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HOW PROSPECTIVE BIOLOGY TEACHERS OF THE SOFIA UNIVERSITY SEE THE PLACE OF TECHNOLOGY IN THE SCHOOL OF THE FUTURE

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Keywords: technology, prospective biology teachers, school of the future

Abstract: Taking and reasoning a particular position on a major public problem requires students to be able to form and defend their own position, responsibility and ethics. The essay, as a type of argumentative essay, implies an original presentation in a free prosaic presentation of the author's idea, assessment or experience related to an actual and socially significant problem. The essay contains personal author's thoughts and conclusions about the problem (topic), presented in concise and original form. It is distinguished by a clear and unambiguously formulated author's thesis on a defined subject. The thesis as a precise and clear statement must be purposeful and thoroughly substantiated. The purpose of this article is to study the motivation and attitudes of student's prospective teachers of biology about the place of technology in the school of the future. Argumentative essays of first year students of the pedagogical programs at the Faculty of Biology of Sofia University "St. Kl. Ohridski" were analysed. The methods used are theoretical analysis and synthesis and pedagogical modelling. The objective of the argumentative essays was for students to clarify their point of view on the posed problem - "The Place of Technology in the School of the Future" through influential language. For this purpose the students chose and used appropriate styles and linguistic means for artistic impact, symbols and symbolic interpretations, unexpected thought twists, innovative forms, etc. Students refereed to personal experience, emotional empathy, authority opinions, specific examples, etc. The emotional argumentation of the thesis and the associative framework for structuring the arguments predominated in their essays.

INTRODUCTION

Teacher profession is unique in its character. It blends a peculiar combination of knowledge, skills and competencies to apply a faithful approach to day-to-day work with students. A good teacher must have not only knowledge but also

needs to be a good pedagogue and psychologist, to properly administer love and strictness to children, to make them believe him/her, to be attractive to assert a position.

The Internet and the revolution of mobile technologies have an impact on the consumption habits of knowledge. Schools are still in the center of the learning process, but the classic model is gradually being exhausted. Today, anyone with access to the Internet can go through a "basic training course", regardless of the information gathered, the sources and the level of qualifications. Some of the world's largest universities offer basic education and fundamental science through online courses (Cooper, 2003; Thomson, 2009).

Self-education or autodidactism (Barab *et al.,* 2001; Bach, 2009), is becoming the new paradigm of the modern life. The field of education is accessible to all ages at any time. With the continuous development of technology and the opportunities for self-education, the structure of consumption and the transfer of knowledge are changing. This created new needs in the educational process. The new type of teachers should be able to use the whole range of multimedia content, to work remotely, to "feel" learners without direct contact (The Room 241 Team, 2013; Shaw *et al.,*2014).

The main features of the innovative teacher are:
• to be flexible in work, thinking and daily routine;
• to be able to apply an individual approach to the student;
• to work towards adequate feedback that measures the level of teaching material absorbed and the level of satisfaction in learners;
• to offer adaptive learning that builds on individual skills;
• to create training that is consistent with the student's healthy lifestyle and the impact of technology on the body;
• to apply new presentation techniques and technologies, including working with large databases, applications, 3D interface modules, holograms and virtual reality.

In general innovative educators should be reflective, learners, creative, connected to students, collaborative, inquisitive, and principled. Innovative educators live life according to strong values. They believe that being an educator is a great way to make their mark in the world and they don't take it for granted. They believe in being a role model to the students, they serve and look for opportunities to show they care by their actions and not just with words. They also care enough to make tough decisions even when it's not popular (Watanabe-Crockett, 2015).

In the theory and practice of evaluation there are different "manifestations" of the acquired knowledge and skills, as well as different approaches to their verification - reproducibility, productivity, creative application of knowledge and skills, application in standard and non-standard situations.

One possible option for creative application of knowledge is the academic argumentative essay. The essay is a thought experiment. Each essay is a freely structured text, with no mandatory patterns and preliminary models, as the author's creativity and imagination is leading in its content (Asenova and Yotovska, 2011).

The essay, as a type of argumentative composition, implies an original presentation in a free prose of the author's idea, assessment or experience, related to an actual and socially significant problem. The essay contains personal author's thoughts and conclusions about the problem (topic), presented in concise and original form. It is distinguished by a clear and unambiguously formulated author's thesis on the subject. The thesis as a precise and clear statement must be purposeful and thoroughly substantiated.

MATERIALS AND METHODS

The purpose of this article is to study the motivation and attitudes of prospective students of biology about the place of technology in the school of the future.

The methods used are theoretical analysis and synthesis and pedagogical modeling. Argumentative essays of students of prospective biology teachers from the first year of pedagogical programs at the Faculty of Biology of Sofia University "St. Kliment Ohridski" have been analyzed.

The objective of the argumentative essays was for students to clarify their point of view on the posed problem - "The Place of Technology in the School of the Future" through influential language. In it, students, future teachers of biology, present evidence and arguments to prove the thesis "Information and Communication Technologies have a specific role and place in the school of the future". The study was conducted in the period October - November 2018 and covered 48 first year students from the specialties Biology and Chemistry, Geography and Biology and Biology and English at the Faculty of Biology, Sofia University "St. Kliment Ohridski". Students produce essays within the obligatory course Information and Communication Technologies in Biology and Digital Work.

The academic essay as a creative scientific elaboration

The students, future teachers of biology, were provided with information about the academic essay as a creative scientific work. The key points in this information were several:

• the essence of the essay is in the reasoning achieved through the depth of thought and emotional empathy (Asenova and Yotovska, 2011).

• in the process of preparation the student should demonstrate the ability to argue his own thesis, to prove a statement, to construct a logically related text, to follow the structural requirements (Mavrodieva, 2005);

• the essay is a type of reasoning - it is the product of the evidence-based

thinking, where each opinion is supported by arguments, exposing and justifying a certain opinion;

• in the search for argumentation the guiding principle is the associative principle - one thought spontaneously brings out another, with which it is connected by some sign;

• the essay's presentation is characterized by an individual view of the problem, the heterogeneity of the arguments, originality (Yotovska and Asenova, 2013);

• the essay as a genre that allows freedom of thought, free positioning;

• the problem breaks through the individual student's viewpoint;

• Students choose and use appropriate styles and linguistic means for artistic impact, use symbols and symbolic interpretations, unexpected thought twists, innovative forms, etc.

• Scientific argumentation - statistical data, research results, rational evidence, etc. is also used to support the thesis.

• Students refer to personal experience, emotional empathy, authority opinions, particular examples, etc.

An outline plan was developed to assess achievements with two core centers: evaluation of the essay content and essay structure (formal-language and technical criteria). An analytical approach is used where "The Place of Technology in the School of the Future" is analyzed and the respective characteristics are determined.

Students should deeply and thoroughly explore the school of the future, modern information and communication technologies, and look at all the "pros and cons" of using these technologies in the learning process. They are part of the evaluation criteria - thus defining the main aspects of the expected response. This is the content part of the essay. It provides information on the specific parameters to be covered by the students.

The content of the essay is part of the specially developed system of evaluation criteria that applies equally to all students' answers (Asenova and Yotovska, 2011). The evaluation criteria are known to the assessed students. The purpose is to give students opportunity to organize their responses according to the evaluator's requirements in order to increase the validity of the assessment as well as self-reflection.

An important element of the rating system is the definition of a performance standard. This is the acceptable minimum level of knowledge and skills that students have to demonstrate in order to achieve the set goals. In the course of the examination, the adequacy of a sample is assessed on the sample of students' answers and, if necessary, it was refined (Yotovska and Asenova, 2013).

Work is assessed separately for each individual criterion that carries a certain number of scores. The final score (overall test score) is formed as the sum of the scores for each criterion. The overall test score is then transformed into a six-point assessment grade, according to the assessment system in Bulgaria (Asenova and Yotovska, 2011).

In the introduction section, 38 of the students used the most common narration (79.1%). A less common approach to introduction is a specific fact – 8 of the students (16.7%), quote - in 2,1% of essays or by rhetorical question – 2,1% (**Fig.1**).
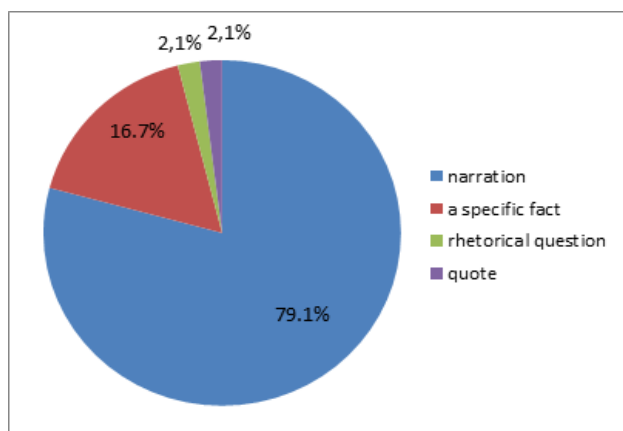
Fig.1. Percentage distribution of styles used by the students in the introduction section of the essay (n=48).

The overall impression is that, as a whole, the introductory section of the student essays succeeded in bringing the reader's attention and orientation to the content and direction of the essay development.

The thesis was the main leading thought of the essay that expressed and revealed the purpose. The analysis showed that it was clearly formulated in 64.6% (31 of the students) of the essays and defined the direction of the essayistic exposition. It is noteworthy that 91.6% (44 of the students) worked on the antithesis "technologies are applicable in the school of the future" and only 8.3% (3 of the students) represented the school of the future without technology. The main part of the students' essays with adequate exposition, evidence and arguments were in support of the antithesis.

Bellow are several examples of student essays from the study (these examples were translated from Bulgarian to English).

"The learning environment should encourage learning and enable pupils to come into a real environment. The integration of technology in the learning process is extremely important as it contributes to assessing pupils' personal development. The technologies change the way of teaching, they are the new way in education that our country should follow and support." Teodora T., Biology and Chemistry program.

In 54.2% (26 of the students) of essays the exposition was fluently but generally organized logically and purposefully. The main part was structured correctly in paragraphs. Evidences were collected from various sources - scientific literature, popular science literature, media, and interviews with students. The essays responded with strong emotional engagement of 43 students (89.6%). Students made facts, voice opinions, evaluated arguments and ranked them successfully, evaluated the place of technology in the process of learning in the "school of the future".

An example of student essays:

"Through technology, children visually perceive information much easier. Even in school age they can rely on tables, diagrams, charts, and results in further development." Pavel V., Biology and Chemistry program.

"Webinars and different platforms, e.g. "Wikipedia" has a serious impact on student education. Without them, it is impossible to have a learning process that is attractive and to "whip up" the students." Aylin A, Biology and Chemistry program.

"Technology makes sense only when the learning process is more effective. For example, students can quickly find information about a research project by entering the Internet. This develops the skills to search, select information, analyze, work in groups, etc." Plamena G., Biology and Chemistry program.

In the essay on The Place of Technology in the School of the Future, the most commonly used models for organization of the main part was the reason - consequence (58.3%), ascending or descending gradation of the arguments (22.9%). Less often, students applied the "questions-answers" strategy (state the nature of the problem, then propose one or several solutions) (10.4%). chronological order (8.3%), and the models from the general to the particular and vice versa are missing. It is noteworthy that the student's work did not used the comparison and opposition model - a school using technology and a school without the use of technology that requires highlighting similarities and differences (Reiner *et al.,* 2002). This is most likely due to several reasons. First of all, the students' belief that technology is an integral part of the future school. Secondly, it is a fact that in the modern world, technology enters everyday life at a faster pace than any other aspect of human life. Education is one of the areas in which today's technologies can make a huge contribution, but unfortunately remains in the background for one reason or another. The technologies and education prepare students for life outside school. Technology has passed the "inaccessibility" barrier for many people today and is already part of what many call "general culture." Computer skills and document layout and presentation materials for the classroom help to further develop on a professional level.

Information and Communication Technology contributes to more interactive learning. Through different types of software, learning material can be presented in a way that enables students not only to look at the learning process but to

become part of it. Technology gives access to more and more comprehensive information. Access to computers and the Internet allows students and teachers to get acquainted with interesting facts and curious information about the material being taught (Gurin *et al.,* 2002; Barakzai, 2004; Guri-Rosenblit *et al.,* 2007). Technologies help communicate with students and their parents, provide them with timely feedback and real-time information. Thus the triad 'student-teacher-parents' becomes more close and meaningful for the process of learning.

The main essentials in the essay, organized by the cause-effect and question-answer models are expressed in the next paragraphs. In the students' essays the emotional argumentation of the thesis and an associative framework for structuring of the arguments predominated.

Examples of student essays:

"Technology allows a different way of appraising students. There are applications in which teachers can see within a few minutes which children the type of answers they are doing better. There are also analyses of how the whole class is dealt with as a group, as well as for each student separately." Avraam G., Biology and English program.

"Experts are categorical that contemporary Bulgarian schools should follow technological developments and adapt to them. Its environment should resemble the natural environment of students' lives - to have spaces for shared learning and teamwork; to have a technique to serve the students; classrooms to be organized at places, especially for younger students. Globally, this is extremely popular, and the idea of classroom classes and teachers' podium must be totally forgotten." Vladimir K, Biology and English program.

However, with the introduction of technologies in Bulgaria, new challenges are emerging. The main problem is the lack of funds for modernization. A number of schools make laboratories, interactive classrooms and cabinets with their own funds or funded by a foundation. Greater schools in the country are able to provide the most needed technology to their students, but they are still far from being sufficient. On the other hand, there is a lack of confidence and ignorance of new technologies on the part of teachers in modernized schools and they encounter serious training challenges. Teacher's ability to integrate technology into education is extremely important. Many of them are not prepared for challenges of technology implementation in the learning process that again shows the need for a change in our education system. Efforts are needed to train teachers to make full use of classroom technology and to provoke students' interest. When properly taught, the effect of technology is positive.

The Information and Communication Technologies sector is developing with strong and accurate resource management; it can be of great help to teachers in organizing classroom work, presenting teaching materials, and introducing extracurricular activities and forms. Most of the students (64.6%) use the general findings. Foreign ideas are not always clearly distinguished from their own –

29 (60.4%), but they are logically consistent with each other (77.1%). Evidence "for" using technology at school is clear, meaningful and diverse (66.7%).

Examples of student essays:

"The use of new technologies with the active participation of students has a positive impact on their ability to link theoretical knowledge with the solution of practical problems." Velmira G., Biology and English program.

"School education should aim at preparing pupils for life. They must be competitive and be able to find the right job after graduation. Considering that technology is an integral part of any profession, children have to go out of school, ready to use them." Ilian G., Biology and English program.

"Technologies are extremely useful in effective schooling. They can increase students' interest in the material to be learned." Tony G., Biology and English program.

"I see the application of future school technology to develop teamwork and learning skills to achieve higher results. Technologies would allow an individual approach to each student. Thus, teachers will be able to focus on the knowledge gap of each learner individually. The possibility of distance learning could also help improve the learning and accessibility of all." Kristina S., Biology and English program.

"Educational cinema, electronic digital textbook reader, personal laptop, educational platform, holograms and models for displaying 3D images, computer screens with touch screen, camera for recording lessons, video chat with teacher in difficulty for students to learn the material, electronic diaries in every school, turning rooms into multimodal spaces that connect to each other through glass walls or movable partitions - these are just some of the characteristics of the school of the future." Alex A., Biology and Chemistry program.

The conclusions summarized the main arguments that support the essay thesis (77.1%). Conclusions were convincing (87.5%), which confirmed the overall impression that the work is complete. Some of them (45.8%) repeated the main conclusions, sentences or excerpts from the exposition. Eighteen students (37.5% of the works), demonstrated skills for generalization.

The essay style was generally impressive. They were literate with various syntactic structures in use. They were distinguished by proficient expression, richness of the phrase and vivid language, using different artistic expressions and means - antithesis, comparisons, and gradation. The essays had correct punctuation and spelling.

The most common mistake in the academic essays on "The Place of Technology in the School of the Future" was the selective transcription (60.4%). Another common mistake was the repetition of the main conclusions, sentences or excerpts from the essay body (45.8%).

It can be summarized that the argumentative essay, as a type of writing, can be applied in the first year students, future biology teachers. Students demonstrate

skills in writing their position on a given subject and defend it argumentally by following the rules of the Bulgarian literary language. The student essays under study are distinguished by: text alignment with the topic set; clearly formulated thesis; bringing in sufficient, adequate and logically bounded arguments to support the thesis; well-defined structure of the exposition - thesis, evidence, conclusion (with clear logical transitions between its parts); spelling and punctuation and the appropriate use of language means of expression. It has to be concluded that students should work toward avoiding selective transcription and plagiarism.

CONCLUSION

Standing and argumentation of a particular position on a significant public problem requires students to develop and defend their own opinion, responsibility and ethics. The application of the essay skills in higher schools allows the diagnosis of the creativity and creative attitude of the students, future teachers of biology. Writing an essay represents the student as an author who has his own cognitive and affective style.

The essay as a literary form is free from the limitations of genre frames. It provides an opportunity for students to think about causal links; life and science examples; comparing and / or opposing facts, signs, phenomena; thoughts of famous people.

In the preparation of future biology teachers, the essay is applied as a specific way of thinking and attitude to the world, and as a tool for motivating and evaluating learners.

The Initiative for Technology Implementation in the Bulgarian School is welcomed by all - students, teachers and parents (National strategy for the development of pedagogical staff, 2014-2020). There is a need to change in a few basic directions - environment, technology, pedagogy, teacher training. The new technology environment contributes to the students' personal development and motivates them to achieve higher results.

The future is outlined - a modern education based on digital technology and entrepreneurship.

AUTHOR CONTRIBUTION STATEMENTS
K.Y. and V.N. conceived of the presented idea. K. Y. developed the theory and performed the computations. V.N. verified the analytical methods. Both authors K.Y. and V.N. discussed the results and contributed to the final manuscript.

K.Y. and V.N. carried out the experiment. K.Y. and V.N. wrote the manuscript. K.Y. developed the theoretical formalism, performed the analytic calculations and performed the numerical simulations. Both K.Y. and V.N. authors contributed to the final version of the manuscript.

Both authors K.Y. and V.N. conceived and planned the experiment, carried out the

experiments and contributed to the interpretation of the results. K.Y. took the lead in writing the manuscript.

Both K.Y. and V.N. authors discussed the results and commented on the manuscript, contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

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