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Družbena Odgovornost in Umetna Inteligenca 28·5·2025

Izzivi in priložnosti uporabe navidezne resničnosti pri poučevanju

Saša Planinc in Marko Kukanja

UP FTŠ Turistica

The project is co-financed by the Republic of Slovenia, the Ministry of Higher Education, Science and Innovation, and the European Union – NextGenerationEU. The project is implemented in accordance with the Recovery and Resilience Plan (RRP) under the development area Smart, Sustainable and Inclusive Growth, component Strengthening competencies, in particular digital competencies and those required by the new professions and the green transition (C3 K5), for the investment measure Investment F. Implementation of pilot projects, the results of which will serve as a basis for the preparation of a roadmap for the reform of higher education for a green and resilient transition to a Society 5.0: project Pilot Projects for the Reform of Higher Education for a Green and Resilient Transition.

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Povzetek

Uporaba navidezne resničnosti (VR) v visokem šolstvu predstavlja pomemben korak v smeri digitalnega, vključujočega in trajnostnega izobraževanja. Prispevek temelji na izkušnjah pri projektu "VR EU Hoteliers", pri katerem se razvija VR aplikacijo za potrebe poučevanja gostinstva. Aplikacija, ki je še v fazi razvoja, študentom med drugim omogoča vstop v simulirano restavracijsko okolje, kar lahko potencialno pripomore k boljšemu razumevanju organizacije dela in to brez obiska gostinskega obrata. Kljub potencialu VR za večjo motivacijo študentov in atraktivnost učnih vsebin, pa se v praksi pojavljajo številni izzivi, kot so visoki stroški razvoja in opreme, tehnične in organizacijske omejitve pri izvedbi vaj z večjim številom študentov, vprašanje dejanskega pedagoškega učinka (da ne gre le za navdušenje nad tehnologijo) in v konkretnem primeru tudi omejene interaktivnosti (gre bolj ali manj le za vizualno izkušnjo in ne orodje za aktivno in učinkovito učenje). Sodoben pristop k poučevanju se torej v prispevku želi kritično ovrednotiti in osvetliti različne vidike.

Ključne besede: navidezna resničnost, visokošolsko izobraževanje, tehnologija, izzivi, gostinstvo

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Razlike med nekaterimi sorodnimi koncepti/tehnologijami

- XR - extended reality - krovni izraz za spodnje:
  - VR - virtual reality - povsem simulirano okolje oz. navidezna resničnost, brez povezave z realnim okoljem (je pa lahko njegova simulacija):
    - I-VR - Immersive VR - z uporabo VR kompleta (HMD oz. "očala" + krmilnika)
    - D-VR - Desktop VR - na običajnem računalniškem zaslonu
    - CAVE - cave automatic virtual environment - projekcija na vse stene v prostoru
  - AR - augmented reality - obogatena resničnost oz. preko realnega sveta prikazani digitalni elementi, ki pa z njim niso v interakciji.
  - MR - mixed reality - podobno kot obogatena resničnost, le da so digitalni elementi v interakciji z realnim svetom.
- 360º video - panoramski posnetek vsega okoli kamere, v vseh smereh sočasno, spreminjamo lahko vidni kot oz. smer gledanja, "pasivni VR"

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Prednosti / priložnosti / potencial VR

- Atraktivna izkušnja vpliva na motivacijo (pozitiven odnos študentov).
- Miselna angažiranost, osredotočenost, lažje razumevanje.
- Vizualizacija v prostoru in proučevanje odnosov med objekti.
- Interaktivnost, igrifikacija, sodelovanje (pomemben vpliv izbire avatarja).
- Vživetost, vključenost, potopljenost, teleprisotnost, zanos.
- Izkustveno učenje, proceduralno in spretnostno usposabljanje, reševanje problemov, kritično razmišljanje.
- Izkušnja nečesa sicer nedostopnega (cenovno, časovno, lokacijsko, iz vidika opreme...), lahko neobstoječega (npr. iz preteklosti/prihodnosti).
- Komplementarnost z drugimi metodami raje kot nadomestek.

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Prednosti / priložnosti / potencial VR

- Simulirano okolje je varno pred usodnimi napakami iz realnega.
- V določenih primerih zmanjšan vpliv na okolje.
- Brez motenja procesov v organizacijah in primerno koder v realnem okolju ni možna določena interakcija.
- Prilagoditev zahtevnosti in poteka, različni scenariji in situacije.
- Primerno za nekatere osebe s posebnimi potrebami.
- Pričakovana velika sinergija z umetno inteligenco.
- Spoznavanje zmožnosti novih tehnologij (VR) in prenos izkušnje iz uporabe pri izobraževanju v delovno okolje (velik potencial v turizmu) za potrebe usposabljanja zaposlenih ali doživetje za goste.

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Prednosti / priložnosti / potencial VR

- Nekatera primerna področja v poučevanju: medicina, arhitektura, oblikovanje, umetnost, zgodovina, geografija, turizem, kemija, tuji jeziki, komunikacijske veščine (reagiranje v določenih situacijah)...
- Predvajanje na zunanji zaslon za spremljanje uporabnika.
- Uporaba v izobraževanju narašča, predvsem tudi nosljivih naprav, posledično se oprema ceni.
- Številni avtorji navajajo boljše rezultate na račun VR, drugi tega niso mogli potrditi, nekateri navajajo celo slabše (glejte literaturo na koncu prezentacije).

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Slabosti / težave / izzivi VR

- Vprašljivost učinka in razlog učinkovitosti (le privlačnost tehnologije?).
- Omejena uporabnost, primernost le za določene vsebine, ki jih je potencialno težko ustrezno izbrati in oblikovati (npr. socialne interakcije).
- V nekaterih obstoječih rešitvah manjka uporabne vsebine, realizma, interakcije in sočasnega sodelovanja z drugimi (tudi mentorji).
- Razkorak med simulacijo in realnostjo.
- Neprimernost za velike skupine študentov (zaradi omejenega števila mentorjev, opreme, časa, prostora, kompetenc, potreb po prilagoditvi...).
- Zahtevna organizacija in izvedba.
- Potrebno usposabljanje za izvajalce, preden se uporabi s študenti.

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Slabosti / težave / izzivi VR

- Nerodnost v navideznem okolju (prijemanje in premikanje objektov).
- Nevarnost izvedbe (poškodbe, slabost, zasvojenost).
- Informacijska preobremenitev, nezavedanje časa, težave, če ni premorov.
- Pomanjkanje ustrezno velikega prostora brez ovir.
- Problem higiene opreme pri veliko uporabnikih.
- Izbira ustrezne opreme in omejitve opreme.
- Strošek opreme (en VR komplet je premalo za skupino študentov).
- Relativno hitro zastaranje opreme in ne nujno zanesljiva oprema.
- Težave pri uporabi opreme in potreba po tehnični podpori.
- Zahteven, drag in zamuden razvoj, testiranje in posodabljanje aplikacij.

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Slabosti / težave / izzivi VR

- Zamudno in težavno privajanje študentov na uporabo opreme pred resno uporabo.
- Med polnjenjem naprav, jih zaradi nemobilnosti ne moremo resno uporabljati.
- Vprašanje zasebnosti, varovanja osebnih podatkov in druga etična vprašanja.
- Brezžična povezljivost je (vsaj pri nekaterih napravah) omejena na WiFi in BlueTooth, torej ni povezljivosti preko mobilnih podatkov.
- Nosljive naprave, ki so lahko kar nekaj časa na glavi, predstavljajo določeno izpostavljenost elektromagnetnemu sevanju.

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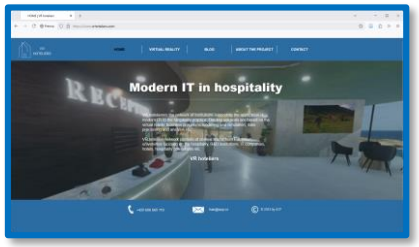
Projekt

- Program: Erasmus+, KA220-HED - Cooperation partnerships in higher education, Call 2023, Round 1
- Naslov: Application of virtual reality to the European hospitality and tourism educational programmes
- Akronim: VR EU Hoteliers
- Številka projekta: 2023-1-CZ01-KA220-HED-000157759
- Trajanje: 36 mesecev (1.9.2023 - 31.8.2026)

Logotip:

VR HOTELIERS

Spletna stran:



www.vrhoteliers.com

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REPUBLIKA SLOVENIJA MINISTRSTVO ZA VISOKO ŠOLSTVO, ZNANOST IN INOVACIJE

Financira Evropska unija NextGenerationEU

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Projekt

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Projekt

- Cilj je inovirati izobraževalne metode in orodja v okviru visokega šolstva na področju gostinstva z uporabo VR tehnologije, z namenom povečevanja učinkovitosti, omogočanja izmenjave znanj in premoščanja oteženega dostopa do realnih okolij.
- Aktivnosti so priprava metodologije, izobraževalnih modulov, scenarijev in VR modela ter njihovo testiranje in evalvacija.
- Ključni rezultat so 3 izobraževalni moduli (restavracija - strežba, restavracija - kuhinja in hotelske sobe).
- Uporaba VR lahko olajša/izboljša razumevanje organizacije dela.

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Projekt

- UP FTŠ Turistica je zadolžena za pripravo modula strežbe (restavracija) s 3 scenariji: pogrinjki, točilnica, postavitev omizij.
- Za pripravo modela je bilo potrebno pripraviti: seznam inventarja z opisi, informacijo o interaktivnosti in možnosti premikanja objektov, obstoječe primere ustreznih 3D modelov in vprašanja ter odgovore za ponavljanje snovi.
- Prednost, da ni potrebno obiskati gostinskega obrata, je pri organizaciji, stroških, ne-motenju delovnega procesa in gostov.

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Aplikacija

- Simulirano restavracijsko in hotelsko okolje.
- Aplikacija je še v fazi razvoja.
- Zaenkrat je precej omejena interaktivnost.
- V kolikor bo na voljo čas, po koncu sledi kratka demonstracija s predvajanjem slike iz VR naprave na zunanji zaslon preko www.oculus.com/casting, ali vsaj prikaz videa oz. zaslonskih slik.
- Po koncu zaključne razprave, v času druženja, vabljeni na ogled opreme in aplikacije.
- Take aplikacije imajo velik potencial tudi za turistično gospodarstvo, kjer si to lažje privoščijo in je po drugi strani problem fluktuacije delovne sile.

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Trenutne izkušnje z VR kompletom in aplikacijo

- Najprej je potrebna začetna nastavitev naprave (med drugim povezava v omrežje) in osvojiti je potrebno veščine upravljanja z VR kompletom (določitev varnega območja, uporaba krmilnikov...), kar vse zahteva svoj čas.
- Praznjenje baterij je relativno hitro in moteče.
- VR komplet se zaznavno segreva.
- V aplikaciji varno območje ni vselej ustrezno zaznano.
- Aplikacija brez povezave v omrežje ne deluje oz. ne omogoča vstopa v sobe.
- Prenos slike na zunanji zaslon omogoča spremljanje mentorja.

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Trenutne izkušnje z VR kompletom in aplikacijo

- Prvotne verzije aplikacije so imele določene napake (nepravilna začetna pozicija - ob premiku padci v prazno, previsoki objekti), torej je pri razvoju potrebno računati na usklajevanje z razvijalci.
- Premikanje objektov je precej nerodno početje.
- Omejena interaktivnost še ne zagotavlja največjega pedagoškega učinka, upamo na možnost dopolnitve.
- Preden se začne s pripravo vsebin je koristno spoznati možnosti tehnologije in jo preizkusiti na kakšnem obstoječem primeru aplikacije, še bolj koristne pa so izkušnje pri samem razvoju take aplikacije.

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Trenutne izkušnje z VR kompletom in aplikacijo

- S testiranjem presojamo uporabnost posameznih vsebinskih scenarijev in primernost izbranih vsebin ter pedagoški učinek:
  - Pogrinjke je nerodno urejati s krmilniki, koristno je spremljanje in korigiranje s strani mentorja preko zunanjega zaslona, brez tega bi bila potrebna povratna informacija o pravilnosti pogrinjka v aplikaciji.
  - Spoznavanje kozarcev in drugega inventarja v točilnici morda ni najbolj domišljena in primerna vsebina, tehnologija tako ni najbolje izkoriščena, večja interaktivnost pa bi to lahko izboljšala.
  - Oblike omizij hitro in enostavno preklopiš in si jih v prostoru lažje predstavljaš, kar je primerno tudi za samostojno delo.

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