

THE ABSTRACTS

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1.1 Dissertation work for the award of the educational and scientific degree "doctor"

Dissertation: **A methodical system for teaching teachers to use interactive information technologies**

Summary: The implementation of IT in the educational process is related to the solution of a number of challenges: insufficient technology in schools; unpreparedness of teachers to use available technical means; insufficient methodological developments for the use of technology in the lesson, insufficient electronic materials and educational software in Bulgarian and free for the needs of education. The preparation of methodical materials is related to labor-intensive work by the teacher in choosing the necessary sources of information and working out the technology for use in the various academic disciplines. Solving some of these challenges is the essence of the present work: A methodical system for teaching teachers to use interactive information technologies, in which the following tasks are solved:

- The didactic possibilities of the interactive whiteboard (IWB) and multi-mouse technologies (MT) have been analyzed both for education in general and in relation to individual cultural and educational areas.
- A methodical system for teacher training for the application of IBD and MT based on two main principles has been developed and subjected to experimental verification: learning through experience and learning through discovery.
- A new approach to goal setting was implemented, requiring the division of learning content into elements subject to memorization, understanding and application, as a result of which a detailed system of goals of experimental learning was justified, as well as an objective system of criteria and indicators for control and assessment of academic achievement.
- Technical and didactic criteria were formulated for a comparative analysis of the capabilities of different types of IBD and MT, and one was carried out on 5 IBD and 2 MT.

The experience of the conducted experiment allows to outline the advantages of the methodical system for training teachers to use interactive IT in their work. The implementation of the model and the analysis of the obtained results allow the following conclusions to be drawn about the advantages of the experimental methodological system:

- An optimal combination of theoretical knowledge about interactive information technologies and practical exercises for applying the basic skills for working with them has been achieved. The method of clarifying the learning situations in which interactive IT is used and the planning of such with the toolkit of software and hardware proved to be extremely successful. The majority of practical exercises are perceived by teachers as useful for their professional activity.
- Competently developed didactic materials are attached, which: present in an analytical and accessible form the theory and practice of using interactive IT in the teacher's work; specify to the necessary extent the software and hardware tools, indicating rules and guidelines for their use; they save the teaching time of the lecturer and create conditions for adequate independent work of the teachers with the hardware and software.
- A developed system for evaluating the results of the training has been implemented, which contains precisely formulated criteria and indicators and is implemented through a complex of diagnostic methods for establishing the training, practical and statistical results of the training.

- Based on the comparison between the purpose of experimental learning and the obtained results, it can be said that teachers have formed and developed skills for working with interactive IT. The achieved goal means that the research confirms its hypothesis, namely: as a result of the conducted qualification courses with the methodological system based on learning through action for solving educational tasks and following adequate methodological guidelines, teachers have developed their digital skills for working with interactive IT at a higher than average level.
- In the present study, the technical systems - interactive information technologies (IBD and MT) are connected with the methodical component "learning aids". The technical capabilities of these digital technologies seamlessly fit into the school learning process as didactic tools in all cultural and educational fields.
- The developed and experimentally tested methodological system for training teachers for the application of IBD and MT, based on the principles of learning through experience and learning through discovery, achieved excellent results and can be used for future similar courses with teachers and students in pedagogical specialties in the AVITO discipline.

3.1. Habilitation work - monograph

The teacher and computer modeling in school, University Publishing House of Technical University - Varna, 2021, ISBN 978-954-20-0832-3

Summary: The monograph is an analysis of the discipline "Computer modeling" in school preparation and a description of an experimental model for training teachers in computer modeling. The following tasks are implemented in the book:

- The scientific foundations of KM are analyzed through the focus of the curricula for grades III and IV.
- A computer modeling training methodology based on the constructivist and competence approach is proposed.
- An analysis has been made of existing visual programming environments suitable for conducting KM training at the initial stage.
- A comparative analysis of the study sets was made from the point of view of the pedagogical technology, the methodological framework and the means of achieving learning goals.
- A model for training KM teachers has been developed and tested experimentally.

The obtained results prove the advantages of the proposed author's model for training KM teachers for the formation of knowledge and skills in informatics and work in a visual block environment, ensuring the process of learning KM in III and IV grades. Its implementation and the analysis of the obtained results lead to the following conclusions about the benefits of its application in similar qualification forms related to the subject matter for studying KM in the Bulgarian school:

- An optimal combination of theoretical knowledge about the basics of algorithms, visual environments for block programming and practical exercises for applying the basic skills for working with them has been achieved. The method of implementing the "learning by solving problems" method in the design of the lesson and the planning of learning problems and learning projects to achieve the educational goals is extremely successful. The majority of practical exercises are perceived by teachers as useful for their professional activity.
- Detailed instructions for working with various visual environments as didactic materials are attached, which: present in an analytical and accessible form the theory and practice of block programming for children; specify to the necessary extent the software and hardware tools, indicating rules and guidelines for their use; save the lecturer's teaching time and

create conditions for adequate independent work of the teachers with the hardware and software.

- A developed system for evaluating the results of the training has been implemented, which contains precisely formulated criteria and indicators and is implemented through a complex of diagnostic methods for establishing the training, practical and statistical results of the training.
- Based on the comparison between the purpose of the experimental learning and the results obtained, it can be concluded that the teachers formed and developed knowledge and skills in KM. The achieved goal means that the research confirms its hypothesis, namely: as a result of the conducted qualification courses and specializations with the current model based on learning through action to solve educational tasks and following adequate methodological guidelines, teachers have developed their knowledge and skills in KM at a higher than average level.
- In the present study, visual environments for block programming are associated with the methodological component - teaching aids. The technical capabilities of these digital technologies seamlessly fit into the school process of KM training as didactic tools and in other cultural and educational areas.
- An overview of the KM teaching sets approved by the Ministry of Education and Culture at the present time (2020/2021) was made, and both the methodological framework of the lessons, pedagogical technologies, and the means with which the author teams propose to achieve the learning goals in III and IV class.
- The developed and experimentally tested model for KM teacher training, based on the principles of experiential learning and discovery learning, achieved very good results and can be used for future similar courses with teachers and students in pedagogical specialties in disciplines related to KM.

6. Articles and reports published in scientific publications, referenced and indexed in world-renowned databases of scientific information

6.1. E. Koleva, Valkova, T., **Application of the "Jumpido" software in the teaching of mathematics in primary grades**, magazine *Pedagogika*, no. 4, 2016, p. 484, ISSN 0861 – 3982. (EBSCOhost Research Databases, ERIH PLUS, CEEOL, Google Scholar, Primo (Ex Libris) and Summon (ProQuest) – (Bulgarian language).

Summary. The article presents the Bulgarian educational software Jumpido and offers specific methodological ideas for applying the tools of this software in lessons and extracurricular forms of mathematics education in primary grades. Using Jumpido in the educational process in primary school requires additional skills from the teacher to work with it, but they are largely intuitive. With a computer and projector available, this software is easily integrated into the learning environment, and preparation for its inclusion in various forms of learning does not take much time. The application of this system enriches the forms and methods of teaching, brings methodical benefits that are yet to become available to the pedagogical community.

6.2. E. Koleva, K. Garov, S. Georgieva, A. Angelov, **Integrative links in the competence approach in mathematics and information technology education**, *Journal of Mathematics and Informatics*, no. 5, 2017, p. 439, ISSN: 1310 - 2230. (EBSCOhost Research Databases, ERIH PLUS) – (Bulgarian).

Summary: With the adoption of the new law on preschool and school education, the foundations were laid for the application of the competence approach in Bulgarian education. The implementation of this approach can be done in many ways, one of which is the application of

integrative connections in the learning process at the structural and functional level. The present work proposes a competency model of learning in mathematics and informatics with integrative connections. The main characteristics of the competence approach and the integrative approach are presented before demonstrating their application in unity in the teaching of mathematics and informatics in the 7th grade on the topic "Diagrams".

7. Articles and reports published in non-refereed peer-reviewed journals or published in edited collective volumes

7.1. Kovacheva, E. Modern software and hardware technologies for the benefit of the teacher, Collection of scientific works, National conference with international participation "40 years of Shumen University 1917-2011", Faculty of Pedagogy, Shumen: University Publishing House "Bishop Konstantin Preslavski", 2011, p. 166, ISBN 978-954-577-582-6

Summary: The development and spread of IT has fundamentally changed the way lessons are prepared and conducted. The interactive whiteboard, multi-mouse technologies and answer collection systems are a small part of the software and hardware tools that are involved in the teacher's work. With their help, such situations are possible that may not happen in a traditional classroom. The article presents the main characteristics of the three technologies and gives examples of their use. Situations that could not happen in the traditional classroom without these systems are analyzed.

7.2. Kovacheva E., Petrova V. Application of technology for e-learning of teachers, Collection of Scientific Works, National Conference with International Participation "40 Years of Shumen University 1917-2011", Faculty of Pedagogy, Shumen: University Publishing House "Bishop Konstantin Preslavski", 2011, p. 37, ISBN 978-954-577-582-6

Summary: With the establishment of e-learning as a teaching method, the teacher's interest in this way of teaching and learning is enhanced and its advantages stand out. In order for the teacher to be convinced of the benefits of this tool, he must first immerse himself in the situation of an e-learner in order to be able to effectively apply new information and communication technologies in his work.

The main objectives of the report are the following:

- to describe the architecture and technologies for the design and implementation of an Internet-based learning environment, as well as for its management and implementation in a learning organization.
- to specify an application of technologies for electronic training of teachers in the Department for Information and Teacher Qualification (DIPKU) - Varna.

In the report, the authors seek to analyze the features of the learning process, define approaches to building the learning environment, and present the role and importance of technology in this aspect.

The advantages of the Internet-based learning environment for the management and conduct of the training are outlined and the prerequisites, requirements, stages and methods for its design and application are defined.

Together with teachers and students from "St. Kliment Ohridski" - the city of Varna, a web-based project - NTEL - eSafety training environment was developed, which helps the Department's qualification courses. The task of the project is to apply the knowledge and skills acquired by the students during the lessons of informatics and information technology in a working platform, which on the other hand serves activities related to the qualification of teachers. The NTEL learning

environment is a way to improve education and use and has a number of advantages over traditional learning.

7.3. Kovacheva E., Chakarova D. Using an interactive whiteboard in foreign language learning, Write-off Education, 2012, issue 5, p. ISSN 0861-475X

Summary: The implementation of the interactive whiteboard (IWB) is perhaps one of the most effective innovations of the new technologies for information and communication in foreign language education (FLE). For some teachers, the use of IBD is just an additional tool or tool, a product of technological progress. For others, it is a "revolution" in the pedagogy and methodology of CEO. But one thing is certain: for both, the use of IBD in the learning process represents a challenge that "breaks" established teaching methods.

This article presents the main advantages and also the difficulties in using IBD, offers some ideas for work in a CEO class, shares observations and considerations about the use and compatibility between the software of the main IBD brands in Bulgaria.

7.4. Kovacheva E., The interactive whiteboard and interactive methods in learning, "Education and qualification of teaching staff. Applied-practical aspects", University Publishing House "Bishop Konstantin Preslavski", Shumen, 2012, p. 290, ISSN: 1314-300X.

Summary: In the field of information technology, media and education, there is a debate about the meaning of the term "interactivity". The interactive whiteboard is the latest revolutionary presentation tool that is entering wide practice and touches on all three areas that debate the term "interactivity" (impact, interaction, contact). The surface (board) itself is not passive, but participates in a dialogue by activating applications, accepting notes and "remembering" all this for further use. Everything happening on some boards can be viewed in real time from a remote location via the Internet. The introduction of interactive learning methods has a positive effect on the learning process. When this is done with the help of information technology, the results are even more positive. The use of an interactive whiteboard in teaching is a revolutionary way of interesting, attractive, dynamic presentation of information to learners, which helps their work in an interactive model.

7.5. Kovacheva E., Using an interactive whiteboard in education, Compendium «Education and qualification of teaching staff. Applied-practical aspects", University Publishing House "Bishop Konstantin Preslavski", Shumen, 2012, p.282, ISSN: 1314-300X.

Summary: The publication presents the main features of the interactive whiteboard and its application in education. Its didactic capabilities as a tool in the learning process are indicated. The activities with this device are justified in relation to the main didactic principles. Different types of technologies, advantages and disadvantages, reflection of the results of the learning process are analyzed.

7.6. Kovacheva, E., Modern methodological guidelines in the teaching of information technology at the primary level, collection "Aspects of Primary Education", University Publishing House "Bishop Konstantin Preslavski", Shumen, 2012, p. 14, ISBN 978-954-577-629-8.

Summary: The teaching of information technologies at the primary stage requires specialized training of the primary teacher. This publication presents the methodological requirements for planning and conducting an IT training process in primary grades. The educational content,

methods, forms and means are analyzed as the main components of the methodological system of education.

7.7. Kovacheva E., Interactive technologies for the benefit of the primary teacher, collection "Aspects of Primary Education", University Publishing House "Bishop Konstantin Preslavski", Shumen, 2012, p. 48, ISBN 978-954-577-629-8.

Summary: The results of the learning process are better when everything in the classroom happens through constant interaction between the teacher and the students. This active learning and teaching, if it happens with the help of information technology, turns the classroom into a modern one; students' motivation to learn increases; the teacher's work becomes more satisfying and goals are achieved that could not be achieved without technology. This report examines interactive moments in the primary education lesson through information technology.

Elementary students learn primarily through listening and observation, unlike older students who also include reading for this purpose. At this age, children receive information primarily figuratively, and visualization of the learning process is mandatory. And when combined with interactive pedagogical elements, visualization through information technology turns the lesson into a useful game that benefits both the students and the teacher.

7.8. Kovacheva E., Sabrieva S.- Interdisciplinary connections in the university education in information technology, geographical and tourism disciplines of students majoring in "Tourism", Collection of scientific works National conference with international participation "40 years Shumen University 1917-2011", Faculty of Natural Sciences, University Publishing House "Bishop Konstantin Preslavski", Shumen:,2012, p. 284, ISBN 978-954-577-643-4

Summary: The publication presents ideas for implementation in the education of students majoring in "Tourism" in classes on information technology, geography and tourism disciplines. A system of tasks is proposed, which are motivating real cases and ensure the achievement of the expected results as competencies from the curricula of the curriculum. Results of conducted training with the students are presented.

7.9. Kovacheva E., Valkova T. Application of the software platform Envision for control of knowledge in mathematics in I-IV grades, Proceedings International Scientific Conference MATTECH 2012. , Shumen, 2012, pp. 334 – 340, ISBN 1314-3921.

Summary: The publication presents the capabilities of the educational software platform *Envision* to carry out periodic ongoing control of students' learning in mathematics in primary grades. The psychological characteristics of children of early school age determine a specific aspect of mathematics education in primary grades. One of its most characteristic features is the need for constant control over the course of mastering knowledge by students. And here it is a question of both periodic inspections - annual, periodic, by section, by topic, etc., and the need for permanent control over the assimilation of the material within the lesson. In the primary grades, mathematics learning is carried out by solving problems. It is the teacher's duty to always check their implementation. At any moment, he must have feedback on what is happening in the lesson and, in general, in the learning process, in order to intervene promptly when needed to help weaker students or engage stronger students in additional work, at all - in order to be able to successfully manage the children's activities.

The fact that control is one of the main, almost continuous, activities suggests the danger of its formal course. In order for children not to lose interest in tasks immediately after solving them, to keep their attention longer on them, the check should be varied not only in content (checking the

answer to the task; the complete implementation of the solution or parts of it; its written form; reproduction of the reasoning conducted or justification of some key moments in them, etc.), but also in form - oral, written, mutual, with the use of multimedia, on an interactive board, etc.

A relatively new software program provides an excellent opportunity to effectively control the learning process of mathematics content. *Envision*.

7.10. Kovacheva E., **The student portfolio in informatics and information technologies - methodological guidelines**, Student's portfolio, UI "Episkop K. Preslavski", Shumen, 2013, p. 15, ISBN 978-954-577-835-3.

Summary: The modern educational technology "student portfolio" is gaining more and more popularity in Bulgaria and requires paying attention to the qualification of pedagogical specialists in this direction. There is a lack of methodological developments and guidelines for the development of a student's portfolio in the various subjects. The present publication is an attempt to assist the College of Informatics and Information Technology in this direction.

7.11. Kovacheva E., Malinova S. **Innovative teaching... or how to convince students that math is useful and fun**, Scientific Almanac of Varna Free University "Chernorizets Hrabar", "Mathematics and Informatics" series, 2013, vol. 3, p. 46, Varna: VSU, ISSN 1311-9222.

Summary: The 21st century teacher has the difficult task of being the person who encourages curiosity and fosters creativity in young people. Students should see mathematics as a science that provides real-life patterns and is therefore useful, interesting and fun. Information technologies, combined with innovative methods, make school mathematics accessible, attractive and permanently attracting the interest of students, facilitate the teacher in achieving the main goals of the lesson, and teamwork with a parent - an information technology specialist - supports the future work of the teacher in preparation and conducting a lesson with an interactive whiteboard or multi-mouse technology. This publication presents a practical experience of teacher-parent teamwork in mathematics education using interactive information technology.

7.12. Kovacheva E. **Animate tasks from motion using POWERPOINT**, Scientific Almanac of Varna Free University "Chernorizets Hrabar", "Mathematics and Informatics" series, 2013, vol. 3, p. 26, Varna, ISSN 1311-9222

Summary: Motion problems are a part of school mathematics that is not very pleasant to a large number of students. Presenting the task condition in verbal form limits easy understanding by the student. The capabilities of computer animation show the condition in a more understandable and dynamic way, which contributes to the easier analysis and solution. The publication presents an application of software for animating objects in solving the main types of motion tasks, giving methodological guidelines for its use.

7.13. Kovacheva E., Pavlova, N., Angelov, A. **Information technology as a diagnostic tool in kindergarten**, Scientific works of Ruse University, 2015, volume 54, series 6.1, Ruse, p.146-150, ISSN 2603-4123 (on-line).

Summary: The article presents the available technological possibilities for diagnostics in kindergarten. Establishing a certain level of knowledge and skills of children on a specific topic of the educational content is a challenge for the teacher. There are many learning opportunities within teacher training courses. Modern information technologies offer a set of tools that make diagnosis fun, active and motivating, while facilitating the teacher in collecting and processing the results of

children's activities. The selected software is easy for teachers to learn and arouses interest and desire to work with children.

7.14. Kovacheva E., Angelov A. **Principles and models for designing and creating an interactive whiteboard lesson**, collection "Motivation and interests in learning", Mediatech, Ruse, 2015, c. 81, ISBN 978-619-207-023-3.

Summary: Designing a lesson is a pedagogical skill that a teacher develops throughout their career. Creating a lesson that engages and motivates your audience and achieves your goal in an easy and fun way is true pedagogical mastery. Various didactic tools support the teacher in his work and at the same time confront him with a number of challenges. This publication offers some principles and models for creating an interactive lesson with an interactive whiteboard (IWB).

7.15. Kovacheva E., Chakarova D. **Creating learning tasks with an interactive whiteboard for foreign language classes**, Motivation and interests in learning, collection "Motivation and interests in learning", Mediatech, c. 85, Ruse, 2015, ISBN 978-619-207-023-3.

Summary: The massive enrichment of the material base in the Bulgarian school with an interactive whiteboard (IBB) offers the teacher new opportunities for increasing the attractiveness of the class, concentrating the students' attention, increasing activity and motivation for participation. This puts the teacher in front of the need to increase his digital competences for working with IBD - on the one hand, mastering skills for working with the tools (software), and on the other - developing methodological skills for developing and presenting tasks and lessons in a foreign language through IBD. The publication presents ideas for creating learning tasks in a foreign language with IBD.

7.16. Kovacheva E., Angelov A. **Application of modern information technologies in the interactive learning process**, Interactive training and qualification of teachers, UI "Ep. K. Preslavski", Shumen, 2015, ISBN 978-619-201-045-4..

Summary: In education, there is a debate about the meaning of the term "interactivity" (from the English language: interactivity) in the circle of specialists in information technology and in pedagogy. "Interactive information technology" and "interactive learning process" are defined from different perspectives. Technologies are interactive when they interact with the user (eg the tablet, interactive whiteboard, etc. respond to the teacher's touches or other actions), and an interactive learning process is one in which there is interaction between a teacher and learners or between learners themselves (who a process can be "with" or "without" a computer). Information technology (interactive or not) is a didactic tool in a learning system (interactive or not). The publication presents several online technologies for application in the learning process, which help to make it interactive.

7.17. Kovacheva E., Valkova T., **Application of Jumpido software in kindergarten mathematics education**, The game in learning, UI "Ep. K. Preslavski", Shumen, 2015, ISBN: 978-619-201-065-2.

Summary: The article examines software for implementing the game in preschool mathematics education. *Jumpido* is based on a hardware device to recognize body movement. The application of this approach motivates children to learn mathematics in a fun and playful way.

7.18. Kovacheva E., Petrova S., **Objective opportunities for creating games in informatics education**, The game in learning, UI "Ep. K. Preslavski", Sh., 2015, ISBN 978-619-201-065-2.

Summary: The publication indicates the objective possibilities of creating computer games the learning process of informatics using the visual programming tool *Scratch*. Examples of projects for games in mathematics, ecology and more are presented.

7.19. Kovacheva E., Chakarova D. **Cloud technologies in the work of the foreign language teacher**, 2016, book. 5 sp. Education, p.19, ISSN 0861-475X

Summary: The article is dedicated to some new possibilities that the so-called "cloud technologies" allow part of the training to be carried out in the Internet space, while the work on paper is reduced to a minimum. Some cloud technologies are described that allow developing skills for joint and individual work in a foreign language as well as social skills - for responsibility, cooperation and teamwork.

7.20. Kovacheva E., Dimitrova Z., **Dynamic software tools in the application of the design method on the topic "Surface Faces"**, Education and qualification of teaching staff. Applied and practical aspects, UI "Ep. K. Preslavski", 2016, Shumen, ISSN: 1314-300X.

Summary: The article clarifies the specific features of the use of dynamic software in the application of the project method in the teaching of mathematics in the high school stage of primary education. The experimental setting for the application of this method in the education of students in the 12th grade is described.

7.21. Koleva E., I. Trajkov, D. Danalev, **Study on students' readiness and satisfaction with the use of online information technology capabilities as a tool for control and assessment in chemistry and environmental protection education**. Natural Pedagogical Journal, Vol 3, No 1, 2020, Page 20, Shumen, ISSN 2603-4468.

Abstract: Over the last decade the capabilities of information technology in the field of education have grown significantly. A large number of platforms have been created with different functionality regarding the training, sharing and dissemination of information in the form of reports, abstracts, essays, videos, etc., as well as for carrying out different forms and types of control and evaluation. Some of these platforms are Google Drive, Moodle, Ucha.se, etc. Particularly noteworthy are those who provide opportunities for the teacher's personal intervention in creating relevant, tailored, and taught teaching content to form an appropriate testing and evaluation. However, education in the various disciplines of the high school curriculum becomes more and more inconceivable without the inclusion of the broad possibilities of the IT tools. In this paper we report the results of our study on the attitudes students in high school education in the course of chemistry and environmental protection to use information technology tools as a tool for learning and controlling and evaluating academic achievement. Some conclusions about the degree of student achievement in the implementation of electronic forms of control and assessment have also been done.

Summary: In the past decade, the possibilities of information technology in the field of education have grown significantly. A large number of platforms have been created with different functionality in terms of learning, sharing and dissemination of information in the form of reports, summaries, essays, videos, etc., as well as for carrying out different forms and types of control and evaluation. Some of these platforms are *Google Drive*, *Moodle*, *Ucha.se* and others. Particularly notable are those that provide opportunities for teacher personal intervention in creating relevant, personalized

and taught learning content to shape appropriate testing and assessment. Training in the various disciplines of the high school program, however, is becoming more and more unthinkable without the inclusion of the wide possibilities of IT tools. In this article, we present the results of our study on the attitudes of high school students in the chemistry and environmental protection course to use information technology tools as a means of learning and monitoring and evaluating academic achievement. Some conclusions have also been drawn about the degree of student achievement in the application of electronic forms of control and assessment.

7.22. Kovacheva E., Georgieva S. **Cloud technologies in the teacher's professional activity**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p. 9. ISBN 978-954-760-418-6.

Summary: A modern implementation of computer technology is cloud technology. Multiple applications as a type of service are massively entering the work of people in various professions and specialties. There is no single definition of cloud technology. There are definitions created from different focuses hardware software according to the services offered and so on. With the development of this technology model, users can access serious services through portable devices such as mobile phones, laptops and tablets. Computational work and information are moved from desktop computers and portable devices to the cloud, which reduces software costs New knowledge and skills and habits are gradually formed for a more flexible approach to storing and organizing information. In this publication, the applications of cloud platforms that can be a tool in the teacher's work are mainly considered. The main software services correlating with the activities of the teacher are: e-mail, a place to store information, a shared environment with the ability to communicate with collaborators, forms with the ability to evaluate answers, calendar, video link, maps, create and maintain a site and others.

7.23. Kovacheva E., Georgieva S. **Basic technological models for applying cloud technologies in the teacher's professional activity**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p. 18. ISBN 978-954-760-418-6.

Summary: Modeling the formation and improvement of digital skills is a particularly important methodological direction in the field of information technologies. It is related to the task facing the teacher qualification process, namely the preparation of teachers who have the ability to implement effective teaching through the use of information technology in two directions: supporting the teacher's work outside the classroom and showing students the role of the computer as a means of learning and solving scientific problems. The models developed in this publication are of practical applicability as they represent stages and basic actions to achieve a specific result needed in the work of the teacher in his main functions: planning the educational process; organizing and conducting the educational process; Assessing the progress of children and students and the degree of assimilation of the intended competences; cooperation and participation in teams with other pedagogical specialists; interaction with other institutions and organizations; controlling, encouraging and reporting the participation of children or students in the educational process; responsibility for the life and health of children and students; participation in the conduct of national external evaluation, state matriculation exams; participation in the evaluation and selection of appropriate knowledge books or study aids, of a textbook or a study set for teaching a subject. The proposed models are the basis for forming and improving the digital skills of teachers, including information technology teachers, necessary to achieve expected results according to curricula, demonstrated with tasks, textbooks and teaching aids.

7.24. Kovacheva E., Georgieva S., **Application of electronic forms in the control and evaluation of educational achievements**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p.27. ISBN 978-954-760-418-6.

Summary: This publication presents e-forms as a cloud service in the focus of school education. The application of forms as a service of cloud technologies in the learning process can occur in: administrative activity; teamwork with fellow teachers; cross-curricular links with subject and information technology; mirroring; tools for project-based approaches; control and assessment of students' learning achievements, etc. The technology in creating, distributing the form and analyzing the results of the collected responses is presented in detail.

7.25. Kovacheva E., Petrova M. **Quizzes, educational games and tests with Kahoot**, Cloud technologies in the teacher's professional activity, Color print, 2017, Varna, p.79. ISBN 978-954-760-418-6.

Summary: The publication presents an electronic cloud-type educational platform for creating and conducting electronic quizzes, tests and surveys. The sequence of actions to generate a form and implement a session to collect responses is traced. The distinguishing features of the software compared to other platforms are presented.

7.26. Kovacheva E., Dukova V., **Study with Excel Survey**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p. 88. ISBN 978-954-760-418-6.

Summary: The article presents a platform tool *Microsoft Office 365 - Excel Survey*. It is a web-based cloud tool that a teacher can design and collect student responses in an Excel spreadsheet. The application is suitable to be used in the professional work of the teacher in several aspects to collect responses of students, parents, colleagues, etc. in various studies and surveys; to collect student responses for group assessment; to collect student responses for individual assessment. The app is simple and easy to use. The familiar interface contributes to adding new tools to the teacher's digital skills without much difficulty.

7.27. Kovacheva E., Valkova T. **Checking knowledge of mathematics using cloud technologies**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p. 95. ISBN 978-954-760-418-6.

Summary: In recent years, the so-called cloud technologies are of particular interest for the practice of mathematics education, and in particular, for the purposes of checking and evaluating knowledge. One of the characteristic features of mathematics education at the initial stage is the need for constant control over the progress of knowledge acquisition, which is expressed in: checking the solution of each task; assignment of written independent works in order to receive feedback (frequent, but with a small volume); assignment of written independent works for assessment purposes (less frequent, but with a larger volume). In the publication, the application of Google Forms is presented as a solution for checking the knowledge of elementary level mathematics.

7.28. Kovacheva E., Chakarova D., Hristova K. **Application of electronic forms in the teaching of the English language at the initial stage**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p. 112. ISBN 978-954-760-418-6.

Summary: The publication offers a solution to the challenge of reinforcing grammar rules and learned vocabulary using cloud technologies - creating an electronic form. This solution also helps to strengthen the reduced motivation of students to solve homework tests, exercises and assignments outside of school hours.

7.29. Kovacheva E., Chakarova D. **Cloud technologies through the focus of the professional teacher portfolio**, Cloud technologies in the professional activity of the teacher, Color Print, 2017, Varna, p.121. ISBN 978-954-760-418-6

Summary: With the introduction of the new normative changes through the Law on Pre-school and School Education, the need to pay attention again to the benefits and challenges posed by the creation of a teacher's portfolio has been substantiated. The publication presents the essence of the teacher's portfolio and offers creation and maintenance through the tools of cloud technologies, based on all the advantages of cloud services: accessibility, editability, easy tools, sharing and publishing.

7.30. Kovacheva E., Georgieva, S., Petkov, P. **Mathematics in an electronic environment GeoGebra Activity (MEGA)**, MATHEMATICS AND MATHEMATICS EDUCATION, 50th anniversary spring conference of the Union of Mathematicians in Bulgaria, 2021, pp. 373-380, ISSN 1313-3330.

Summary: Within the program "The next 10 – in support of that matter in the next ten years" in the "Online Learning" section of the America for Bulgaria Foundation The Union of Bulgarian Mathematicians – UBM-Varna section, participates with the project "Mathematics in electronic environment Geogebra Activity/Classroom ()". The results of its implementation are suitable for usage by mathematics teachers for the needs of e-learning 5th–12th grade.

7.31. Kovacheva E., Georgieva S. **Model for Learning in a Mathematics and Informatics Laboratory**, Collection of reports "Digital transformation of education - problems and solutions, assessment and accreditation", Ruse, 2023 pp. 143-148, ISBN 978-954-712-892-7.

Summary: In order to meet the demands of modern education, teachers need to develop their digital creativity and methodological competences, with which they can implement STEM education.

This paper develops a model for teaching students with Technology, Engineering, Mathematics and Informatics (TEMI) in a "Mathematics and Informatics Lab" in a STEM center. The distinguishing features of the proposed model are:

- prioritization of creative learning goals;
- electronic form of control and assessment;
- digital tools in the learning process;
- digitalization of the research approach.

Solutions for using the described TIMI model are proposed.

Results of a study conducted on the implementation of the research approach in an electronic environment are presented.

7.32 Kovacheva, E. (2017) etc. **Realization of the integrativity in the educational process trough virtual classroom**, Knowledge – International Journal Scientific papers Vol. 19.2, Skopje, в съавт. с Н. Колева, С. Георгиева, ISSN 2545 - 4939 (printed), 1857 - 923X (e-version) Impact factor: 1.322 / 2016

Summary: The article points on the virtual classroom as a technical medium in the electronic education, which gains popularity among educators, view to the realization of their instructional and educational aims. It offers plenty of possibilities for the educational process and includes different models of teaching/ learning. Teaching pupils, students and teachers through different forms of virtual classroom is characterized by combination of different software tools for the creation of study situations, access to educational materials, discussion on studied topics, elaboration of projects, tasks, formulation of questions, data gathering and assessment and control of knowledge and abilities. The article offers analysis and results of a research focusing on the “Application of the integrative approach in the educational process through virtual classroom“. The strengths and the weaknesses of the virtual classroom tools for students and teachers are pointed. On one hand are commented the interdisciplinarity and the teamwork between teachers and/or students as ways of the educational integration increasement, and on the other - combination of multiple students activities or variety of teaching methods like combination of different media furnishing teaching/ training materials – text, images, audio, video files, hyperlinks - and/or combination of various activities - work on a shared documents, test solving, research, discussions, mind maps etc.. The analysis lead to the following conclusions: virtual classroom users have a positive attitude concerning the increasement of the integrativity as a result of its application in the educational process. They point a high level of instruments worth, a high level of integrativity realization and a high level of positive attitude about its application in practice. Positive appreciations are more than the negatives which concern the technical value and are about to be solved.

9. Studies published in non-refereed peer-reviewed journals or published in edited collective volumes

9.1. Kovacheva E.,A teacher training system for using an interactive whiteboard, Modern information technologies to help the teacher, "Bishop Konstantin Preslavski" University Publishing House, Shumen, 2012, p. 5, ISBN 978-954-577-650-2.

Summary: The mass introduction of the interactive whiteboard in the Bulgarian school requires additional training of a large number of pedagogical specialists with new tools, which presents the teacher with a great challenge, filled with many positive emotions and expectations for good results. The proposed training system is intended for both prospective trainers and self-taught colleagues with this new technology.

9.2. Kovacheva E.,A teacher training system for using multi-mouse technologies, Modern information technologies to help the teacher, scientific-methodical guide, "Bishop Konstantin Preslavski" University Publishing House, Shumen, 2012, p. 28. ISBN 978-954-577-650-2.

Summary: With increasing interest in multi-mouse technologies, the need for additional training of pedagogical specialists increases. The publication offers a system of training teachers, with which knowledge and skills are formed about the software and the basic tools in creating a lesson with these technologies.

9.3 Kovacheva E., Momcheva G. **Teaching aid "Information technologies for 9th grade"**, Prosveta, 2012, Sofia, ISBN 978-954-01-2681-4.

Summary: The study aid was developed according to the compulsory information technology training program for the 9th grade and contains tasks arranged by topic and difficulty. The type of tasks is "learning challenge" and they aim to form and improve problem-solving skills and creative thinking in students.

9.4 Kovacheva E., **Teacher book for the computer modeling for the 3rd grade**, ed. Bulvest 2000, Sofia 2019, in co-authorship with A. Angelov, Kr. Harizanov, T. Srebrevna, T. Momcheva-Mihaleva, S. Petrova. ISBN 9789541812594,

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach computer modeling in the 3rd grade. It is based on the textbook on computer modeling, developed according to the curriculum of the subject, mandatory preparation. The main model of the lesson of the author's collective is according to the approach "learning by solving problems" and aims to develop creative thinking in students.

9.5 Kovacheva E., **Teacher book for the computer modeling for the 4th grade**, Bulvest 2000 publishing house, Sofia, 2019, co-authored with A. Angelov, Kr. Harizanov, T. Srebrevna, T. Momcheva-Mihaleva, S. Petrova, ISBN 9789541814178.

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach computer modeling in the 4th grade. It is based on the textbook on computer modeling, developed according to the curriculum of the subject, mandatory preparation. The main model of the lesson of the author's collective is according to the approach "learning by solving problems" and aims to develop creative thinking in students.

9.6 Kovacheva E., **Teacher book for the information technology for the 5th grade**, ed. Bulvest 2000, Sofia 2016, co-authored with Momcheva G., Angelov A., Harizanov Kr., ISBN 9789541809815

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach information technologies in the 5th grade. It is based on the textbook on information technology, developed according to the curriculum of the subject, compulsory preparation until 2021. The main model of the lesson of the author's collective is according to the approach "learning by solving problems" and aims to develop creative thinking in students.

9.7 Kovacheva E., **Teacher book for the information technology for the 6th grade**, ed. Bulvest 2000, Sofia 2017, in co-authorship with Momcheva G., Angelov A., Harizanov Kr., ISBN 9789541810514

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach information technology in the 6th grade. It is based on the textbook on information technology, developed according to the curriculum of the subject, compulsory preparation until 2022. The main model of the lesson of the author's collective is according to the approach "learning by solving problems" and aims to develop creative thinking in students.

9.8 Kovacheva E., **Teacher book for the information technology for the 7th grade**, ed. Bulvest 2000, Sofia, 2018, co-authored with A. Angelov, Kr. Harizanov, T. Srebrevna, V. Dafcheva, ISBN 9789541812686

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach information technologies in the 7th grade. It is based on the information technology textbook, developed according to the curriculum of the subject, compulsory preparation. The main model of the lesson of the author's collective is according to the "learning by solving problems" approach and aims to develop creative thinking in students.

9.9 Kovacheva E., **Teacher book for the information technology for the 8th grade**, ed. Bulvest 2000, Sofia 2017, in co-authorship with Momcheva G., Angelov A., Harizanov Kr., Srebrevna T., Dafcheva V., ISBN 9789541810552.

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach information technologies in the 8th grade. It is based on the information technology textbook, developed according to the curriculum of the subject, compulsory preparation. The main model of the lesson of the author's collective is according to the "learning by solving problems" approach and aims to develop creative thinking in students.

9.10 Kovacheva E., **Teacher book for the information technology for the 9th grade** ed. Bulvest 2000, Sofia, 2018, co-authored with A. Angelov, Kr. Harizanov, T. Srebrevna, V. Dafcheva, ISBN 9789541813065,

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach information technologies in the 9th grade. It is based on the information technology textbook, developed according to the curriculum of the subject, compulsory preparation. The main model of the lesson of the author's collective is according to the "learning by solving problems" approach and aims to develop creative thinking in students.

9.11 Kovacheva E., **Teacher book for the information technology for the 10th grade**, ed. Bulvest 2000, Sofia, 2019, co-authored with A. Angelov, Kr. Harizanov, T. Srebrevna, ISBN 9789541814260.

Summary: The book for the teacher helped in the methodical preparation of the teachers who teach information technologies in the 10th grade. It is based on the information technology textbook, developed according to the curriculum of the subject, compulsory preparation. The main model of the lesson of the author's collective is according to the "learning by solving problems" approach and aims to develop creative thinking in students.

9.12 Kovacheva E., **Check your knowledge - Collection of tasks on information technologies for the 5th grade**, ed. Bulvest 2000, Sofia, 2020, co-authored with Angelov A., Harizanov Kr., Srebrevna T., ISBN 9789541815694.

Summary: The publication is a collection of information technology tasks for the 5th grade. Includes theory tests and practical tasks. It is aligned with the information technology curriculum and follows the topics in the annual distribution. There are resource files for the practice exercises. It is suitable for preparing both for school hours and for participation in olympiads and information technology competitions.

9.13 Kovacheva E., **Check your knowledge - Collection of tasks on information technologies for the 6th grade**, ed. Bulvest 2000, Sofia, 2020, co-authored with Angelov A., Harizanov Kr., Srebrevva T., ISBN 9789541815786.

Summary: The publication is a collection of information technology tasks for the 6th grade. Includes theory tests and practical tasks. It is aligned with the information technology curriculum and follows the topics in the annual distribution. There are resource files for the practice exercises. It is suitable for preparing both for school hours and for participation in olympiads and information technology competitions.

9.14 Kovacheva E., **Check your knowledge - Collection of tasks on information technologies for the 7th grade**, ed. Bulvest 2000, Sofia, 2021, co-authored with Angel Angelov - Acho, Krasimir Harizanov, Tanya Srebrevva, ISBN 9789541816431.

Summary: The publication is a collection of information technology tasks for the 7th grade. Includes theory tests and practical tasks. It is aligned with the information technology curriculum and follows the topics in the annual distribution. There are resource files for the practice exercises. It is suitable for preparing both for school hours and for participation in olympiads and information technology competitions.