OPINION

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Member of the Scientific Jury appointed by the Director of IMI-BAS via
Order № 203/13.11.2020

Subject: Dissertation of Oleg Petrov Iliev with title "Methods and models for personalization of a thematic-oriented learning content", presented for the acquisition of educational and scientific degree "doctor" in a doctoral program "Informatics", Professional field 4.6. "Informatics and computer science".

At the first meeting of the Scientific Jury I was chosen to write an opinion and I received in electronic format a complete set of documents on the procedure.

1. Actuality, purpose and tasks of PhD dissertation

The dissertation presents opportunities for improving the learning process, using methods and models for personalization of thematically oriented learning content. The goal is not only to optimize the time it takes to learn to acquire new knowledge, but also to make the acquisition of knowledge easier by approaching learners personally and the learning content is presented as the most appropriate for their learning style.

The aim and objectives of this dissertation are aimed at conducting an in-depth review and analysis of e-learning standards, which will underlie the design and creation of an effective model, which will be based on a software environment offering an effective architecture for " repository "for learning content, through which to provide automatic automated preparation of personalized learning materials from thematically oriented educational content, as well as providing a modern way to motivate learning and training.

2. Analytical characterization of PhD dissertation

The dissertation is presented in 145 pages and contains 16 tables and 35 figures. It includes an introduction, 8 chapters, a list of used literature from 49 literature sources, a list of 7 publications of the author related to the presented dissertation and a list of 3 citations of the author.

Chapter I. defines the object and subject of the research and outlines the objectives of the dissertation. Chapter II. has an overview-analytical character and presents modern methods and approaches for personalized delivery of the learning content according to the cognitive abilities, preferences and learning style of the learners. This analysis provides a basis for creating a model for automated preparation of personalized learning materials from thematically oriented learning content. An overview of the main characteristics, features, problems and shortcomings of a specific e-learning environment is made. Possibilities for

overcoming these shortcomings are outlined through commitment to the stage of "maturity" and development of the environment. Different ways of validation and verification of conceptual models through their software implementation are considered. In Chapter III. A model for the preparation of personalized learning materials from thematically oriented content is presented, which provides multiple use of basic learning objects and the creation of new learning resources, personalized according to the specific cognitive abilities of students. The chapter also describes the process of designing structures and components that provide granularity and reusability of resources in the learning content repository. Algorithms and methods for automatic generation of teaching materials and the ability to collect feedback on the quality of training have been created. Chapter IV describes the effectiveness of the presented model and the results are validated by experiment with real subjects. This chapter presents an analysis of the results of the experiment. Chapter V. presents the developed "concept of scaling in software development" - a universal guide used in planning the stages of development of software environments. It outlines 7 stages in the development of a learning environment, as well as what should be considered in each of them. This chapter also presents the developed new type of flexible software architecture and infrastructure, as well as a method for updating the version of the environment. Chapter VI. defines the need to provide an opportunity for verification of the user identity of all participants in the learning process - learners and trainers. It presents a method for identifying the user that has legal weight and, in addition to eliminating the possibility of compromising the training process, provides the opportunity to issue official certificates of completion. Chapter VII. presents the methods used for validation and verification of the methods, models and algorithms developed as part of the dissertation, thus providing an opportunity to confirm their added value. Chapter VIII. considers the potential problems of the models, methods and project of the software environment set in the dissertation, additionally presenting potential ways for their solution and outlining the possibilities for future work.

3. Contributions

I accept all the doctoral student's contributions, namely:

1. The conceptual and terminological structures of the thematic area are systematized - environments for e-learning, personalized learning materials, models and theories for presentation and acquisition of knowledge.

2. A model has been developed for automated preparation of personalized learning materials from thematically oriented educational content using a descriptive structure created for use in the repositories for learning content.

3. A scheme for validation and verification of the model for preparation of personalized learning materials is proposed, oriented towards achieving effective and high-quality transfer of knowledge to students with different cognitive abilities.

4. A software architecture of e-learning environment has been developed, providing personalization of the learning content.

5. A concept for scaling the software learning environment has been developed. A new type of flexible architecture has been created, as well as a method for updating the version of the environment that overcomes the shortcomings of modern software architectures.

6. A model has been developed for secure authentication of users, as well as possible for identification of user identity.

4. Abstract and author' declaration

The presented two versions of the abstracts in Bulgarian and English correctly reflect the content of the dissertation and correspond to the requirements of Bulgarian legislation.

5. Assessment of compliance with the minimum national requirements

The PhD student Oleg Iliev has tested parts of his dissertation in 7 scientific publications, 6 in English and 1 in Bulgarian. Two of the publications numbers 4 and 5 are with SJR and are indexed in Scopus.

According to the minimum national requirements for obtaining of the educational and scientific degree „Doctor in the professional field 4.6 " Informatics and computer science ", the required scores are to be at least 30 for the group of indicators G. The same number of scores is required by the Regulations on the Conditions and Procedures for Acquisition of Academic Degrees and Occupation of Academic Positions in BAS and the Regulations on Specific Conditions for Acquisition of Academic Degrees and Occupation of Academic Positions in IMI-BAS. The presented publications on the dissertation form a total 60 scores for the indicators from G group, which is significantly higher than the required minimum of 30 scores. Attached is a list of citations from which it can be seen that one of the candidate's publications is cited in 3 scientific publications.

6. Notes, recommendations and questions

How is the authentication and authorization of the learners ensured? Is the use of anti-plagiarism programs envisaged in the assessment of students' written work?

7. Conclusion

The presented dissertation meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria.

The described results in the dissertation, along with the fulfillment of the national minimum requirements, give me enough reason to give a positive assessment of the dissertation work and I suggest to the honorable scientific jury to award to Oleg Petrov Iliev the educational and scientific degree „Doctor" in doctoral program "Informatics", professional field 4.6 "Informatics and computer science".

17.12.2020   /Prof. DSc Ivan Garvanov/