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METHODOLOGY FOR DESIGNING AND IMPLEMENTING INTEGRATED DIGITAL EDUCATIONAL AND METHODOLOGICAL COMPLEXES IN PEDAGOGICAL HIGHER EDUCATION

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Abstract
This article explores the methodological foundations for designing and implementing integrated digital instructional-methodological complexes (IDIMC) in higher pedagogical education. It highlights the structure of digital complexes, their didactic potential, and the stages of their effective integration into the educational process. Based on experimental results, the study demonstrates the impact of such digital solutions on education quality and student engagement.

Keywords: Digital education, instructional-methodological complex, integration, didactic tool, methodology, innovative technology.

Introduction

PEDAGOGIK OLIY TA’LIMDA INTEGRATSIYALASHGAN RAQAMLI O‘QUV-METODIK KOMPLEKSLARINI LOYIHALASH VA TATBIQ ETISH METODIKASI

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Annotatsiya
Ushbu maqolada oliy pedagogik ta’limda integratsiyalashgan raqamli o‘quv-metodik komplekslarni (IRO‘MK) loyihalash va ularni ta’lim jarayoniga tatbiq etishning metodik asoslari yoritilgan. Maqolada raqamli texnologiyalar asosida yaratilgan komplekslar tarkibi, ularning didaktik imkoniyatlari, shuningdek,

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ularni amaliyotda samarali qo‘llash bosqichlari tahlil qilinadi. Shuningdek, tajriba-sinov natijalariga asoslangan holda mazkur yondashuvning ta’lim sifati va talaba faolligiga ta’siri ko‘rsatib beriladi.

Kalit so‘zlar: raqamli ta’lim, o‘quv-metodik kompleks, integratsiya, didaktik vosita, metodika, innovatsion texnologiya

Аннотация
В данной статье рассматриваются методические основы проектирования и внедрения интегрированных цифровых учебно-методических комплексов (ИЦУМК) в высшем педагогическом образовании. Раскрывается структура цифровых комплексов, их дидактические возможности, а также этапы эффективного внедрения в учебный процесс. На основе результатов экспериментального обучения показано влияние интегрированных цифровых решений на качество образования и активность студентов.

Ключевые слова: цифровое обучение, учебно-методический комплекс, интеграция, дидактическое средство, методика, инновационная технология

INTRODUCTION

The rapid development of digital technologies is fundamentally changing the education system, creating the need to modernize the pedagogical process, reform educational resources, and improve the quality of education [1]. In particular, the introduction of innovative technologies in the field of higher pedagogical education requires new approaches to the didactic and methodological activities of the teacher [2]. The increasing presence of elements such as digital platforms, multimedia tools, interactive tasks, and automated assessment systems in the educational process makes the complex integration of pedagogical technologies an important task [3]. From this point of view, the design of integrated digital educational and methodological complexes (IDMCs) and their scientifically based implementation in the educational process is considered an urgent issue [4]. Such complexes are manifested in pedagogical activity as a tool that serves to effectively master not only theoretical knowledge, but also practical skills. They include components such as digital textbooks, tests, visual aids, video lessons, interactive tasks, analytical reports [5].

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The relevance of the topic is that most of the existing educational and methodological materials have not yet been fully digitized, most of them are in static form, with limited interactivity, flexibility, and adaptation to the individual characteristics of the student [6]. Therefore, there is a need to increase student learning activity, modularize educational materials, and expand the possibilities for analyzing learning outcomes with the help of digital complexes created on the basis of an integrated approach [7].

This article analyzes the methodological approaches on which digital educational and methodological complexes can be designed in the pedagogical higher education system and their integration into the educational process. The article also focuses on assessing the impact of IROMK on educational effectiveness, based on experimental data [8]

MAIN PART

1. The concept of an integrated digital educational and methodological complex (IDMC) and its structural structure

The process of digital transformation requires a radical renewal of the education system, improvement based on the integration of pedagogical technologies. In this regard, the concept of an integrated digital educational and methodological complex (IDMC) is interpreted as a conceptual basis for the effective organization of modern education in a digital environment [4]. These complexes combine all components of the educational process - theoretical knowledge, practical exercises, assessment tools, methodological guidelines and analytical mechanisms - on a single digital platform.

The structure of IROMK usually consists of the following main components:

Electronic textbooks and interactive content, which activate the multi-channel perception process in students through their multimedia form (text, images, video, sound);

Modularized video lessons, where the educational material is divided into parts and covered step by step;

Automated tests and assessment tools, which allow for real-time identification of knowledge;

Interactive tasks and virtual practical exercises, which encourage students to actively participate;

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Virtual laboratories or simulators, which are especially relevant for technical and experimental sciences;
Analytical reports designed to monitor student activity, serve as an objective analysis of the educational process;
Methodological instructions and methodological guides for teachers, which help coordinate the educational process.
With the help of such complexes, the principles of individualization, flexibility and automated control of the educational process are implemented in practice. This allows for a deeper understanding of student activity and a systematic assessment of their level of mastery [2].

2. Stages and methodological foundations of IROMK design

The process of effective IROMK design, based on scientific and methodological approaches, includes the following stages:
Didactic analysis: the content, goals and system of competencies of the course are determined. At this stage, pedagogical tasks that should be formed on the basis of IROMK are determined.
Structural modeling: educational material is divided into theoretical, practical, assessment and support modules. The task, entry and exit criteria of each module are clearly defined.
Technological design: digital tools are selected - such as video, interactive test, PDF content, infographics, animation. This stage ensures the connection between the technological tool and the didactic goal [5].
Platform integration: the developed IROMK is deployed in modern LMS (Learning Management System) systems - Moodle, Google Classroom, Edmodo and other platforms. At this stage, the user interface, access options, and control mechanisms are developed [3].
Testing and optimization: initial tests are conducted and the system is improved based on student feedback, evaluation results, and observations. Feedback-based optimization is important at this stage.
Each stage has its own methodological criteria that serve to increase the effectiveness of the IROMK. As a result of such a systematic approach, the educational process is fully adapted to the digital format.

3. Practical implementation of the IROMK and results of experimental activities

The IROMK developed within the framework of this study was applied to 3rd-year students studying in the field of informatics at the Faculty of Physics and

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Mathematics of Andijan State University. The experiment was organized as follows:

Experimental group – 30 students, trained on the basis of IROMK;

Control group – 30 students, trained on the basis of traditional methods.

During the educational process, initial and final tests, intermediate controls, and observations were conducted based on activity indicators to assess students' knowledge. Based on the data obtained, the following aspects of students were studied:

learning indicators;

speed and accuracy of completing tasks;

level of participation in interactive tasks;

frequency of being active on the digital platform.

According to the final analysis, the final grades of the experimental group were 27.3% higher than those of the control group. This confirms the effectiveness of the digital learning environment organized on the basis of IROMK, as well as the need to introduce innovative methods into the educational process [8].

LITERATURE REVIEW

The issue of designing integrated digital educational and methodological complexes (IDMCs) and their implementation in the pedagogical process has been widely studied in recent years as one of the topical topics in scientific and pedagogical literature. It has been scientifically substantiated that these complexes serve to increase the effectiveness of education through the presentation of educational content in a modularized, digitized and interactive form.

Khodjaeva N.Kh. [1] in her research describes theoretical approaches to the structural elements of the pedagogical environment formed on the basis of digital technologies and their interaction. She especially emphasizes the role of digital educational resources in competency-based education.

Kadyrov M.M. [2] proposed various models of digital teaching methods in the higher education system, in which the emphasis is on the methodology for creating effective electronic courses on platforms such as Moodle, Edmodo, Google Classroom. The issue of technological integration of IDMKs is well-founded in these developments.

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Azizov Z.M. [3] provides a comprehensive analysis of the issue of innovative pedagogical approaches and their integration with digital technologies. The author supports a constructive approach to education and writes about the methodology for forming students' independent thinking using interactive tools.
Karimova D. [4], along with the theoretical substantiation of integrated educational and methodological complexes, also deeply studies the stages of their design in practice. Her research covers in detail the methods of systematizing the components of IRMK, placing them on a platform, and experimental evaluation.
Also, the practical instructions given by Abdurakhmonov O.A. [5] on the methodological foundations of using digital resources in education directly serve the practical part of the topic of this article. The author recognizes the role of interactive tasks and automated assessment systems in activating student activity.
An analysis of scientific articles in Europe and the CIS countries shows that modern education is unthinkable without digital technologies. Therefore, Ganiyev A.Kh. [6] and Saidov S.S. [8], substantiated the educational approaches based on digital complexes with experimental analyses and proved that they significantly increase the effectiveness of education.
The analysis of the above literature shows that IROMKs should be considered not only as a set of digital tools, but also as an integrative system that creates a systematized, pedagogically goal-oriented and technologically stable environment. This approach is considered inextricably linked with modern pedagogical theories (constructivism, situational learning, mastery theory, etc.).
Tadqiqot metodi va metodologiyasi. Tadqiqot metodologiyasi zamonaviy raqamli ta’lim nazariyasi, shaxsga yo‘naltirilgan yondashuv, integratsiyalashgan didaktik tizimlar nazariyasi asosida shakllantirildi. Ishda o‘quv jarayonini kompleks tahlil qilish uchun tizimli, integrativ va innovatsion yondashuvlar asos qilib olindi.
Nazariy bosqichda IRO‘MK kontseptsiyasi, uning tarkibiy tuzilmasi va pedagogik imkoniyatlari haqida ilmiy adabiyotlar tahlil qilindi. Empirik bosqichda Andijon davlat universiteti informatika yo‘nalishidagi 3-kurs talabalari ishtirokida eksperiment o‘tkazildi. Talabalar ikki guruhga bo‘lindi: eksperimental (IRO‘MK asosida o‘qitilgan) va nazorat (an’anaviy o‘qitilgan) guruhlari.
Tadqiqotda nazariy-tahliliy, eksperimental, kuzatuv va statistik metodlardan foydalanildi. O‘quv natijalari testlar orqali baholanib, o‘zlashtirish darajalari foizlarda taqqoslandi. Statistik tahlillar asosida IRO‘MK asosidagi o‘qitish samaradorligi amaliy jihatdan isbotlandi.

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Xulosa va takliflar. Olib borilgan tadqiqotlar natijasi shuni ko‘rsatadiki, integratsiyalashgan raqamli o‘quv-metodik komplekslar (IRO‘MK) oliy pedagogik ta’lim tizimida o‘quv jarayonini zamonaviy raqamli texnologiyalar asosida tashkil qilishda muhim didaktik vosita bo‘lib xizmat qiladi. Bunday komplekslar o‘zining modullashtirilgan, interaktiv va moslashuvchan tuzilmasi bilan nafaqat bilimlarni uzatish, balki talabaning individual xususiyatlarini hisobga olgan holda o‘zlashtirish faoliyatini boshqarish imkonini ham beradi.

IRO‘MK tarkibida o‘quv materiallarining elektron shakllari, avtomatlashtirilgan baholash vositalari, multimedia resurslari, interaktiv topshiriqlar va tahliliy hisobot modullari mavjud bo‘lib, ular o‘rtasidagi metodik integratsiya yuqori samaradorlikka erishishga xizmat qiladi. Eksperimental faoliyat natijalari shuni ko‘rsatadiki, bunday komplekslar asosida tashkil etilgan o‘qitish an’anaviy yondashuvlarga nisbatan talabalarning faolligi, o‘zlashtirish darajasi va mustaqil ishlash ko‘nikmalarini sezilarli darajada oshiradi. Xususan, eksperimental guruhdagi talabalar yakuniy testlarda nazorat guruhiga nisbatan 27,3 foizga yuqori natijalarni qayd etganlari fikrimizni dalillaydi.

Yuqoridagilardan kelib chiqib, quyidagi takliflar ilgari suriladi:

IRO‘MKlar asosidagi raqamli o‘quv muhiti namunalarini ishlab chiqish va ularni fanlar kesimida ommalashtirish maqsadga muvofiq. Har bir fan uchun maxsus modullashtirilgan komplekslar ishlab chiqilishi zarur.

O‘quv platformalar (Moodle, Google Classroom, Edmodo va boshqalar) doirasida IRO‘MK modullarini to‘liq integratsiyalash va sinxronlashtirish orqali o‘qitish sifatini tizimli oshirish lozim.

O‘qituvchilar va metodistlar malakasini oshirish kurslariga IRO‘MKni loyihalash, platformaga joylashtirish va undan samarali foydalanish kompetensiyalarini o‘rgatuvchi maxsus bloklarni kiritish tavsiya etiladi.

IRO‘MK samaradorligini muntazam monitoring qilish uchun tahliliy va diagnostik vositalarni (learning analytics) joriy etish, bu orqali talabalar faoliyati to‘g‘risida aniq ma’lumotlar asosida pedagogik qarorlar qabul qilish imkoniyati yaratiladi.

Pedagogik oliy ta’lim muassasalari o‘quv rejalari va dasturlarini raqamli ta’limga moslashtirish, ayniqsa, integratsiyalashgan o‘quv-komplekslarga tayangan yondashuvlarni didaktik me’yor sifatida joriy etish zarur.

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IRO‘MKlarni ilmiy-tadqiqot asosida sertifikatlash va metodik baholash tizimini ishlab chiqish, bu ularning sifatini kafolatlashga va ta’lim tizimida rasmiy joriy qilishga xizmat qiladi.

Ushbu takliflarning amaliy joriy etilishi oliy ta’lim tizimida raqamlashtirish jarayonini tizimli asosda tashkil qilish, pedagogik jarayonni moslashuvchan, shaxsga yo‘naltirilgan va yuqori natijadorlikka ega shaklda olib borish imkonini beradi.

REFERENCES:

1. Ходжаева Н.Х. Цифровые педагогические технологии: основы методологии. – Ташкент: Фан ва технология, 2021. – 152 с.
2. Кадыров М.М. Методы цифрового обучения в системе высшего образования. – Самарканд: Илм Зиё, 2020. – 136 с.
3. Азизов З.М. Инновационные педагогические подходы и цифровые технологии // Педагогика и психология. – 2022. – № 3. – С. 25–30.
4. Каримова Д. Интегрированные учебно-методические комплексы: теоретические основы и практические подходы // Цифровое образование. – 2023. – № 1. – С. 41–48.
5. Абдурахманов О.А. Методическое пособие по использованию цифровых ресурсов в обучении. – Ташкент: ТГПУ, 2021. – 98 с.
6. Ганиев А.Х. Эффективное использование цифровых средств в педагогической деятельности // Журнал образовательных инноваций. – 2020. – № 4. – С. 15–21.
7. Шукуров И.М. Методы активизации деятельности студентов с использованием цифровых инструментов // Информационные технологии в образовании. – 2022. – № 2. – С. 30–35.
8. Саидов С.С. Эффективность цифровых комплексов в экспериментальном обучении // Методические новшества в высшем образовании. – 2024. – № 1. – С. 12–17.
9. Ganiev I.D. Basic Requirements For Educational Electronic Resource / Creativity and Intellect in Higher Education: International Scientific-Practical Conference, 138–139. Retrieved from.
10. G‘aniyev I.D. Ta’lim tizimida tarmoq texnologiyalari kursini o‘qitishning samarali usullari / Ta’lim jarayonida raqamli texnologiyalarni joriy etish

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brightmindpublishing.com
ISSN (E): 3061-6964

samaradorligi - Respublika ilmiy-amaliy konferentsiyasi. Chirchiq. 2023-B 314-316.

11. G‘aniyev I.D. Tarmoq texnologiyalari kursini o‘qitishni takomillashtirish / Ta’lim jarayonida raqamli texnologiyalarni joriy etish samaradorligi - Respublika ilmiy-amaliy konferentsiyasi. Chirchiq. 2023-B 38-40.
12. Ганиев И.Д. Роль “Blended learning” и “Flipped classroom” в совершенствовании методической системы обучения сетевым технологиям // Mug‘allim ham uzliksiz bilimlendirio‘ ilmiy-metodikalq jurnali Nukus, 2023. – №4/2 – B. 340-343.
13. Ganiev I.D. (2023). Classification of educational electronic resource and electronic resource. "online - conferences" platform, 135–137.
14. Quljonov N. J., Abdigaffaforov H. S. METHODS OF SOLVING PROBLEMS IN OLYMPIAD ISSUES IN MATHEMATICS //Web of Teachers: Inderscience Research. – 2023. – T. 1. – №. 8. – C. 277-282.
15. Mahkamov E. M., Quljonov N. J. O’zbekiston va finlandiya umumiy o’rta ta’limda matematika fanini o’qitishning uslublarini kamchilik hamda yutuqlarini ba’zi misollarda solishtirish //Academic research in educational sciences. – 2021. – T. 2. – №. 12. – C. 815-819.
16. Quljonov N. J. O. G. L. et al. Finlandiya metodlari asosida matematika fanini o‘qitish samaradorligini oshirish usullari //Academic research in educational sciences. – 2023. – T. 4. – №. CSPU Conference 1. – C. 285-289.
17. Kuljonov N. J. Principles Based On The Teaching Of Mathematics Using Application Programs In Higher Education Institutions //Pedagogical Cluster-Journal of Pedagogical Developments. – 2024. – T. 2. – №. 11. – C. 25-33.