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PEDAGOGICAL SCIENCES

IMPLEMENTATION OF THE INNOVATIVE PROGRAM "3-D HAOC" IN THE EDUCATIONAL PROCESS AMONG THE MEDICAL, PHARMACEUTICAL AND DENTAL FACULTIES IN VINNYTSIA NATIONAL PIROGOV MEMORIAL MEDICAL UNIVERSITY

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Introductions.

Innovative technologies and their rampant implementation in programs and mobile applications on gadgets during the educational process have turned classic and traditional teaching methods into an exciting interactive educational process, whilst making them accessible and making learning effective for students.

Let's consider the subjects that are studied in the 1st year of medical universities among medical, pharmaceutical and dental faculties: Organic Chemistry and Bioorganic Chemistry.

The presentation of the material and conducting practical classes in institutions of higher education, without a proper base and appropriate training in schools, does not give an opportunity to focus on the key points of solving typical, situational, practical problems related to isomers of various classes of organic compounds.

Starting with the events that were caused and propelled by COVID-19, almost every citizen, pupil, applicant, student now freely operates and receives materials through mobile applications and properly uses this information on various online platforms in a distance form of education.

Multimedia resources and traditional forms of education have been replaced by

interactive web platforms as well as websites and programs that are represented by interactive stimulating exercises and tests, not to mention cloud technologies which are used for saving and exchanging information and the further thorough work on many scientific projects.

Aim.

When studying important and complex subjects such as chemistry, an interactive learning experience will be provided in the form of computer programs and mobile applications for virtual simulation of chemical experiments, which will allow students to perceive, operate and use the acquired skills efficiently.

Nowadays, there are several programs and their applications available namely: ChemDraw, ChemSpider, PubChem, Avogadro, and Chemistry Assistant. It is thanks to these programs that we can improve and strengthen the gaps in chemistry education and review or perform an experiment virtually, in the absence of practical classes, however, not all these applications fully meet the modern requirements and standards of the educational process.

During the last four years, applicants and students have shown a lack of sufficient knowledge and skills in Organic Chemistry, notably when performing test tasks at school, at NMT and especially during university studies in such disciplines as: Bioorganic Chemistry and Organic Chemistry.

This gap in knowledge presented modern challenges to the pedagogical process

at the basis of the study of chemistry, there was a need to create and develop an innovative program known as: “3-D HAOC” (3-D HOLOGRAPHIC ATLAS FOR ORGANIC CHEMISTRY) as a mobile application in APP (APK) format.

With the help of the knowledge and experience I garnered whilst working in the field of teaching, I decided to help future students and took part in the founding of project: “3-D HAOC”.

The application can be used by educators of medical, pharmaceutical, and dental fields, as well as by schoolchildren, applicants and students studying specialized chemical disciplines.

The program is aimed at facilitating the better understanding, assimilation, and deepening of basic material based on isomers of all classes of organic compounds apart of the first ten members of the homologous series.

Materials and methods.

The purpose of using the program is to collect, systematize, and generalize information the thousands of variants of isomers and their radicals of the homologous series, modelled using the chemical editor ACD/ChemSketch, as well as examples of organic compounds so as to find this information easier, on a specific class of organic compound and all its possible isomers in 9 languages of the world.

The basis of the technical link of creation of "3-D HAOC" is (Fig. 1):

- programming language: Dart;
- software framework: Flutter;
- development environment: Visual Studio Code + Android Studio;
- DBMS: not used;
- client-server architecture: not used;
- object-oriented programming was used in compliance with all relevant practices.

Results and discussion.

This material will be a pivotal and significant contribution to the educational process in the study of Organic Chemistry and Bioorganic Chemistry in many countries, due to its philological component — translation in 9 languages.

The use of the program is available now, as a mobile application only on smartphones run by Android.

Currently, the program includes 11 classes of organic compounds and work is currently underway to add 5 more classes of compounds. The program also presents all possible isomers for the first 10 members of the main representatives of this homologous series, as well as radicals of isomers for each of the classes of main representatives of this series. (Fig. 1)

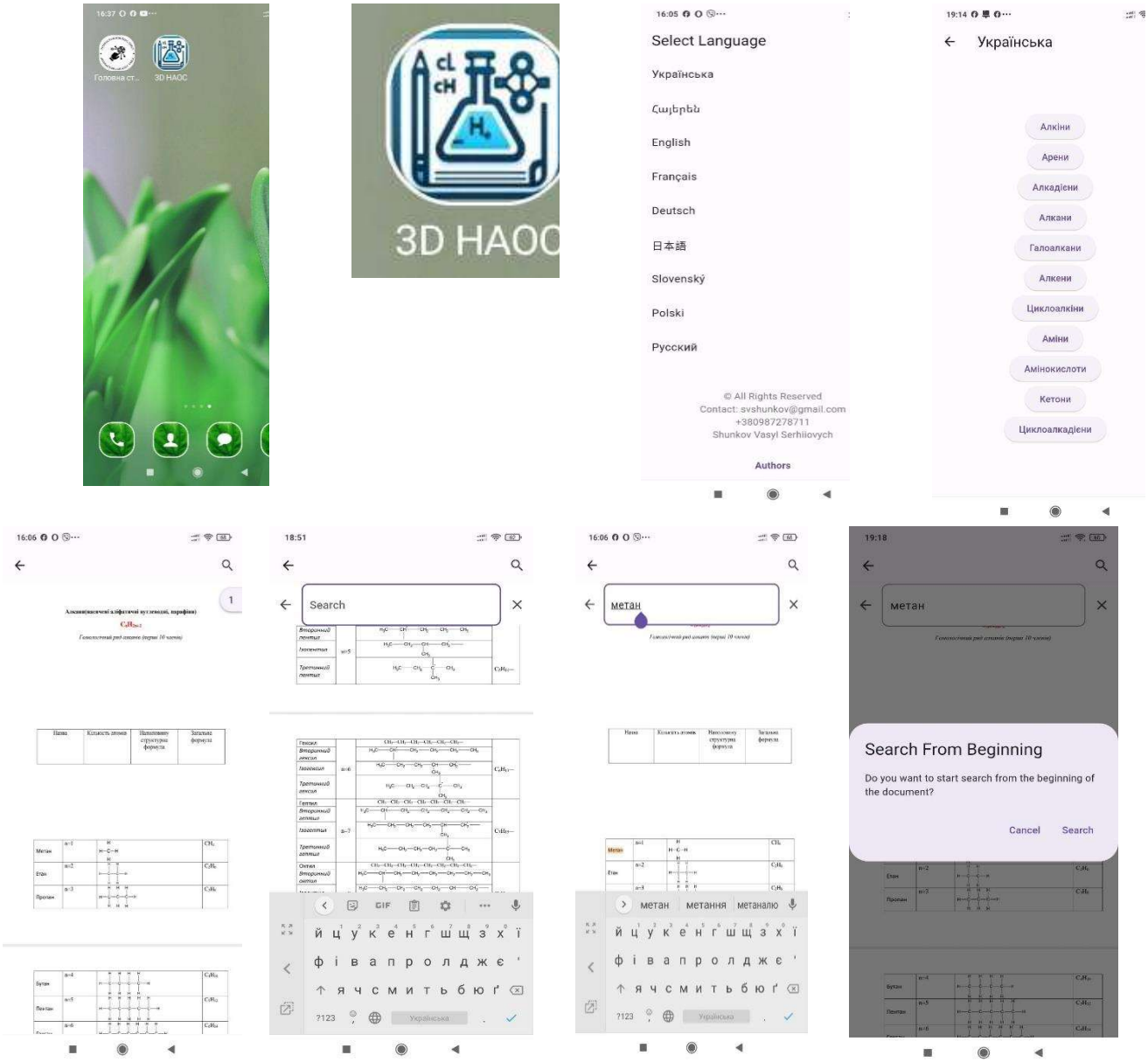

Fig. 1. "3-D HAOC"

Conclusion.

The modern trends in the development of educational and scientific progress of higher educational medical institutions are changing our worldview with ample effect: starting with traditional methods and ending with the introduction of innovative approaches to the teaching and learning experience.

These transformations of the classic methods of project-oriented learning reveal to us a completely different approach to interactive technologies, using graphic design and visualization, which makes this program unique when searching, performing both situational tasks and laboratory experiments.

Thanks to this program: “3-D HAOC”, every citizen, every person can independently get all the answers to the isomers of each class of organic compounds, regardless of where they may be and what language they make speak.

The program is convenient and easy to use, it does not require specialized skills and increases the effectiveness of the educational process, by making it more interactive and creative.

At present, stage two out of four of the application is currently under development.

I believe that this program: “3-D HAOC” will greatly improve and effectively facilitate the educational process in the future, it will provide a wider presentation of this material and will stimulate medical, pharmaceutical and dental educators towards further achievements in the educational space, regardless of their location, nor the barriers brought by the different languages in which we speak.