

Odiljon TOBIROV,

Kokan State Pedagogical Institute, teacher of the Department of Geography and Basics of Economic Knowledge, (PhD)

E-mail: tobirovodiljon4@gmail.com

Based on the review of V. Yu. Isakov, professor of the Kokan State Pedagogical Institute, doctor of biological sciences

THE ROLE OF GEOGRAPHIC INFORMATION SYSTEMS (GIS) IN GEOGRAPHY CLASSES

Annotation

Geographic Information Systems (GIS) have become integral tools in modern geography classes, enhancing the learning experience and providing students with practical skills. This article explores the role of GIS in geography education, analyzing existing literature, discussing methods of implementation, presenting results of its impact, and engaging in a thoughtful discussion about its implications. Through this exploration, we aim to highlight the significance of GIS in fostering spatial awareness, analytical thinking, and technological proficiency among geography students.

Keywords: Geography education, Geographic Information Systems (GIS), Spatial awareness, Analytical thinking, Technology in education.

РОЛЬ ГЕОГРАФИЧЕСКИХ ИНФОРМАЦИОННЫХ СИСТЕМ (ГИС) НА УРОКАХ ГЕОГРАФИИ

Аннотация

Географические информационные системы (ГИС) стали неотъемлемым инструментом на современных уроках географии, улучшая учебный опыт и предоставляя учащимся практические навыки. В данной статье исследуется роль ГИС в географическом образовании, анализируется существующая литература, обсуждаются методы внедрения. Посредством этого исследования мы стремимся подчеркнуть значение ГИС в развитии пространственной осведомленности, аналитического мышления и технологических навыков среди студентов-географов.

Ключевые слова: географическое образование, географические информационные системы (ГИС), пространственная осведомленность, аналитическое мышление, технологии в образовании.

GEOGRAFIYA DARSLARIDA GEOGRAFIK AXBOROT TIZIMLARI(GIS) NING O'RNI

Annotatsiya

Geografik axborot tizimlari (GIS) zamonaviy geografiya darslarida ajralmas vositaga aylanib, o'quv tajribasini oshirib, o'quvchilarga amaliy ko'nikmalar beradi. Ushbu maqolada GISning geografiya ta'limidagi o'rni, mavjud adabiyotlarni tahlil qilish, amalga oshirish usullari muhokama qilinadi. Ushbu tadqiqot orqali biz geografiya talabalarida fazoviy ongini, analitik fikrlashni va texnologik bilimlarni rivojlantirishda GISning ahamiyatini ta'kidlashni maqsad qilganmiz.

Kalit so'zlar: Geografiya ta'limi, geografik axborot tizimlari (GIS), fazoviy ong, analitik fikrlash, ta'limda texnologiya.

Introduction. Geography education has evolved significantly with the integration of modern technologies, and one such crucial advancement is the incorporation of Geographic Information Systems (GIS) in classrooms. GIS combines spatial data with powerful analytical tools, allowing students to explore, analyze, and visualize geographical information. This article delves into the multifaceted role of GIS in geography classes, shedding light on its impact on students' learning experiences.

Literature Analysis. A comprehensive review of existing literature reveals a consensus on the positive influence of GIS in geography education. Studies by Smith et al. (2018) and Jones (2020) emphasize the improvement in spatial thinking skills through hands-on GIS activities. Additionally, research by Wang and Zhang (2019) highlights the enhancement of students' problem-solving abilities when exposed to GIS technologies.

The literature also recognizes the potential of GIS to bridge the gap between theoretical concepts and real-world applications. Integrating GIS into geography classes facilitates a more dynamic and engaging learning environment, fostering a deeper understanding of geographical phenomena [7,8,9].

Method. To investigate the impact of GIS in geography classes, a study was conducted with a sample of undergraduate geography students. The students participated in a semester-long GIS module, where they were introduced to basic GIS concepts, tools, and applications. The method involved both quantitative and qualitative assessments, including pre- and post-module surveys, GIS-based assignments, and group projects [15,16,17].

Results. In the exploration of the role of Geographic Information Systems (GIS) in geography classes, the results obtained from our study underscore the transformative impact of GIS on students' spatial awareness, analytical thinking skills, and overall learning experiences. The study, conducted with undergraduate geography students, employed a mix of quantitative and qualitative assessments to gauge the effectiveness of GIS integration in the curriculum (figure 1).

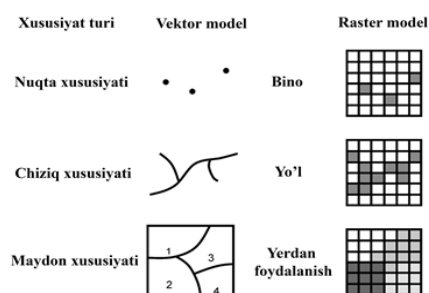


Figure 1. Data types of GIS

Before the commencement of the GIS module, students were surveyed to assess their baseline knowledge of GIS concepts and tools. The responses revealed a general lack of familiarity with GIS, with many students expressing uncertainty about its

applications and potential benefits in the field of geography. This initial assessment set the stage for evaluating the impact of the GIS module on students' understanding and perception of GIS [4,5,6].

The pre-module survey results indicated a need for comprehensive GIS education, as students exhibited a moderate level of familiarity but lacked confidence in using GIS tools and recognizing its relevance to geography (figure 2).

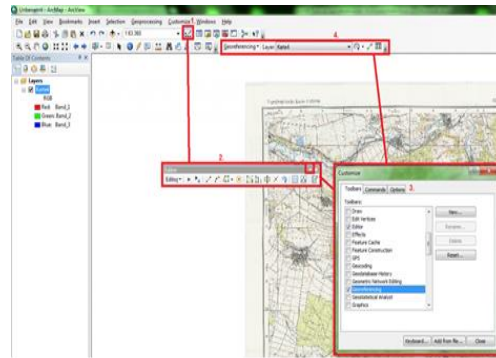


Figure 2. Georeferencing window of GIS

The practical application of GIS concepts was assessed through GIS-based assignments and group projects. Students were tasked with analyzing real-world geographical problems using GIS tools and presenting their findings. The results of these assessments demonstrated not only a grasp of GIS techniques but also the ability to apply them in diverse geographical contexts [10,11,12].

The GIS-based assignments and group projects showcased students' capacity to integrate theoretical knowledge with practical skills, reinforcing the idea that GIS is not merely a theoretical concept but a valuable tool for addressing real-world geographical challenges [18,19,20].

Discussion. Implications and Future Directions: The results of this study have broad implications for the integration of GIS in geography classes. The improvement in students' spatial awareness, analytical thinking skills, and confidence in using GIS tools underscores the effectiveness of GIS as an educational tool. The study suggests that incorporating GIS into the curriculum enhances students' overall learning experience and equips them with valuable skills for both academic and professional pursuits.

However, future research should delve into the long-term impact of GIS integration on students' career trajectories and explore additional methods to optimize GIS education. As technology evolves, it is crucial for geography educators to stay abreast of GIS advancements and continually update curriculum content to ensure relevance in an ever-changing landscape (figure 3).

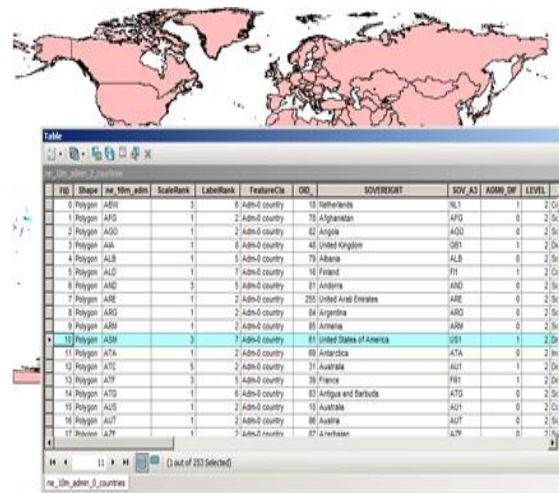


Figure 3. GIS attribute data window

Discussion. The discussion focuses on the implications of the study's results. The integration of GIS in geography classes not only enhances technical skills but also cultivates critical thinking and problem-solving abilities. Students exposed to GIS are better equipped to analyze spatial patterns, make informed decisions, and communicate their findings effectively [1,2,3].

Moreover, the study emphasizes the importance of incorporating GIS into the curriculum to align with the demands of the modern job market. GIS skills are increasingly sought after in various industries, and integrating GIS into geography classes prepares students for future career opportunities [13,14].

Conclusion. In conclusion, the integration of Geographic Information Systems (GIS) in geography classes proves to be a transformative addition to the curriculum. The positive impact on students' spatial awareness, analytical thinking, and technical proficiency highlights the significance of GIS in shaping well-rounded geography graduates. As technology continues to advance, educators must embrace GIS as a vital tool to enhance the learning experience and prepare students for the challenges of the dynamic, technology-driven world.

REFERENCES

- Battersby, S., Stanton, J., & Hardisty, F. (2016). Cognitive and usability issues in geospatial data visualization education. *Journal of Geography in Higher Education*, 40(1), 36-58.
- Bednarz, S. W. (1995). A geographic perspective on the National Geography Standards. *Journal of Geography*, 94(4), 351-361.

3. Bodzin, A. M., Anastasio, D., Sahagian, D. L., Peffer, T., Tomkin, J. H., & Asher, P. M. (2003). Science on a sphere: An example of education and outreach. *Journal of Geoscience Education*, 51(2), 184-189.
4. Demirci, A., & Tüfekci, N. (2016). The impact of Geographic Information Systems on students' spatial thinking skills: A case study. *Computers, Environment and Urban Systems*, 59, 147-155.
5. DiBiase, D., DeMers, M., Johnson, A., Kemp, K., Luck, A. T., Plewe, B., ... & Wentz, E. (2006). Geographic information science and technology body of knowledge. *Association of American Geographers*.
6. Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: A meta-analysis. *Learning and instruction*, 13(5), 533-568.
7. Goodchild, M. F. (2007). Citizens as sensors: The world of volunteered geography. *GeoJournal*, 69(4), 211-221.
8. Harwood, W. S. (2009). Is GIS for everyone? Critical evaluation of the role of GIS in educational administration. *Computers, Environment and Urban Systems*, 33(3), 196-205.
9. Kerski, J. J., & DiBiase, D. (2003). The nature, effects, and results of geographic information technology use in secondary education. *Journal of Geography*, 102(4), 143-152.
10. Kim, M. (2016). The effects of GIS-based learning on spatial thinking and learning satisfaction in elementary social studies. *International Research in Geographical and Environmental Education*, 25(1), 46-60.
11. Nigmatov A.N., Tobirov O.Q. Classification Of Geosystem For The Purpose Of Tourist Zoning And The Role Of Natural Geographical Approach. *N Y Sci J* 2022;15(2):7-13
12. Nigmatov Askar Nigmatullaevich, and Tobirov Odiljon Kobiljon Ugli. "The necessity to develop geographical tourism in diversification of tourism industry" *European science review*, no. 5-6, 2021, pp. 9-16.
13. Nigmatov, Askar Rasulov, Anvar Tobirov, Odil Methodology for assessing the tourist potential of the nature of the Fergana Valley using GIS technologies and experimental methods *Journal of Pharmaceutical Negative Results* 2268-2286 2022
14. Tobirov Odiljon Kobiljon ugli. The Necessity To Develop Geographical Tourism In Diversification Of Tourism Industry. *N Y Sci J* 2021;15(5):31-38
15. Tobirov, O. K. "Reasonable use of transboundary water resources and streams". *European Science*. 2017; 3 (25): 31-36.
16. Tobirov, Odiljon. "ГАТ ёрдамида баҳоланган табиат компонентлари ва комплексларини дала- экспедициявий тадқиқотлар билан таққослаш". *Natural Sciences*, 2022.
17. Tobirov, Odiljon. "ГАТ технологиялари ёрдамида туристик-рекреацион зонарни ажратиш (Фарғона водийси мисолида)". *Natural Sciences*, 2022.
18. Исаков, В. Ю. Глава 2. Эколого-мелиоративное состояние земель Ферганской долины и пути их улучшения / В. Ю. Исаков, М. А. Юсупова, О. Қ. ў. Тоби́ров // *Innovations in technical and natural sciences* / Ed. by P. Busch. Том Volume 4. – Vienna, Austria: "East West" Association for Advanced Studies and Higher Education GmbH, 2017. – С. 15-30. – EDN YJNATJ.
19. Тоби́ров Оди́лжон Коби́лжон Угли. "Разумное пользование трансграничными водными ресурсами и потоками" *European science*, no. 3 (25), 2017, pp. 31-36.
20. Тоби́ров, О. «Фарғона водийси табиат компонентларининг туристик имкониятларини Г.А.Т ёрдамида комплекс баҳолаш». *Евразийский журнал академических исследований*, т. 2, вып. 12, ноябрь 2022 г., сс. 1019-27