Торайғыров университетінің
ҒЫЛЫМИ ЖУРНАЛЫ

НАУЧНЫЙ ЖУРНАЛ
Торайгыров университета

ТОРАЙҒЫРОВ УНИВЕРСИТЕТІНІҢ ХАБАРШЫСЫ

Педагогикалық сериясы

1997 жылдан бастап шығады

TORAIGHYROV UNIVERSITY

ВЕСТНИК ТОРАЙГЫРОВ УНИВЕРСИТЕТА

Педагогическая серия

Издается с 1997 года

ISSN 2710-2661

№ 4 (2025)

Павлодар

НАУЧНЫЙ ЖУРНАЛ
Торайгыров университета

Педагогическая серия
выходит 4 раза в год

СВИДЕТЕЛЬСТВО
о постановке на переучет периодического печатного издания,
информационного агентства и сетевого издания
№ KZ03VPY00029269
выдано
Министерством информации и коммуникаций
Республики Казахстан

Тематическая направленность
публикация материалов в области педагогики,
психологии и методики преподавания

Подписной индекс – 76137

https://doi.org10.48081/UWEH8749

SRSTI 14.35.07

https://doi.org/10.48081/TVPC7121

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A PRACTICAL APPROACH TO TEACHING PYTHON PROGRAMMING FOR UNIVERSITY STUDENTS

Research on this topic is relevant due to the increasing need for practical skills that enhance the competitiveness of graduates, the development of technology and the need to solve real problems. The purpose of the work is to evaluate the effectiveness of a practice-oriented approach to teaching Python programming in universities in order to optimize curricula and increase students' readiness to meet the requirements of modern industry. Among the applied methods, analytical, experimental, comparative, modeling, classification, statistical and others can be distinguished. The study noted a significant improvement in academic performance, an increase in interest in the subject and the development of practical skills, which confirms the importance of a practice-oriented approach in university education. The results of the work indicate a significant improvement in the quality of education, high student satisfaction, increased interest in the subject and increased practical skills, which together emphasizes the success and effectiveness of this educational approach. The work focuses not only on improving the educational process, but also on its positive impact on students' readiness for a career in the field of programming. The results of the study also emphasize the importance of courses based on practical training in Python programming for the formation of both technical skills and the ability to creatively solve problems. Improving student academic performance and satisfaction confirms the effectiveness and prospects of

this approach. Thus, the study provides an in-depth analysis of practical benefits and successful outcomes, supporting the implementation of practice-oriented learning in curricula. The practical value of the work lies in the development and implementation of an effective educational approach based on practical training in Python programming, which provides students with real software development skills, increases their competitiveness in the labor market and contributes to successful adaptation in the information technology industry.

Keywords: curricula, innovations in education, modern technologies, assessment of educational results, integration of knowledge.

Introduction

The practice-oriented methodology of teaching Python programming to university students is distinguished by its focus on real-world application of the learnt knowledge. This approach emphasises the development of real projects and problem solving, providing students with the practical skills needed to successfully enter the professional programming community. This method involves the integration of theoretical knowledge with practical experience, which contributes to a more profound learning of the material and the development of skills necessary to work in the modern field of information technology. The relevance of this study is caused by the desire to optimise the educational process, improve the quality of students' training to meet the modern requirements of the programming industry and increase their competitiveness in the labour market through the introduction of an effective practice-oriented approach to teaching Python programming in universities. The problematic of this study lies in the identification and solving of the problems associated with outdated teaching methods, lack of practical experience, low student motivation, the need for curriculum actualisation and insufficient interaction with real industry challenges.

N. N. Kerimbayev et al. [1] consider the use of chatbots as a student-centred teaching method with an emphasis on the integration of the Python programming language into its functionality. The findings of the cited study reveal that integrating Python into a chatbot enables students to develop practical programming skills in an interactive format, and integrating Python into a chatbot enables students to develop practical programming skills in an interactive format. However, this study lacked an analysis of the more concrete impact of using Python on students' academic progress, a detailed comparison with conventional teaching methods, and an in-depth look at the theoretical underpinnings of choosing a Python programming language to integrate into a chatbot.

A. A. Tengayeva and K. O. Orazbek [2] aimed to create a software system to improve the development and visualisation of electronic educational programmes. The results have powerful implications for educational institutions, learners, and educators, enhancing usability through an intuitive interface, to improve the quality of learning and provide effective management of learning material in a Python environment. However, the cited study lacked a detailed analysis of the context of e-learning software use in different educational institutions and the absence of information on feedback from teachers and learners using the software package.

A. B. Bexoltanova and N. N. Ospanova [3] aimed to develop an effective web-based system for multilevel control of educational achievements in higher education institutions using the Python programming language. The results are essential for modern educational institutions, providing transparency and efficiency in the control of the learning process. But this paper lacked a detailed analysis of the potential problems or benefits of integrating the Python programming language into the web system being developed.

Generally, each of the cited studies has made valuable contributions to the research on Python programming courses for higher education, but some aspects were left understudied. This study seeks to develop and optimise methods for teaching Python programming with a focus on practical applications. The study aims to create an effective educational approach that will enable students to learn real-world programming skills, increase their applicability in industry, and prepare them for a successful career in information technology.

The purpose of this study was to develop and validate an educational course that emphasises the practical application of knowledge and skills in Python programming. It endeavoured to identify best teaching methods that integrate theoretical foundations and practical assignments to provide students not only with theoretical knowledge but also with the real skills needed to successfully enter the professional community in the field of information technology. The objectives of this study were set as follows: to develop a course structure including topics, teaching methodology, and level of difficulty; to conduct a controlled experiment to compare the effectiveness of a practice-oriented course with conventional teaching methods; and to analyse the results of student surveys and interviews on how the skills learned in Python affect their readiness for application in real-world projects and the labour market.

Materials and Methods

This study involved a review of scientific articles and research on the subject of Python programming, covering both theoretical and practical aspects, studies concerning pedagogical aspects of teaching programming and a meta-analysis of the evaluation of the effectiveness of intelligent tutoring systems, research on the

effectiveness of various methods of teaching Python and the impact of students' cognitive-affective states on their learning in different computer-based learning environments [4 – 6]. These materials provide valuable information for this study and the development of educational approaches for Python programming. To conduct scientific research on the practice-oriented approach of teaching Python programming to university students, the study employed various methods of scientific cognition, which helped to conduct a comprehensive analysis and develop effective strategies and solutions.

The analytical method allowed analysing existing educational approaches to teaching programming, investigating pedagogical theories and concepts. The experimental method helped in comparing the effectiveness of the practice-oriented approach with conventional methods of teaching programming, as well as forming groups of students with different teaching methods, conducting the learning process, and comparing the results. Using the comparative method, different instructional strategies, technology options, and policies were compared. The synthesis method was used to create a generalised model of the educational process that integrates a practice-oriented approach in teaching Python programming to university students. The modelling method was used to create conceptual and practical models of the educational process, as well as creating abstract models that reflect the key elements and structure of practice-oriented Python learning. The classification method divided the students into groups to better tailor the training. The application of this method enabled a more effective adaptation of learning to the individual needs and characteristics of students, which can increase the overall effectiveness of the educational process. Through the statistical method, data were collected, processed, and interpreted using mathematical and statistical tools. This method made it possible to identify patterns, trends, and considerable differences in learning outcomes, and to assess the statistical significance of the findings.

A group of students from a leading technical university was selected to conduct an experiment to evaluate the effectiveness and usability of a practice-oriented approach to teaching Python programming. The experiment was conducted during one semester and included two groups of students: a control group, which studied under the conventional programme, and an experimental group, where the practice-oriented approach was introduced. The total number of participants in the experiment was 100 students divided into two groups. Students were divided into groups randomly to reduce possible distortion of results. The average age of the participants was 20 years. The experiment included a series of training sessions, practical projects, and testing based on a new practice-oriented approach. Assessment of academic performance was based on test results, practical assignments, and general activity of students in the learning process.

Data analysis included statistical processing of the results as well as comparison of performance between the control and experimental groups. At the end of the semester, feedback was collected from students in both groups to conduct analyses of student performance before and after the implementation of a practice-oriented approach to teaching Python programming.

The study was organised with a focus on developing both theoretical and practical aspects. The theoretical aspect analysed key concepts, theoretical models, highlighting important variables, and formulating hypotheses. Considering the theoretical background, key concepts, theoretical models were analysed, significant variables were identified, and hypotheses were formulated. Considering this theoretical framework related to learning to program in Python, the relationships between educational strategies, practices, and learning outcomes were identified. The practical aspect included data collection and analysis, where relevant information on student learning outcomes, effectiveness of practical assignments and teaching cases was accumulated. The findings obtained served as a basis for the development of recommendations for improving the educational process, focused on the identified problems and requirements. Ultimately, these recommendations were used to substantiate the feasibility of implementing and improving the practice-oriented approach in teaching Python programming to university students.

Results and Discussion.

The creation of an educational course on Python programming with a practice-oriented approach was prompted by the realisation of existing problems in conventional teaching methods and the need to offer an innovative approach that meets the modern requirements of the information industry. In today's world, where technological advance occurs rapidly, programming training should be more effective and adapted to the requirements of the labour market [7].

Conventional methods of teaching programming are often limited to theoretical aspects, outdated pedagogies, and insufficient attention to practical skills. This creates a gap between the knowledge obtained in educational institutions and the requirements of the real market, where specialists with not only theoretical but also practical skills are in demand [8]. Providing students with a modern, market-adapted Python programming course will not only enable them to grasp theoretical concepts, but also to actively develop practical skills [9]. The development of this course aims to fill the gap between the curriculum and the expectations of modern industry, giving students a successful start to a career in IT. The developed educational course "Practical Python Programming" is designed considering the principles of practice-oriented learning, which includes theoretical materials and their direct application in real development scenarios. The course structure includes introduction to Python, data structures

and algorithms, object-oriented programming (OOP) in Python, working with libraries and frameworks, hands-on projects, individual projects and intermediate checks, industry integration, and final project and certification.

The course begins by learning the basics of Python, including syntax, variables, and data types. Students immediately begin writing basic programmes, which provides a practical basis for further training. In the data structures and algorithms unit, students expand their knowledge by exploring different data structures such as lists, tuples, and directories. Developing algorithms in Python becomes a key element, and practical exercises reinforce understanding and application of data structures. The course moves on to OOP principles, including classes, objects, and heritage. Students develop object-oriented programs, which allows them to understand how to structure code for more efficient development. Students learn popular libraries and frameworks such as NumPy and Django. The task involves implementing a project using these tools, giving hands-on experience with real-world technology. The key stage is where students implement several large-scale projects. From web applications to data analysis, these projects require the full application of the knowledge and skills learnt. Students complete individual projects, receiving feedback from instructors. Intermediate checks ensure continuous monitoring of the learning of the material. Lectures and masterclasses from industry representatives enrich the students' experience. Collaborative projects with companies elevate learning to the level of genuine business scenarios. A final stage, where students develop their personal project and complete a final assessment. This confirms their readiness to apply knowledge in a real professional context.

Assessment methods are derived from involvement in practical projects, intermediate checks, individual assignments, and the results of the final project. Students are assessed on their active involvement in the implementation of practical projects. This includes not only the programming process itself, but also the ability to collaborate effectively in a team, apply code development principles, and solve problems that arise during project activities. Regular revisions throughout the course assess students' understanding of the topic units. These checks serve to correct the learning process and provide students with feedback on their academic progress. Students are provided with individual assignments that test their ability to apply knowledge independently. These assignments may involve solving concrete programming problems, writing code, or analysing software. The final stage of the course involves students creating their personal project. Assessment is based not only on technical implementation, but also on the student's ability to display the skills learnt in a real professional context. The course, using the methods described above, aims not only to provide students with theoretical knowledge of Python,

but also to develop key practical skills. The results of the evaluation measure how successfully students integrate the knowledge and skills they have learnt into the creation of real software products. This approach ensures that learning is not limited to theoretical aspects, but rather promotes an in-depth and sustained learning of practical programming skills.

Students in the education course are given different tasks to complete at each stage. Introduction to Python: task to write a program to solve a simple mathematical equation using basic operators; create a script that asks the user for their name and displays a welcome message. Data structures and algorithms: task to implement a programme to sort a list of integers using the bubble sorting algorithm; create a function to search for a certain element in a directory and output the corresponding value. OOP in Python: assignment to define a class "Student" with attributes name, age, and a method to output information about the student; create a class "Book" with a method to check if a book is available in the library. Working with libraries and frameworks: the task to use the NumPy library to perform matrix operations and calculate the average value of an array; create a simple web application using the Django framework, displaying information about users. Practical projects: assignment to develop a console application for task accounting with the ability to add, delete, and view tasks; create a web application for data analysis using the Pandas library and visualising the results using Matplotlib. Individual projects and mid-term tests: an assignment to implement an individual project of the student's choice related to their area of interest, such as the development of a game, website, or a mobile application. These assignments provide an overview of how tasks are organised within the course, promoting a variety of skills and preparing students for real programming challenges. The approbation of the developed course on a small group of students revealed the following results: a considerable increase in learning efficiency, verification of the applicability of theoretical knowledge in practical scenarios, and a high evaluation of the effectiveness of the practical modules. Several adjustments and improvements were made based on feedback from students and the results of the piloting.

The course structure was analysed, and, in some cases, changes were made to better meet the needs of the students. The sequence of study of some topics was refined to provide a more natural and smooth transition from basic concepts to more complex ones. Additional practical tasks were added for each section to encourage more intensive practical application of knowledge. This included additional programming challenges, real life case studies, or in-depth projects. Where certain libraries, frameworks, and tools are used, they were reviewed and updated to reflect the latest trends and standards in Python programming. Migration to more current versions of libraries or integration recent technologies

was also covered. Project assignments were revised to clarify requirements, objectives, and expected results. This has provided a clearer definition of functionality, clarified success criteria, and provided more detailed resources to support project delivery. Additional materials were added in response to student feedback, including video tutorials, reference materials, and additional code examples. This was to provide students with additional resources and to better support them in their learning. These adjustments and improvements were made to optimise the learning process, meet the needs of the students and ensure a more effective and in-depth learning experience. The data obtained served as a basis for adjustments in the course structure, refinement of materials and projects, considering the real needs of students.

Preparing university students for a practice-oriented approach to teaching Python programming requires a systematic and flexible approach. The university students were prepared for it through a series of steps. The results of training university students in a practice-oriented approach to teaching Python programming are very encouraging. The analysis of the students' level of training in programming and Python allowed for a detailed identification of their initial competences. This was the basis for the development of individualised learning plans that considered not only the level of knowledge, but also the individual needs of students, as well as different learning styles and rates of learning. Providing access to preliminary online courses about Python before the main course began played a key role in preparing students, giving them a chance to familiarise themselves with the basics and prepare for more in-depth study of the material to come. Effective implementation of project assignments allowed students not only to learn theory, but also to independently apply their knowledge in practice, developing practical programming skills. Encouraging collaborative working in teams was a successful approach as it facilitated sharing of experiences and collective problem solving, which enriched the learning process. Regular feedback on assignment results and support in obtaining professional practices complemented the educational experience, creating conditions for effective learning and application of knowledge in practice. Building a community of students and teachers has become an integral part of the educational process, providing a platform to share experiences, discuss issues, and collectively find solutions. This collaborative approach to learning fostered a fuller and more profound understanding of the material, preparing students to successfully enter the field of programming with real-world practical skills.

Courses focused on real-world tasks and scenarios using Python have become a key element of the learning experience. Students were encouraged to work together in teams, which facilitated shared experiences and collaborative

problem solving. Feedback on task results and mentoring support made learning more personalised and effective [10]. Creating a community of students and faculty provided a platform to share experiences, discuss issues, and find solutions together. The constant updating of courses has made it possible to keep up with changes in the programming field and integrate recent technologies into the learning process. Professional practices and internships provided students with the opportunity to apply their knowledge in practice and gain work experience in real projects. It prepared preparing them for the needs of the contemporary IT sector by offering both theoretical knowledge and real – world skills necessary for a smooth transition into the workforce. The following graphs were created to show how satisfied students were with the creative method. (Figures 1, 2).

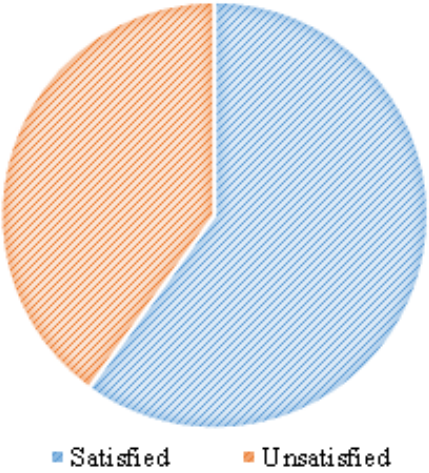

Figure 1 – Schedule before implementation of the practice – oriented approach in HEIs

Source: compiled by the authors of this study.

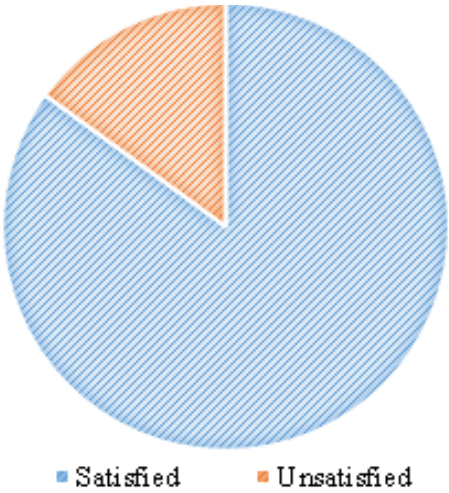

Figure 2 – Graph after implementation of practice – oriented approach in HEIs

Source: compiled by the authors of this study.

Student achievement has significantly increased, according to statistics like test scores, project grades, and other quantitative indicators of student success. Better material assimilation and the practical application of theoretical knowledge are two benefits of incorporating practical assignments and projects into the learning process. The improvement of students practical skills is one of the study's main results. Applying informationto real – world situations is necessary for real – world problem – solving projects, which increases students' comprehension and self – assurance. In addition to improving academic achievement, a practice – oriented approach raises the standard of learning in general. Testing was done to assess the methodology's practice – oriented approach to teaching Python programming's efficacy and usability. A histogram was created based on the findings, and the test's outcomes were displayed graphically (Figure 3).

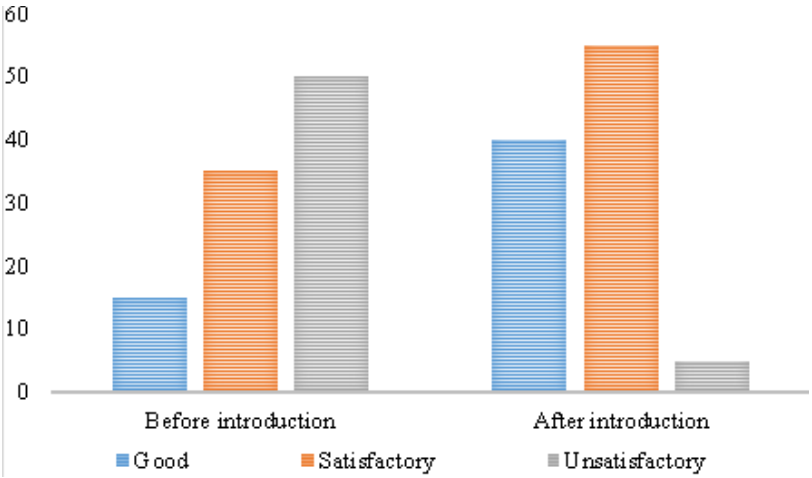

Figure 3 – Results of analyses of student performance before and after the implementation of a practice – oriented approach to teaching Python programming

Source: compiled by the authors of this study.

Significant results were obtained when university students were taught Python programming using a practice – oriented approach. With a growing percentage of kids earning the highest scores, the grade distribution has evened out. The proportion of pupils receiving «excellent» grades increased significantly, suggesting a deeper comprehension and effective practical application of knowledge. A discernible decline in the proportion of pupils receiving "unsatisfactory" grades suggests that the study content is being learned at a higher level. Students' general happiness with the educational experience was impacted by improvements in their academic achievement. Students were successfully developed as practicing programmers by the practice – oriented method, which also gave them practical skills for a successful industry debut. The graph's dynamic changes in performance demonstrate a slow but steady increase, signifying methodical and consistent learning progress.

These results highlight the value of teaching Python using a practice – oriented method, which raises student achievement and fosters the development of long – lasting skills necessary for a lucrative programming profession. More comprehensive and in – depth learning results from the introduction of real – world tasks and the focus on knowledge application. Student evaluations and comments show a high degree of satisfaction with the adopted strategy. Positive learning experiences are produced by real – world initiatives, engaging challenges, and the

application of acquired knowledge in authentic contexts. The study demonstrates that teaching Python programming using a practice – oriented approach is a good educational strategy in a university setting since it enhances student performance, sparks curiosity, and develops practical abilities.

Depending on the specific degree and course, university Python programming instruction varies. The fundamentals of programming, including ideas like variables, conditions, loops, functions, and data structures, are covered first. Python's fundamental syntax, features, and data structures are presented to the students. Students learn how to use the Python programming language to create algorithms that solve issues. Students can learn to work with well – known Python libraries and frameworks including NumPy (Numerical Python), Pandas, Flask, and Django, depending on the course level. In order to put their knowledge into practice, students frequently complete practical tasks and projects as part or their training. Collaborative projects are a common feature in Python programming classes, which aids in the development of students' interpersonal and practical abilities. Students frequently take tests at the end of the course, and their grades are determined by their performance on these assignments and tests [11].

Instructors observed improvements in the educational process. Because of the interesting practical assignments, students demonstrated a greater interest in the course. Increased student participation in class resulted in deeper conceptual and problem – solving discussions. Positive student comments on the novel strategy further emphasized how appealing and successful it was. A significant improvement tn the students' practical Python programming skills was attained. One of the objectives was a successful introduction into the professional community, and based on the outcomes, students have affectively adjusted to the demands of contemporary industry. As a result, the practice – oriented approach's successful deployment validated both its efficacy in the classroom and its capacity to actively involve students in learning Python programming.

Students' motivation and deep comprehension of the programming language increased noticeably after project assignments were incorporated into the curriculum. Participation in the projects is designed to improve comprehension of the subject matter as well as to actively the knowledge gained during implementation. By taking into account the concepts of practical experience in the educational process, this had an impact on the students' performance. In addition to mastering the content more quickly, students who receive training in practical approaches also demonstrate greater enthusiasm in the subject. Despite its effectiveness, theoretical learning is frequently not applied to the same methodology and application of knowledge in practice as practically oriented learning. High improvement scores were seen in the results, particularly for those

who actively participated in the practical tasks. This guarantees a high level of active student participation in the practical work in addition to maximum efficiency. According to the study's findings, students who receive training that prioritizes practice are effectively incorporated into the workforce. Employers commend graduates trained with this resource or their professional skills and preparedness for real – world projects.

In the end, the current study demonstrates that teaching Python programming through a practice – oriented approach is a successful way to enhance the educational process, get students ready for the demands of contemporary industry, and raise the standard of university graduates' resources overall.

The findings of the present study indicate that the adoption of a practice – oriented strategy resulted in significant enhancements in student performance, heightened student interest in the subject, and the cultivation of practical programming abilities. Students who completed the course not only effectively absorbed theoretical concepts but also actively implemented them in reality by executing actual software projects. This enabled students to gain theoretical knowledge and build practical abilities, which are essential in the field of programming. Educators commended the efficacy of the novel instructional style. The observes remarked that the students exhibited creativity and demonstrated active engagement in the learning process by applying their knowledge practically. The successful outcomes of students and their high level of satisfaction demonstrate that the practice – oriented approach effectively integrates theory and practice, enhancing the educational process's efficacy and appeal for students. An experiential approach to instructing Python programming to undergraduate students is an effective and unique strategy to enhance comprehension of the subject matter, cultivate practical abilities, and adequately equip students for the requirements of contemporary industry.

This study highlighted the importance of this approach in higher education institutions. The educational course developed, which incorporates practical assignments and real projects, shows significant enhancement in students' performance, increased interest in the subject, and the advancement of practical programming skills. Theoretical materials encompass essential programming concepts and principles, equipping students with the requisite theoretical foundation. The primary focus is on the practical dimensions of learning. Students may apply their acquired knowledge through practical projects, beginning with fundamental assignments and advancing to more intricate tasks. This approach enables students to engage with theoretical material and apply it practically.

K. Rutskaya et al. [12] examine the use of an activity – based approach for the effective professional development of teachers, which includes a comprehensive

study of the Python programming language. Students instructed through an activity – based approach utilizing Python have exhibited enhanced programming skills and preparedness for real – world projects. Additionally, this method has fostered the establishment of active working groups in which instructors exchange experiences and best practices, leading to an improvement in their skills and competencies in software product development. The study examines teacher professional development, the effective integration of Python, and the active implementation of practical cases in educational settings. The practice – oriented approach outlined in this study enhances students' practical programming skills. Both methods facilitate current and efficient learning in Python programming. The successful development of students' practical skills, preparedness for real – world projects, and effective integration into the industry are anticipated outcomes.

S. I. Szabo and L. Ronai [13] seek to develop effective educational scenarios through the use of Python for programming a robot. The study's findings provide a foundation for creating innovative educational programs focused on enhancing students' programming and engineering skills. The researchers concentrate on employing a robot alongside Python, whereas the present study emphasizes the instruction of Python programming, encompassing teaching methodologies, course organization, and practical projects. Both approaches seek to enhance the learning process.

The study demonstrated the effectiveness of a practice – oriented approach in teaching Python programming to higher education students. This study's results align with similar research, demonstrating significant enhancements in student performance, heightened interest in the course, and the acquisition of practical skills. Structured teaching methods have demonstrated their importance in facilitating a systematic comprehension of the programming language. Analyses of similar studies indicate that industry partnerships in Python education enhance a practice – oriented approach by offering students practical experience and insight into industry demands. Recommendations from previous studies emphasize the importance of structured projects, the organization of the learning process, and close collaboration with industry to ensure quality education. The current study emphasizes that effective Python instruction in higher education necessitates a blend of practical methodologies, organized teaching strategies, and collaborations with industry. These components collaborate to enhance performance and skill development while also stimulating students' interest in programming.

Conclusions

The study aimed to identify optimal strategies for incorporating practical assignments and projects into the learning process, taking into account the specific characteristics of the Python programming language. The findings highlighted that a practice – oriented approach enhances both the comprehension of theoretical

concepts and the cultivation of skills applicable in real – world situations. This study examined multiple methods, analyses, and recommendations for developing and implementing a practice – oriented approach to teaching Python programming in higher education. A comprehensive literature review was performed, encompassing benchmarking outcomes from similar studies, examining pedagogical experiences, and evaluating best practices in education.

The outcomes of the educational course "Practical Programming in Python" demonstrate its effectiveness and significant impact on students' preparedness for contemporary programming demands. The course offered students theoretical knowledge of Python while emphasizing practical application through real project development and concrete problem – solving. The integration of project assignments with practical modules enabled students to learn theoretical material and apply it directly in practical scenarios. This approach significantly enhanced student motivation and invigorated the learning process. An individualized approach to training students, taking into account their knowledge levels and specific needs, was crucial to the training's success. Access to online pre – courses, the development of individualized plans, and the promotion of collaborative teamwork facilitated effective learning. The establishment of a community comprising students and faculty enhanced the traditional learning model by facilitating the exchange of experiences and collaborative problem – solving. The course's regular reviews and adaptations based on feedback from students and industry experts highlight its flexibility and relevance.

The findings indicate a significant improvement in the performance of students enrolled in the practice – oriented course, alongside an increase in their interest in the subject and the development of practical skills. This analysis yields several significant conclusions. The implementation of project assignments positively influenced students' motivation, enhancing their engagement with the subject matter. This highlights the importance of practical experiences in programming education. The performance of students engaged in programming education. The performance of students engaged in practical projects showed a significant improvement, demonstrating the effectiveness of a practice – oriented approach in learning educational material. The results validated the efficacy of this educational approach in higher education.

This study highlights the significance of incorporating practical assignments and projects into the educational framework, enhancing learning outcomes and equipping students for real – world industry challenges. Structured teaching methods, when combined with a practical approach, enhance systematic understanding of the programming language.

The findings of this study suggest the potential for genuine integration of a practice – oriented approach into curricula. The course is designed to emphasize the

practical application of knowledge via real – world problem solving and software project development, offering specific tools to improve the learning process. This course equips students with both theoretical knowledge and practical skills essential for a successful initiation into programming. This course server as a significant resource for higher education institutions aiming to enhance their educational programs and increase the competitiveness of graduates in the job market.

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Received 04.12.24.
Received in revised form 04.12.24.
Accepted for publication 25.11.25.

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Поступило в редакцию 04.12.24.
Поступило с исправлениями 08.10.25.
Принято в печать 25.11.25.

ЖОО СТУДЕНТТЕРІНЕ АРНАЛҒАН PYTHON-ДА БАҒДАРЛАМАЛАУДЫ ОҚЫТУДЫҢ ПРАКТИКАЛЫҚ БАҒЫТТАҒЫ ТӘСІЛІ

Бұл тақырыптағы зерттеулер түлектердің бәсекеге қабілеттілігін арттыратын практикалық дағдыларға деген қажеттіліктің артуына, технологиялардың дамуына және нақты мәселелерді шешу қажеттілігіне байланысты өзекті болып табылады. Жұмыстың мақсаты оқу бағдарламаларын оңтайландыру және студенттердің заманауи индустрия талаптарына сәйкес келуге дайындығын арттыру мақсатында университеттерде Python бағдарламалауды оқытуға тәжірибеге бағытталған тәсілдің тиімділігін бағалау болып табылады. Қолданылатын әдістердің ішінде аналитикалық, эксперименттік, салыстырмалы, модельдеу, жіктеу, статистикалық және басқаларын бөліп көрсетуге болады. Зерттеу барысында оқу үлгерімінің айтарлықтай жақсаруы, пәнге қызығушылықтың артуы және практикалық дағдылардың дамуы атап өтілді, бұл университеттік білім берудегі тәжірибеге бағытталған тәсілдің маңыздылығын растайды. Жұмыс нәтижелері білім беру сапасының айтарлықтай жақсарғанын, оқушылардың жоғары қанағаттанушылығын, пәнге деген қызығушылықтың артқанын және практикалық дағдылардың артқанын көрсетеді, бұл

жиынтықта осындай білім беру тәсілінің табысы мен тиімділігін көрсетеді. Жұмыс тек білім беру процесін жақсартуға ғана емес, сонымен қатар студенттердің бағдарламалау саласындағы мансапқа дайындығына оң әсерін тигізуге бағытталған. Зерттеу нәтижелері сонымен қатар техникалық дағдыларды да, тапсырмаларды шығармашылықпен шешу дағдыларын да қалыптастыру үшін Python бағдарламалау бойынша практикалық сабақтарға негізделген курстардың маңыздылығын көрсетеді. Студенттердің үлгерімі мен қанағаттанушылығын арттыру мұндай тәсілдің тиімділігі мен перспективалылығын растайды. Осылайша, зерттеу оқу жоспарларына тәжірибеге бағытталған оқытуды енгізуге ықпал ететін практикалық артықшылықтар мен табысты нәтижелерді терең талдауды қамтиды. Жұмыстың практикалық құндылығы студенттерге бағдарламалық қамтамасыз етуді әзірлеудің нақты дағдыларын беретін, олардың еңбек нарығындағы бәсекеге қабілеттілігін арттыратын және ақпараттық технологиялар саласында табысты бейімделуге ықпал ететін Python бағдарламалауды практикалық оқытуға негізделген тиімді білім беру тәсілін әзірлеу және енгізу болып табылады.

Кілтті сөздер: оқу жоспарлары, білім берудегі инновациялар, заманауи технологиялар, білім беру нәтижелерін бағалау, білімді интеграциялау.

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04.12.24 ж. баспаға түсті.
08.10.25 ж. түзетулерімен түсті.
25.11.25 ж. басып шығаруға қабылданды.

ПРАКТИЧЕСКИЙ ПОДХОД К ОБУЧЕНИЮ ПРОГРАММИРОВАНИЮ НА PYTHON ДЛЯ СТУДЕНТОВ ВУЗОВ

Исследования на эту тему актуальны в связи с растущей потребностью в практических навыках, повышающих конкурентоспособность выпускников, развитием технологий и

необходимостью решения реальных задач. Целью работы является оценка эффективности практико-ориентированного подхода к преподаванию программирования на Python в университетах с целью оптимизации учебных программ и повышения готовности студентов соответствовать требованиям современной индустрии. Среди применяемых методов можно выделить аналитический, экспериментальный, сравнительный, моделирующий, классификационный, статистический и другие. В ходе исследования было отмечено значительное улучшение успеваемости, повышение интереса к предмету и развитие практических навыков, что подтверждает важность практико-ориентированного подхода в университетском образовании. Результаты работы свидетельствуют о значительном улучшении качества образования, высокой удовлетворенности учащихся, возросшем интересе к предмету и возросших практических навыках, что в совокупности подчеркивает успех и эффективность такого образовательного подхода. Работа направлена не только на улучшение образовательного процесса, но и на его положительное влияние на готовность студентов к карьере в области программирования. Результаты исследования также подчеркивают важность курсов, основанных на практических занятиях по программированию на Python, для формирования как технических навыков, так и умения творчески решать задачи. Повышение успеваемости и удовлетворенности студентов подтверждает эффективность и перспективность такого подхода. Таким образом, исследование содержит углубленный анализ практических преимуществ и успешных результатов, способствующих внедрению практико-ориентированного обучения в учебные планы. Практическая ценность работы заключается в разработке и внедрении эффективного образовательного подхода, основанного на практическом обучении программированию на Python, который дает студентам реальные навыки разработки программного обеспечения, повышает их конкурентоспособность на рынке труда и способствует успешной адаптации в отрасли информационных технологий.

Ключевые слова: учебные планы, инновации в образовании, современные технологии, оценка образовательных результатов, интеграция знаний.

Теруге 25.11.2025 ж. жіберілді. Басуға 30.12.2025 ж. қол қойылды.
Электронды баспа
9,42 Kb RAM
Шартты баспа табағы 31,59.
Таралымы 300 дана. Бағасы келісім бойынша.
Компьютерде беттеген З. Ж. Шокубаева
Корректорлар: А. Р. Омарова, Д. А. Қожас
Тапсырыс № 4485

Сдано в набор 21.11.2025 г. Подписано в печать 30.12.2025 г.
Электронное издание
9,42 Kb RAM
Усл.п.л. 32,63. Тираж 300 экз. Цена договорная.
Компьютерная верстка З. Ж. Шокубаева
Корректоры: А. Р. Омарова, Д. А. Қожас
Заказ № 4485

«Toraighyrov University» баспасынан басылып шығарылған
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