilizing energy of the hexane isomers (kJ/mol).

In this study the structure and energy stability of hexane molecule isomers have been analyzed. The most energetically stable isomer is hexane, while the least stable is 2.2-dimethylbutane with a stabilizing energy of 6.24 kJ/mol.

The described method can be applied to determine the energy status of organic molecules at both university and pre-university level.

Theoretical study of the condensation process

Several models that would allow the completion of some complex studies of molecular features [9] and some chemical processes can be proposed for the discipline of Chemistry.

One of the chemical processes encountered in the course of Organic Chemistry is the condensation process. For the purpose of organizing profound studies it is proposed to analyze an integrated training-research application model in which the condensation reaction of organic molecules to be studied by means of quantum-chemical calculations based on specialized software which allows the determination of the energy of the studied processes and the probability of chemical reaction. It has been studied the condensation process of 3-pyridinaldehyde with hydrazine under the ratio 2:1, resulting in a new organic product – 3-pyridinealdehyde azine.

The set of applied methods allows a detailed analysis of certain features related to the structure and properties of the new chemical compounds and is recommended for application at university level and for students interested in at the pre-university level.

Transition states were localized and verified by vibration analysis. For these transition states an imaginary frequency has been obtained, which demonstrates the presence of these activated states of the investigated systems. The values of the imaginary frequencies are described in the text and figures below.

The scheme of the reaction overall mechanism is shown in Figure 2.

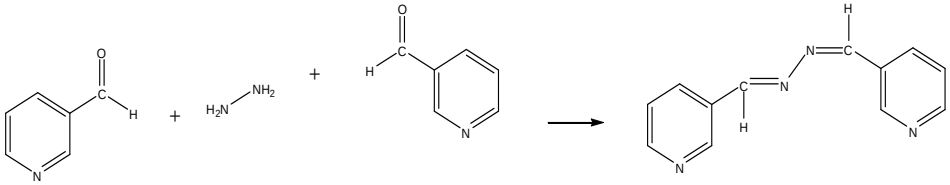


Fig. 2. The overall reaction of the examined mechanism.

Initially, the values of the total energies of the structure of reagent and reaction products are calculated (Table 2).

For each particle of the mentioned reaction the optimal geometry is determined and the total energies are calculated. In all cases it was considered that the spatial nuclear configuration of the studied molecules corresponds to the symmetry group C_1.

The values of the geometric parameters and the total energies for the studied species, obtained as a result of the optimization, correlate to a large extent with those in the literature.

On the basis of the obtained results (Table 2), the energy gain for this condensation reaction has been calculated to obtain an exothermic energy of -22.03 kcal / mol.

Table 2. Total energy of calculated systems.

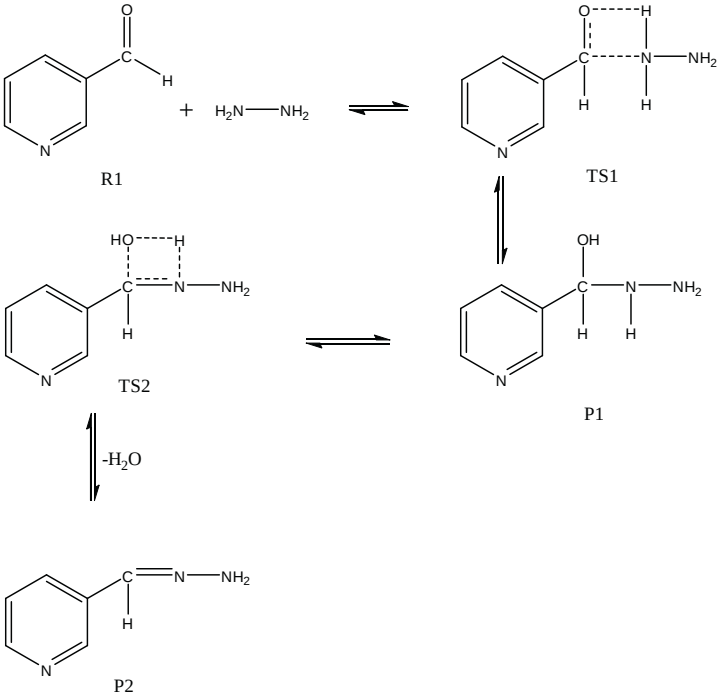
Species	Energy calculation	Total energy
Reactants (R)	2 • (-361.4999)+(-111.7853)	-834.7851
Produts (P)	-682.0479+2 • (-76.3861)	-834.8202
ΔE(e.a.u)		-0.0351

Based on this, we intend to calculate all the species involved in the reaction (reagents, reaction products, intermediates and transition states) and on the basis of these calculations to obtain the energetic profile of the studied reactions.

Later on it has been carried out the optimization of the geometric configuration of the pairs of molecules involved in the reaction that were initially in the immediate vicinity. The general aspect of this reaction, the way the particles interact and the reaction mechanisms act are described and discussed below.

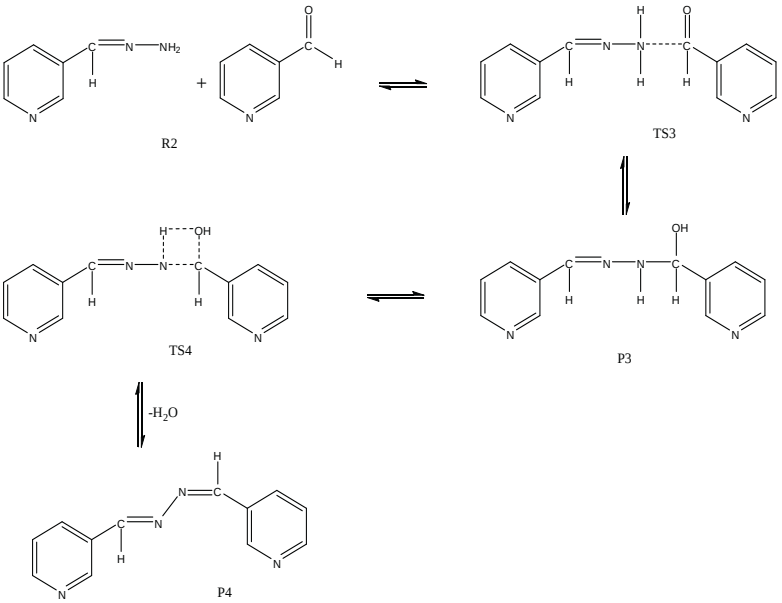
As mentioned above, the object of the study was the mechanism of condensation of 3-pyridinaldehyde with hydrazine according to the following two schemes.

I-st stage of condensation reaction:



Scheme 1. The first stage of condensation reaction.

II-nd stage of condensation reaction:



Scheme 2. The second stage of condensation reaction.

Optimization takes place in several stages where for each coordinate change the electron energy is calculated in the given nuclei configuration (Table 3).

Table 3. Total energies of reactants, products, transition states and imaginary frequencies of studied intermediates.

Species	Energy calculation	Total energy	Imaginary frequency
R1	2 • (-361.4999)+(-111.7853)	-834.7851	
TS1	-473.2707-361.4999	-834.7706	1432.10i
P1 -473.3349-361.4999		-834.8348	
TS2	-473.2618-361.4999	-834.7617	597.88i
P2=R2	-396.9430-361.4999-76.3861	-834.8290	
TS3	-758.3815-76.3861	-834.7676	1541.61i
P3	-758.4521-76.3861	-834.8382	
TS4	-758.3716-76.3861	-834.7577	1679.87i
P4	-682.0479+2 • (-76.3861)	-834.8202	

Figure 3 shows the energy profile of the entire condensation reaction cycle which includes four transition states (TS1, TS2, TS3 and TS4).

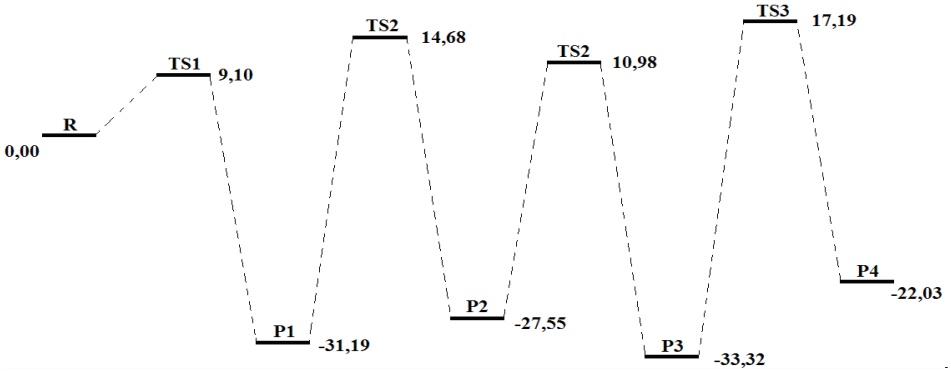


Fig. 3. Energy profile calculated for the entire reaction mechanism (all values are in kcal/mol).

For all the intermediate complexes (ST1, ST2, ST3 and ST4), more precisely for their optimized geometries, vibration frequencies has also been calculated to ensure that there is only one imaginary frequency that corresponds to a local minimum on the surface of potential energy.

The study of the energy profile of the mechanism as a whole confirmed that this is an exothermic reaction with an energy gain equal with 22.03 kcal/mol.

Conclusions: The use of calculations to determine the energy status of some molecular systems allows rational application and practice of theoretical knowledge in the field of Chemistry and the adaptation of IT skills to the needs and specifics of Organic Chemistry. On the basis of the previously done calculations, pupils/ students independently determine the energy status of each system, obtain the most advantageous spatial configuration of the studied compound and understand some structural features of organic molecules. Applying the methods of calculating the energy profile of chemical molecules based on contemporary information

technologies allows the physic-mathematical determination of the probability degree of the chemical reactions and, thus, contributes to the development of sustainable competences and the multilaterally research of some fine phenomena. These practical exercises allow the development of some individual aspects of the specialist and self-learning developmental capacity positively marking the trajectory of initial professional competence training.

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Theoretical study of some phenomena and processes in the course of organic chemistry

Abstract

The current trends of didactic methodology are oriented towards the formation of competencies applicable in the context of dynamic technology evolution. The educational system should provide pupils/students with opportunities to integrate knowledge from different fields in order to understand logically the essence of natural processes and phenomena. Integrating training with research into an interdisciplinary context presents one of the fundamental objectives of the contemporary educational system. Using computational calculations to determine the spatial configuration and energy of molecular systems allows the pupils to apply specialized programs to determine the most convenient molecular state and the direction of chemical reaction. This method allows the integrated development of chemistry skills and the use of information technologies to solve specific problems in the field, which enables the development of specialists with knowledge-applying skills in various work situations to respond to challenges of varying degrees of difficulty.

Key words: chemistry training, energy calculation, isomerism, molecular configuration, condensation, specific skills, inter-disciplinarity, professional competence.

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