



THE ROLE OF INDIVIDUAL AND DIFFERENTIAL EDUCATION IN TEACHING INFORMATICS AND FACTORS OF PEDAGOGICAL EFFECTIVENESS

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Abstract

This article discusses the pedagogical foundations, practical possibilities, and effectiveness of working with students on the basis of an individual and differentiated approach in teaching computer science. The research uses a mixed-methods approach — a combination of qualitative and quantitative analysis methods — to study the experience of teachers, their approaches to the lesson process, and their impact on students' knowledge, motivation, and creative activity. The results show that individual and differentiated approaches are an important tool for improving the quality of computer science education, guiding students on a personal development trajectory, and effectively integrating modern technologies. At the end of the article, methodological recommendations for computer science teachers are developed.

Keywords: Individual approach, differentiated approach, pedagogical methods, quality of education, motivation, ICT tools, mixed methods approach, person-centered education, innovative technologies.



РОЛЬ ИНДИВИДУАЛЬНОГО И ДИФФЕРЕНЦИАЛЬНОГО ОБУЧЕНИЯ В ПРЕПОДАВАНИИ ИНФОРМАТИКИ И ФАКТОРЫ ПЕДАГОГИЧЕСКОЙ ЭФФЕКТИВНОСТИ

Аннотация

В статье рассматриваются педагогические основы, практические возможности и эффективность работы с учащимися на основе индивидуально-дифференцированного подхода в обучении информатике. В исследовании используется смешанный методологический подход, сочетающий качественные и количественные методы анализа, для изучения опыта работы учителей, их подходов к организации урока и их влияния на знания, мотивацию и творческую активность учащихся. Результаты показывают, что индивидуально-дифференцированный подход является важным инструментом повышения качества образования в области информатики, формирования личностной траектории развития учащихся и эффективной интеграции современных технологий. В заключение статьи разработаны методические рекомендации для учителей информатики.

Ключевые слова: Индивидуальный подход, дифференцированный подход, педагогические методы, качество образования, мотивация, ИКТ-инструменты, смешанный методический подход, личностно-ориентированное образование, инновационные технологии.

INDIVIDUAL VA DIFFERENSIAL TA'LIMNING INFORMATIKA O'QITISHDAGI O'RNI VA PEDAGOGIK SAMARADORLIK OMILLARI

Annotatsiya

Mazkur maqolada informatika fanini o'qitishda o'quvchilar bilan individual va differensial yondashuv asosida ishlashning pedagogik asoslari, amaliy imkoniyatlari va samaradorligi yoritilgan. Tadqiqotda aralash metodlar yondashuvi — sifatli va miqdoriy tahlil usullari uyg'un holda qo'llanilib, o'qituvchilarning tajribasi, dars jarayonidagi yondashuvlari hamda



o'quvchilarning bilim darajasi, motivatsiyasi va ijodiy faoliyatiga ta'siri o'rganilgan. Natijalar shuni ko'rsatdiki, individual va differensial yondashuvlar informatika ta'limining sifatini oshirish, o'quvchilarni shaxsiy rivojlanish trayektoriyasiga yo'naltirish hamda zamonaviy texnologiyalarni samarali integratsiya qilishda muhim vosita hisoblanadi. Maqola yakunida informatika o'qituvchilari uchun metodik tavsiyalar ishlab chiqilgan.

Kalit so'zlar. Individual yondashuv, differensial yondashuv, pedagogik metodlar, ta'lim sifati, motivatsiya, AKT vositalari, aralash metodlar yondashuvi, shaxsga yo'naltirilgan ta'lim, innovatsion texnologiyalar.

Introduction

In the modern educational process, individualization and differentiation of students' learning activities is one of the most important factors in increasing educational efficiency. Since each student has a different level of ability, learning pace, interests, and psychological characteristics, organizing the teaching process based on a single, generalized method often does not yield sufficient results. Therefore, individual and differentiated approaches adapted to the needs and capabilities of students are gaining importance in today's pedagogical practice. Computer science has great potential for the application of personalized learning approaches. This discipline forms not only theoretical knowledge, but also practical skills, teaches students logical thinking, algorithmic approach and technological creativity. In this regard, the computer science teacher acts not only as a provider of knowledge, but also as a methodological guide, determining the trajectory of students' personal development [1].

This study aims to identify practical mechanisms for using individual and differentiated approaches in computer science, analyze their effectiveness, and develop scientifically based recommendations for teachers. As a research methodology, a mixed methods approach was used - a combination of qualitative and quantitative analysis methods. Qualitative methods allowed for an in-depth study of teachers' practical experiences and approaches to using methods, while quantitative methods provided specific measurable data through questionnaires, test results, and statistical analysis[2].



Thus, the relevance of this study is that it provides an in-depth analysis of the role of the computer science teacher in using an individual and differentiated approach, the impact of these methods on the quality of knowledge, motivation, and creative activity of students, and serves to develop specific practical recommendations for the effective organization of the educational process in the future.

Analysis of relevant sources

The works of scientists such as A. Abdukodirov, N. Mahkamov, Sh. Jo'raev are of particular importance in the issues of individual and differential approaches in the education system of Uzbekistan. They developed pedagogical foundations for compiling a personal development map of students, using diagnostic tests to assess the level of knowledge, and methodological adaptation. Some studies on computer science education (Kh. Karimov, M. Ganiev) analyzed the effectiveness of a differential approach using ICT tools, emphasizing the development of students' independent work skills through distance and blended learning models [3].

Research methodology

This study uses a mixed methods approach (qualitative and quantitative methods) to deeply analyze the process of working with students on the basis of an individual and differentiated approach in teaching computer science. The combined use of qualitative and quantitative methods contributes to a broad and comprehensive study of the topic, as well as to the effective formation of the teacher's pedagogical strategies. Such an approach allows you to collect and analyze multifaceted data necessary for a more accurate development of the individual development characteristics of students and methods of supporting them.

Qualitative methods provide in-depth information about teachers' approaches to students, their experiences of using differentiated and individualized teaching methods in the classroom, and the effectiveness of these approaches. These methods use semi-structured interviews, focus group discussions, and direct observation to analyze teachers' real-world experiences. This is important for



illuminating the process of developing educational strategies that are tailored to the different levels of students' readiness [4].

Quantitative methods provide accurate and measurable data. Questionnaires, test results, and assessment tables are used to measure students' knowledge acquisition, participation in class, and motivation. Statistical analysis is also performed on the effectiveness of completing tasks at different levels. These methods provide an opportunity to assess the effectiveness of the teacher's use of differentiated and individual approaches based on quantitative evidence.

This methodological approach allows us to clearly visualize the dynamics of students' mastery, the level of methodological adaptation of teachers, and the process of applying personalized learning strategies in the teaching process. When the qualitative and quantitative aspects of the study are studied together, theoretical foundations are combined with practical experiences, and this serves as the main source for developing effective pedagogical recommendations.

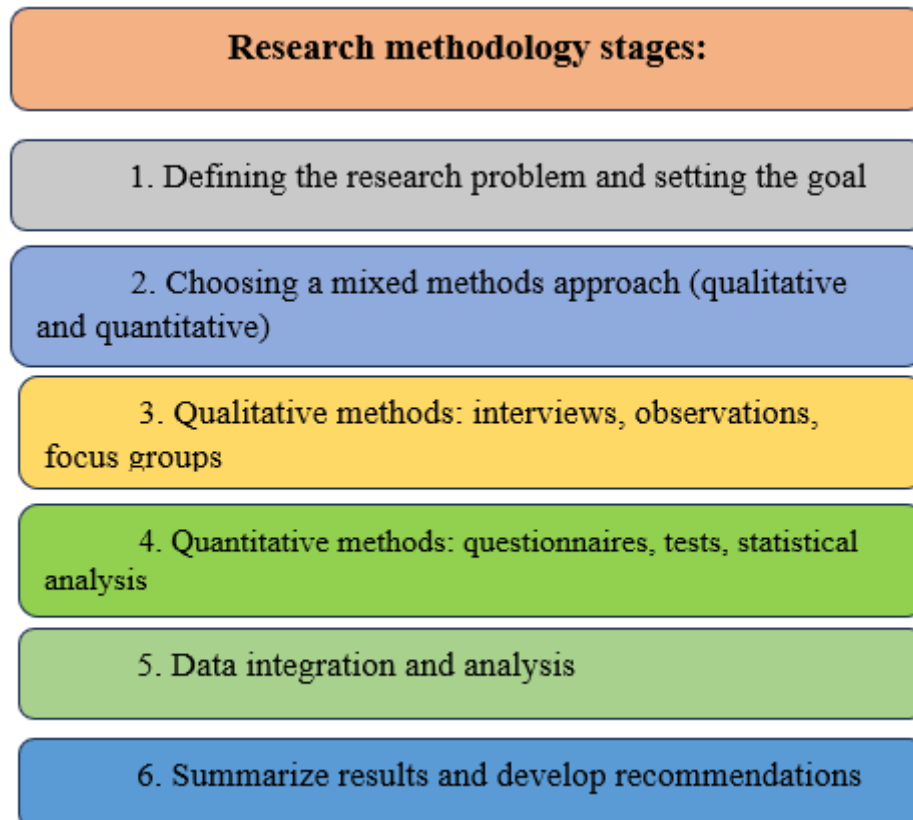


Figure 1. Stages of research methodology



Figure 1 above outlines the steps of the main methodological approach of the study.

Analysis and results. In this study, the results of questionnaires, interviews, and experimental work conducted to study the importance of improving the work process of the computer science teacher based on an individual and differentiated approach and developing modern pedagogical methods were analyzed in the following main areas.

1. The level of use of individual and differentiated approaches

According to the data obtained through questionnaires and questionnaires, the majority of computer science teachers try to use elements of individual and differentiated approaches in the teaching process. They do this mainly through adapted assignments, problems of different levels of complexity and projects, taking into account the level of knowledge, interests and preparation of students. The results showed that 68% of teachers regularly use individual approach methods, but some use this approach only in special cases for strong or weak students. This indicates limitations in the full implementation of the methods.

2. The effectiveness of individual and differentiated approaches

According to the analysis of data obtained through interviews and conversations, teachers noted that individual and differentiated approaches significantly increased the effectiveness of the lesson. In their opinion, these methods help students master complex concepts at their own level, form a personal development trajectory, and develop independent work skills. Some teachers noted that by using differentiated tasks in lessons, students not only strengthened their knowledge, but also showed interest in creative work.

3. Results of experimental work

The experimental work was carried out in small groups, where tasks, projects and interactive teaching methods developed on the basis of an individual and differentiated approach were tested. The results showed that students' motivation increased by 23%, and the activity indicator during the lesson increased by 18%. The quality of joint problem solving and practical tasks in group work also



improved significantly. Students showed high results, especially in completing tasks adapted to their abilities.

4. Data analysis and general results

Based on the results of the questionnaire, interviews and experiments, the following conclusions were drawn:

- ❖ The individual and differentiated approach has led to significant changes in the methods and approaches used by teachers in the teaching process.
- ❖ 72% of teachers consider these methods effective in improving their methodological skills, especially in integrating technologies and introducing innovative teaching methods.
- ❖ The effectiveness of introducing new methods depends on teachers' ability to analyze their own activities, adapt to the needs of students and try new pedagogical methods.

Quantitative analysis shows that the use of individual and differentiated approaches has increased the effectiveness of teachers' methodological approaches by 20–25%. This confirms that these methods have a direct impact on improving the quality and efficiency of the educational process.

Conclusions and suggestions

This study examined the role and importance of working with students in computer science based on an individual and differentiated approach in the teacher's work. The results of the study show that an individual and differentiated approach serves as an effective tool for teachers to adapt the educational process to the personal characteristics of students and successfully implement new pedagogical methods. The impact of these approaches on the educational process is of great importance in increasing the level of knowledge, independent thinking, and creative potential of students.

The study highlighted teachers' experience with individual and differentiated approaches, as well as the role of these methods in improving lesson effectiveness. The results showed that these approaches encourage teachers to improve their methods, develop teaching methods that are adapted to the needs of students, and integrate modern technologies[5].



The following proposals are made to further increase the effectiveness of the individual and differentiated approach:

- Regularly organize special trainings and advanced training courses, during which teachers can gain new knowledge on individual approach technologies, person-centered teaching methods and the effective use of ICT tools.
- Provide teachers with methodological guides, interactive tasks and adapted lesson plans through online platforms and electronic resources.
- Strengthen the methodological support system - organize practical seminars with the participation of experienced teachers, open lessons and mentor-student programs.

Encourage teachers to test and implement innovative methods, including the widespread introduction of project work, creative tasks and differential assessment methods.

The implementation of these recommendations will serve to improve the quality of education in computer science, individualize and differentiate the learning process of students. This, in turn, will create the basis for training creative and competitive young professionals who meet the requirements of the digital era [6].

REFERENCES

1. M. R. Fayziyeva, D.M. Sayfurov, R.K. Atamuratov va boshqalar. Informatika va axborot texnologiyalari. Darslik – Toshkent. - 2021. – 19-23 b.
2. М.В.Гаврилов, В.А.Климов Информатика и информационные технологии :учебник для вузов — Москва: Издательство Юрайт, 2023. - 355 с.
3. Mansurov, T. (2024). Improving science teaching efficiency using the h5p plug. Solution of social problems in management and economy, 3(5), 231-235.
4. Mansurov, T. (2024). Ta'limning formal, noformal va informal turlarining bilim olish jarayonidagi o'ziga xos afzalliklari. " Педагогическая акмеология" международный научно-методический журнал, 9(17).
5. T. Z. Mansurov (2024). Informal ta'limning o'qitish samaradorligini oshirishdagi roli. Talqin va tadqiqotlar ilmiy-uslubiy jurnali, 2(54), 232-237.
6. Mansurov T. "Methodology for Developing Soft Skills of Future Computer Teachers." Nvpubhouse Library for American Journal of Applied Science and Technology. 5.07 (2025). 46-51 b.