

## О P I N I O N

By Assoc. Prof. Dr. Tatiana Vladimirova Atanasova – Institute of Information and  
Communication Technologies - Bulgarian Academy of Sciences  
Member of the scientific jury, appointed by Order of the Director of ICT-BAS  
№ 37/27.01.2023

ABOUT: Dissertation work of Ava Ahmed Chikurteva on the topic "Information and communication technologies in education", presented for the acquisition of the educational and scientific degree "doctor" in the doctoral program "Computer systems, complexes and networks", professional field 5.3 Communication and computer technology, with scientific supervisor Prof. Dr. Dimitar Karastoyanov

### 1. General description

At the first meeting of the Scientific Jury, I was chosen to prepare an opinion and I received the following documents:

As a member of the scientific jury, I received:

- Dissertation for awarding the educational and scientific degree "Doctor",
- Abstract of the dissertation in Bulgarian with a short resume in English,
- Copies of the articles included in the dissertation,
- Other documents accompanying the procedure.

### 2. Relevance, purpose, and tasks

The topic of the dissertation is in the field of modern educational technologies. Changing living conditions, as well as rapid technological progress in all areas of human activity, require change and development of new approaches, methods and means in the educational process. This emphasizes the undoubted relevance of the presented dissertation work.

The stated **goal** of this dissertation includes research and development of information technologies, resources, methods and means for expanding and improving e-education.

To achieve the goal of the dissertation, the following **research tasks** have been formulated:

1. To make an overview analysis and systematization of technologies and platforms for electronic/distance learning.
2. To investigate the existing information and communication technologies for the application of electronic education and project-based learning in an electronic environment.
3. To develop an interactive platform for application of project-based learning.
4. To develop resources for working in an electronic environment.
5. To conduct experiments and present the obtained results

### 3. Common characteristics of the dissertation work

The dissertation consists of 134 pages, structured in an introduction, four chapters, a conclusion, a bibliography and two appendices (a working note on an experiment conducted in a real environment and results of a survey completed by students). It contains 50 figures, 8 tables and 129 literary sources. A list of used abbreviations and designations is presented.

**Chapter one** analyses the essential role of education in achieving economic prosperity, as well as social and personal satisfaction of the learner. It has been shown that ICT is a catalyst for new processes in education.

Research on the role of information and communication technologies in education from both the teacher's and the student's side has been systematized.

**The second chapter** presents opportunities for combining different teaching methods and technologies. The main emphasis is placed on project-based learning as a point of intersection of the main elements of future education, namely its interdisciplinarity, competence orientation, practicality, and technology.

In **chapter three**, the developed application model of project-based learning method is described. The web-based platform is built on a modular basis and offers various interactive features. All stages of construction of the process of creating a project-based lesson in the offered web-based educational platform are described. Attention paid to security and ensuring optimal operation of all functionalities.

The content of the **fourth chapter** is devoted to digital educational resources, presented as an essential element of teaching. Simulation environment and mobile robot models were created. The applicability of simulations in electronics for engineering distance learning purposes is illustrated. The variety of possibilities for using different digital educational resources has been validated through an experiment in a real learning environment with the Classroom application of Google Workspace for Education on the example of a project-based lesson.

#### **4. Contributions**

I accept and positively evaluate the scientific and applied contributions formulated in the dissertation. In summary, they can be stated as:

1. A platform model has been developed to achieve project-based learning.
2. A project-based lesson was developed, combining such innovative educational technologies as the flipped classroom and augmented reality.
3. An interactive assistant model is proposed to support the creation of project-based lessons.
4. Digital educational resources for robotics training were developed.
5. An increase in student success after applying the developed model for project-based learning compared to traditional educational methods has been experimentally shown.

#### **5. Abstract**

The presented two versions of the abstract, in Bulgarian and English, accurately reflect the content of the dissertation and correspond to the requirements of the Law on the Development of the Academic Staff of the Republic of Bulgaria, as well as the relevant Regulations for the implementation of the Law on the Development of Academic Staff, the Bulgarian Academy of Sciences.

#### **6. Assessment of compliance with minimum national requirements**

Doctoral student Ava Chikurteva has approved parts of her dissertation work in six scientific publications, three of them are in English and three are in Bulgarian. Two of the publications are indexed in Scopus. The remaining publications are in peer-reviewed journals or edited collective volumes.

According to the minimum national requirements for obtaining the "Doctor" degree in professional field 5.3 Communication and computer technology, the presence

of at least 30 points in Group Г indicators is required. The same number of points is also required by the Rules for the conditions and procedure for acquiring scientific degrees and for occupying academic positions at BAS and the Regulations on the specific conditions for acquiring scientific degrees and for occupying academic positions at IKT-BAS. The presented dissertation publications form a total sum of points for Group D indicators equal to 100 points, which exceeds the required minimum of 30 points.

The reference in Scopus shows that Ava Chikurteva has so far ten indexed publications with ten independent citations noticed so far and an h-index equal to 3, which convincingly proves the doctoral student's abilities to carry out scientific research.

#### **6. Notes and recommendations**

I note a good definition of several widely used terms, which are often used interchangeably, but have their specificity. The dissertation shows the personal professional teaching experience of the doctoral student, which contributes to the thoroughness and argumentation of the presentation and helps to achieve results corresponding to the set topic.

I have no objections to the substance of the dissertation. The subject is very vast, and any aspect of its consideration is of benefit to the scientific community.

#### **7. Final comprehensive assessment**

I consider that the submitted dissertation meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria. The achieved results give me reason to give a positive assessment with complete conviction and I recommend to the honourable Scientific Jury to award the educational and scientific degree "Doctor" to Ava Ahmed Chikurteva in professional direction 5.3 Communication and computer technology, doctoral program "Computer systems, complexes and networks".

05.03.2023  
Sofia

Me. *НА ОСНОВАНИЕ*  
*ЗЗЛА*