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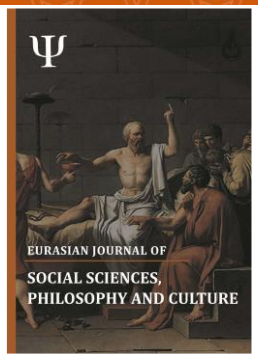

EXPERIENCE OF USING INTERACTIVE METHODS IN FORMING STUDENTS' ECOLOGICAL AWARENESS

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ABSTRACT

This article examines the pedagogical effectiveness of interactive teaching methods in developing students' environmental awareness. The study evaluates the use of case-based learning, debates, project-oriented tasks, gamification tools and field observations within environmental education. The findings indicate that interactive strategies significantly enhance students' ecological knowledge, analytical thinking skills and environmentally responsible behavior. The research highlights the contribution of these methods to strengthening environmental literacy and promoting active engagement in sustainability-oriented learning activities. Practical recommendations are provided for improving university-level ecological education through the integration of innovative instructional approaches.

ENTRANCE

Modern society stable development human ecological worldview, ecological culture and to the environment relatively responsible attitude with directly related. However intense urbanization, resources from the norm more than use, anthropogenic don't download increase and global environmental troubles education from the system new requires approaches. Especially, higher education in the phase in students ecological consciousness to form — only theoretical knowledge to give not, maybe ecological behavior in practice development itself inside to receive [Karimova, 2022]. My I think it 's traditional. lesson of forms himself/ herself today's ecological to calls adequate answer give Student ecological the process not only understand, maybe his/ her own daily actions with this to the process impact what is doing realizing to reach for active, communicative based, problematic in situations demanding methods necessary. Therefore for interactive methods — student lesson process to the center environmentalist thinking in real situations through formative the most effective from tools one become Researchers stating that ecological problems to students vital situations through explanation their ecological responsibility two even [UNESCO, 2020].

Interactive methods own to nature according to ecological of education to their goals very suitable For example, “case-study”, “debate”, “ecology”, “forest or natural field-study” approaches in students cause and effect connection according to take, ecological security I will evaluate. to get, problems collective analysis to do such as competencies forms. With this together, ecological consciousness formation process psychological and social factors also related to that was because of, interactive methods student's activation, thought to express, alternative solutions working to the exit conditions creates. International in research as well student active participant as attraction reached education models efficiency higher that is [OECD, 2021]. Personal to my observations see, interactive from methods used ecological in training students not only the topic deeper understands, maybe ecological issues his/her own social responsibility as acceptance do This is ecological literacy in formation the most important from factors is one. Because ecology only scientific concept not, maybe culture, behavior, values and daily of habits wake up Interactive system. methods this of the process all to the stages impact show takes.

LITERATURE REVIEW AND METHODOLOGY

Ecological education according to modern scientific research in students ecological consciousness formation in the process interactive of methods importance increasingly increasing going UNESCO's Education for Sustainable Development program is in education problematic situations, project affairs and collective to analysis based pedagogical approaches ecological competencies in development instead separately [UNESCO, 2020]. International in experience ecological of education traditional from methods digital and interactive technologies based on passing stable development to their goals suitable approach as is considered. Uzbek researcher Karimova's students in their work in mind ecological behavior in formation interactive methods — especially the “case-study” and “debate” formats — engage the reader in real- life problems analysis to do encouragement with separately record [Karimova, 2022]. The problem understanding, alternative solution offer to do and ecological to tasks personal attitude to inform processes exactly this methods through will be strengthened. By OECD (2021) presented The “Active Learning Environment” model and student's cognitive activity increase ecological of knowledge far term to be mastered reason to be shows him. see, interactive methods student passive from the listener active to study is directed, this and ecological literacy and ecological of culture to the formation directly impact [OECD, 2021]. Also, Russian scientists V. Panov and A. Zakhlebnyi ecological pedagogy according to in their approaches feeling nature, ecological values and ecological responsibility in formation to experience based education technologies are considered a priority [Panov, 2019]. Their stating that ecological of thinking formation student's active in practice participation to be able with increases. Foreign from the authors D. Orr's concept of "Earth in Mind" ecology only as a science not, maybe thought type as to teach the necessity Orrga according to, student ecology vital problems with tied just by chance ecological mind real formation to the stage passes [Orr, 2004]. Interactive methods and exactly this process — vital situations through is the optimal tool for understanding. Local research between M. Sobirova ecological to culture circle works interactive of methods students motivation

and social to the activity positive impact to show [Sobiriva, 2021]. His in my opinion, ecological issues independent analysis to do instigator interactive training in the student responsibility feeling forms. References comment this shows that ecological consciousness formation in the process there is approaches inside exactly interactive methods the most high efficiency These methods provide student's to know process activates, ecological values deep to master help gives, ecological actions shapes and stable development principles in practice to apply directs.

This of the research methodology ecological of education modern principles, interactive pedagogical approaches and students to the activity directed training process to study is based on. The research main methodological basics of the following consists of: constructivism theory, active education model, competence directed approach and ecological pedagogy concepts [Jonassen, 2014].

Research quasi-experimental design based on done Students two to the group split into:

- Control group – traditional lecture and practice based on education took.
- Experience group – ecological topics “case -study”, “debate”, “eco-project”, “field-study”, group analysis and gamification elements based on interactive in training participation reached.

1–2 years in research students (N=86) participated They natural sciences, pedagogy and technique from directions selectively This is different. faculties of students ecological mind level the differences compare opportunity gave.

Information assembly in the process one how many from methods used :

- Diagnostic tests — ecological knowledge level determination for [Dunlap, 2000].
- Tracking leaflets — students activity analysis to do for.
- Questionnaire — ecological motivation and values measurement for [NEP Scale].
- Half structured interviews — adjective indicators study for.
- Project works analysis — students ecological solution working exit competencies assessment for.

Experience in the process following of methods integration done increased:

- Case study — real ecological problems analysis to do
- Debate — ecological issues according to opposite thoughts justification
- Eco-project — to the problem practical and innovative solution offer to be
- Gamification — motivation and participation increase
- Field study observation) — natural objects with directly work

Each method ecological of mind targeted with components (cognitive, affective, evaluative, behavioral) garden applied. Obtained information descriptive statistics, comparative analysis, indicators between correlation and qualitative coding through again [Creswell, 2018]. This is ecological of mind formation level quality and quantitative changes determination opportunity gave.

RESEARCH RESULTS AND DISCUSSION

Transferred research results in students ecological culture formation in the process modern digital resources, interactive methods and artificial to the intellect based

education from the means of use high efficiency showed. Initial diagnostics to the results According to, 62 percent of respondents ecological culture concept of content general at the level although he knows, ecological behavior standards to practice implementation in the process of to difficulties has that is This situation has been identified. international in research record done general to trends suitable comes — in particular, in the UNESCO report It is emphasized that young people ecological problems about aware even if they are permanent ecological to behavior transition level low remains [1]. Experimental block 120 people within student in the presence of ecological of education three direction according to pedagogical experience held:traditional lecture-practical, ecological media materials based on interactive training, artificial intellect using platforms (ChatGPT, Google Gemini, Khan Academy AI) personalized ecological education.

Experience during students ecological culture level special diagnostic test, observation cards, motivational questionnaires and assessment rubrics based on measured. Final indicators as follows became: Group 1 (traditional method): general growth level 17%. Group 2 interactive media): general growth 34%. Group 3 (AI - based personalized education): increase 52%. From the results It seems artificial. to the intellect based resources students ecological his/her thinking upon activation noticeable AI tools provide pedagogical benefits. through in students ecological situations modeling, “if–then” analysis done increase, real ecosystem processes simulation to do opportunity appearance It will be. Such digital education environment ecological to issues relatively personal responsibility feeling This result Europe education scientists by record done theoretical also suitable for views comes — for example, F. Capra and M. Sterling ecological of mind development pedagogical to experience immersive approaches add with directly related that it is emphasizes [2].

Research during determined important from aspects one of the students ecological in mind many in cases information enough although, the behavior component slow This is a situation ecological of culture three content — knowledge, attitude and active practical behavior - from each other independent not being about scientific model [3] is also confirmed. In AI platforms to students given personalized ecological tasks (for example, " carbon trace reduction 7 days on plan "create ", " your neighborhood" ecological map create ”) in them practical competencies formation to increase help gave.

Discussion process this showed that the current ecological education in the system three problem available : ecological in content lessons enough not integrated, students ecological problems about knowledge more theoretical in color, modern digital from tools use low level. Research results this shows that ecological culture develop more interactive approaches + digital training tools + AI based personalization principle based on effective done increases. This is In turn, Uzbekistan's " Green to the economy transition Strategy - 2030" previously pushed ecological literacy increase according to national also suitable for purposes comes [4].

CONCLUSION AND SUGGESTIONS

Transferred scientific research in students ecological culture formation process to oneself typical many step by step, systematic requires an approach again one there is confirmed. Diagnostics, monitoring and pedagogical experiments based on It is

determined that ecological of culture three main component — knowledge, attitude and ecological behavior - study in the process one kind at the level does not form. Traditional education methods more theoretical knowledge to give directed therefore, students stable ecological behavior to form complete opportunity This situation does not create international in research cited knowledge - action difference about scientific results It also woke up with [1]. Experiment-test works this showed that ecological of education efficiency directly interactive teaching technologies, media resources, especially artificial to the intellect based education from the means use with noticeable at the level AI - based personalized assignments, environmental situations simulation, virtual research and ecological modeling students ecological thinking, responsibility feeling and practical activity motivation This approach is supported by global platforms (UNESCO, OECD) recommendation being done innovative ecological education model with suitable comes [2]. Results this shows that ecological culture in development the most high indicator using AI trained in students record (52% increase). This is in turn, ecological education system digital transformation to do necessity important scientific from the basics is one of them. besides, students ecological literacy increase the state's " Green to the economy to go priority in the " Strategy -2030" from directions one as confession done because of, high education in institutions ecological culture develop according to new methodical to solutions need large [3]. In general when taking, taking visited research ecological culture in increasing innovative study technologies, environmental contents and AI resources integration efficiency scientific in terms of This model not only study process activates, but in students ecological of mind stable to the formation ground creates.

1. High education in institutions ecological education modernization to do

Study to programs ecological culture to form aimed at new subjects, modules and interactive seminars introduction necessary. Lesson in the process ecological projects, practical laboratories and ecological observation works systematic on the road to be put need.

2. Artificial intellect technologies wide current to be

AI- based education on platforms ecological situations modeling, decision acceptance to do simulations, personalized ecological assignments working exit and to students presented to grow recommendation This method is in students ecological responsibility and active behavior to form service does [4].

3. Environmental media resources base create

Local to the conditions suitable, Uzbek in the language infographics, environmental podcasts, video lessons, environmental maps and mobile applications working exit current. Students their using ecological problems globally and local in context see takes.

4. Students for ecological projects incubator organization to be

Universities have initiatives like “Green Student Lab” or “ EcoTech Hub” centers organization students ecological innovative ideas working exit and to practice current to grow as much as possible has to be need.

5. Ecological culture evaluation national indicators create

Uzbekistan under the circumstances ecological culture measurement according to national competence model working exit These indicators are international compliant with standards (OECD Green Skills, UNEP Education Framework). to be need.

6. Digital ecological literacy develop according to qualification increase courses on the road to put

Professors and teachers for AI, media resources and digital ecological education methodologies specialized trainings transfer to the goal according to.

7. Ecological education local communities with integration to do

Students ecological actions, areas landscaping projects, waste reduce campaigns and in the "Eco-volunteer" programs participation to be able encouragement need.

8. Ecological behavior daily to life implementation to do according to motivational mechanisms current to be

"Green" students rating", "Eco-bonus" system or ecological responsibility for stimulating grants effective to be possible.

9. Ecological monitoring in education and analysis system strengthen.

Based on AI ecological behavior monitoring indicators, students' ecological in projects participation and development real -time dynamics in mode observation possible.

10. International cooperation strengthen.

Within the framework of UNESCO, UNEP, ERASMUS+ cooperation projects expansion through students' global environmental awareness thinking formation possible.

References:

1. Capra, F., & Luisi, PL (2014). The systems view of life: A unifying vision. Cambridge University Press.
2. Sterling, S. (2021). Educating for the future we want: A systems approach to sustainability education. Journal of Sustainability Education, 26(4), 1–15.
3. UNESCO. (2020). Education for Sustainable Development: A roadmap 2020–2030. Paris: UNESCO Publishing.
4. OECD. (2022). Green skills and environmental literacy for future-ready learners. OECD Publishing.
5. Uzbekistan Republic Ministers Court. (2019). "Green to the economy to go Strategy — 2030". Tashkent: Official publication.
6. United Nations Environment Program (UNEP). (2021). Youth, education and environmental responsibility. UNEP Publications.
7. Tilbury, D. (2011). Education for sustainable development: An expert review of processes and learning. UNESCO.
8. Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? Environmental Education Research, 8(3), 239–260.
9. Gifford, R. (2014). Environmental psychology matters. Annual Review of Psychology, 65, 541–579.

10. Hungerford, HR, & Volk, T. (1990). Changing learner behavior through environmental education. Journal of Environmental Education, 21(3), 8–21.
11. Leal Filho, W., Raath, S., Lazzarini, B., Vargas, VR, & others. (2018). The role of higher education in sustainable development: Evidence from global case studies. Journal of Cleaner Production, 199, 143–160.
12. Krasny, ME, & Dillon, J. (Eds.). (2013). Trading zones in environmental education: Crossovers between formal and informal learning. Springer.
13. Uzbekistan Republic President's Decree. (2020). “Education system by 2030 develop strategy”. Tashkent: President press service.
14. Barkemeyer, R., Holt, D., Preuss, L., & Tsang, S. (2014). What happened to the 'development' in sustainable development? Sustainable Development, 22(1), 15–32.
15. Wang, J., & Shen, H. (2023). Artificial intelligence-enhanced environmental education: Opportunities and challenges. Computers & Education, 194, 104687.
16. Saleh, I., & Pendlebury, C. (2022). The role of digital platforms in promoting environmental literacy among youth. International Journal of Environmental & Science Education, 17(6), 321–338.
17. Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50(2), 179–211.
18. Uzbekistan Ecology, environment protection to do and climate change Ministry of Youth. (2023). ecological literacy increase according to methodological guide. Tashkent.
19. Bandura, A. (2001). Social cognitive theory: An agentic perspective. Annual Review of Psychology, 52, 1–26.
20. Muro, M., & Yong, S. (2020). AI and sustainability: How artificial intelligence can support environmental goals. Brookings Institution Research Papers, 1–18.