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The new quality of academic education in the face of a civilisation change – the interactive problem-focused lecture

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The article presents important problems that colleges and universities will have to face in order to adapt its didactic offer to the requirements of the present day. The article is based on the research conducted by the author during the training of the researchers and teachers at one of the Polish technical universities.

KEY WORDS: education, modern academic didactics

Introduction

The information technology development is permanently changing the life of people today. A systematic change can also be seen in the output that has humanist or social connotations. The traditional letter has been replaced with the e-mail, while e-books and audiobooks are taking the place hitherto reserved for paper books. Libraries are becoming digitized. Wikipedia and e-journals have come around, while photoblogs, vlogs and blogs steadily replace

diaries and albums. New forms and models of communication and commonly used, e.g. discussion forums and social media. There are electronic information resources such as databases, repositories etc. The Internet has changed or extended the functional scope of products and the way they are used. Many traditional activities now have their modified counterparts in the cyberspace. The important advantage of the contemporary world is not only the fast and open access to information (Web 1.0), but also the possibility to share and co-create information (Web 2.0). For the present day generations immersed in the digital world, this situation seems obvious and natural.

The easy and immediate access to information on the Web and the possibility of personalization and exchange have significantly accelerated the decision-making process and have also impacted the speed and self-sufficiency in the case of solving problems in multiple fields. One could formulate a thesis that owing to the free access to online resources and services that broaden the set f available tools and the human cognitive field, contemporary people are more self-sufficient and emancipated. They can access and use depositories and they also can co-create them thanks to the available mechanisms. Due to the dynamically changing life environment which constantly offers new options to use digital method and cybertools, a contemporary human must put a lot of effort to learn and adapt to the new reality as well as to implement it creatively in everyday activities. This is what the digital civilisation demands. The qualities of contemporary generations, their active lifestyle, efficiency and the ability to adapt fast to new conditions as well as creativity are conducive to the development of key skills in the process of lifelong education.

Who are we teaching?

R. Friedrich and M. Peterson defined the contemporary young generation as Generation C (R. Friedrich, M. Peterson et al., 2010). It refers to three typical characteristics: *connect, communicate, change.*

What decides about belonging to this community is not only age, but also the openness to change and the speed of familiarisation with the new digital reality, i.e. acquiring the qualities of "digital natives". Most probably, the decisive moment occurs when the Internet and social media become the integral part of the generation's life (J. Morbitzer, 2012).

The specific feature of Generation C is constant experiencing in order to get more knowledge about the world. Having access to many sources of information, young people construe their knowledge syncretically. They build their own identity and seek balance that ensures stability ans security in the situation of permanent development. Such an approach to information is valuable in terms of being open to changes and new solutions. In fact, it is not a distinguishing feature. It belongs to every young generation. What has changed are the methods and tools used by young people nowadays. Generation C is more independent and self-sufficient than people in the previous stages of social development. Thanks to the constant online activities, people have naturally developed the sense of autonomy, the power to decide and the control over one's actions, including learning. Such attributes as the quick information exchange and decision-making, multi-tasking and resourcefulness derive from the activity on the Web. The research confirms that the cognitive activity of today's people in combination with the easy access to information considerably accelerates the learning process, including the solution of complex problems. The key matter is, then, the occurrence of the problem situation demanding intellectual efforts and solving it with the use of generally available method, tools and means, including the contemporary digital methods and tools. The stimulation of the cognitive curiosity with the consideration of the strategies employed by young people immersed in the virtual world makes it possible to achieve great educational results.

The constant activity and self-sufficiency of young people in the ever changing reality make them expect novelties from the education methods used in schools, colleges and universities. They expect change and adaptation of the educational process to the contempo-

rary strategies of construing knowledge. To them, the traditional learning models seem anachronistic and lagging behind the present day, especially when they consist in transmission of knowledge that can be found in other generally accessible repositories. They are unwilling to gain knowledge that has only to be remembered. It is demotivating when the knowledge transmission method is assessed negatively. Simultaneously, in their everyday activities, students have quick access to information and they efficiently navigate the online communities. The comparison of one's knowledge with the knowledge of others, mobility and the lack of space and time restrictions in the access to information which are so distinctive for the cyberspace drive the development of new strategies for problem-solving as well as encourage collaboration and engagement, motivating various activities aimed at broadening one's knowledge. At present, cognition is a phenomenological process in line with the principles of hermeneutics (Morańska, 2017).

It is, therefore, expected that for people to creatively make use of the possibilities offered by the new life environment the educational process must prioritize the educational forms and methods which drive the development of problem-focused thinking by using the potential of the learning subjects. Their use should be conducive to reflectiveness (Perkowska-Klejman, 2013) and responsibility in the process of construing knowledge. This issue is considered by B. Bloom and B. Niemierko (Bloom 1984; Niemierko 2002) in the taxonomy of educational goals. Both researchers underline that the educational process should achieve the top goals related to the acquisition of the skills to operate knowledge. *Learning by doing* by J. Dewey is, then, the standard for all present-day organizers of education, including academic teachers. The task of contemporary teachers is to direct and manage the process of students' building up their knowledge as well as to organize a proper learning environment for them.

The continuation of the work on artificial intelligence will have the following result: the personal and professional success will be the reward only for creative individuals who are open to changes

and reflective, who think ahead and can collaborate. Developing such skills and competences is now deemed more important than gaining detailed knowledge which is undergoing dynamic changes.

The key to satisfying the learners' needs and providing them with conditions for active learning is the extension of the set of didactic skills of teachers by adding the problem-focused teaching methods to the academic didactics (Morańska, 2017).

A new perspective on didactics

The new activity models in the world which is a synergy of the real world and the virtual world as well as the change of tools and methods used by contemporary humans have become an essential problem in the present-day didactics, especially in the academia. It can be easily seen that the traditional models of academic education (e.g. the standard informational lecture) do not give the expected results.

The contemporary approach to the educational process needs to include multiple integral elements which interact in a synergistic way. The key elements are:

- the specific qualities of the subjects participating in the didactic process, including their experience as well as the cognitive strategies used in everyday life; in consequence, it is possible to understand the learning mechanisms employed by contemporary students and to adequately plan the educational situations that will correspond to their preferences,
- the educational environment and its correspondence to the life environment of the learners,
- a high level of activity in the learning process,
- a high level of motivation to learn.

One of the key factors that influence the achieved results of education is the stimulation of the motivation to learn. It can be safely concluded that in the contemporary academic didactics it is not only

the "what" (the educational content), but also the "how" (methods of presenting the content) that drives the effectiveness of the educational process. The questions most frequently asked by students are: "why am I learning this", "what is the point of it?" It is necessary to consider answers to these questions in the planning of the educational process and the arrangement of educational situations by the lecturer.

The adoption of the constructivist paradigm in modern-day didactics (Bruner, 1987) introduces crucial changes in the perception of the educational process and redefines the traditional teacher and student roles. In consequence, the student is perceived as an active subject who construes his or her knowledge in a social environment when performing tasks in line with the educational situation planned by the teacher. The role of the teacher is to manage the learning process of the students. The adoption of the principles for organising the educational content significantly increases the motivation to learn.

1. From the general to the detail, the idea is to present the educational content in a wider context and in keeping with the principles of correlation of the content.
2. From practice to theory, the idea is to indicate where the acquired knowledge can be applied, which justifies the need to acquire it, in line with the principles of the research process.

Respecting the principle of correlation of the educational content and setting the knowledge acquisition in a wider context encourage students to build the structures of knowledge and its organization. The adoption of the principle related to the practical application of the knowledge by presenting examples of how it can be used in situations connected with the given profession or the environment in which the students function makes it possible to see the usefulness of the knowledge and makes the students want to gain it. Teachers of highly abstract subjects (e.g. mathematics) will face the most difficult task in this respect.

Description of research

The described model of the lecture is a proposal based on analyses of the traditional academic lecture and its adequacy to contemporary requirements. The research participants were 28 academic teachers who took part in the training related to the improvement of academic education. These teachers are not pedagogues. The research used the method of individual cases and the technique of competent judges. One should underline the high commitment of the participants in performing the task of developing methodical solutions that are possible to implement in the process of educating students in order to make it more effective.

The research covered the search of the means to make students more engaged in the process of learning. The following issues were indicated as needing improvement:

– low attendance of students at lectures,
– the way that students prepare for exams following the unwritten rule of "memorize, pass and forget",
– poor engagement of students in tasks and projects,
– negative and unethical behaviours such as imitation, plagiarism and superficial analyses.

The research participants took part in the training courses on the implementation of modern methods of education in the academic didactics. The training was based on the Design Thinking method. Before the potential solutions were developed, there was the empathy stage that consisted in the in-depth analysis of the university students. The next stage was the definition of problems that needed solving.

In this respect, the following tasks were considered in designing the changes to the educational process:

– to make students more interested in the participation in lectures,
– to develop design thinking, creativity, reflectiveness and, in consequence, the responsibility for the learning process,
– to start group processes that would allow to develop social skills.

The interactive problem-focused lecture

Is the contemporary lecturer still a lecturer in the traditional sense? The research participants believe that the answer to this question is "no". What needs to be changed is the manner of presenting the educational content and the role of the lecturer. One of the proposed solutions is the interactive problem-focused lecture where the lecturer engages the students in collaboration in order to solve the problem that is the topic of the lecture. When the academic teacher interacts with students, he or she refers to their experience and knowledge.

It was determined that each problem-focused lecture should:

– start with the opening question to which the answer would be given during the lecture,
– next, by asking prepared and correctly formulated detailed questions, the lecturer and the students move forward together to solve the problem,
– if there is no feedback from the students, the lecturer gives the information and asks the next question,
– visualization can be used to make the presented information more understandable.

The lecturer is the guide and the mentor who leads students from the knowledge they become aware of to solving the problem, inspiring and provoking them to think and reflect on the next stage of the solution.

The case study method with references to real-life situations and events can be used to prepare the problem-focused lecture. The key task is to activate the students and stimulate their cognitive curiosity, reflection and intellectual efforts.

In the opinion of the lecturers, the use of activating elements can make students more focused and engaged during the lecture. One of the proposed solutions is to organize a quiz during the classes in order to check the students' level of understanding of the presented content. The control situation can be arranged during or after the lecture. People with the best score can be rewarded in line with join-

tly defined rules. The simple cloud application Kahoot.com can be used to prepare the test. This methodical solution can improve the students' active listening and attendance. The quiz allows to summarize the key topics in the educational content by giving them a specific structure. The way and scope of understanding of the lecture topics are also checked. The advantage of this particular solution is the immediate feedback on the students' progress. The analysis of the quiz results allows to see in detail which content has been understood sufficiently and which has not. The drawback of this solution is the necessary Internet access during the classes. Due to the low, but nevertheless existing probability of technical problems, it is not recommended to use the application for grading the students. Another solution suggested by the research participants in order to encourage the learner's active engagement in the lecture is for them to make graphic notes (e.g. thought maps) illustrating the subject matter of the lecture.

"It used to be the chalk and the blackboard that were enough to make the lecture understandable"

When the lecturing method was discussed, it was pointed out that the lecture could be ineffective despite the use of visualization in order to facilitate the understanding. First, the analysis covered the course of the traditional lecture with special consideration of the role of images on the standard blackboard or on prepared sheets. This case analysis resulted in the following conclusions:

- the lecturer mostly used the spoken word, while the illustrations served to present the key pieces of information that were sequenced in such a way as to form a structure of the content (idea) and the illustrations were discussed during the lecture,
- the illustrated content was crucial for understanding the subject matter,
- the display sheets/boards contained images that were discussed by the lecturer.

To sum up, the visualization complemented the spoken word during the lecture and made it easier to understand. The image was connected with the verbal communication.

The next task performed by the lecturers participating in the research was the analysis of the presentations prepared for the lecture with the use of dedicated applications (e.g. PowerPoint). The analysis detected the following errors of method:

– the presentations often contain too much text, which makes it difficult for the students to follow the lecture and see its main points as well as to understand the essence. They are focused on writing down the text from the presented images, because they want to make it before the lecturer changes the slide,
– simultaneous discussion of the displayed long textual information – the students must choose: either listen or make notes, which is uncomfortable and disrupts the perception of the content,
– a particularly wrong practice is when the lecturer reads the text from the slides,
– the students stop listening actively when they know that the presentation will be later sent to them,
– a badly prepared presentation – the images are too small to be seen by the students at the other end of the hall – the students are unable to interpret the content correctly, the multiple colours and fonts make it difficult to order the content, the lack of contrast and the blurring colours make the image illegible.

The result of the analysis was to define the purpose and the rules of preparing and sharing the lecture presentation.

– Similarly to the traditional blackboard, the content of the presentation should cover only illustrations that facilitate understanding of the lecture (diagrams, tables, charts, drawings, comparisons) and the visualizations should be chronologically correlated with the discussed topics. The slide should not replace what the lecture wants to say. It should be remembered that the lecturer never wrote the entire content on the blackboard. The rule is to minimize the text.

– When the presentation is prepared, the lecturer should check if it is visible and legible from each part of the lecture hall. Longer descriptions should be replaced with symbols whose meanings can be explained at the start of the lecture.
– Colours, types and attributes of the font should be related to the structure of the presented information. It is recommended to use one type of font (preferably sans serif). The structure of information should be created by means of the font attributes (size, bold, italics, underline). Colours carry meanings, so they should be used to indicate the key information or warnings.
– Contrast must be applied as the basic rule during the preparation of the visual presentation.

Another crucial issue was pointed out in the course of the analysis. By displaying information that is full of text, the lecturer will very likely be asked about sharing the visual material. It would be perfectly correct provided that the students treated the presentation as a compendium to be used for further study. Unfortunately, they often approach the received textual material as the main source of preparing for the exam. It must be noted that the conclusion "let them learn at least this" limits the students' intellectual effort related to the in-depth analysis of information and the search of solutions associated with the learned field based on multiple sources and, moreover, it limits their cognitive activity. In extreme cases, it may even lead to the following explanation by the student: "I didn't get materials from the lecturer, so I didn't prepare for the exam".

It was concluded that the solution could be to create a repository of presentations for the lecture, illustrating the covered topics, which the students can print and bring to lecture in order to fill in additional information, while listening actively. Such a repository could be made available on the university's e-learning platform. The studies show that students' notes made in such a manner differ depending on the actual knowledge of each student.

The presented solutions arrived at by the research participants refer to the studies described as part of the psychology of education

(Mietzel, 2003) and psychology of motivation (Franken, 2013). They will be implemented into the educational process in the next semester and evaluated.

Conclusion

The contemporary academic didactics is changing. It needs modification in terms of educational forms and methods in the context of the present-day goals of education. The best strategy could be the use of new methodical solutions which improve the students' engagement in the learning process, motivation, collaboration and healthy competition. In the contemporary learning process, it is crucial to develop thinking, self-reflection and self-perfection. It is also important for the students to achieve a certain level of meta-learning.

The modification of the present-day academic didactics is absolutely necessary. The academic staff must move ahead past their own of educational experiences which are usually inadequate in today's environment.

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