Methodik zur Steigerung der Bildungseffizienz von Programmiertechnologien an Hochschulen

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Anmerkung. In diesem Artikel werden die Probleme des Lehrens von Programmiersprachen an Hochschulen, Wege zu ihrer Überwindung sowie ein Modell zur Verbesserung der Effektivität des Lehrens von Programmiertechnologien vorgestellt.

Schlüsselwörter: Programmierung, Modell, Case-Stady, E-Learning-Ressource, Anwendung. Dies ist einer der Gründe für das Aufkommen des Bedarfs, d. h. die Verbesserung von Programmiersprachen und das Aufkommen moderner Sprachen.

Methodology to increase educational efficiency of programming technologies in higher educational institutions

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Abstract. This article presents the problems of teaching programming languages in higher education institutions, ways to overcome them, as well as a model for improving the effectiveness of teaching programming technologies.

Keywords: programming, model, Case-Stady, e-learning resource, application. This is one of the reasons for the emergence of the need, i.e. the improvement of programming languages and the emergence of modern languages.

The aim of the study is to increase the effectiveness of teaching programming technologies in higher education institutions.

Material and research methods. In the comparative-critical study and analysis of scientific, methodological, electronic sources on the subject, the methods of mathematical and statistical analysis of the results of state educational standards and qualification students of higher education institutions and the study, design, experimental work of advanced pedagogical practices used in the educational process.

Results. It was found that the effectiveness of the methodology developed in the study, ie teaching C $^{++}$, Delphi, Phaytin programming languages increased by 9%.

Introduction. Today, due to the improvement of programming languages and the emergence of modern languages, it poses new challenges in the field of programming [1]. Therefore, the effectiveness of teaching programming technologies in higher education institutions today Improving the form, methods and tools of teaching to increase is one of the current challenges.

In this regard, M.R.Fayzieva [2], N.A.Otaxonov [3], U.M.Mirsanov [4], A.S.Lagoxa [5], T.N.Lebedeva [6], V.V.Popova [7], S.I.Maradjabov [8], A.E.Kazakova [9], D.G.Jemchujnikov [10], O.P.Yurkovets [11], F.V.Shkarba [12], I.A. Babushkina [13], I.A. Babushkina [14].

Although some approaches have been put forward in the research of the above-mentioned scholars to increase the effectiveness of teaching programming languages in higher education institutions, today there is a need to improve the methodology of teaching programming languages in pedagogical higher education institutions.

Materials and research methods. Research on the methodology of teaching programming technologies aims to improve the methodological system of teaching programming in connection with the need to train specialists with a procedural, object-oriented, logical and functional approach in the development of algorithms and programs for future informatics teachers [15, 16]. Despite the research, today there is a need to organize the teaching of programming in higher education and to train professionals who have effectively mastered all the programming paradigms [17, 18].

Programming plays an important role in training specialists in the field of information technology. Because programming allows future computer science teachers to adapt their knowledge to the rapidly changing environment in the field of new information technologies, which in turn allows the use of information technology in the learning process at a new quality level and lays the groundwork for implementing the required teaching model.

Therefore, during the study, a model aimed at teaching programming technologies to future teachers of computer science in pedagogical higher education institutions was developed (Figure 1).
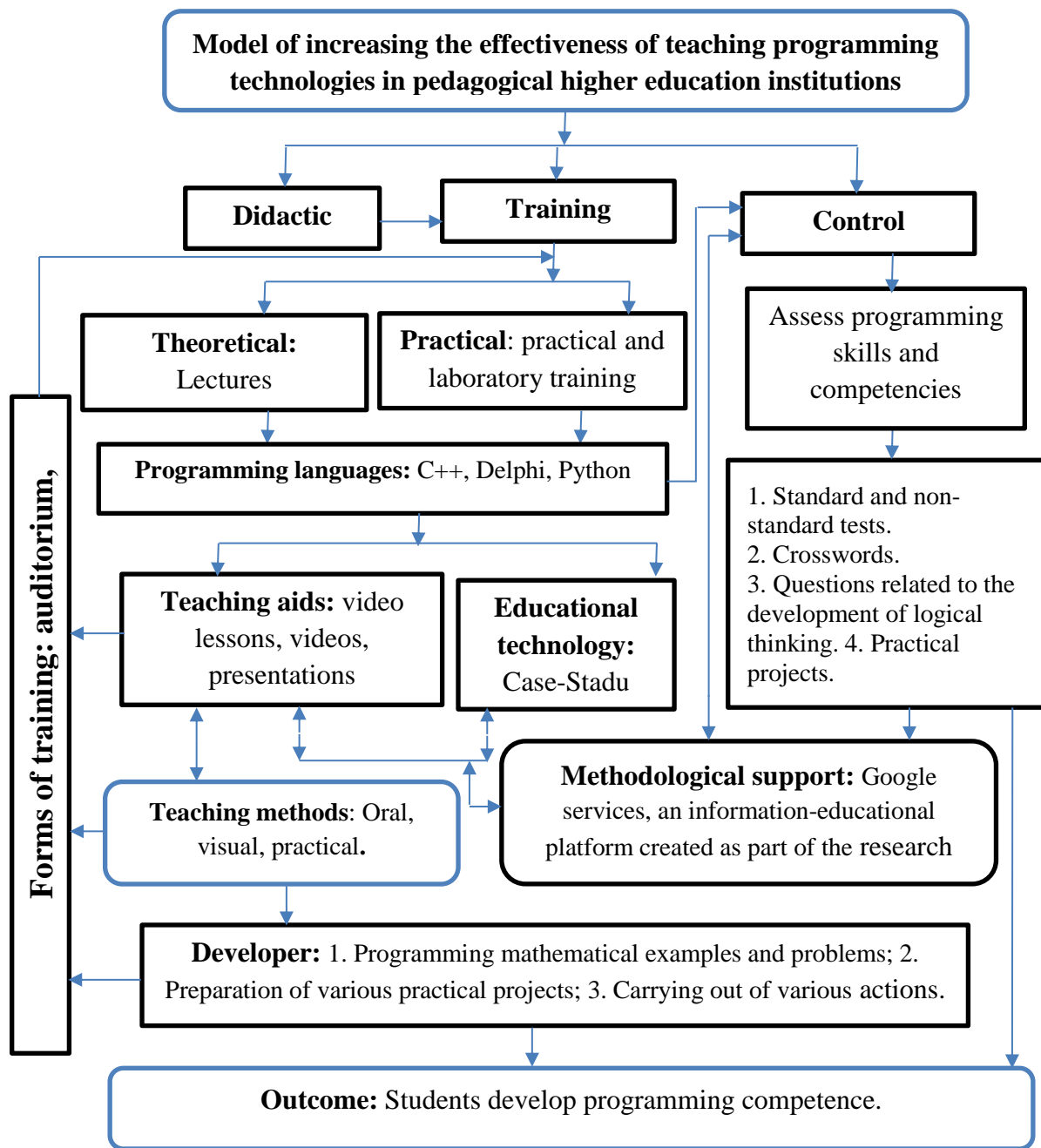

Figure 1. Model of increasing the effectiveness of teaching programming technologies in pedagogical higher education institutions.

This model provides training in programming languages (C++, Delphi, Python) in higher education institutions (lectures, practical and laboratory) to increase the effectiveness of teaching and the organization of independent learning activities of

students from e-learning resources (video lessons, video clips, presentations, visual aids) and the integration of Case-Stady technologies.

In the study of programming languages, the use of educational technologies aimed at increasing the motivation and creativity of students, the formation and development of creative thinking and competence, based on the programming of more problems and the implementation of various projects, as well as the creation of problem situations is effective. These include didactic e-learning resources (video lessons, training programs), analysis and diagnostic systems, and Case-Stady technology as an important pedagogical software tool.

Research results. Based on the above model of increasing the effectiveness of teaching, experimental work was carried out to determine the level of effectiveness of teaching programming languages in higher education institutions. Students of the Navoi State Pedagogical Institute in the field of "Methods of teaching computer science" were involved in the experimental work. These involved students were divided into an experimental and control group. The control group was trained in the traditional way, while the experimental group was organized using the methodology developed in the study. The results of the students involved in the experiment were analyzed mathematically and statistically on the basis of the Student-Fisher criterion.

In using this criterion suitable average value for selections, $\bar{X} = \frac{1}{n}\sum_{i=1}^{4} n_i X_i$, $\bar{Y} = \frac{1}{n}\sum_{i=1}^{4} n_i X_i$ while determining the mastery indicators $A\% = \frac{\bar{X}}{3}\cdot 100\% - \frac{\bar{Y}}{3}\cdot 100\%$ formula was used. According to the results of the calculation, the performance of the experimental group increased by 9% compared to the control group.

Conclusions.

1. In order to increase the effectiveness of teaching programming technologies in higher education institutions, it is necessary to organize trainings based on the integration of e-learning resources and Case-Stady technologies. As a result, students can achieve independent learning of programming, increase their motivation in science, develop their creative abilities and develop their competence.

2. We propose to use the above-mentioned model of improving the effectiveness of teaching future computer science teachers in improving their skills and competencies in professional subjects, in particular in programming languages. This model is important in that it teaches programming based on the creation of problem situations in the student, focusing on the preparation of practical projects using programming languages.

References

1. Mojarov M. S. Application of modern technologies in the field of interactive learning programming: trends and perspectives // Vestnik TGPU (TSPU Bulletin). 2017. 5 (182). - S. 134-139.

2. Fayzieva M.R. Creation of WEB systems adapted to the educational process // Doctor of Philosophy (PhD) dissertation in pedagogical sciences. - Tashkent, 2017. - 189 p.

3. Otaxonov N.A. Methods of teaching object-oriented programming technologies // Dissertation for the degree of Candidate of Pedagogical Sciences. - Tashkent, 2009. - 186 p.

4. Mirsanov UM Formation of students competence in object-oriented programming languages // Electronic education. - Navoiy, 2020. - № 4. - Б. 23-35.

5. Lagoxa A.S. Development of algorithmic composition of professional competence of students of legal faculties in the use of computer expert systems // Dissertation for the study of the degree of candidate of pedagogical sciences. - Barnaul, 2013. - 207 p.

6. Lebedeva T.N. Formation of algorithmic thinking of schoolchildren in the process of teaching recursive algorithms in specialized classes of secondary schools // Abstract of the thesis for the degree and candidate of pedagogical sciences. - Yekaterinburg, 2005 .-- 20 p.

7. Popova V.V. Formation of algorithmic competencies of students - future ICT specialists in the system of secondary professional education in the process of

teaching mathematics // Dissertation for the study of the degree of candidate of pedagogical sciences. - Krasnoyarsk, 2019. - 227 p.

8. Maradjabov S.I. Development of algorithmic thinking of students in higher education in the process of object-oriented programming // Dissertation for the study of the degree of candidate of pedagogical sciences. - Tajik National University, 2018. - 178 p.

9. Kazakova A.E. Methodological basis of language development programming // Authors abstract for the study of the degree and candidate of pedagogical sciences. - Moscow, 2008. - 23 p.

10. Jemchujnikov D.G. Methods of teaching programming, based on the creation of dynamic computer games for schoolchildren // Authors abstracts for the study of the degree of candidate of pedagogical sciences. - Moscow, 2013. - 25 p.

11. Yurkovets, O.P. Formation of professional competencies of technicians-programmers on the basis of modular-competent teaching technologies // Dissatrasiya kandidat pedagogik nauk. - Tolyatti, 2008. - 243 p.

12. Shkarban F.V. Methods of teaching the basics of object-oriented Programming of bachelors of applied computer science with the use of visual aids // Authors abstract of the dissertation on the study of students and candidates of pedagogical sciences. - Volgograd, 2018. - 28 p.

13. Babushkina I.A. Methods of teaching visual progrgishiroaaniyu in pedagogical universities // Authors abstract of the dissertation on the study of the degree and candidate of pedagogical sciences. - Moscow, 2002. - 19 p.

14. Babushkina Irina Anatolevna. Methods of teaching visual programming in pedagogical universities // Dissertation for the study of the degree of candidate of pedagogical sciences. - Moscow, - 162 p.

15. Vaganova O.I., Ermakova O.E. System-activity approach in the development of professional pedagogical education // Bulletin of the Minin University. 2014. - No. 4 (6). - P. 21-26.

16. Vaganova O.I., Koldina M.I., Trutanova A.V. Development of the content of vocational pedagogical education in the context of the implementation of the competence-based approach // Baltic Humanitarian Journal. 2017.Vol. 6, No. 2 (19). - P. 97-99.

17. Abramova N.S., Gladkova M.N., Vaganova O.I. Features of the development of assessment materials in the context of the implementation of the competence-based approach // Problems of modern pedagogical education. 2017. - No. 57-1. - P. 3-9.

18. Ilaltdinova E.Yu., Filchenkova I.F., Frolova S.V. Features of the organization of postgraduate support of graduates of the targeted training program in the context of support of the life cycle of the profession of a teacher // Bulletin of Minin University. 2017. - No. 3 (20). - P. 2.