ORIGINAL ARTICLE

INTERNATIONAL JOURNAL OF ARTIFICIAL INTELLIGENCE

ISSN: 2692-5206, Impact Factor: 12,23

American Academic publishers, volume 05, issue 09,2025

Journal: https://www.academicpublishers.org/journals/index.php/ijai

DEVELOPING STUDENTS' SCIENTIFIC MINDSET IN TEACHING PHYSICS

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Abstract: In this article, the possibilities of traditional teaching methods in modern physics education are examined, along with their limitations in developing students independent thinking and problem-solving skills. As a possible solution, the study considers the integration of Carol Decks "growth mindset" concept into the methodology of teaching physics. The results show that adopting a growth mindset approach not only improves students' academic performance but also strengthens their intrinsic motivation to learn and their perseverance in solving problems. The article blends theoretical perspectives with practical examples and analysis.

Key words: Physics, teaching, worldview, natural sciences, outcomes, motivation, methods, examples

FIZIKA FANINI O'QITISHDA TALABALARNING ILMIY DUNYO QARASHINI SHAKLLANTIRISH

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Annotatsiya: Ushbu maqolada zamonaviy fizika ta'limida qo'llaniladigan an'anaviy metodik usullarning imkoniyatlari va ularning talabalarda mustaqil fikrlash va muammolarni hal qilish qobiliyatini rivojlantirishdagi cheklovlari tahlil qilinadi. Muammoning yechimi sifatida Carol Dweck tomonidan taklif etilgan «o'suvchi dunyoqarash» (growth mindset) konsepsiyasining fizika o'qitish metodikasiga integratsiyasi masalasi ko'rib chiqiladi. Tadqiqot natijalari shuni

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ko‘rsatadiki, o‘suvchi dunyoqarash yondashuvi nafaqat o‘quvchilarning akademik natijalarini oshirishga, balki ularning o‘rganishga bo‘lgan ichki motivatsiyasi va muammolarni hal qilishda qat’iyatini mustahkamlashga xizmat qiladi. Maqolada nazariy yondashuvlar amaliy misollar va tahlillar bilan uyg‘unlashtirilgan.

Kalit so‘zlar: Fizika, o‘qitish, dunyoqarash,aniq fan, natija, motivatsiya, usullar, misollar

KIRISH (ВВЕДЕНИЕ / INTRODUCTION)

Fizika fani ko‘pincha o‘quvchilar orasida murakkab fan sifatida qabul qilinadi[1-6]; bu holatda esa ularning o‘rganishga bo‘lgan ishtiyoqi kamayishiga va ko‘plab talabalarda “men bunga qodir emasman, men qila olmayman, o‘rgana olmayman“ kabi fikrlarni yuzaga keltiradi. Bunday fikrlashga yechim sifatida Carol Dweck tomoniga ilgari surilgan o‘suvchi dunyoqarash yechim bo‘la oladi. Fizika fanini o‘qitishda turli grafik va jadval asosidagi metodlar keng qo‘llanilib kelmoqda. Jumladan,

ADABIYOTLAR TAHLILI VA METODOLOGIYA (ЛИТЕРАТУРА И МЕТОДОЛОГИЯ / METHODS)

Ven diagrammasi metodi : Bu usul fan va uning tarkibiy qismlari hamda elementlarining turdosh fanlar bilan umumiy jihatlarini va farqlarini anglashda juda samarali hisoblanadi[12].

Klaster usuli : materiallarni tarmoqlangan tarzda tasniflash tamoyiliga asoslanadi, bu fan va texnologiya tarkibiy qismlarining o‘zaro bog‘liqligi va integratsiyasini ochib berishda foydali hisoblanadi.[13]

Kategoriyalash jadval usuli: Ushbu usul talabalarga fizika darslarida ma’lumotlarni “afzalliklar”, “noaniqliklar” va “xavflar” kabi kategoriyalarga ajratib tahlil qilish imkonini beradi. Bu metod yordamida o‘quvchilar o‘zlashtirilgan materialni taqqoslab, mantiqiy guruhlarga bo‘lish orqali chuqurroq tushunchaga ega bo‘ladilar [14]

Baliq skeleti metodi: Bu metod (ba’zan Fishbone diagramma yoki Ishikawa diagrammasi deb ataladi) o‘quvchilarga asosiy tushuncha va uning tarkibiy qismlarini sabab–natija munosabatida tasniflash imkonini beradi. Grafik ko‘rinishda “bosh suyak” markazda asosiy g‘oyani ifodalaydi, yon suyaklar esa uning tarkibiy jihatlari va ta’sir etuvchi omillarni ko‘rsatadi. Talabalar ushbu diagrammani to‘ldirish jarayonida konseptual bog‘lanishlarni chuqurroq anglaydilar. Fizikani o‘qitishda bu usul, masalan, nanotexnologiyalar tasnifi, yorug‘lik xossalari yoki energiyaning saqlanish qonunini o‘rgatishda samarali hisoblanadi (Daly & Bryan, 2007; Ishikawa, 1990).

“B/BX/B” jadval metodi: Ushbu metod talabaning o‘z bilimlarini tahlil qilish va baholashiga yordam beradi. Jadval odatda uchta ustundan iborat bo‘ladi:

1. B (Bilaman) – talaba mavzu bo‘yicha ilgari bilgan tushunchalari, ta’riflari va materiallarini qayd etadi.
2. BX (Bilmoqchi Xohlayman) – mavzuga oid savollar, qiziqishlar va o‘rganilishi zarur bo‘lgan jihatlar yoziladi.
3. B (Bilib oldim) – dars oxirida talaba olgan yangi bilimlar, o‘z qarashlaridagi o‘zgarishlar va xulosalarni ifodalaydi.

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Yuqorida ta'kidlangan metodik usullarning barchasi o'ziga xos afzalliklarga ega bo'lib, asosan bilimlarni tasniflash, taqqoslash va tizimlashtirishga qaratilgan. Biroq, ular talabada murakkab masalalarni yechishda zarur bo'lgan qat'iyatlilik, motivatsiya va muvaffaqiyatsizlikdan qo'rqmaslik kabi fazilatlarni to'liq shakllantirishda cheklovchi bo'lishi mumkin.

Aynan shu muammoni hal qilishda o'suvchi dunyoqarash muhim ahamiyat kasb etadi. Carol Dweck tomonidan ilgari surilgan bu nazariya shaxslarning dunyoqarashini ikkita asosiy turga ajratadi: to'g'rilangan dunyoqarash (fixed mindset) va o'suvchi dunyoqarash (growth mindset). To'g'rilangan dunyoqarashga ega shaxslar qobiliyatni tug'ma va o'zgarmas deb hisoblaydilar, shu bois muvaffaqiyatsizlikni o'z qobiliyatsizligining belgisi sifatida qabul qiladilar. Aksincha, o'suvchi dunyoqarashga ega bo'lgan shaxslar qobiliyatni mehnat va tajriba orqali rivojlantirish mumkin deb bilishadi va xatolarni esa yangi narsalarni o'rganish uchun imkoniyat sifatida ko'radilar (Dweck, 2006; Yeager & Dweck, 2012).

NATIJALAR (РЕЗУЛЬТАТЫ / RESULTS)

Odatdagi dunyoqarash:

Bu test ataylab qiyin qilingan, bizni yeqitishni xoxlashadi, biz bilmaydigan mavzularni ataylab topishadi, meni hech kim tushunmaydi, hamma joyda nohaqlik, ustoz o'zi darsni yaxshi tushuntirmadi, meni ataylab orqa partaga o'tkazishgan, ustozlar o'zi shu o'tmagan narsasini so'raydi.

O'suvchi dunyoqarash:

O'xo misolni yangisiyu a?, Ustozga qoyile zo'ridan topadiya, bu misolni ishlagan odam avvalgi odam bo'lmaydi, axa demak kitobdagi hamma mavzuni tugatishim kerak ekande, ex 1,5 hafta oldin 5 olgan mavzuyimdan ekan yaxshi misol yechmagan edim shundan tushubdi. Uyga borib maslasini hal qilamiz, qaysi kitobdan olganlarini aytganlarida shu kitobni o'zimniki qilib hamma ilmni yod olar edim. Har doim biladigan narsamizdan emas, bilmaydiganlarimizdan bering bir safar yecholmasmiz yana urinib yechamiz.

MUHOKAMA (ОБСУЖДЕНИЕ / DISCUSSION)

Pedagogik tadqiqotlar shuni ko'rsatadiki, o'suvchi dunyoqarash o'quvchilar orasida mehnat qilish motivatsiyasini oshiradi, ularni murakkab strategiyalarni sinab ko'rishga undaydi [15] va muvaffaqiyatsizlikka qarshi chidamlilikni oshiradi. Fizika fani aynan shu xususiyatlarni talab qiladi, chunki fizik masalalar ko'pincha bir necha bosqichli mantiqiy fikrlash, matematik analiz va turli usullarni sinab ko'rishni talab etadi. Shuning uchun talabalarda qat'iyat, sabr-toqat va xatolardan o'rganishga bo'lgan irodani rivojlantirish juda muhimdir.

XULOSA (ЗАКЛЮЧЕНИЕ / CONCLUSION)

Fizika fanini o'qitishda qo'llanilayotgan turli metodlar : Venn diagrammasi, klaster, kategoriyalash jadvali, "Baliq Skeleti" va "B/BX/B" kabi usullar o'quvchilarning bilimlarini tasniflash, tizimlashtirish va taqqoslashga samarali xizmat qiladi [12-16]. Biroq, ushbu metodlar o'z-o'zidan talabada murakkab masalalarni hal qilishga zarur bo'lgan qat'iyatlilik va ichki motivatsiyani to'liq shakllantira olmaydi. Shu nuqtai nazardan, mazkur metodlarni

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o‘suvchi dunyoqarash (growth mindset) konsepsiyasi bilan uyg‘unlashtirish dolzarb ahamiyat kasb etadi. O‘suvchi dunyoqarash yondashuvi o‘quvchilarni xatolardan saboq olishga, yangi strategiyalarni qo‘llashga va qiyinchiliklarga bardoshli bo‘lishga undaydi. Bu esa, o‘z navbatida, fizika ta’limining eng muhim maqsadi talabalarda mustaqil fikrlash, ijodkorlik va ilmiy tafakkurni shakllantirishga xizmat qiladi.

Shunday qilib, o‘suvchi dunyoqarash asosidagi ta’lim yondashuvi fizikani o‘rganish jarayonini nafaqat samarali, balki motivatsion jihatdan ham barqaror qiladi. Bu yondashuv, zamonaviy ta’limda, talabalarni kelajakdagi ilmiy faoliyat va amaliy hayotda uchraydigan murakkab vazifalarni qat’iyat bilan hal qilishga tayyorlaydi.

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