REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION

ISSN 2350-4803 (SPLET/ONLINE)
ISSN 1855-4431 (TISK/PRINT)

Revija za elementarno izobraževanje

NASLOV UREDNIŠTVA

Revija za elementarno izobraževanje, Uredništvo revije Revija za elementarno izobraževanje
Koroška cesta 160, SI-2000 Maribor, Slovenija, e-pošta: rei.pef@um.si, http://rei.um.si

ZALOŽNIK

Univerzitetna založba Univerze v Mariboru
Slomškov trg 15, 2000 Maribor, Slovenija
e-pošta: zalozba@um.si, http://press.um.si/, http://journals.um.si/

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Revija za elementarno izobraževanje je revija, ki jo izdaja Univerzitetna založba Univerze v Mariboru v soizdajateljstvu Pedagoške fakultete Univerze v Mariboru, Pedagoške fakultete Univerze na Primorskem in Pedagoške fakultete Karlove Univerze v Pragi. Več o reviji: https://journals.um.si/index.php/education

Prispevke avtorji oddajo na spletni aplikaciji:
https://journals.um.si/index.php/education/about/submissions.

Journal of Elementary Education

EDITORIAL OFFICE ADDRESS

Journal of Elementary Education, Editorial Board of Journal of Elementary Education
Koroška cesta 160, SI-2000 Maribor, Slovenija , e-pošta: rei.pef@um.si, http://rei.um.si

PUBLISHED BY

University of Maribor Press
Slomškov trg 15, 2000 Maribor, Slovenia
e-mail: zalozba@um.si, http://press.um.si/, http://journals.um.si/

Articles appearing in this journal are abstracted and indexed in: SCOPUS (Elsevier Bibliografhic Databases), DOAJ, ERIH PLUS**,** EBSCO (EBSCOhostweb), Ulrich`s Periodicals Directory, IBZ (Internationale Bibliographie der Zeitschriftenliteratur), Proquest, dLib.si, DKUM, COBISS (Co-operative Online Bibliographic System and Services).

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Revija za elementarno izobraževanje
Journal of Elementary Education

Volume 17 **Number 2** **June 2024**

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 123–139, June 2024

BRANJE VEČKODNEGA BESEDILA V SREDNJEŠOLSKIH UČBENIKIH OBČE GEOGRAFIJE

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Potrjeno/Accepted
29. 11. 2023

Objavljeno/Published
27. 6. 2024

Abstract/Izvleček

Razprava obravnava opomenjanje večkodnih učbeniških besedil obče geografije z ugotavljanjem dijakove zmožnosti samostojne interpretacije nove vsebine, izražene s slikovnim in z besednim virom, s sočasnim razbiranjem informacij iz obeh semiotskih virov. Pri razbiranju večkodnega besedila se dijak praviloma osredotoči na jezikovni kod kot pomembnejši, slikovnega pa upošteva kot obrobnega.

Da bi razumeli, kako dijaki razbirajo pomen učbeniškega besedila, koliko so zmožni samostojno opomeniti besedno in/ali slikovno in če pri tem upoštevajo samo en kod ali oba, smo izvedli raziskavo, ki nam pokaže, da dijaki opomenjajo podatke z razbiranjem besednega, slikovno pa osmišljajo kot dodatek k besednemu.

Ključne besede:
večkodno učbeniško besedilo, opomenjanje besedila, slikovno, besedno, branje.

Keywords:
multimodal textbook, text meaning-making, pictorial, verbal, reading.

Reading Multimodal General Geography Textbook in Secondary School Classes

The discussion deals with the reading of multimodal texts by determining the student's ability to interpret content, expressed pictorially and verbally, while simultaneously understanding information from both semiotic resources. When reading multimodal texts, the student usually focuses on the verbal resource, and the pictorial one is considered marginal.

We conducted research to understand: the dynamic in students' meaning extraction from the textbook; their ability to understand the text; their greater attention to one resource or to both resources. The research proves that these students comprehend the information by focusing on the text, while the pictorial is interpreted as an addition.

UDK/UDC
81'4:[37.091.64:91]

DOI https://doi.org/10.18690/rei.4486

Uvod

V 21. stoletju se je komunikacija spremenila pod vplivom informacijske tehnologije, mobilnih elektronskih naprav in interneta. Ti so spodbudili ustvarjanje in rabo različnih besedilnih zvrsti, tako tiskanih kot govorjenih, ki ustvarjajo pomen z različnimi kodi (Kress in van Leeuwen, 2006; Moschini, 2013). Tovrstna besedila, sestavljena iz jezikovnega in nejezikovnega koda, ki se lahko prenašajo prek slušnega, vidnega ali obeh kanalov, so imenovana večkodna (Starc, 2010, 2011a). Kompleksnost večkodnih besedil je v hkratnem dekodiranju različnih vrst komunikacijskih kodov, besednega/verbalnega in nebesednega/neverbalnega (Kress in van Leeuwen, 2006; Serafini, 2012; Starc, 2007, 2009b, 2011b).

V pisni komunikaciji sta prisotna besedni in slikovni kod, ki součinkujeta pri opomenjanju (Kress, 2006; Starc, 2009b). Slikovni omogoča večjo svobodo pri razbiranju pomena od besednega, ker je lahko opomenjeno kot celota ali kot sestavek dveh ali več semiotskih entitet (Kress, 2015), besednega pa razbiramo linearno. Kress (2015) poudarja izenačeno vlogo besednega in slikovnega, čeprav opaža v anglosaksonskem pisnem izročilu iz tridesetih let 20. stoletja kot edini upoštevan semiotski kod besedno, medtem ko slikovno, čeprav dopolnjevalno, pri opomenjevanju ni bilo povezano z besednim. V sodobnih besedilih je veliko prostora namenjenega slikam, ki imajo skupaj z besednim izenačeno sporočevalno moč (Kress, 2003).

Današnja družba zahteva razširjeno besedilno pismenost, ki se ne nanaša le na sposobnost branja in pisanja besedila, besednega in slikovnega, temveč razbiranja in tvorjenja raznovrstnih besedil, bodisi v tradicionalnem bodisi v digitalnem okolju (Kress, 2010 v Serafini, 2012; Možina, 2007 v Starc, 2011b). Zmožnost dekodiranja večkodnega oziroma dvokodnega besedila, kar učbeniško besedilo je, izhaja iz usposabljanja iz različnih pismenosti. Poleg temeljnih pismenosti branja in pisanja pri branju učbeniških besedil igra pomembno vlogo tudi slikovna pismenost, ki se uresničuje z analizo v kompoziciji prestavljenih udeležencev (Kress in van Leeuwen, 2006). Vizualna slovnica Kressa in van Leeuwena razlaga slikovni semiotski sistem in prispeva k »vizualni pismenosti« (Kordigel Aberšek, 2008, str. 9; Grosman, 2010, str. 19) oziroma »slikovni pismenosti« (Starc, 2009a). Z analizo slikovnega, med katere Serafini (2012) in Turbill (2002) uvrstita grafične elemente (sheme, tabele idr.) in besednega, dijak tvori koherentno celoto in s tem novo predstavo/pojem ter zviša raven pomenjenja in tvorjenja avtentičnih besedil (Kress in van Leeuwen, 2006;

Starc, 2011b, 2017). Raziskava o branju večkodnega časopisnega besedila (Starc 2011b, str. 36) pa kaže, da dijaki in študentje »razbirajo pomen besednega in slikovnega kot pomena dveh ločenih sistemov«. Ugotovitev je naša izhodiščna točka, ker nas zanima, ali so dijaki sposobni razumevanja besednega in slikovnega koda, ki jih ponuja učbeniško besedilo.

Orodje za analizo nam nudi vizualna slovnica Kressa in van Leeuwena (2006), ki izhaja iz Hallidayeve (2004) sistemsko-funkcijske slovnice. Slednja utemeljuje tvorbo pomena na treh pomenskih ravninah ali metafunkcijah (ideacijski, medosebni in besedilni). Ideacijska metafunkcija izraža izkustveni svet z besediščem in različnimi procesnimi stavki. Enako kot besedno lahko tudi slikovno izraža dinamičnost ali statičnost, kar je izraženo z narativno ali konceptualno strukturo. Medosebna metafunkcija predstavlja odnos med piscem in bralcem, kar se v besednem izraža z glagolskim naklonom, v slikovnem ponazarja z vzpostavljanjem interakcije med predstavljenim/i udeležencem/i in naslovnikom s pogledom in to izraža poziv, z vzpostavljanjem distance pa ponudbo. Tretja pomenska ravnina oziroma besedilna metafunkcija kaže povezave v sporočilu. Besedno je zgrajeno z razvrščanjem pomena v stavku (osnovni enoti) po pomembnosti in s kohezivnimi izrazi, slikovno prav tako razvršča predstavljene udeležence po pomembnosti za diskurz (Kress in van Leeuwen, 2006; Starc, 2009a, 2009b, 2011a, 2017). Besedno in slikovno součinkujeta na naslovnika glede količine in lastnosti/kvalitete informacije (Starc, 2009b, 2017).

Večkodno učbeniško besedilo ponuja dijakom možnost različnega razbiranja kodov v besedilu; dijaki lahko preberejo najprej besedno, nato slikovno ali obratno. Pri tem se smisel in pomen besedila kot celote ne okrne ali spremeni. Vprašanje je, koliko se dijaki zavedajo, da je besedilo sestavljeno iz različnih kodov in kdaj zavestno preberejo najprej bolj razberljiv kod, ki jim nudi v kratkem času splošne in obenem natančne informacije, in koliko ta kod aktivno/zavestno povežejo z drugim.

Cilji raziskave

S pričujočo analizo, ki sloni na kvalitativni raziskovalni paradigmi, skušamo ugotoviti, kako in katere semiotske kode upoštevajo dijaki pri razbiranju vsebine in sporočila učbeniških večkodnih besedil in kako vplivajo na razbiranje besednega uokvirjeni zapis avtorja in/ali priloženi citati/odlomki.

Vzorec

V raziskavi je sodelovalo 65 dijakov prvega letnika iz štirih srednješolskih oddelkov s Tržaškega (Italija). V vsakem razredu sta bili z naključnim izborom oblikovani dve skupini, ena je morala prebrati večkodno besedilo, druga le besedno, obe pa sta odgovarjali na vprašanja, prirejena besediloma.

Učbeniška odlomka za analizo in vprašalne pole

Odlomka besedil sta bila izbrana iz dveh učbenikov za geografijo. Izbira je upoštevala tematska področja s skoraj enako vsebino in razporeditvijo v učbeniku. Med učbenikoma obstaja nekaj razlik v zaporedju vsebinskih sklopov, časopisnih izvlečkov, slik, fotografij in grafov. Slikovno se tematsko navezuje na besedno. Glavni naravni pojavi so v besednem predstaljeni jasno in konkretno.

Prvi raziskovani učbenik je Obča geografija za 1. letnik gimnazijskega in strokovnega izobraževanja, avtorjev Terezije Kurbus, Karmen Cunder, Borisa Hajdinjaka ter Branka Kandriča (v nadaljevanju Obča geografija 1, MK). Za raziskavo smo izbrali uvodni del predmetnega sklopa Podnebje, s poglavjem Sestava in pomen ozračja ter podpoglavjem Pomen ozračja in onesnaževanje zraka, ki je opisano na dveh straneh omenjenega učbenika.

Drugi raziskovani učbenik je Obča geografija za 1. letnik gimnazij, avtorjev Jurija Senegačnika in Boruta Drobnjaka (v nadaljevanju Obča geografija 1, Modrijan). Za analizo smo uporabili dve strani iz tematskega sklopa Podnebje, in sicer poglavje Ozračje, vreme in podnebje ter podpoglavja z naslovi: Kaj sestavlja atmosfero?, Onesnaževanje zraka in njegovi onesnaževalci ter Plasti atmosfere in ozonska luknja.

Da bi lahko ugotovili, kako dijaki razumejo besedilo oz. kako razbirajo pomen s ponujenimi izraznimi sredstvi, smo sestavili dve vprašalni poli po sklopih za vsak učbenik – eno z le verbalnim besedilom, eno pa z večkodnim. Tako so nastale štiri kombinacije vprašalnih pol, ki smo jih združili v sedem tabel (razpredelnica 1). V vprašalnikih uporabljamo besedilo namesto besedno, ker dijaki s terminologijo vizualne slovnice niso seznanjeni.

Razpredelnica 1: Razporeditev različic učbenikov in vprašalnih pol.

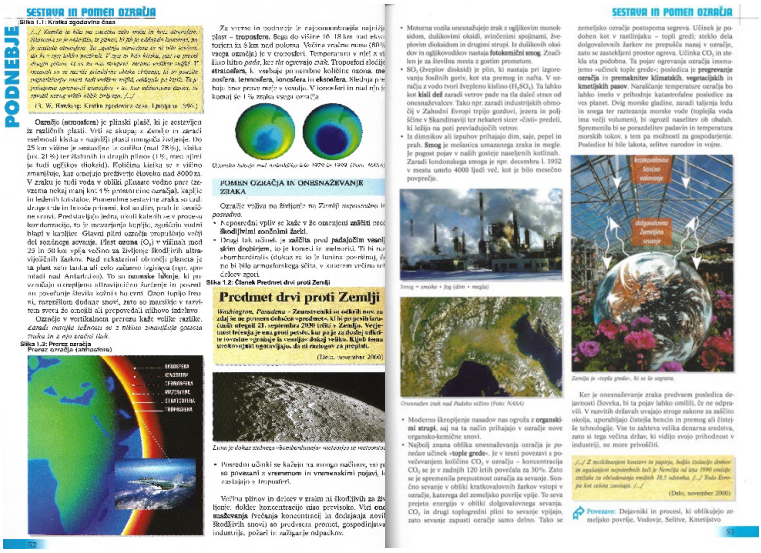
Učbenika	Vprašalne pole	Št. tabele
Obča geografija 1, MK Tematski sklop: Podnebje Poglavje: Sestava in pomen ozračja Podpoglavje: Pomen ozračja in onesnaževanje zraka	Prva kombinacija (besedno):	
	1. Kaj sestavlja atmosfero?	Tabela 1
	2. Plinski plašč je sestavljen iz plinskih plasti. Naštej jih.	Tabela 3
	3. Letala letijo v plašču stratosfere, ko potujejo čez ocean. Razloži vzrok.	Tabela 4
	Druga kombinacija (večkodno):	
	1. Ali si prej prebral citat ali tekoče besedilo poglavja? 2. Ali je citat služil temu, da si bolje razumel sestavo atmosfere? 3. Prepiši iz citata poved, ki ti je razložila današnjo sestavo atmosfere.	Tabela 1
	4. V odlomku članka Predmet drvi proti Zemlji je omenjen nedoločen predmet, ki bi lahko zadel Zemljo. Zakaj lahko strokovnjaki trdijo, da ni razlogov za preplah? 5. Ti je odlomek članka Predmet drvi proti Zemlji nudil kako pomoč za razumevanje besedila? Razloži svoj odgovor v eni povedi.	Tabela 2
	6. Plinski plašč je sestavljen iz plinskih plasti. Naštej jih. 7. Si upošteval slike ali besedilo za naštevanje plinskih plasti?	Tabela 3
	8. Letala letijo v plašču atmosfere, ko potujejo čez ocean. Razloži vzrok.	Tabela 4
Obča geografija 1, Modrijan Tematski sklop: Podnebje Poglavje: Ozračje, vreme in podnebje Podpoglavja: 1. Kaj sestavlja atmosfero? 2. Onesnaževanje zraka in njegovi onesnaževalci 3. Plasti atmosfere in ozonska luknja	Tretja kombinacija (besedno):	
	1. Kateri plini sestavljajo atmosfero?	Tabela 5
	2. Katere snovi so direktno vključene v umiranje iglastih gozdov?	Tabela 6
	Četrta kombinacija (večkodno):	
	1. Kateri plini sestavljajo atmosfero? 2. Si sestavo atmosfere razbral iz diagrama ali iz besedila? Razloži zakaj. 3. Pri katerem predmetu si se naučil razbrati krožne diagrame?	Tabela 5
	4. Katere snovi so direktno vključene v umiranje iglastih gozdov? 5. Si kdaj v naravi videl učinek kislega dežja? 6. Ti je fotografija Umiranje iglastih gozdov razkrila že znano posledico onesnaževanja atmosfere?	Tabela 6
	7. Kateri so glavni viri onesnaževanja? Za odgovor preberi besedilo in krožni diagram. 8. Katera vrsta zapisa, besedilo ali krožni diagram, ti je sporočila informacije, da si lahko sintetično in pravilno odgovoril na vprašanje?	Tabela 7

Analiza vprašalnikov

V nadaljevanju predstavljamo odgovore vseh štirih pol, tako da najprej kratko predstavimo vsebino branega odlomka, v tabelah odgovore dijakov (v odstotkih), nato analizo odgovorov.

Prvi učbenik: Obča geografija 1, Mladinska knjiga

V tem učbeniku je tema Podnebje obravnavana v okviru naslova Sestava in pomen ozračja ter podnaslova Pomen ozračja in onesnaževanje zraka. Na začetku poglavja (str. 52) je v levem stolpcu citiran odlomek iz knjige Kratka zgodovina časa (Hawking, 1996), v drugem pa med razlago o vplivih ozračja na življenje na Zemlji preveden članek Predmet drvi proti Zemlji (objavljen novembra 2000 v Delu). Fotografije in slike so umeščene pod odstavek in nadenj in tematsko povezane z besednim sporočilom. Odstavki so med seboj neodvisni, vsak odstavek samostojno razširi obravnavano temo.



Slika 1: Podnebje; Sestava in pomen ozračja. Vir: Obča geografija 1, MK, str. 52 in 53.

V prvem odstavku levega stolpca avtor našteje plasti atmosfere ter opiše njeno sestavo. Opis se začne z najnižjo plastjo, ki sega do višine 25 km in je sestavljena iz dušika (nad 78 %), kisika (okoli 21 %) ter žlahtnih in drugih plinov (1 %, med njimi je tudi ogljikov dioksid), nadaljuje z vodo in uvrsti med sestavine zraka trde in tekoče primesi, kot so dim, prah in kemične snovi. Z besedo in formulo je zapisan le ozon. Nad odstavkom citirani odlomek iz Kratke zgodovine časa opisuje nastanek atmosfere, brez naštetih sestavin današnje atmosfere (slika 1.1 v učbeniku).

Z vprašanji smo želeli ugotoviti, koliko dijaki razbirajo informacije iz avtorjevega besedila v učbeniku in koliko iz odlomka iz knjige Kratka zgodovina časa (v nadaljevanju citat)

Tabela 1. Odgovori dijakov o sestavi in pomenu ozračja.

SESTAVA IN POMEN OZRAČJA – besedno	
Samo avtorjevo besedilo (18 dijakov) 1. Kaj sestavlja atmosfero? Plašč iz dušika, kisika, žlahtnih in drugih plinov (89 %). Plašč iz dušika, kisika, drugih plinov, vode in drugih primesi (11 %).	Avtorjevo besedilo + citat (18 dijakov) 1. Ali si prej prebral citat ali tekoče besedilo poglavja? Prej citat (77,8 %). Prej besedilo (22,2 %).
	2. Ali je citat služil temu, da si bolje razumel sestavo atmosfere? Citat (72 %). Ni odgovora (28 %).
	3. Prepiši iz citata poved, ki ti je razložila današnjo sestavo atmosfere. Niso dobili odgovora v besedilu (27,8 %). Prepisali so zgrešen del citata (72,2 %).

Dijaki, ki so imeli pred sabo samo avtorjevo besedilo, so odgovorili sicer pravilno, a nepopolno, le dva dijaka sta poglobljeno prebrala avtorjevo besedilo in posledično dodala poleg plinov tudi vodo in druge primesi. Enajst dijakov s citatom in avtorjevim besedilom je trdilo, da so najprej prebrali citat. Trinajst jih je potrdilo, da jim je ta služil, da so razumeli sestavo atmosfere. Na zahtevo po prepisu povedi iz citata, ki naj bi razložila današnjo sestavo atmosfere, je pet dijakov odgovorilo pravilno, ostali so prepisali zgrešen del citata.

Med branjem kratkega citata ugotovimo, da ni zabeležena sestava današnje atmosfere, ki je razvidna iz avtorjevega besedila, je pa opis nastanka kisika, ki ga po avtorjevih besedah »vdihavamo danes«. Iz tega sledi, da je večina dijakov res sledila povedim, a med branjem citata podatkov ni razbrala točno.

V citiranem članku Predmet drvi proti Zemlji (slika 1.2 v učbeniku) je omenjen nedoločen predmet, ki bi lahko trčil v Zemljo 21. septembra 2030. Avtor članka uporabi besedne zveze »grožnje iz vesolja«, »verjetnost trčenja je ena proti petsto, kar pa je /.../ dokaj veliko«, kar omili z zadnjim stavkom »/.../ ni razlogov za preplah«.

Besedilo članka informira o veliki možnosti za trčenje neznanega »predmeta« v Zemljo, ne razloži pa »razlogov za preplah«. To razlago dobijo dijaki v avtorjevem besedilu.

S prvim vprašanjem smo želeli ugotoviti, če dijaki pri branju smiselno povežejo besedilo avtorja učbenika z odlomkom članka iz Dela (v nadaljevanju citat).

Z drugim vprašanjem smo želeli ugotoviti, ali sam citat dijakom pomaga pri razumevanju avtorjeve razlage o atmosferskem ščitu.

Tabela 2. Odgovori dijakov o sestavi in pomenu ozračja.

SESTAVA IN POMEN OZRAČJA
Odlomek članka Predmet drvi proti Zemlji (18 dijakov)
4. V odlomku članka Predmet drvi proti Zemlji je omenjen nedoločen predmet, ki bi lahko zadel Zemljo. Zakaj lahko strokovnjaki trdijo, da ni razlogov za preplah? Vrednost trčenja je 1/500 (61,1 %). Ker je atmosferski ščit dovolj močen (5,6 %). Do zdaj se ni nikoli zgodilo (5,6 %). Podatka/ov ni v članku (22,1 %). Zgrešen odgovor (5,6 %).
5. Ti je odlomek članka Predmet drvi proti Zemlji nudil kako pomoč za razumevanje besedila? Ni nudil (66,7 %). Je nudil (33,3 %). Razloži svoj odgovor v eni povedi. V ozračju okoli Zemlje so raznovrstni predmeti, kot so meteoriti in meteorji, ki stalno krožijo po vesolju (5,6 %). Mi je pomagalo, ker sem razumel, da je veliko predmetov, ki nas bombardirajo (5,6 %). Članek/besedilo ni povezan/o z besedilom poglavja (38,8 %). Ni razumel vprašanja (50 %).

Enajst dijakov je iskalo rešitev samo v citatu in razumeli so, da vrednost trčenja 1/500 ni tako relevantna, čeprav sam avtor citata v nadaljevanju poudari, da je možnost trčenja dokaj velika. Dijak, ki ni črpal informacij le iz citata, temveč tudi iz avtorjevega besedila, je zapisal pravilno interpretacijo »ker je atmosferski ščit dovolj močen«. Vsebina odgovora »do zdaj se ni nikoli zgodilo« ni nikjer nakazana, sam dijak pa ne išče odgovora/ov ne v citatu ne v avtorjevem besedilu niti ne inferira. Štirje dijaki so pravilno odgovorili, da odgovora znotraj citata ni, a hkrati niso pomislili, da bi odgovor našli tudi izven besedila.

Iz navedenega izhaja, da se dijaki večinoma naslanjajo le na v vprašanju omenjeni citat, le nekateri se zavedajo, da informacije lahko pridobijo tudi v sobesedilu – avtorjevem besedilu.

Dvanajst dijakov nas seznani z dejstvom, da citat ne nudi pomoči za boljše razumevanje vsebin poglavja, sedem jih je obratnega mnenja. Sedem dijakov pa je izjavilo, da citat ni povezan z avtorjevim besedilom, polovica jih ni razumela vprašanja. Odgovora »Mi je pomagalo, ker sem razumel, da je veliko predmetov, ki nas bombardirajo« in »V ozračju okoli Zemlje so raznovrstni predmeti, kot so meteoriti in meteorji, ki stalno krožijo po vesolju,« nas seznanjata, da dijaka ne upoštevata citata, temveč uporabita izključno avtorjevo besedilo in se tega ne zavedata. Sedem dijakov ne upošteva citata kot sestavine poglavja, ker menijo, da »ni

povezave z besedilom«. Dva dijaka ne upoštevata citata, kar kaže, da jim citat deluje kot tujek, ne pa kot sestavni del koherentnega učbeniškega poglavja.

Avtor usmerja dijake k ozaveščanju novih, neznanih besed oziroma terminov s polkrepkim tiskom. Na strani 52, v drugem stolpcu, so polkrepko zabeležene troposfera, stratosfera, mezosfera, termosfera, ionosfera in eksosfera. Učenci v večkodnem besedilu lahko razberejo informacije tudi s slike z naslovom Prerez ozračja (atmosfere) (slika 1.3 v učbeniku), ki se nahaja v prvem stolpcu pod avtorjevim besedilom.

Da bi ugotovili, koliko vplivata polkrepki tisk in slika z naštetimi plastmi na hitro razbiranje podatkov, smo od dijakov želeli, da jih naštejejo.

Z drugim vprašanjem smo želeli ugotoviti, ali dijaki pri naštevanju uporabijo informacije iz besednega ali slikovnega besedila.

Tabela 3. Odgovori dijakov o sestavi in pomenu ozračja.

SESTAVA IN POMEN OZRAČJA	
Besedno (18 dijakov)	Večkodno (18 dijakov)
2. Plinski plašč je sestavljen iz plinskih plasti. Naštej jih.	6. Plinski plašč je sestavljen iz plinskih plasti. Naštej jih.
Troposfera, stratosfera, mezosfera, termosfera, ionosfera, eksosfera (61,1 %).	Troposfera, stratosfera, mezosfera, termosfera, eksosfera (83,2 %).
Ne piše (5,6%).	Zgrešen odgovor (16,8 %).
Zgrešen odgovor (33,3 %).	
	7. Si za naštevanje plinskih plasti upošteval slike ali besedilo?
	Besedilo (33,3 %).
	Slike (38,9 %).
	Ni odgovora (27,8 %).

Enajst dijakov, ki je bralo samo besedno in petnajst večkodno besedilo, je pravilno naštelo plinske plasti. Med slednjimi jih je 1/3 razbrala podatke samo iz besednega, 1/3 pa iz slikovnega.

Večina dijakov je pravilno naštela plinske plasti atmosfere, kar kaže, da je polkrepko zapisano besedilo hitro razvidno in uporabno. Ugotovimo tudi, da dijaki z večkodnim besedilom prebirajo le en kod, ne pa obeh.

V drugem in tretjem odstavku avtor učbenika obravnava razlike v vertikalnem prerezu ozračja.

V večkodnem besedilu so imeli dijaki na razpolago tudi sliko s prerezom atmosfere ter znotraj slike fotografijo letečega letala (slika 1.3 v učbeniku). Fotografija letečega letala je povezana s sliko atmosfere z daljico, ki prikaže plinsko plast poleta.

V vprašalniku smo napisali in s tem pojasnili, da letala letijo v stratosferi, ko potujejo čez ocean.
Z nalogo smo želeli ugotoviti, koliko dijaki opomenjajo vsebino iz slikovnega, besednega in s splošnim vedenjem.

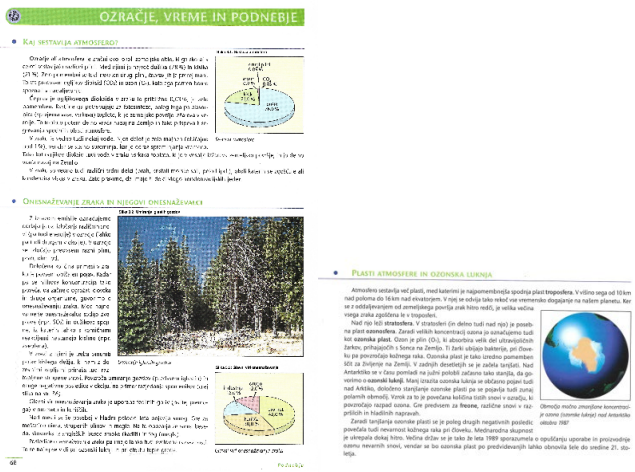
Tabela 4. Odgovori dijakov o sestavi in pomenu ozračja.

SESTAVA IN POMEN OZRAČJA	
Besedno (18 dijakov)	Večkodno (18 dijakov)
3. Letala letijo v plašču stratosfere, ko potujejo čez ocean. Razloži vzrok. Zaradi manjše težnosti se z višino zmanjša gostota zraka in z njo zračni tlak (22,3 %). Zaradi manjše težnosti se z višino zmanjša gostota zraka in z njo zračni tlak. V stratosferi je manj kot 20 % zračne mase, torej je zračni upor dosti manjši (5,5 %). Odgovora ni v besedilu / niso razumeli vprašanja/niso poznali odgovora (72,2 %).	8. Letala letijo v plašču stratosfere, ko potujejo čez ocean. Razloži vzrok. Zaradi manjše težnosti se z višino zmanjša gostota zraka in z njo zračni tlak (16,7 %). Odgovora ni v besedilu / niso razumeli vprašanja/ niso poznali odgovora (83,3 %).

Pet dijakov v samo verbalnem in trije v večkodnem besedilu je dobesedno prepisalo poševno tiskano besedilo drugega odstavka. En dijak v verbalnem je opomenil informacije iz drugega in tretjega odstavka in uporabil predhodno znanje iz fizike.
Nizko število odgovorov dijakov (27,8 %), vezanih samo na besedno besedilo, nas ozavešča, da dijaki niso zmožni opomenjanja prebranega. Še nižje število pravilnih odgovorov dijakov, vezanih na večkodno verzijo učbeniškega besedila, pa nas informira, da dijaki niso zmožni hkratnega razbiranja besednega in slikovnega. Navedeno kaže, da dijaki ne opomenjajo fotografije, ker jih ne prepoznajo kot besedilo.
Iz števila pravilnih odgovorov lahko upravičeno trdimo, da dijaki ne (le delno) uporabijo v šoli pridobljenega znanja in/ali splošnega vedenja.

Drugi učbenik: Obča geografija 1, Modrijan

Iz tega učbenika obravnavamo besedilo iz tematskega sklopa Ozračje, vreme in podnebje. Besedilo avtor razdeli na podpoglavja Kaj sestavlja atmosfero?, Onesnaževanje zraka in njegovi onesnaževalci ter Plasti atmosfere in ozonska luknja. Podpoglavja so ločena s praznimi vrsticami. Vsako podpoglavje je določeno s polkrepkimi velikimi tiskanimi črkami in ravno črto. Besedno je razdeljeno na odstavke, ki se navezujejo na temo podpoglavja. Ob desni strani besednega je dodano slikovno (fotografija/krožni diagram).



Slika 3: Ozračje vreme in podnebje. Vir: Obča geografija 1, Modrijan, str. 68 in 69.

Naslov prvega podpoglavja je v vprašalni obliki, da privabi bralce k spoznavanju nove vsebine. Tu avtor v štirih odstavkih našteje in opiše sestavo atmosfere. V prvem odstavku omeni dušik, kisik, ogljikov dioksid, ozon, pline in druge pline, polkrepko označi dušik (78 %) in kisik (21 %) ter doda kemijski formuli CO_2 in O_3, v drugem odstavku opiše ogljikov dioksid (0,03 %), v tretjem delež vode v zraku (običajno pod 1 %), v zadnjem pa trdne delce.

Ob besednem besedilu je krožni diagram (slika 3.1 v učbeniku) razdeljen na štiri krožne izseke z glavnimi plini ter njihovimi odstotki.

Iz tega podpoglavja smo želeli ugotoviti, ali dijaki razbirajo informacije ali samo iz besednega ali le iz slikovnega ali iz obeh in pri katerih učnih urah/predmetih so se naučili opomeniti krožne diagrame.

Tabela 5. Odgovori dijakov o ozračju, vremenu in podnebju.

OZRAČJE, VREME IN PODNEBJE	
Besedno (14 dijakov)	Večkodno (15 dijakov)
1. Kateri plini sestavljajo atmosfero? Ogljikov dioksid in ozon (7,1 %). Kisik in dušik (14,3 %). Kisik, dušik, ozon in ogljikov dioksid (78,6 %).	1. Kateri plini sestavljajo atmosfero? Kisik, dušik, ogljikov dioksid, argon in ozon (86,6 %). Kisik in dušik (13,3 %).
	2. Si sestavo atmosfere razbral iz krožnega diagrama ali iz besedila? Iz krožnega diagrama (26,7 %). Iz besedila (26,7 %). Iz obeh kodov (19,9 %). Ni odgovora (26,7 %). Razloži zakaj.

	Sestavo atmosfere sem prebral iz besednega, ker je razumljiv (26,7 %). Sestavo atmosfere sem prebral iz krožnega diagrama, ker je razumljiv / zanimiv / berljiv / zapomljiv (26,7 %). Ni odgovora (46,6 %).
	3. Pri katerem predmetu si se naučil razbirati krožne diagrame? Med urami: matematike (33,3 %), fizike (5 %), slovenščine (5 %), zemljepisa (6,7 %), informatike (33,3 %), tehnologije (6,7 %). Sam (5 %). Ni odgovora (5 %).

Enajst dijakov, ki je imelo pred sabo samo besedno besedilo in štirinajst dijakov z (možnim) opomenjanjem tudi krožnega diagrama, je odgovorilo pravilno, ostali so odgovorili nepopolno, ker so upoštevali le dva plina.

Štirje dijaki so trdili, da so razbrali informacije iz krožnega diagrama, isto število dijakov je razbralo iz besednega, trije pa so upoštevali oba koda. Iz navedenega ugotovimo, da je malo dijakov povezalo informacije iz besednega s slikovnim.

Odgovori dijakov na zadnje vprašanje nudijo informacije o obravnavi krožnih diagramov v šolskem prostoru, kar kaže, da so jih usvojili s pomočjo učiteljev pri različnih predmetih.

V drugem podnaslovu Onesnaževanje zraka in njegovi onesnaževalci avtor argumentira, katere primesi v velikih koncentracijah ogrožajo naravo. Besedilo predstavi posledice kislega dežja s fragmentiranim opisom in s fotografijo iglastega gozda (slika 3.2 v učbeniku) in glavne vire onesnaževanja zraka s krožnim diagramom.

Z vprašanji smo želeli ugotoviti, ali dijaki razberejo glavne informacije iz besedila z linearnim branjem ali s pomočjo polkrepko označenih besed in koliko doprinese k pomenu besednega fotografija.

Tabela 6. Odgovori dijakov o ozračju, vremenu in podnebju.

OZRAČJE, VREME IN PODNEBJE	
Besedno (14 dijakov)	Večkodno (15 dijakov)
2. Katere snovi so direktno vključene v umiranje iglastih gozdov? Kisli dež (78,6 %). Žveplove, dušikove spojine in kisline (21,4 %).	4. Katere snovi so direktno vključene v umiranje iglastih gozdov? Kisli dež (73,3 %). Žveplove in dušikove spojine (13,3 %). Plin in prah (6,7 %). Ni odgovora (6,7 %).
	5. Si kdaj v naravi videl učinek kislega dežja? Da (26,7 %). Ne (73,3 %).
	6. Ti je fotografija Umiranje iglastih gozdov razkrila že znano posledico onesnaževanja atmosfere? Da (93,3 %). Ne (6,7 %).

Iz odgovorov ugotovimo, da je večina dijakov upoštevala polkrepko tiskan termin kisli dež, le redki so navedli druge onesnaževalce zraka, kar kaže, da se dijaki orientirajo s polkrepko tiskanimi besedami.

Enajst dijakov je odgovorilo, da v življenju ni nikoli videlo umirajočih dreves, zato jim je bila fotografija z naslovom Umiranje iglastih gozdov v oporo pri besednem opisu. Dijak je poleg odgovora dodal: »Fotografija rabi, da ljudje, ki niso še videli posledic onesnaževanja, razumejo kaj se dogaja.«

Iz analiziranega lahko razberemo, da ima slika dopolnjevalno vlogo, ker razširja informacije besednega.

V četrtem odstavku avtor našteje glavne vire onesnaževanja: »Glavni vir onesnaževanja zraka je uporaba fosilnih goriv (nafte, premoga) v prometu in kuriščih.«

Ob besednem (v večkodnem) je frekvenčni kolač razdeljen na štiri krožne izseke z glavnimi viri onesnaževanja (industrija (15,0 %), promet (43,0 %), kurišča (30,0 %) in drugo (12,0 %)) (slika 3.3 v učbeniku).

Iz tega podpoglavja smo želeli ugotoviti, ali dijaki razbirajo informacije iz besednega, slikovnega ali iz obeh kodov in koliko se tega zavedajo.

Tabela 7. Odgovori dijakov o ozračju, vremenu in podnebju.

OZRAČJE, VREME IN PODNEBJE	
Besedno (14 dijakov)	Večkodno (15 dijakov)
3. Kateri so glavni viri onesnaževanja? Fosilna goriva (50 %). Fosilna goriva, promet in kurišča (42,9 %). Zgrešen odgovor (7,1 %).	7. Kateri so glavni viri onesnaževanja? Za odgovor preberi besedilo in krožni diagram. Fosilna goriva (6,7 %). Fosilna goriva, promet, kurišča, industrija (59,9 %). Industrija, promet, kurišča (26,7 %). Zgrešen odgovor (6,7 %).
	8. Katera oblika, besedilo ali krožni diagram, ti je sporočila informacije, da si lahko sintetično in pravilno odgovoril na vprašanje? Besedilo (26,7 %). Krožni diagram (53,3 %). Oboje (20 %).

Dijaki, ki so imeli na razpolago le besedno besedilo, so odgovorili pravilno, le en dijak je zgrešil odgovor. Očitne so razlike med dijaki, ki so lahko razbrali informacije iz večkodnega besedila, med temi je eden upošteval samo besedno (fosilna goriva), štirje so opomenili podatke iz krožnega diagrama (industrija, promet, kurišča), devet pa je upoštevalo oboje (fosilna goriva, promet, kurišča, industrija).

Odgovori dijakov na osmo vprašanje niso v skladu z odgovori na sedmo vprašanje, ker je večina dijakov trdila, da je izbrala le krožni diagram, da je lahko odgovorila na sedmo vprašanje in štirje so trdili, da so upoštevali besedilo, trije pa, da so uporabili oboje.

Iz odgovorov dijakov z večkodno vprašalno polo ugotavljamo, da je res večina dijakov upoštevala informacije iz obeh kodov, da je lahko odgovorila na vprašanje, a razvidna neskladnost med odgovori na sedmo in osmo vprašanje nas seznanja, da koda opomenijo podzavestno.

Sklepne ugotovitve

Raziskava kaže realno stanje glede opomenjenja večkodnega besedila srednješolskih učbenikov obče geografije, ki obravnavata temo o atmosferi. Iz analize priložnostnega vzorca lahko trdimo, da dijaki preberejo in opomenjajo ponujeno učbeniško besedilo iz besednega ali iz slikovnega, večina iz besednega. Slikovno je še dandanes večinoma razumljeno v smislu nečesa, kar privabi k branju in morebitno ilustrira, redkokdaj dopolnjuje, kar je že povedano v besednem delu. Le ko predložimo slikovno z naslovom/podnaslovom in/ali s kratkim opisom/razlago

in/ali z usmerjevalnimi leksemi, dijaki zavestno osmišljajo predstavljeno slikovno, ker naj bi jim nudilo krajšo pot do opomenjanja in pomnjenja. Opomenjanje je tudi podrejeno individualnim učenčevim sposobnostim in predznanju, ki ga dijak pridobi predvsem v šoli. Čeprav slika v svoji celovitosti nudi informacije v zgoščeni obliki in možnost lažjega dekodiranja besednega, ta prednost ni v celoti upoštevana s strani dijakov. Redki dojemajo dvokodno besedilo kot celoto dveh ločenih semiotskih kodov, ki sta res lahko samostojno uporabljena, a pridobita nov smisel, ko kod dopolnjuje kod, kar privede do ustvarjanja novega znanja ter dviganja pismenosti.

Summary

Today's society demands expanded text literacy, which refers to the ability to read and write a text, word and image, and to read and create diverse texts, whether in a traditional, or in a digital environment (Kress, 2010, as citated in Serafini, 2012; Možina, 2007, as citated in Starc, 2011b). In written communication there are two codes, pictorial and verbal, which interact in the creation of meaning when they are read (Kress, 2006; Starc, 2009b). The complexity of a multimodal text is in the simultaneous comprehension of both codes, as demonstrated in the Slovenian environment by a survey on the reading of the multimodal newspaper text of Sonja Starc (2011b), which concluded that respondents "read the meaning of the word and image as meanings of two separate systems".

The research focused on the student's comprehension of multimodal school texts of general geography. The question is how much students are aware that the text is made up of different codes, and when they consciously read the more understandable code which provides them with more accurate information in a short period of time, how often do they actively/consciously link it to the other code.

With this analysis based on a qualitative research paradigm, we try to determine how and what semiotic codes are considered by students when reading the content and messages of multimodal textbook texts and how much they influence the reading of the author's word form and the attached citations and passages.

The study involved 65 first-year students, four secondary school departments. In each class, two groups were formed by random selection, one had to read multimodal text, the other one only had the verbal part, both answering questions.

Segments of the texts were selected from two textbooks for geography. The choice took into account the thematic areas of textbooks of general geography with almost the same content and layout. The first textbook studied was General geography for the 1st year of secondary and professional education (Cunder et al., 2001), while the

second textbook studied was The General Geography for the 1st year of grammar schools (Senegačnik et al., 2002).

In order to determine how much students perceive the text and how they create meaning by the means offered, we put together two questionnaires for each textbook, one with only the verbal text, one with both the multimodal and verbal text.

The results of the survey point to the real situation of today's students regarding the comprehension of the multimodal textbooks of secondary textbooks of general geography, which address the topic of atmosphere. From the analysis of the random sample, it can be claimed that students read and describe the information offered from the text or from the image, most of them from the text. Image is still largely understood in terms of something that attracts reading and possibly illustrates, rarely complementing what is already described in the word section. Only when we submit a picture with a title or subtitle and/or with a short description/explanation and/or a directional lexeme, students consciously make sense of the pictorial representation, because it should offer them a shorter path to comprehension and memorization. The comprehension is also subordinate to the individual learner's abilities and prior knowledge, which the student acquires prevalently in the school. Although the image provides information in a condensed form and the possibility of easier decoding of the text, this advantage is not fully considered by the students. Few of them perceive a multimodal text as a whole of two separate semiotic codes, that can really be used independently, but acquire a new meaning when the code complements the code, which leads to the creation of new knowledge and the rise of reading literacy.

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 141–154, June 2024

DEVELOPMENT AND CONTEMPORARY UNDERSTANDING OF WORK-BASED LEARNING

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Potrjeno/Accepted
13. 3. 2024

Objavljeno/Published
27. 6. 2024

Abstract/Izvleček

Serious criticism of didactic intellectualism in the past resulted in a range of pedagogical approaches to Work-based Learning as a response to this issue. A comparative overview of the development of work-based learning over time is presented in this article. Additionally, a temporal approach to work-based and workplace learning is explored. We see the change of WBL from being one part of individual pedagogical approaches to becoming part of policy recommendations. Finally, a discussion of the didactic features of contemporary Work-based Learning clearly positions it as a didactic model. The paper stresses the importance of WBL as a didactic model that is appropriate in all student-centred classrooms, regardless of the level of education.

Keywords:
didactical model; work-based Learning; workplace learning; work-related learning, contemporary education.

Razvoj in sodobno razumevanje praktičnega učenja skozi delo

Ostra kritika didaktičnega intelektualizma v preteklosti je kot odgovor na to problematiko privedla do različnih pedagoških pristopov k učenju, ki temeljijo na praktičnem učenju skozi delo. V prispevku je prikazan primerjalni pregled razvoja praktičnega učenja skozi delo v daljšem časovnem obdobju. Poleg tega je predstavljen tudi sodobni pristop praktičnega učenja na delovnem mestu in usposabljanja z delom. Opazujemo lahko, kako je praktično učenje skozi delo, ki je bilo včasih del individualnih pedagoških pristopov, postalo del strateških priporočil. Razprava o didaktičnih značilnostih sodobnega praktičnega učenja skozi delo ga jasno opredeli kot didaktični model. Članek poudarja pomen praktičnega usposabljanja z delom kot didaktičnega modela, ki je primeren v vseh učilnicah, ki se osredinjajo na učence ne glede na stopnjo izobraževanja.

Ključne besede:
didaktični model; učenje skozi delo; učenje na delovnem mestu; učenje, povezano z delom, sodobno izobraževanje.

UDK/UDC
374

DOI https://doi.org/10.18690/rei.3609

Introduction

Historically, pedagogy and didactics have been marked by diametrically opposed theories and ideas, along with efforts to interpret the development of the teaching process and pedagogical theories as a linear process. For example, regarding the polarity in pedagogy, called pedagogical dualism in Milat (2007) while relating upbringing to education, the following types of division can be seen: teacher-centred learning and content-centred learning vs. student-centred learning, theory vs. practice, the intellectualist approach vs. work-based learning, exemplification vs. abstraction, upbringing vs. education, traditionality vs. modernity, etc.

The linear understanding of the development of pedagogical thought is based on the idea that a new (more contemporary) pedagogical approach has replaced the old (more traditional) one, meaning that pedagogical idealism has been replaced by pedagogical empiricism, behavioural theory by constructivist theory, etc. (Jordan, Carlile and Stack, 2008). However, this is not always the case either in theory or in practice. By analysing the development of pedagogical and didactic thought, we can see that what we currently consider modern and innovative is not new at all, but has existed before, though in different social and economic circumstances (Koludrović and Rajić, 2019), and Work-based Learning is a good example of that.

Another problem with the linear understanding of the development of pedagogical and didactic ideas, theories, and approaches, which are sustainable over a long period, lies in the fact that they are always associated with economic and social features. Therefore, according to some authors, any definition of didactics is temporary and open (Poljak, 1991) because didactics always starts from certain philosophical, psychological, and sociological theories and cannot be universal and neutral to different theoretical approaches (Bognar and Matijević, 2002). Stoll and Fink (2001) relate society to the education system, pointing out that the latter must always keep up with or be faster than societal changes, so that its stakeholders can find it relevant and useful. Konig and Zedler (2001, 253) explain that "science never has abstract and unlimited validity but is embedded in concrete sets of actions under cultural and historical conditions". In postmodern society and education, the situation is further complicated, especially under pressure from the relationship among upbringing, education, the individual, society, and the economy. Moreover, Heyler (2015) claims that the postmodern approach to learning can be seen as

pedagogical romanticism (Jordan et al., 2008), which is focused on full personality development, and its implications can be seen primarily in the works of Rudolf Steiner and Maria Montessori. What pedagogical empiricism and romanticism have in common is that they move away from intellectualist teaching and promote the importance of experience-based work and learning, but in completely different ways.
A particularly important period in the development of WBL was the second half of the 19th century and the beginning of the 20th century, when many teachers in Europe and the USA were engaged in intensifying the importance of work, i.e. experiential learning in pedagogical terms. The reason for the intensification of WBL was primarily the desire to react to a lack of connection between the content and the structure of the teaching process in schools, on the one hand, and events in industrial society and the labour market, on the other.
A special contribution to work-based learning in the German-speaking world at the end of the 19th century should be assigned to the labour school movement, which emerged as a reaction to the then social and economic situation (Jakopović, 1984). Its most famous representative is Georg Kerschensteiner (1852–1932), who, according to Rohrs (1993), pointed out that children are motorically inclined, and their primary urge is towards acutal manual contact with concrete things. Kerschensteiner is especially known as an advocate of the work school instead of the book-learning school. Even at that time, he was aware that the largest percentage of children preferred any type of practical activity and pointed out that if students were put in workshops and kitchens, gardens, fields, stables, and fishing boats, they would always be willing to work (Kerschensteiner, 1912, 106 as cited in Rohrs, 1993, 6). It should be stressed that Kerschensteiner was not an advocate of pedagogical polarity in terms of intellectualism vs. work school but felt that these complemented each other. He saw manual work primarily as an opportunity to develop independence, work ethic, activities, self-reflection, planning and organizing skills (Kerschensteiner, 1950 as cited in Rohrs, 1993).
Hugo Gaudig (1860–1923) perceived the educational process as spiritual self-work, which encourages learner self-reflection. Gaudig had a significant impact on Kerschensteiner's departure from pedagogical dualism between intellectualism and work school. Gaudig (1969, 25) believed that the goal of manual work was not exclusively a product, but, among other things, the opportunity for reflection provided by the work itself. He claimed that in this process, the learner observes and

at the same time understands the technique of the work that takes place in front of his eyes and ears, and by explaining the technique, the learner gets an insight into the chosen method of work (Gaudig, 1969).

Dutch educator Jan Lighart (1859–1916) devised the concept of the *school full of life (school and life)*, stressing that a full life should be formed by taking the teaching content from nature which is complete and diverse (Poljak, 1959, 51–52). In accordance with other counsellors and teachers of the time, he believed that students acquired too much theoretical knowledge and too little practice (Poljak, 1959; van Oenen, 2021). Lighart also devised three principles for choosing the content, which include introducing children to (1) nature as a large reservoir of raw materials from which humans draw their wealth; (2) society that works to process these raw materials from nature; and (3) society as a consumer of these products (Poljak, 1959, 51–52). According to Poljak (1959) and van Oenen (2021), this was a bold idea at the time and, owing to the choice of content, Lighart was criticized and reproached for relying on didactic materialism.

Furthermore, for its affirmation of work-based learning, the Soviet Union's School of Work, also called the complex Soviet school system (Poljak, 1959) is well known. In his book *School of Work*, Pavel Petrovič Blonski (1884–1941) pointed out that "the content of a school of work should not be an abstract work process, but a concrete production, which is integral and interconnected" (Blonski, 1921, 10 as cited in Poljak, 1959, 58). According to Blonski (Poljak, 1959), there are three basic components of complex teaching: nature as a source of raw materials, human work in nature, and new social relations based on the socialist concept of collective work. In this process, work occupies a central place as a source of social progress, affecting both the exploitation of nature and the formation of socialist labour relations, while the highest degree, according to Blonski, is industrial work because industry is the highest power over nature, and the factory and factory workshop are schools of work for youth (Blonski, 1921, 19–22 as cited in Poljak, 1959, 59). In terms of moving away from dry intellectualist teaching, the project method by John Dewey and William Heard Killpatrick should be highlighted. Their main idea was to choose projects primarily starting from current life-practical issues, which contributes to the fact that project solutions have not only a general theoretical cognitive value but also a quite concrete practical benefit in terms of changing certain living conditions to improve human existence (Poljak, 1959, 74–75). With his pragmatic approach, Dewey tried to integrate the intellectual, practical, and experiential in the processes of higher-level thinking and reflection (Topolovčan, Rajić and Matijević, 2017).

In his definition of the project method, Killpatrick (1918) stressed not only the purposefulness of projects, but also the importance of student activities in the project work, the moral responsibility acquired by working on the project, emphasizing that the success and purposefulness of projects are determined by students' commitment in learning, i.e. working, with their whole heart. In his analysis of the project method, Collings (1935, 190 as cited in Poljak, 1959) pointed out (1) that for the school to function well, students must plan what they are doing and should want to do something, not just do what the teacher wants. The topic of the project is jointly planned and jointly worked on. (2) Learning must not be an isolated and abstract activity but must have a real-life basis. (3) All learning must have a practical benefit, as this motivates students in their work; everything is learnt according to a specific useful purpose, which delights children and sparks their interest, and (4) The emphasis should be placed on constantly raising, enriching, and forming experiences.

Croatian writer Mate Demarin (1939, 4, as cited in Bognar and Matijević, 2002, 20) stated in his book *A Practical Example of Work Training* that "to affect the formation and education of a full personality, on the one hand, work should include fertile and adaptable material, and in particular, work should be close to life. It should be borne in mind that schoolwork is real and complete only if students are trained for work in life."

A special contribution to the affirmation of life-practical skills in the educational system was made by Maria Montessori (1870–1952) and Rudolf Steiner (1861–1925). Although these represent two different pedagogical and didactic views, both Montessori pedagogy and Steiner's Waldorf pedagogy described the importance of acquiring life-practical skills from an early age and elaborated exercises to encourage such skills. Unlike other approaches, these two include life-practical skills as their inseparable parts, which are implemented in almost all educational activities at all levels of education.

The analysis of the historical development of WBL reveals that, according to authors from the late 19th and early 20th centuries, learning and teaching processes must be useful to students, applicable in real life, exemplified, and economical; they should also include and link cognitive, affective, and psychomotor tasks, be purposeful and encourage students to be active, responsible, and independent. Moreover, it is noticeable that from the beginning, WBL arose as a reaction to dissatisfaction with the application of didactic intellectualism in the teaching process.

Ultimately, the authors believe that work-based learning does not replace or diminish intellectual work but builds on and improves it.
However, the difference can be seen in understanding the importance of WBL which is not always dedicated to socio-economic progress (e.g., Blonski), but it has a primarily pedagogical purpose (e.g., Montessori and Steiner) with the aim of full personality development, i.e. training for an independent and purposeful life where work is an integral part of the overall process of student development, while training for a particular job is not its primary role.

Contemporary understanding of WBL

The last decades of the 20th century and the beginning of the 21st century saw the development of the knowledge society, which along with the influence of economic and social circumstances and the competence approach to education, contributed to re-actualizing the issue of work-based learning. Numerous authors (Rainbird, Munro, and Senker, 2005; Raelin, 2008; Avis, 2010; Heyler, 2015, Major, 2016) who explore the features of contemporary work-based learning emphasize its connection with the social and economic circumstances of contemporary life. They see WBL as an aid to students and teachers in bridging the sluggishness of the education system in relation to the rapidly-changing modern labour market, but also to connect the formal education system and the labour market. For the first time, WBL is not created as an initiative of individual instructors, as has been the case historically, but has become an integral part of educational policy and legislation (European Commission, 2015; Standards and Guidelines for Quality Assurance in the European Higher Education Area, 2015) and curricula documents, both in VET (more about concrete solutions can be found in InovatiVET, 2017) and in the higher education system, where multiple solutions for the implementation of WBL can be found in study programs.
Although some authors claim this is a novelty in learning (Raelin, 2008), that WBL is a new pedagogy for new times (Boud and Symes, 2000), based on a historical overview and contemporary ways of realization of work-based learning, it can be seen this is nothing new in pedagogy and didactics. On the contrary, considering new scientific knowledge and the practical implications of the benefits of work-based learning, WBL is clearly being re-actualized in new social, educational, and economic circumstances.

In terms of understanding and implementing WBL, it should be emphasized that almost all authors exploring WBL agree there is no single definition of this issue important for the quality of education, which makes its interpretation extremely difficult. The reasons can partly be sought in semantics. For example, workplace learning, and work-based learning are two different models that involve work, each of which has its own characteristics; however, in applying the term workplace learning, the learning process must be organized in the workplace. Moreover, sometimes the categorization and systematization of terms depend on the (didactic) approach, pedagogical school, and the competence of the authors dealing with this issue, and finally there are authors who equate WBL and workplace learning.

Therefore, for the purposes of this paper, we will distinguish between different models of work-related learning, including workplace learning, work-based learning, volunteering, internship after graduation and other models. Such categorization is in accordance with the views of other authors. Avis (2002, 2010) and Morris (2019) point out that WBL should be distinguished from workplace learning, which is a form of learning that occurs every day at work when employees seek new skills or develop new approaches to solving problems. Sweet (2013; 166) defines WBL as "a subset of experience-based learning and points out that WBL should be clearly distinguished from learning that takes place in enterprise-based training workshops and training classrooms".

Neither is there any clear consensus on how WBL should be categorized with regard to the didactic classification of terms. Some authors and sources (Raelin, 1997; InovatiVET, 2017; Major, 2016) call it a model. Raelin (1997) defines WBL as a comprehensive model which combines explicit and tacit forms of knowledge and theory and practice modes. The toolkit WBL practices in Europe (InovatiVET, 2017) defines WBL as a model of integrative pedagogy.

Musset (2020) points out that WBL has different application models, but does not put it in any category, opposing it to the concept of school-based learning. Similar views are expressed by other authors (European Training Foundation, 2013), who also agree that there is no single definition of WBL. Neither do Kis and Windisch (2018) offer categorization or definition, while Kis (2016, 7) defines work-based learning as "learning that takes place through some combination of observing, undertaking, and reflecting on productive work in real workplaces. It may be paid or unpaid and includes a diversity of arrangements".

Harvey (2023), for example, does not categorize WBL in didactic terms, but states that "work-based learning refers to any formal higher education learning that is based wholly or predominantly in a work setting". Johnson, White, Charner, Cole, and Promboin (2018) define WBL as a set of instructional strategies that engages employers and schools in providing learning experiences for students.

Consequently, after analysing this and other relevant literature, it is noticeable that authors often do not categorize WBL didactically, while others call it a model or concept, or a set of strategies. In any case, WBL is not a single didactic strategy because it does not have clear implementation steps, unlike project-based learning or problem-based learning. Work-based learning is neither an educational approach nor a curriculum structuring approach because it is an integral part of the contemporary competency-based approach in education that is defined and elaborated by educational policy and related legal and curricular documents. All authors dealing with this issue clearly point out that the goal of work-based learning is to improve the education system by connecting theory with practice, and to strengthen, improve, and master the professional and generic competences of pupils and students, and indirectly the mentors and employees from whom pupils and students learn, encouraging them towards lifelong learning. In other words, WBL also contributes to both work organization and the education system (Sweet, 2013; Boud et al., 2001; Boud and Solomon, 2007).

We believe that WBL has also gone beyond the notion of something related to an insufficiently elaborated idea. In scientific contexts, a model (*Croatian Encyclopedia*, 2021b) is a set of assumptions theoretically describing a system. In this sense, it is best to distinguish between different models of work-related learning (workplace learning, work-based learning, volunteering, internship after graduation etc.), whereby WBL is one model that has several different types of implementation and application, depending on the education system in which it is applied (adult education, VET, higher education system) and depending on the curriculum structure (strictly programmed in advance or flexibly structured).

Ultimately, WBL is a didactic model of planning, organizing, and realizing a learning process that links the learning outcomes of a particular qualification with immediate practical learning. It is based on a constructivist paradigm and a competency-based approach to learning and teaching, and curriculum-wise, it is flexibly planned and individualized.

Its goal is to develop and improve the professional and generic competences acquired by pupils and students, linking the benefits of academic learning and the labour market, and it forms an integral part of lifelong learning.

Features of the contemporary Work-based Learning Model

Based on the above, the main features of WBL as a didactic model can be identified. First, WBL relies on a competency-based approach to education. Competency is a set of knowledge, skills, independence, and responsibility, and the main purpose of WBL is full personality development and the acquisition of professional and generic competences to provide young people with the highest possible quality education, so that they can quickly adapt to the labour market, participate successfully in it, and ultimately improve it. Sweet (2013, 191) sees WBL as a powerful form of pedagogy that can be used to develop basic work habits, occupational identity, and specific occupational competences.

WBL is determined by the curriculum and learning outcomes (Brennan and Little, 1996; Boud, Solomon and Symes, 2001; Boud and Solomon, 2007; Sweet, 2013; Johnson, White, Charner, Cole and Promboin, 2018, Steinert, 2019). If it is not defined by the curriculum, this is a workplace learning model. Boud et al. (2001) point out that curricula should be flexibly structured in such a way that learning outcomes are applicable in diverse work environments and can meet the specific interests of learners. They also have features of transdisciplinarity, as activities from different fields are most often connected in the workplace (Boud et al., 2001; Johnson et al., 2018). The goal is to connect workplace needs and classroom study (Boud, Solomon and Symes, 2001; Sweet, 2013). The authors agree that it is best to organize WBL to connect the labour market and the academic context. Boud et al. (2001) argue that the goal is not only to train students for the labour market, but also to improve both the learning process and companies. Sweet (2013) claims that WBL contributes not only to student creativity and innovation (Johnson et al. 2018) but also to the innovation and productivity of a particular company.

Another feature of WBL is that it is didactically shaped (Boud et al., 2001; Sweet, 2013; Boud and Solomon, 2007). According to Sweet (2013), WBL is a type of experiential learning, where mentoring work, demonstration and practice, task rotation and task variety, project work and problem solving are important didactic strategies and methods.

Raelin (2008) adds modelling, demonstrating, storytelling, coaching, Bruner's scaffolding, and experiential learning. WBL can be shaped using a range of strategies and methods of learning and teaching, but it is necessary that they be focused on student activity, that is, on their learning. It is therefore clear that an important feature of WBL is the full development of learners. In addition to contributing to the development and improvement of holistic competences, WBL also has a motivational role (Sweet, 2013), and successful WBL implies meeting student interests (Johnson et al., 2018) and helping students become active in identifying their needs and interests and in organizing the learning process (Lester and Costley, 2010). According to Johnson et al. (2018), by solving specific problems WBL contributes to the development of critical and analytical thinking, seeing problems from different perspectives, it encourages data research, analysis of previous solutions, and decision-making to ultimately arrive at a solution to the problem.

The following feature of WBL relates to its task of training students for the labour market. Here, it is crucial to keep in mind that WBL is not just an observation of what is happening in practice (in the labour market). Part of the learning outcomes should certainly be focused on getting to know the features of the workplace, but the learning outcomes and the work plan should be defined according to individual student abilities so that they can participate actively in the WBL process, taking into account the level of independence.

WBL also improves numerous generic competences such as learning how to learn (Boud et al., 2001), creativity and innovation, originality, responsibility, respect, appreciation of different opinions, work ethic, and professionalism (Johnson et al., 2018) and, ultimately, metacognition because it requires continuous student reflection on the problem-solving process (Raelin, 2008). Many authors also emphasize self-reflection, reflective practice, and peer evaluation as essential features of WBL (Seufert, 2000; Heyler, 2015; Major, 2016; Johnson et al., 2018), which are also indispensable features of the constructivist paradigm and the competency-based approach to education. WBL will truly have an impact and motivate students to further learn if an authentic and positive learning atmosphere is established and teachers and mentors are trained to apply this model. An additional important feature of WBL is intergenerational learning, as this is a reciprocal model of education in which different generations can learn from each other and collaborate.

In this regard, it is necessary to train teachers and mentors in the field of WBL application and to foster continuous cooperation among all stakeholders based on reflective practice and mutual respect.

Conclusion

The analysis of the development of Work-based Learning presented in this article reveals that WBL is not a novelty. It occurs cyclically in those periods when economic progress and change are intensified and when there is a discrepancy between learning in school and at university and the needs of the labour market. Even though WBL may arise as a reaction to dissatisfaction with classroom teaching, it is noticeable that the main goal of both older and newer models of WBL is the competency and well-being of students and that it was not created purely to meet the needs of the labour market. The difference between older and contemporary models lies mainly in the fact that the new ones are determined by education policy and legislation, which ensures that they will not remain an idea or an attempt, but are an integral part of the education system, primarily in VET, adult education, and higher education. WBL can also be applied in the education of students at lower educational levels mostly through manual work, home economics, experiential learning, gardening, technical culture, and numerous other activities that promote experiential learning. Finally, it is justified to expect that modern WBL will function longer because the speed of change within the economy ensures its place in lifelong learning.

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 155–170, June 2024

RECOMMENDATION SYSTEMS, PARENTS, AND PRESCHOOL CHILDREN: THE STORY BEHIND DIGITAL TECHNOLOGY

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Potrjeno/Accepted
3. 8. 2023

Objavljeno/Published
29. 3. 2024

Abstract/Izvleček

A survey was conducted in November 2023, involving 554 Slovenian parents and their preschool-aged children. The survey aimed to investigate the following: (i) the way parents and their preschool-aged children employ social media and digital technology; (ii) the parents' comprehension of the term "information bubbles", and (iii) the parents' awareness of recommendation systems. Parental and child digital technology patterns and behaviours are correlated, according to the findings. The results suggest that most parents have a restricted understanding of the operational mechanisms of recommendation systems and how they contribute to the construction of "information bubbles."

Keywords:
recommendation systems, parents and preschool children, digital technology, social media.

Priporočilni sistemi, starši in predšolski otroci: zgodba, ki se skriva v zakulisju digitalne tehnologije

Novembra 2023 je bila izvedena raziskava, v kateri je sodelovalo 554 slovenskih staršev in njihovih predšolskih otrok. Cilj raziskave je bil preveriti, (i) kako starši in njihovi predšolski otroci uporabljajo družbena omrežja in digitalno tehnologijo, (ii) kako starši razumejo pojav »informacijskih mehurčkov« in (iii) preveriti znanje staršev o priporočilnih sistemih. Glede na ugotovitve so vzorci in vedenja digitalne tehnologije staršev in otrok povezani. Poleg tega rezultati kažejo, da ima večina staršev omejeno razumevanje operativnih mehanizmov priporočilnih sistemov in tega, kako prispevajo k izgradnji »informacijskih mehurčkov«.

Ključne besede:
priporočilni sistemi, starši in predšolski otroci, digitalna tehnologija, družbena omrežja.

UDK/UDC
316.472.4:004-055.2, 316.472.4:004-053.4

DOI https://doi.org/10.18690/rei.3488

Introduction

In recent decades, digital technology has significantly and fundamentally altered the global scene. It has transformed various domains, including communication, information access, work processes, entertainment, healthcare, education, social interaction, innovation, privacy, and security (Burlacu et al., 2021; Entschew, 2021; Gui and Büchi, 2019).

The undeniable impact of digital technology is evident in the fast-changing world of modern parenting as well. Contemporary parents are facing the difficulty of raising children in a society where screens and devices are omnipresent. Digital technology has become an essential aspect of parenting, functioning as both a means for enhancing knowledge and a form of amusement (Livingstone and Byrne, 2018).

Although parents endeavour to stay informed of the constantly changing digital environment, a significant knowledge gap persists, specifically concerning recommendation systems (hereinafter referred to as RS). Parents frequently struggle to grasp the complexities of RS, which hinders their ability to understand how these systems intelligently select content for their children (Funk et al., 2009).

Furthermore, parental guidance faces a unique challenge in the form of "information bubbles", which are frequent and pushed by RS. Although the objective of these systems is to customize content for individual users, they unintentionally foster the development of isolated information ecosystems that restrict the range of information accessible to preschool-aged children (Wineburg et al., 2016). Unaware of the mechanisms underlying recommendation algorithms, parents who rely exclusively on suggested content may unintentionally contribute to the continuation of these information bubbles.

At present, there is a lack of available data concerning the level of awareness among Slovenian parents of preschool children regarding RS and information bubbles. This study aims to address the existing research deficiencies in the literature. The paper presents first a brief overview of the present state in Slovenia concerning the usage and popularity of digital technology and social media by parents and their preschool children. In the continuation, the study examines two key subjects: (i) parental awareness of RS, and (ii) parental understanding of information bubbles.

Background

The incorporation of technology has resulted in a major upheaval in daily existence, affecting our occupations, communication, and day-to-day habits. The population, particularly those born between 1990 and 2000, known as Millennials and Generation Z, underwent significant changes in their methods of communication, formation of relationships, and access to information. The transformation began with the introduction of instant messaging and expanded with the emergence of social networking platforms (de Castro et al., 2022). The formative years of these generations, encompassing adolescence and early adulthood, were influenced by the ubiquitous presence of digital culture, resulting in a substantial impact on their identities and viewpoints on the world (Chang and Chang, 2023).

Although digital natives, Millennials and Generation Z, now parents of a considerable number of preschool children in today's fast-paced, interconnected society, find themselves grappling with the challenges and opportunities presented by the digital age, and are forced to reconfigure conventional parenting practices. These parents are confronted more than ever with choices that were absent in past generations, such as supervising a child's usage of digital technology and integrating educational applications into recreational time (Benedetto and Ingrassia, 2021).

Today, the concept of a "digitally interconnected family" has become increasingly prevalent, as technology has become an essential component of our everyday existence. The contemporary family acknowledges the evolving significance of technology in the advancement of young children and strives to incorporate appropriate digital activities into the lives of preschoolers, while also considering their holistic physical, social, and cognitive development (Lim, 2018).

The incorporation of tablets, mobile phones, and educational apps into the learning process of preschoolers is ushering in a new era of early childhood education and experience. Given the significant amount of time parents spend with their children, it is anticipated that the attitudes and media usage of parents will influence and shape the media usage of their children (Lee et al., 2022). Research has indicated a correlation between the amount of time parents spend with media and the amount of time their children spend using media (Oh and Park, 2019; Poulain, 2019). Additionally, parents who adopt permissive or neglectful parenting styles tend to grant their children more freedom to engage with media (Coyne et al., 2017).

Contemporary, digitally well-educated parents face the challenge of managing their children's media consumption, and within this domain lies the frequently disregarded impact of recommendation systems (RS). These systems, "software tools and techniques that provide suggestions for items that are most likely of interest to a particular user" (Ricci et al., 2015:1), have a hidden, yet crucial influence on the information that parents come across on the internet.

These systems direct users toward movies, games, shopping, news, and apps, depending on their past interactions. With the ongoing advances in technology, parents are dealing not only with the obvious aspects of media consumption, but also with the subtle effects of algorithms that operate behind the scenes of RS, shaping their digital experiences. Although parents may make efforts to provide a secure and instructional online environment, RS may add unforeseen elements into the equation of choice (Seaver, 2019).

According to reports, certain RS possess poor algorithms, which implies that these algorithms do not effectively incorporate contexts, characteristics, and behaviours (Margalit, 2016). As a result, "filter bubbles" (information bubbles) are created, a concept introduced by Pariser (2011b), where information is selectively filtered based on individual users, removing any content that does not conform to a standardized pattern of similar information.

For children, filter bubbles/information bubbles refer to the use of RS and algorithms to control the information received when watching entertainment content, searching for (preschool-related) information, listening to music, or using social media for communication, even if this is done together with their parents. Therefore, instead of obtaining novel knowledge, preschool children are immersed in a familiar setting that offers security, and joy, while requiring minimum cognitive exertion. This can lead to a significantly restricted understanding of the world in the current day, excessive self-assurance, reduced creativity, and the incapacity to generate innovative ideas and engage in exploration (Izci et al., 2019).

Many individuals, including those who are proficient in using digital technology, remain unaware of the occurrence of such filtering and the intentional or unintentional construction of filter bubbles because of its subtle nature. While users may understand filter bubbles, it might be difficult to take control over how the filter operates and how it is used (Holone, 2016).

Methodology

An anonymous online survey was conducted in November 2023 using Google Form to collect data, targeting parents of children who had been enrolled in kindergarten since the age of three. Questions about the decision-making process concerning the exclusive use of data for a single child were posed to parents with multiple children of similar age.
The survey link was subsequently distributed to parents by kindergarten principals, who were initially mailed the survey along with a description of its content. Additionally, the responses of parents to this survey were gathered online. R studio was used for the statistical analysis.

Participants
A total of 554 parents responded to the survey. Out of these 554 parents, 86 were fathers (16%) and 468 were mothers (84%), aged from 23 years to 52 years (mean age = 35.64). The regions of Osrednjeslovenska (37.55%) and Gorenjska (22.74%) yielded the highest number of responses, followed by Podravska (15.70%), Primorsko-notranjska (9.39%), and Goriška (7.04%). The regions with the lowest response rates were Savinjska (4.69%), Jugovzhodna (2.17%), Posavska (0.36%), Obalno-kraška (0.18%), and Zasavska (0.18%).
The survey included a total of 554 preschool children, of which 252 (45.49%) were identified as female and 300 (54.15%) as male. For two children (0.36%) no gender was provided. One hundred and fifty-eight (28.52%) of these 554 preschool-aged children were three years old, 185 (33.40%) were four years old, 195 (35.20%) were five years old, and a mere 16 (2.88%) were six years old.

Results

A university degree is held by the plurality of parents (refer to Table 1), followed by secondary school and college education. A considerable proportion of parents have also earned a master's degree. Out of the total 554 parents examined, only ten have earned a doctoral degree (PhD), while five parents possess only a primary school diploma. No statistically significant differences were found between the father and mother in terms of their academic degree.

Table 1: Academic degree obtained by parents.

	Primary	Secondary	College	University	Master's degree	PhD	Total
f	5	157	83	226	73	10	554
f %	0.90	28.34	14.98	40.79	13.18	1.81	100 %

To examine which of the digital devices/print media were the most popular and used in parents, seven different options were provided: television, mobile phone, radio, laptop/tablet, book, magazines, and newspapers. The results are shown in Table 2.

Table 2: Usage of digital devices and print media by parents.

Digital d./ p. media		Never	Rarely	Some-times	Often	Always	Total	Mean (SD)
Television	f	98	109	172	111	64	554	2.88
	f %	17.69	19.68	31.05	20.04	11.55	100	(1.25)
Mobile phone	f	23	62	128	146	195	554	3.77
	f %	4.15	11.19	23.10	26.35	35.20	100	(1.16)
Radio	f	97	127	141	117	72	554	2.89
	f %	17.51	22.92	25.45	21.12	13.00	100	(1.28)
Laptop/ tablet	f	156	150	130	71	47	554	2.46
	f %	28.16	27.08	23.47	12.82	8.48	100	(1.26)
Books	f	45	77	146	127	159	554	3.50
	f %	8.12	13.90	26.35	22.92	28.70	100	(1.26)
Magazine	f	180	129	136	70	39	554	2.11
	f %	32.49	23.29	24.55	12.64	7.04	100	(1.19)
Newspaper	f	237	118	123	51	25	554	2.11
	f %	42.78	21.30	22.20	9.21	4.51	100	(1.19)

There are no statistically significant differences between the use/popularity of digital devices and print media between mothers and fathers. The most popular media used by parents (see Table 2) is the mobile phone (mean = 3.77), followed by books (mean = 3.50). The least popular are magazines (mean = 2.11) and newspapers (mean = 2.11). Surprisingly, the laptop (tablet) is moderately popular (mean = 2.46).

Table 3 shows the usage of digital devices and print media by children. As for the parents, seven different options were provided: television, mobile phone, radio, laptop/tablet, book, magazines, and newspapers. The correlation between parents and children regarding the usage/popularity of print media is shown in Figure 1.

A correlation exists between parental usage (popularity) of digital devices and print media and their children's usage. A strong correlation was found in the use of television (0.51) and books (0.51), and a medium correlation in the use of radio (0.44). A medium correlation was found in the use of magazines (0.40), newspapers (0.36), and the laptop/tablet (0.31). Only a minor correlation was found in the use of mobile phones (0.25).

Table 3: Usage of digital devices and print media by children.

Digital d./ p. media		Never	Rarely	Some-times	Often	Always	Total	Mean (SD)
Television	f	39	75	127	136	177	554	3.61
	f %	7.04	13.54	22.92	24.55	31.95	100	(1.25)
Mobile phone	f	193	106	109	84	62	554	2.49
	f %	34.84	19.13	19.68	15.16	11.19	100	(1.39)
Radio	f	217	112	129	59	37	554	2.25
	f %	39.17	20.22	23.29	10.65	6.68	100	(1.30)
Laptop/ tablet	f	296	104	82	34	38	554	1.94
	f %	53.43	18.77	14.80	6.14	6.86	100	(1.24)
Books	f	45	77	146	127	159	554	4.00
	f %	3.25	6.86	22.38	21.84	45.67	100	(1.12)
Magazine	f	200	80	126	85	63	554	2.51
	f %	36.10	14.44	22.74	15.34	11.37	100	(1.40)
Newspaper	f	420	71	39	16	8	554	1.41
	f %	75.81	12.82	7.04	2.89	1.44	100	(0.85)

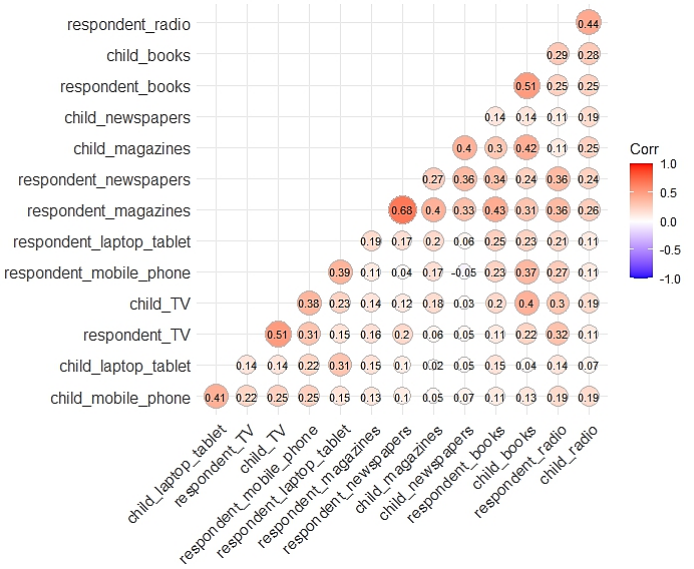

Figure 1. The correlation between the digital device and print media usage of children and their parents (respondents).

Table 4 shows the usage of social media by parents. As can be seen, the most popular social media are Facebook Messenger (mean = 4.17), YouTube (mean = 4.15), and Facebook (mean = 4.14). The least popular are Amazon Kids (mean = 1.24), and Spotify Kids (mean = 1.22). There were no statistically significant differences found between the father and mother in terms of their usage of social media.

Table 4. Use of social media by parents.

Social media		Never	Rarely	Some-times	Often	Always	Total	Mean (SD)
Facebook	f	28	23	73	148	282	554	4.14
	f %	5.05	4.15	13.18	26.71	50.90	100	(1.11)
Facebook Messenger	f	31	23	63	141	296	554	4.17
	f %	5.60	4.15	11.37	25.45	53.43	100	(1.14)
Instagram	f	154	59	83	98	160	554	3.09
	f %	27.80	10.65	14.98	17.69	28.88	100	(1.59)
Twitter (X)	f	386	81	38	26	23	554	1.59
	f %	69.68	14.62	6.86	4.69	4.15	100	(1.08)
YouTube	f	8	23	91	187	245	554	4.15
	f %	1.44	4.15	16.43	33.75	44.22	100	(0.94)
YouTube Kids	f	181	64	92	103	114	554	2.83
	f %	32.67	11.55	16.61	18.59	20.58	100	(1.55)
YouTube Music	f	180	71	96	105	102	554	2.78
	f %	32.49	12.82	17.33	18.95	18.41	100	(1.52)
Amazon Kids	f	483	33	22	8	8	554	1.24
	f %	87.18	5.96	3.97	1.44	1.44	100	(0.72)
Spotify	f	400	47	47	27	33	554	1.64
	f %	72.20	8.48	8.48	4.87	5.96	100	(1.19)
Spotify Kids	f	489	31	18	8	8	554	1.22
	f %	88.27	5.60	3.25	1.44	1.44	100	(0.71)
Netflix	f	243	63	74	66	108	554	2.52
	f %	43.86	11.37	13.36	11.91	19.49	100	(1.59)
VOYO	f	227	77	86	71	93	554	2.51
	f %	40.97	13.90	15.52	12.82	16.79	100	(1.53)
WhatsApp	f	242	63	79	71	99	554	2.50
	f %	43.68	11.37	14.26	12.82	17.87	100	(1.57)
TikTok	f	378	63	51	32	30	554	1.69
	f %	68.23	11.37	9.21	5.78	5.42	100	(1.18)
Snapchat	f	359	76	66	24	29	554	1.71
	f %	64.80	13.72	11.91	4.33	5.23	100	(1.15)

The same list of social media was used to obtain answers about their usage by the children.

Table 5. Use of social media by children.

Social media		Never	Rarely	Some-times	Often	Always	Total	Mean (SD)
Facebook	f	524	17	7	3	3	554	1.09 (0.46)
	f %	94.58	3.07	1.26	0.54	0.54	100	
Facebook Messenger	f	529	11	9	3	2	554	1.08 (0.43)
	f %	95.49	1.99	1.62	0.54	0.36	100	
Instagram	f	534	12	6	1	1	554	1.06 (0.33)
	f %	96.39	2.17	1.08	0.18	0.18	100	
Twitter (X)	f	551	2	1	0	0	554	1.01 (0.18)
	f %	99.46	0.36	0.18	0.00	0.00	100	
YouTube	f	151	83	130	92	98	554	2.82 (1.44)
	f %	27.26	14.98	23.47	16.61	17.69	100	
YouTube Kids	f	267	50	89	64	84	554	2.36 (1.53)
	f %	48.19	9.03	16.06	11.55	15.16	100	
YouTube Music	f	403	39	51	35	26	554	1.63 (1.17)
	f %	72.74	7.04	9.21	6.32	4.69	100	
Amazon Kids	f	540	8	3	0	3	554	1.05 (0.35)
	f %	97.47	1.44	0.54	0.00	0.54	100	
Spotify	f	541	6	4	0	3	554	1.05 (0.35)
	f %	97.65	1.08	0.72	0.00	0.54	100	
Spotify Kids	f	545	6	0	1	2	554	1.03 (0.29)
	f %	98.38	1.08	0.00	0.18	0.36	100	
Netflix	f	458	32	31	21	12	554	1.37 (0.91)
	f %	82.67	5.78	5.60	3.79	2.17	100	
VOYO	f	425	38	42	23	26	554	1.53 (1.10)
	f %	76.71	6.86	7.58	4.15	4.69	100	
WhatsApp	f	532	8	8	3	3	554	1.08 (0.45)
	f %	96.03	1.44	1.44	0.54	0.54	100	
TikTok	f	530	15	3	4	2	554	1.07 (0.41)
	f %	95.67	2.71	0.54	0.72	0.36	100	
Snapchat	f	531	18	2	2	1	554	1.06 (0.32)
	f %	95.85	3.25	0.36	0.36	0.18	100	

A strong correlation between parents and children was found in the use of YouTube Kids (0.69), and VOYO (0.53), a medium correlation in the use of Netflix (0.46), YouTube Music (0.42), Amazon Kids (0.41), YouTube (0.37), and Spotify Kids (0.32).

According to the results, the utilization of digital devices, and print media among preschool children shows a tendency for supervision and joint participation primarily with parents.

Among the 554 parents surveyed, the majority claimed to oversee their children's internet usage (81%), as well as their usage of laptops/tablets (76%), mobile phones (71%), newspapers (67%), magazines (46%), television (39%), and books (28%).

Among the 554 parents who were surveyed, a substantial majority of 416 (75%) stated that they had received online recommendations regarding what to watch, listen to, and buy, and which other related activities to choose. Among the entire parent population, a mere eighty-five individuals (15%) expressed uncertainty, while fifty-three parents (10%) reported not having received recommendations. Thirty-seven percent of parents, which is equivalent to 204 individuals, expressed a keen sense of dissatisfaction with these recommendations. Another 25% (140 parents) reported being dissatisfied, while 32% (178 parents) felt neither dissatisfied nor content. A small percentage of 5% (26 parents) reported being satisfied, and just 1% (6 parents) expressed a high level of satisfaction.

While parents may be aware of the presence of recommendations, most lack sufficient understanding regarding the existence and functioning of the RS behind these recommendations (see Table 6).

Table 6. Familiarity of parents with recommendation systems.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
f	103	61	201	107	82	554
f %	18.59	11.01	36.28	19.31	14.80	100 %

Comparable findings were observed with respect to parental awareness concerning the influence that recommendation systems exert on children's social media usage (see Table 7).

Table 7. Familiarity of parents with recommendation systems and their impact on children's social media usage.

	Strongly disagree	Disagree	Undecided	Agree	Strongly agree	Total
f	152	78	142	81	99	554
f %	27.44	14.08	25.63	14.62	17.87	100

To determine whether parental age, level of education, and digital device/print media usage significantly predicted familiarity with recommendation systems, multiple linear regression was applied. A significant regression equation was found ($F(12, 541) = 2.444$, $p < .001$), with an R^2 of .030.
The individual predictors were examined further and showed that age ($t = 2.31$, $p = .021$), and the use of laptop/tablet ($t = 2.95$, $p = .003$) were significant predictors in the model.

Table 8 displays the parents' awareness regarding the presence of information bubbles. Most parents have limited understanding of information bubbles. No statistically significant difference was found between fathers and mothers regarding awareness about the existence of these bubbles.

Table 8. Parent's awareness of the existence of information bubbles.

Parent		Do not know	No	Yes	Total
Mother	f	210	86	172	468
	f %	44.87	18.38	36.75	100
Father	f	23	16	47	86
	f %	26.74	18.60	54.65	100

Most parents are also uncertain about their ability to have influence over information bubbles. Out of 554 parents, 276 (50%) answered "do not know", 174 (31%) answered "no" (31%), and only 109 (19%) parents answered "yes".
When asked to provide potential solutions for avoiding information bubbles, only a few parents (14.81%) replied by providing solutions such as "browsing without history", "deleting cookies", "using only necessary cookies", "not using media at all", "ignoring recommendations of RS", "there is no possibility to influence the recommendations", "seeking help from the Ministry of Education", and using "Adblocker".

Discussion

Although research indicates that fathers are also dedicating an increasing amount of time to their children in many Western countries (Gauthier et al., 2004; Raley et al., 2012), most parents who responded to the survey were mothers. This was expected, given that mothers typically spend significantly more time with their children than fathers do.

This survey has shown no statistically significant differences between mothers and fathers regarding the usage of digital devices/print media. The mobile phone is the most widely utilized and well-liked digital medium. This is not surprising, given its portability and status as an integral "smart" component of society, facilitating tasks such as information retrieval, problem-solving, information storage, knowledge acquisition, and even entertainment through online and offline gaming (Szyjewski and Fabisiak, 2018).

Particularly intriguing is the prevalence of book popularity among parents who were born around 1990/2000 and who thus spent their childhoods immersed in the digital environment. Given that most of the parents surveyed possess a university degree (40.79%), the results align with those documented in a study by Mažgon et al. (2020), which discovered that individuals with a university degree reported being more committed readers (as well as having a greater preference for books) than the general population.

A correlation was found between parental usage of digital devices, print media, and social media and their children's usage. This is in accordance with similar studies reporting that parent's habits and usage of digital devices/print media, and social media are associated with their children's usage (e.g., Bar Lev, and Elias, 2020; Celik, 2020; Lauricella et al, 2015; Vaala and Hornik, 2014). The correlation observed between parents and their children on some social media platforms was expected, given the age of the children.

Findings indicate that most parents are monitoring their preschool children's use of digital devices and social media and are prepared to intervene if needed. Similar findings emerged from other studies, such as Livingstone (2007) and Livingstone and Helsper (2009). However, the question is whether monitoring the usage of digital devices and social media in their preschool children is always sufficient. As outlined by Dias et al. (2016: 419), there is a discrepancy between "what children actually know and do with digital technologies and what parents think they know and do". A parent, aged 50, stated in a study conducted by Dias et al. (2016) that his 6-year-old daughter possessed the ability to independently locate and download applications from Google Play.

The findings indicate that while the majority of parents have encountered recommendations regarding what to watch, listen to, buy, and so on, they reported

having a limited understanding of how RS operate. The results indicate that age plays a significant role in comprehension of these systems, and older parents appear to have more experience.

This is consistent with findings by Beel et al. (2013), who found that age influences users' interactions with recommendation systems and that older users are more inclined to click on recommendations compared to younger users. The impact of laptop/tablets on experiencing recommendations/RS is confusing; however, plausible reasons could be the powerful operating systems of laptops/tablets, large screen, browsing experience, flexibility, better reliability, power, performance, and web loading time (Research.com, 2024).

Dias et al. (2016) found that contemporary preschoolers exhibit higher levels of resourcefulness and technology skill compared to children from two to three decades ago. They employ multiple techniques to discover content, manage their memory, and deal with advertisements. Therefore, preschool children can *potentially* encounter disturbing/inappropriate information and recommendations from RS if parents are not actively monitoring their children's use of digital devices.

Many parents indicated a lack of awareness regarding the impact that recommendation systems can have on their children's experiences with digital devices and social media through the creation of information bubbles. Parents may presume that the content offered to their children is carefully selected with their welfare in consideration. Nevertheless, the customized nature of recommendations can unintentionally confine access to particular viewpoints, thus constraining the range of their children's knowledge and experiences (Izci et al., 2019).

Conclusions and future work

"We shape our tools, and thereafter our tools shape us."
(Marshall McLuhan, media theorist)

A survey was conducted in November 2023, involving 554 Slovenian parents and their preschool-aged children. The survey aimed (i) to investigate the usage of social media and digital technologies by parents and their preschool-aged children, (ii) to explore the comprehension of "information bubbles" and to establish (iii) the level of parental awareness concerning recommendation systems.

The findings indicate a correlation between the digital technology habits and behaviours of parents and children. The survey has also revealed that parents

acknowledge the significance of digital technologies and are aware of the necessity to supervise their children's utilization of digital devices and social media.

However, the findings also indicate that most parents have a limited comprehension of the functional mechanics of recommendation systems and their role in the building of information bubbles. Given the rapid growth and widespread availability of various forms of media (Pariser, 2011a, b), coupled with advances in technology making it increasingly difficult for individuals to access content that has not been customized to their preferences, modern parents will need to stay informed and to continuously update their knowledge. This will enable them to make informed decisions regarding their children's digital activity (Bar Lev and Elias, 2020; Naab, 2018).

According to Pariser's 2011 statement (Pariser, 2011b), it is anticipated that our decisions regarding what to watch, read, and see rely on a combination of nonprofessional 'editors' (our friends and coworkers) and software algorithms. However, it is also anticipated that at some point in the future, the widely employed personalization features of RS might replace proficient human editors.

From this standpoint, the proficiency of contemporary and future parents to comprehend and evaluate digital technology and social media will be highly important. Fortunately, there is a growing number of workshops, courses, events, and educational groups in Slovenia that strive to enhance digital and media literacy among parents. As the importance of literacy in the context of digital and media parenting is significant, future research should consider further exploration of this area (Golob et al., 2021). Moreover, professionals will be needed more than ever to support parenting in the everyday changing digital society, to determine how to face these innovations and challenges, what to "consume" of information, recommendations, and technology.

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 171–187, June 2024

POGLEDI UČITELJEV RAZREDNEGA POUKA IN UČITELJEV SLOVENŠČINE NA INTERPRETATIVNO BRANJE

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Potrjeno/Accepted
13. 3. 2024

Objavljeno/Published
27. 6. 2024

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Abstract/Izvleček

Temelj sodobnega načrtovanja pouka književnosti predstavlja t. i. komunikacijski pouk. V prispevku izhajamo iz predpostavke, da interpretativno branje učitelja predstavlja središčno vlogo v priporočenem modelu šolske interpretacije umetnostnega besedila za razvijanje bralne zmožnosti učencev. Preučili smo poglede učiteljev razrednega pouka in učiteljev slovenščine na interpretativno branje. V raziskavi, v kateri je sodelovalo 110 učiteljev, se je med drugim pokazalo, da se večini zdi ustrezno interpretativno branje v razredu zelo pomembno, znanje pa bi morali, sodeč po izsledkih raziskave, še nadgraditi. Med učitelji razrednega pouka in učitelji slovenščine ni razlik glede znanja o interpretativnem branju.

Ključne besede:
komunikacijski pouk, šolska interpretacija, književno besedilo, interpretativno branje, pogledi učiteljev.

Views of Elementary School Teachers and Slovenian Language Teachers on Interpretive Reading

The basis for modern planning of literature teaching is communication teaching. In the present study, we assumed that interpretive reading by the teacher plays a central role in the recommended model of school interpretation of literary texts for the development of student reading ability. We investigated the views of elementary school teachers and Slovenian language teachers on interpretive reading. A survey of 110 teachers revealed, among other things, that most consider appropriate interpretive reading in the classroom to be very important and that knowledge about it should be further developed. There was no difference between elementary school teachers and Slovenian language teachers in terms of knowledge about interpretive reading.

Keywords:
communication teaching, school-based interpreting, literary texts, interpretive reading, teachers' views.

UDK/UDC:
373.3:028.8

DOI https://doi.org/10.18690/rei.3741

Uvod

Slovenščina ima v vzgojno-izobraževalnem procesu v Republiki Sloveniji več vlog, med drugim tudi vlogo učnega predmeta, ki je temeljni splošnoizobraževalni predmet v javni osnovni šoli in ima izmed vseh predmetov največ ur (Petek, 2013; Petek, 2021). Sodobno načrtovanje pouka književnosti (znotraj predmeta slovenščina) temelji na komunikacijskem pouku (Petek, 2014b), »[…] kar pomeni, da sta v središču šolskega branja leposlovja književno besedilo in učenec; učitelj pri branju spodbuja prekrivanje pomenskega polja besedila in učenčevega obzorja pričakovanj, ki izvira iz njegove zunajliterarne in medbesedilne izkušnje« (Program osnovna šola. Slovenščina. Učni načrt, 2018, str. 70). Glavni cilj tega modela je vzpostavljanje in ohranjanje učenčevega zanimanja za branje in poslušanje umetnostnih besedil (prir. prav tam). V prispevku izhajamo iz predpostavke, da lahko ta cilj doseže učitelj, ki učence poučuje slovenščino, in sicer tudi z interpretativnim branjem, ki ga, tako kot Krakar Vogel (2020), razumemo kot glasno, pomensko ustrezno, čustveno izrazno in estetsko branje literarnega besedila v razredu. Ker branje (in poslušanje) umetnostnih besedil po našem prepričanju učencu med drugim omogoča(ta): širjenje splošne izobrazbe in razgledanosti ter besedišča, krepitev sporazumevalne zmožnosti, novo znanje, možnost razmišljanja na višjih taksonomskih ravneh in boljšo bralno pismenost, se zdi še posebej pomembno, da je interpretativno branje učitelja v razredu prisotno in kakovostno, zato pa je smiselno in hkrati nujno preveriti poglede učiteljev, ki učence poučujejo slovenščino, tj. učiteljev razrednega pouka in učiteljev slovenščine, na interpretativno branje.

Sodobno načrtovanje pouka književnosti

Temelj sodobnega načrtovanja pouka književnosti predstavlja t. i. komunikacijski pouk (Petek, 2014). Kerndl (2021) navaja, da se pouk književnosti v sodobnem času bistveno razlikuje od tradicionalnega. Saksida (2006, 2008) poudarja, da je za komunikacijski pouk bistveno spoznanje, da je branje književnosti dialog, in sicer 1) med učencem in književnim besedilom, pri čemer navaja, da je branje književnega besedila izhodišče šolske interpretacije; 2) med učenci samimi; 3) med učenci in učiteljem o književnem besedilu. V prenovljenem učnem načrtu za slovenščino (Program osnovna šola. Slovenščina. Učni načrt, 2018) je zapisano, da branje umetnostnih besedil učencem v prvem vzgojno-izobraževalnem obdobju, v katerem

je sprejemanje besedila navadno nadrejeno tvorjenju, ponuja možnost za polno literarnoestetsko doživetje. V drugem vzgojno-izobraževalnem obdobju je pomembno ohranjanje učenčevih interesov za branje in poslušanje umetnostnih besedil, v tretjem pa se ohranja komunikacijski model književnega pouka, ker je izhodišče obravnave prav književno besedilo. Šolska interpretacija umetnostnega besedila je po učnem načrtu priporočeni model za razvijanje bralne zmožnosti pri učencih in zajema več faz/dejavnosti, tj. uvodna motivacija, napoved besedila, umestitev in interpretativno branje, premor po branju, izražanje doživetij ter analiza, sinteza in vrednotenje, ponovno branje in nove naloge. Krakar Vogel (2020) to opredeljuje kot osrednjo metodo pouka književnosti, Saksida (2008) pa omenja, da je zaporedje dejavnosti stalno, pri posamezni obravnavi besedila pa učitelj posamezne faze sproti prilagaja vsebini. Tudi Kerneža (2023) omenja področje poučevanja književnosti, pri čemer poudarja učinek spremenjenega načina dela.

Za dejaven stik učenca z besedilom in uresničitev že omenjenih ciljev je pomembno interpretativno branje učitelja, ki po Kerndl (2021) v fazi šolske interpretacije književnega besedila predstavlja prvo branje besedila, ki načelno poteka neprekinjeno, Podbevšek (2008) pa poudarja, da ima govorna interpretacija literarnega besedila (glasno interpretativno branje) pri tem središčno vlogo.

Interpretativno branje učiteljev

Učiteljev govor pred razredom, kot navaja Podbevšek (1995, str. 103), »[…] je posebna oblika javnega govora«. Avtorica (prav tam, str. 106) nadaljuje: »Kadar [pa] učitelj glasno bere umetnostno besedilo, mora biti njegovo branje interpretativno. To pomeni, da logično branje napolni s čustvenim odnosom. […] Takšno branje, ki je odsev razumskega in čustvenega, želi pri učencih spodbuditi umetniško doživljanje.«

Podbevšek (2011) omeni še, da učenci s poslušanjem interpretativnega branja postanejo kultivirani poslušalci. Krakar Vogel (2020, str. 126) dodaja: »Interpretativno branje je glasno, semantično ustrezno (logično) in čustveno izrazno, estetsko branje literarnega besedila v razredu.« Kulo, Kibui in Odundo (2020) navajajo, da se z interpretativni branjem uresničuje kritično razmišljanje, pri čemer je bralec oz. učitelj zadolžen za to, da se informacije iz besedila prenesejo z ustreznim glasovnim pregibom, z uvrščanjem besed v smiselne povedi, s prilagajanjem hitrosti in natančnosti ter t. i. avtomatičnosti pri izgovarjavi.

Da bo učitelj v razredu z interpretativnim branjem lahko dosegel cilje iz učnega načrta in cilje, omenjene v tem prispevku, se mora na to dejavnost kakovostno pripraviti. V slovenskem prostoru je Podbevšek (1995, 2008, 2011) na podlagi dolgoletnega poučevanja in ukvarjanja z umetnostnimi besedili oblikovala model učiteljeve priprave na interpretativno branje. Postopek priprave ima dve stopnji, tj. seznanjanje z besedilom v širšem smislu in seznanjanje z besedilom v ožjem smislu. Učitelj se z besedilom v širšem smislu seznani tako, da preuči avtorja obravnavanega besedila, časovno opredelitev, zgodovinske okoliščine, literarnoteoretske in literarnozgodovinske oznake, razlago neznanih besed in težjih skladenjskih struktur, da lahko izpelje celotno učno uro, saj je interpretativno branje le njen del. Priprava učitelja na interpretativno branje v ožjem smislu pa zajema tri faze: 1) upočasnjeno tiho branje; 2) izdelavo govornega zapisa; 3) poskusno glasno branje. Namen upočasnjenega tihega branja je prepoznati govorne znake, ki bodo učitelju pomagali oblikovati govorno interpretacijo. Govorni znaki, ki jih omenja Podbevšek (2008), so: grafična oblikovanost besedila kot celote, ločila, skladenjska zgradba, slogovno zaznamovane jezikovne prvine, naglaševanje, glasovje, ponavljanje, nasprotja in stopnjevanja, medmeti in drugo. Pri interpretativnem branju pa so pomembna tudi govorna izrazna sredstva, ki so slušna/zvočna in vidna. O njih podrobno piše Petek (2014a) v prispevku *Didaktični model razvijanja javnega govornega nastopanja.*
Podbevšek (2008) ugotavlja, da bo interpretativno branje kakovostno, če bo učitelj pisni jezik ustrezno pretvoril v govorjenega. Za izdelavo govornega zapisa je značilno, da si učitelj grafično označi izbrana govorna sredstva, tj. naglase, težje glasovne sklope in glasovne premene, polglasnike, premore, potek intonacije, stavčne poudarke, glasnost, tempo, verzne prestope, metrično shemo, način izgovora, register, barvo glasu itn. Ko vse to opravi, pa lahko preizkusi svoj govorni zapis s poskusnim glasnim branjem in po potrebi pred nastopom v razredu še kaj spremeni (prav tam).

Če povzamemo, učitelj se mora na interpretativno branje temeljito pripraviti; gre za proces in ne enkratni dogodek, zato mora skrbno slediti priporočenemu postopku priprave; po našem mnenju ni pravilnega ali nepravilnega interpretativnega branja, lahko pa je to boljše ali slabše. Merilo je odziv učencev, predvsem pa učinek, ki ga učitelj doseže pri učencih.

Interpretativno branje učencev

V razredu umetnostno besedilo največkrat bere učitelj, lahko pa interpretativno berejo tudi učenci. Ti morajo imeti predvsem dober zgled učitelja, pridobiti pa morajo tudi znanje in izkušnje s tega področja. Veljavni učni načrt za slovenščino (Program osnovna šola. Slovenščina. Učni načrt, 2018, str. 18, 30, 44–45) na več mestih omenja interpretativno branje učencev, npr.: »[…] učenci glasno berejo pesmi, prozo in dramatiko […] s posebno govorico izražajo razpoloženje […] uporabljajo t. i. pravljični ton […] za dramsko osebo poiščejo primeren glas in ga spreminjajo glede na spreminjajoče se lastnosti oseb […] razločno in doživeto glasno berejo prozna besedila (upoštevajo zvočne prvine govora), po vlogah glasno berejo dramska besedila […] z glasnim branjem zvočno (so)oblikujejo besedilno stvarnost, razločno in doživeto glasno berejo pesemsko besedilo, pri tem uskladijo zvočne prvine govora (glasovno barvanje, intonacijo, register, poudarjanje, glasnost, premore, hitrost) […] razločno in interpretativno glasno berejo prozno besedilo«.

Po našem mnenju so učenci zmožni interpretativnega branja, zato jim morajo dati učitelji možnost in priložnost, da si pridobijo čim več izkušenj. Priprava učencev na interpretativno branje je lahko podobna kot priprava učiteljev, le da učenci zanjo potrebujejo več časa. Truden (2021) je izvedla empirično raziskavo o interpretativnem branju učencev, v kateri je ugotovila, da so učenci sposobni interpretativnega branja ter da ga je z ustreznimi dejavnostmi in vajo mogoče razvijati; izsledki so pokazali tudi, da se je zaradi te dejavnosti pri učencih spremenil odnos do književnosti – učenci so v pouku književnosti in interpretativnem branju prepoznali užitek, doživeto branje pa so označili za prijetno aktivnost (prav tam). Stara, Krčmarova in Kratka (2023) predlagajo tudi uporabo videoposnetkov, ker se tako lažje izvede refleksija, hkrati pa ta način lahko deluje tudi motivacijsko. Sklepamo lahko, da učitelj, s tem ko učencu na različne načine omogoča izkušnjo interpretativnega branja, vzpostavlja in ohranja njegovo zanimanje za branje in poslušanje umetnostnih besedil.

Ker lahko predmet slovenščina v javni osnovni šoli v Republiki Sloveniji poučujejo učitelji razrednega pouka (1. in 2. vzgojno-izobraževalno obdobje) in učitelji slovenščine (2. in 3. vzgojno-izobraževalno obdobje), smo med omenjenimi učitelji izvedli empirično raziskavo o njihovih pogledih na interpretativno branje.

Namen in cilji raziskave

Namen raziskave je bil ugotoviti poglede učiteljev razrednega pouka in učiteljev slovenščine na interpretativno branje. Zastavili smo si naslednje cilje: 1) ugotoviti stališča učiteljev do interpretativnega branja in izkušnje z njim; 2) preveriti znanje učiteljev o interpretativnem branju; 3) prepoznati potrebe po nadaljnjem izobraževanju učiteljev s področja interpretativnega branja; 4) ugotoviti, ali med učitelji razrednega pouka in učitelji slovenščine obstaja razlika v oceni pomembnosti ustreznega interpretativnega branja v razredu; 5) ugotoviti, ali med učitelji, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, in učitelji, ki se niso, obstajajo razlike v oceni pomembnosti ustrezne priprave na interpretativno branje v razredu, pogostosti interpretativnega branja učencem v razredu, stopnji seznanjenosti s postopkom priprave na interpretativno branje ter v oceni pomembnosti obnavljanja in izpopolnjevanja znanja s področja interpretativnega branja; 6) ugotoviti, ali učitelji z daljšo delovno dobo tudi bolje ocenjujejo svojo zmožnost interpretativnega branja v razredu in ali potrebujejo manj dodatnega znanja s področja interpretativnega branja; 7) ugotoviti, ali učitelji ki se jim zdi ustrezno interpretativno branje v razredu pomembnejše, tudi pogosteje interpretativno berejo umetnostna besedila v razredu, ali tudi pogosteje od svojih učencev pričakujejo interpretativno branje v razredu in ali tudi bolje ocenjujejo svojo zmožnost interpretativnega branja v razredu; 8) ali med učitelji razrednega pouka in učitelji slovenščine obstaja razlika v znanju o interpretativnem branju.

Metoda

Uporabili smo deskriptivno in kavzalno-neeksperimentalno metodo pedagoškega raziskovanja. Pristop je kvantitativen.

Vzorec

V raziskavi je sodelovalo 110 učiteljev, ki so v celoti izpolnili anketni vprašalnik, od tega 60 % učiteljev razrednega pouka in 40 % učiteljev slovenščine. Način vzorčenja je bil neslučajnostni, priložnostni.

Največ učiteljev (33 %) ima 7–18 let delovne dobe, sledijo učitelji, ki imajo 19–30 let delovne dobe (27 %), nato učitelji z več kot 30 let delovne dobe (19 %), najmanj pa je učiteljev, ki imajo 1–3 let delovne dobe (11 %) in 4–6 let delovne dobe (10 %). Največ učiteljev poučuje v osrednjeslovenski statistični regiji (27 %), sledijo učitelji iz podravske regije (16 %), savinjske (13 %), zasavske (9 %), goriške (8 %), posavske

in jugovzhodne Slovenije (6 %), pomurske (5 %), gorenjske (4 %), obalno-kraške (3 %), primorsko-notranjske (2 %) in iz koroške regije (1 %).

Zbiranje, obdelava in prikaz podatkov

Podatke za raziskavo smo zbrali z avtorskim spletnim anketnim vprašalnikom, poimenovanim *Pogledi učiteljev razrednega pouka in učiteljev slovenščine na interpretativno branje*, ki je bil skladen z namenom in s cilji raziskave, dostopen pa na https://1ka.arnes.si/a/89589ab7, in sicer od 20. 9. 2023 do 9. 10. 2023. V 1. sklopu smo preverjali stališča učiteljev do interpretativnega branja in izkušnje z njim; v 2. sklopu znanje učiteljev o interpretativnem branju; v 3. sklopu pa so nas zanimale potrebe učiteljev po nadaljnjem izobraževanju s področja interpretativnega branja. Za to smo uporabili 5-stopenjske ocenjevalne lestvice (1. sklop: nepomembno, manj pomembno, srednje pomembno, pomembno, zelo pomembno; 2. sklop: zelo slabo, slabo, dobro, zelo dobro, odlično; 3. sklop: nič, malo, srednje veliko, veliko, zelo veliko). V raziskavi nas je glede na opredeljene cilje zanimala tudi primerjava med obema profiloma učiteljev, razrednega pouka in učiteljev slovenščine, ki imata v osnovni šoli kompetence za poučevanje slovenščine, glede na različne spremenljivke (pomembnost interpretativnega branja, nadaljnje izobraževanje, delovna doba, ocena o lastni zmožnosti interpretativnega branja, pogostost interpretativnega branja v razredu, znanje o interpretativnem branju).

Za obdelavo podatkov smo uporabili programsko orodje IBM SPSS Statistics 29. Poleg osnovne deskriptivne statistike smo – glede na to, da so bile vse spremenljivke ordinalne –uporabili tudi neparametrične teste. Za preverjanje povezanosti spremenljivk smo uporabili Spearmanov korelacijski koeficient, za preverjanje razlik med skupinama učiteljev (učitelji razrednega pouka : učitelji slovenščine) pa smo uporabili Mann-Whitneyjev test. Opirali smo se na Štemberger (2021).

Rezultate smo prikazali besedilno in v tabelah.

Rezultati

Stališča učiteljev do interpretativnega branja in izkušnje z njim

Učitelji so presojali o tem, kako pomembno se jim zdi ustrezno interpretativno branje v razredu. Kar 75 % se zdi to zelo pomembno, sledi odgovor pomembno (24 %), le 1 % učiteljev pa je odgovoril, da se mu to zdi srednje pomembno. Največ učiteljev (55 %) je tudi ocenilo, da je ustrezna priprava na interpretativno branje v

razredu zelo pomembna, sledi 41 % učiteljev, ki se jim to zdi pomembno, 5 % učiteljev pa se to zdi srednje pomembno. Na vprašanje, kako pogosto učitelji v razredu interpretativno berejo umetnostna besedila, jih je največ (51 %) odgovorilo, da pogosto, 39 % jih bere zelo pogosto, 10 % pa včasih. Zanimalo nas je tudi, kako pogosto v razredu učenci interpretativno berejo. Učitelji so največkrat odgovorili, da učenci v razredu berejo pogosto (41 %), sledijo pa odgovori včasih (37 %), redko (14 %), zelo pogosto (7 %), nikoli (1 %). Kar 71 % učiteljev je odgovorilo tudi, da učenci berejo v fazi šolske interpretacije umetnostnega besedila, ki se imenuje ponovno branje besedila, v sklopu t. i. novih nalog pa jih bere 12 %. Vsi učitelji imajo pozitiven odnos do interpretativnega branja, pri učencih pa z njim v največjem deležu (51 %) skušajo doseči umetniško oz. estetsko doživetje besedila, najmanj pa njihovo kritično razmišljanje (4 %).

Znanje učiteljev o interpretativnem branju

Vsi učitelji, razen enega, so pravilno odgovorili, kaj je interpretativno branje, tj. *glasno, pomensko ustrezno, čustveno izrazno in estetsko branje literarnega besedila v razredu*. Največ (62 %) jih je odgovorilo, da je njihova zmožnost interpretativnega branja v razredu zelo dobra, sledijo pa odgovori dobra (21 %), odlična (16 %), slaba (1 %). Na vprašanje, kako so seznanjeni s postopkom priprave na interpretativno branje, jih je največ (54 %) odgovorilo, da dobro, sledijo pa odgovori zelo dobro (28 %), slabo (13 %), odlično (4 %), zelo slabo (1 %). Na vprašanje, kako si sledijo faze učiteljeve priprave na interpretativno branje, tj. *branje odraslega in lastno razumevanje besedila, predvidevanje hipotetične otroške oz. najstniške recepcije, strokovna priprava z razčlembo besedila, postavitev cilja, izbira metod spoznavanja in poučevanja*, je pravilno odgovorilo (le) 42 % učiteljev, na vprašanje, kateri so koraki razčlembe besedila, tj. *določitev teme besedila, iskanje osrednje besede/besedne zveze, ki je bistvena za sporočilo, določitev bistvenih prvin za razvijanje bralnih zmožnosti (izbira vsebinskih bralnih strategij), predvidevanje možnosti za aktualizacijo besedila (razvijanje strategij po branju in poglabljanje literarnoestetskega doživetja*, pa je pravilno odgovorilo 57 % učiteljev. Zanimalo nas je tudi, katere korake predvideva model učiteljeve neposredne priprave na dejanje interpretativnega branja v razredu. Pravilno, tj. *upočasnjeno tiho branje, izdelava govornega zapisa, poskusno glasno branje*, je odgovorilo 46 % učiteljev. Na vprašanje, katera govorna izrazna sredstva so pomembna pri interpretativnem branju, tj. *zvočna (intonacija, poudarki, hitrost, premori, register, barva glasu) in vidna (mimika, očesni stik, geste, položaj telesa)*, je pravilno odgovorilo 68 % učiteljev.

Zanimalo nas je še, kateri so po mnenju učiteljev glavni cilji interpretativnega branja v razredu. Pravilni odgovor, tj. *spodbuditi estetsko doživljanje besedil pri učencih in povečati zanimanje za literaturo, spodbuditi učence h komunikaciji z besedilom*, je označilo 66 % učiteljev.

Potrebe učiteljev po nadaljnjem izobraževanju s področja interpretativnega branja

Najprej nas je zanimalo, koliko dodatnega znanja bi potrebovali s tega področja. Največ učiteljev (60 %) je dejalo, da srednje veliko, sledijo pa odgovori veliko (27 %), malo (9 %), zelo veliko (3 %), nič (1 %). Izsledki so pokazali tudi, da se več kot polovica učiteljev (56 %) v zadnjih treh letih ni udeležila nobenega izobraževanja s področja interpretativnega branja niti se na tem področju ni samoizobraževala, kljub vsemu pa se kar 70 % učiteljev obnavljanje in izpopolnjevanje znanja s tega področja zdi pomembno oz. zelo pomembo, da je to nepomembno, pa ni odgovoril nihče. Na koncu so učitelji odgovorili še, zaradi katerega razloga se po navadi odločijo za obisk posameznih programov nadaljnjega izobraževanja in usposabljanja. Največ (43 %) jih je odgovorilo, da zaradi lastnega zanimanja za posamezno področje, sledijo pa še naslednji razlogi: potreba po dodatnem znanju (23 %), priporočilo kolegov (3 %), pobuda vodstva šole (1 %).

Primerjava med obema profiloma učiteljev, razrednega pouka in učiteljev slovenščine, v oceni pomembnosti ustreznega interpretativnega branja v razredu

Kot je razvidno iz tabele 1, je bila povprečna ocena pomembnosti ustreznega interpretativnega branja v razredu pri učiteljih razrednega pouka 4,77 ($\bar{R}$ = 56,36), pri učiteljih slovenščine pa 4,73 ($\bar{R}$ = 54,22). Rezultat Mann-Whitneyjevega testa pa ni statistično značilen (U = 1395,5; p = 0,636), zato ne moremo trditi, da med učitelji razrednega pouka in učitelji slovenščine obstaja razlika v oceni pomembnosti ustreznega interpretativnega branja v razredu.

Tabela 1: Ocena pomembnosti ustreznega interpretativnega branja v razredu glede na profil učitelja.

	N	Povprečje	St. odklon	Povpr. rang ($\bar{R}$)	Mann-Whitneyjev test	
					U	p
Učitelj/-ica razrednega pouka	66	4,77	0,457	56,36	1395,5	0,636
Učitelj/-ica slovenščine	44	4,73	0,499	54,22		

Primerjava med učitelji, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, in učitelji, ki se niso, v lastnih ocenah glede različnih značilnosti interpretativnega branja

Kot je razvidno iz tabele 2, je bila povprečna ocena pomembnosti priprave na interpretativno branje v razredu pri učiteljih, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, 4,81 ($\bar{R}$ = 70,60), pri učiteljih, ki se niso, pa 4,42 ($\bar{R}$ = 51,94). Rezultat Mann-Whitneyjevega testa je statistično značilen (U = 617,5; p = 0,006), zato lahko trdimo, da med učitelji, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, in učitelji, ki se niso, obstaja razlika v oceni pomembnosti ustrezne priprave na interpretativno branje v razredu.

Tabela 2: Ocena pomembnosti ustrezne priprave na interpretativno branje v razredu glede na to, ali so se učitelji v zadnjih treh letih izobraževali s področja interpretativnega branja.

	N	Povprečje	St. odklon	Povpr. rang ($\bar{R}$)	Mann-Whitneyjev test	
					U	p
Sem se izobraževal/-a.	21	4,81	0,402	70,60	617,5	0,006
Nisem se izobraževal/-a.	89	4,42	0,618	51,94		

Kot je razvidno iz tabele 3, je bila povprečna pogostost interpretativnega branja učencem v razredu pri učiteljih, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, 3,81 ($\bar{R}$ = 74,81), pri učiteljih, ki se niso, pa 3,24 ($\bar{R}$ = 50,94). Rezultat Mann-Whitneyjevega testa je statistično značilen (U = 529,0; p = 0,001), zato lahko trdimo, da med učitelji, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, in učitelji, ki se niso, obstaja razlika v pogostosti interpretativnega branja učencem v razredu.

Tabela 3: Pogostost interpretativnega branja učencem v razredu glede na to, ali so se učitelji v zadnjih treh letih izobraževali s področja interpretativnega branja.

	N	Povprečje	St. odklon	Povpr. rang ($\bar{R}$)	Mann-Whitneyjev test	
					U	p
Sem se izobraževal/-a.	21	3,81	0,814	74,81	529,0	0,001
Nisem se izobraževal/-a.	89	3,24	0,812	50,94		

Kot je razvidno iz tabele 4, je bila povprečna stopnja seznanjenosti s postopkom priprave na interpretativno branje pri učiteljih, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, 3,71 ($\bar{R}$ = 79,88), pri učiteljih, ki se niso izobraževali, pa 2,99 ($\bar{R}$ = 49,75). Rezultat Mann-Whitneyjevega testa je statistično značilen (U = 422,5; p < 0,001), zato lahko trdimo, da med učitelji, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, in učitelji, ki se niso, obstaja razlika v stopnji seznanjenosti s postopkom priprave na interpretativno branje.

Tabela 4: Stopnja seznanjenosti s postopkom priprave na interpretativno branje glede na to, ali so se učitelji v zadnjih treh letih izobraževali s področja interpretativnega branja.

	N	Povprečje	St. odklon	Povpr. rang ($\bar{R}$)	Mann-Whitneyjev test	
					U	p
Sem se izobraževal/-a.	21	3,71	0,561	79,88	422,5	< 0,001
Nisem se izobraževal/-a.	89	2,99	0,699	49,75		

Kot je razvidno iz tabele 5, je bila povprečna ocena pomembnosti obnavljanja in izpopolnjevanja znanja s področja interpretativnega branja pri učiteljih, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, 4,14 ($\bar{R}$ = 70,10), pri učiteljih, ki se niso, pa 3,73 ($\bar{R}$ = 52,06). Rezultat Mann-Whitneyjevega testa je statistično značilen (U = 628,0; p = 0,009), zato lahko trdimo, da med učitelji, ki so se v zadnjih treh letih izobraževali s področja interpretativnega branja, in učitelji, ki se niso, obstaja razlika v oceni pomembnosti obnavljanja in izpopolnjevanja znanja s področja interpretativnega branja.

Tabela 5: Ocena pomembnosti obnavljanja in izpopolnjevanja znanja s področja interpretativnega branja glede na to, ali so se učitelji v zadnjih treh letih izobraževali s področja interpretativnega branja.

	N	Povprečje	St. odklon	Povpr. rang ($\bar{R}$)	Mann-Whitneyjev test	
					U	p
Sem se izobraževal/-a.	21	4,14	0,478	70,10	628,0	0,009
Nisem se izobraževal/-a.	89	3,73	0,687	52,06		

Vpliv delovne dobe učiteljev na oceno lastne zmožnosti interpretativnega branja v razredu in potrebo po dodatnem znanju s tega področja

Kot je razvidno iz tabele 6, Spearmanov korelacijski koeficient med oceno lastne zmožnosti interpretativnega branja v razredu in delovno dobo znaša 0,014, kar

predstavlja pozitivno in zanemarljivo povezanost. Ta tudi ni statistično značilna (p = 0,443), zato ne moremo trditi, da učitelji z daljšo delovno dobo tudi bolje ocenjujejo svojo zmožnost interpretativnega branja v razredu.

Tabela 6: Spearmanov korelacijski koeficient med oceno lastne zmožnosti interpretativnega branja v razredu in delovno dobo.

Kako bi ocenili svojo zmožnost interpretativnega branja v razredu?	Spearmanov korel. koef.	0,014
	p	0,443
Delovna doba	N	110

Kot je razvidno iz tabele 7, Spearmanov korelacijski koeficient med oceno količine potrebnega dodatnega znanja s področja interpretativnega branja in delovno dobo znaša –0,265, kar predstavlja negativno in šibko povezanost. Ta je tudi statistično značilna (p = 0,005), zato lahko trdimo, da učitelji z daljšo delovno dobo menijo, da potrebujejo manj dodatnega znanja s področja interpretativnega branja.

Tabela 7: Spearmanov korelacijski koeficient med oceno količine potrebnega dodatnega znanja s področja interpretativnega branja in delovno dobo.

Koliko dodatnega znanja mislite, da potrebujete s področja interpretativnega branja?	Spearmanov korel. koef.	–0,265
	p	0,003
Delovna doba	N	110

Vpliv mnenja učiteljev, ki se jim zdi ustrezno interpretativno branje v razredu pomembno, na lastno in učenčevo pogostost branja v razredu ter oceno lastne zmožnosti interpretativnega branja v razredu

Kot je razvidno iz tabele 8, Spearmanov korelacijski koeficient med oceno pomembnosti ustreznega interpretativnega branja v razredu in pogostostjo interpretativnega branja umetnostnih besedil v razredu znaša 0,374, kar predstavlja pozitivno in šibko povezanost. Ta je statistično značilna (p < 0,001), zato lahko trdimo, da učitelji, ki se jim zdi ustrezno interpretativno branje v razredu pomembnejše, tudi pogosteje interpretativno berejo umetnostna besedila v razredu.

Tabela 8: Spearmanov korelacijski koeficient med oceno pomembnosti ustreznega interpretativnega branja v razredu in pogostostjo interpretativnega branja umetnostnih besedil v razredu.

Kako pomembno se vam zdi ustrezno interpretativno branje v razredu?	Spearmanov korel. koef.	0,374
Kako pogosto v razredu interpretativno berete umetnostna besedila?	p	< 0,001
	N	110

Kot je razvidno iz tabele 9, Spearmanov korelacijski koeficient med oceno pomembnosti ustreznega interpretativnega branja v razredu in pogostostjo interpretativnega branja učencev v razredu znaša 0,192, kar predstavlja pozitivno in zelo šibko povezanost. Ta je statistično značilna (p = 0,022), zato lahko trdimo, da učitelji, ki se jim zdi ustrezno interpretativno branje v razredu pomembnejše, tudi pogosteje od svojih učencev pričakujejo interpretativno branje v razredu.

Tabela 9: Spearmanov korelacijski koeficient med oceno pomembnosti ustreznega interpretativnega branja v razredu in pogostostjo interpretativnega branja učencev v razredu.

Kako pomembno se vam zdi ustrezno interpretativno branje v razredu?	Spearmanov korel. koef.	0,192
	p	0,022
Kako pogosto v razredu učenci interpretativno berejo?	N	110

Kot je razvidno iz tabele 10, Spearmanov korelacijski koeficient med oceno pomembnosti ustreznega interpretativnega branja v razredu in oceno lastne zmožnosti interpretativnega branja v razredu znaša 0,209, kar predstavlja pozitivno in šibko povezanost. Ta je tudi statistično značilna (p = 0,014), zato lahko trdimo, da učitelji, ki se jim zdi ustrezno interpretativno branje v razredu pomembnejše, tudi bolje ocenjujejo svojo zmožnost interpretativnega branja v razredu.

Tabela 10: Spearmanov korelacijski koeficient med oceno pomembnosti ustreznega interpretativnega branja v razredu in oceno lastne zmožnosti interpretativnega branja v razredu.

Kako pomembno se vam zdi ustrezno interpretativno branje v razredu?	Spearmanov korel. koef.	0,209
	p	0,014
Kako bi ocenili svojo zmožnost interpretativnega branja v razredu?	N	110

Primerjava med obema profiloma učiteljev, razrednega pouka in učiteljev slovenščine, glede znanja o interpretativnem branju

Kot je razvidno iz tabele 11, je bilo povprečno število pravilnih odgovorov pri učiteljih razrednega pouka 4,91 ($\bar{R}$ = 53,93), pri učiteljih slovenščine pa 5,07 ($\bar{R}$ = 57,85). Rezultat Mann-Whitneyjevega testa pa ni statistično značilen (U = 1348,5; p = 0,502), zato ne moremo trditi, da med učitelji razrednega pouka in učitelji slovenščine obstaja razlika v številu pravilnih odgovorov.

Tabela 11: Število pravilnih odgovorov glede na profil učitelja.

	N	Povprečje	St. odklon	Povpr. rang ($\bar{R}$)	Mann-Whitneyjev test	
					U	p
Učitelj/-ica razrednega pouka	66	4,91	0,924	53,93	1348,5	0,502
Učitelj/-ica slovenščine	44	5,07	0,759	57,85		

Razprava

V prispevku izhajamo iz predpostavke, da interpretativno branje učitelja predstavlja središčno vlogo v priporočenem modelu šolske interpretacije umetnostnega besedila za razvijanje bralne zmožnosti učencev. V raziskavi se je izkazalo, da se večini učiteljev (75 %) zdi ustrezno interpretativno branje v razredu zelo pomembno. Več kot polovica učiteljev meni, da je ustrezna priprava na interpretativno branje v razredu zelo pomembna. Tudi Klajn (2016) je ugotovila, da je dobra priprava na glasno branje velikega pomena za kakovost učenčevega stika z besedilom. Kar 90 % vseh učiteljev v naši raziskavi je odgovorilo, da pogosto oz. zelo pogosto v razredu interpretativno berejo umetnostna besedila. Klajn (2016) poudarja, da s tem učencem lahko pomagamo energijo namesto v tehnično plat branja usmeriti v doživeto interpretacijo vsebine, Stopinšek (2021) pa dodaja še, da z interpretativnim branjem učence motiviramo tudi za njihovo lastno branje. V raziskavi je 41 % učiteljev odgovorilo, da tudi učenci v razredu pogosto interpretativno berejo. Močnik (2021) navaja, da učenci z večkratnim glasnim branjem zmanjšujejo strah pred branjem, hkrati pa v tej dejavnosti tudi napredujejo. Podobno je ugotovila tudi Truden (2021). Vsi učitelji v naši raziskavi imajo pozitiven odnos do interpretativnega branja, pri učencih pa z njim v največjem deležu (51 %) skušajo doseči umetniško oz. estetsko doživetje besedila, najmanj pa njihovo kritično razmišljanje (4 %). Podobno ugotavlja tudi Podbevšek (2008, str. 77), ko navede: »Z

govorno predstavitvijo literarnega besedila želi učitelj skozi svoje doživetje besedila v učencih spodbuditi njihovo individualno doživljanje, razvijati njihove recepcijske sposobnosti in jih navajati na aktivno komunikacijo z literaturo.« Učiteljem pri nadaljnjem izobraževanju s področja interpretativnega branja priporočamo uporabo Kolbovega modela, ker »ponuja priložnost za izmenjavo konkretnih izkušenj, refleksivnega opazovanja, abstraktnega razmišljanja in aktivnega eksperimentiranja«, kar ugotavljata tudi Močinić in Tatković (2021, str. 409). Pri vsem tem pa se nam zdi zelo pomembna tudi bralna kultura »[…] s psihološke in z vzgojno-izobraževalne perspektive«, o čemer podrobno piše Pečjak (2021, str. 461).

Zaključek

Branje in poslušanje umetnostnih besedil po našem prepričanju učencu omogočata veliko pozitivnih učinkov, predstavljenih tudi v tem prispevku, npr. širjenje splošne izobrazbe in razgledanosti ter besedišča, krepitev sporazumevalne zmožnosti, novo znanje, možnost razmišljanja na višjih taksonomskih ravneh in boljšo bralno pismenost, o čemer piše tudi Petek (2014b, 2022, 2023). Zato se zdi še posebej pomembno, da je interpretativno branje umetnostnih besedil učitelja v razredu prisotno in kakovostno, zato izsledki raziskave učiteljem, ki poučujejo slovenščino, omogočajo premislek o lastni usposobljenosti glede interpretativnega branja in možnostih oblikovanja načrta za večjo lastno ozaveščenost na tem področju, da bi učenem omogočili kakovostno in doživeto interpretativno branje, s tem pa vse prednosti, ki jih tak bralni dogodek omogoča.

Summary

Interpretive reading is reading a literary text aloud, meaningfully, emotionally expressively, and aesthetically in the classroom. It is part of the recommended model for developing student reading skills, in which it plays a central role. Modern planning of literature instruction is based on communication instruction, which means that the focus of school literature reading is on the literary text and the student, while the teacher promotes the intersection between the semantic field of the text and the student's horizon of expectations in reading. The study investigated how teachers of Slovenian (the native language) in elementary school, i.e., elementary teachers and teachers of Slovenian, view interpretive reading.

In a survey of 110 teachers, it was found that three-quarters of the teachers consider appropriate interpretive reading in the classroom to be very important. More than half the teachers also believe that adequate preparation for interpretive reading in the classroom is of key importance. Nine-tenths of all teachers believe that they often or very often read literary texts interpretively in class. Slightly less than half of all teachers indicated that students also frequently read interpretively in class. All teachers have a positive attitude toward interpretive reading and rank it first place their attempts to achieve an artistic or aesthetic experience of the text with students, and in last place, critical thinking. We also tested teachers' knowledge of interpretive reading. This could have been better, but we found no differences in knowledge between elementary school teachers and Slovenian language teachers. Using various statistical calculations, we also sought correlations between the selected variables when testing the hypotheses. Since, in our opinion, reading and listening to literary texts, among other things, enables students to broaden their general education, knowledge and vocabulary, strengthen their communication skills, acquire new knowledge, have the opportunity to think at higher taxonomic levels and improve their reading skills, it seems particularly important that interpretive reading of literary texts by teachers be present in the classroom and of high quality. Consequently, these research results offer teachers of Slovenian (as a native language) the opportunity to reflect on their own competence in interpretive reading and make a plan for greater self-knowledge in this area.

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 189–207, June 2024

ENHANCING TECHNOLOGY COMPETENCE AMONG PRIMARY STUDENTS THROUGH STEAM LESSONS APPLYING THE DESIGN THINKING PROCESS

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Potrjeno/Accepted
8. 5. 2024

Objavljeno/Published
27. 6. 2024

Abstract/Izvleček

This study seeks to evaluate the impact of integrating elements of arts and humanities education into the topic of STEAM on the formation and development of students' competence. The paper suggests a procedure for teaching STEAM subjects using design thinking approaches. Then, technology-related lessons were covered in practical pedagogical activities for grade 3 pupils at three primary schools in Hai Phong, Vietnam. The findings demonstrate that the suggested STEAM subject teaching methodology is workable and helps students develop eight distinctive behavioural markers of technical competence. As a result, this study offers primary school instructors a strategy for implementing STEAM instruction.

Izboljšanje tehnološke kompetence osnovnošolcev s poukom STEAM z uporabo procesa oblikovalskega razmišljanja

Namen študije je ovrednotiti vpliv vključevanja elementov umetnosti in humanistike v okvir izobraževanja STEAM (angl. Science, Technology, Engineering, Arts and Mathematics – znanost, tehnologija, inženiring, umetnost in matematika) ter na oblikovanje in razvoj sposobnosti učencev. V članku predlagamo proces poučevanja predmetov STEAM z uporabo metode oblikovalskega razmišljanja. S tehnologijo povezane lekcije so bile vključene v praktične pedagoške dejavnosti za učence 3. razreda treh osnovnih šol v Hai Phongu v Vietnamu. Ugotovitve kažejo, da je predlagani pristop poučevanja STEAM izvedljiv in pomaga učencem razviti osem značilnih vedenjskih označevalcev tehnične usposobljenosti. Zato ta študija osnovnošolskim učiteljem ponuja strategijo za poučevanje STEAM.

Keywords:
STEAM education, design thinking, technical competence, technology in primary school.

Ključne besede:
izobraževanje izobraževanje STEAM, oblikovalsko razmišljanje, tehnična kompetenca, tehnologija v osnovni šoli.

UDK/UDC:
37.091.3

DOI https://doi.org/10.18690/rei.2960

Introduction

STEAM education, which combines science, technology, engineering, arts, and mathematics, is a global trend that is gaining attention at all educational levels (Bertrand and Namukasa, 2020; Burnard et al., 2019; Timotheou and Ioannou, 2021). STEAM education encourages students to gain more knowledge in science, technology, engineering, mathematics, and the arts and develop their skills in applying this knowledge to real-world problems. It is regarded as a significant educational strategy for developing and increasing students' capacities (da Silva et al., 2020). By incorporating arts into STEM training, students are pushed to think creatively and develop innovative solutions. This approach also promotes critical thinking, communication, teamwork, and problem-solving skills. Furthermore, students learn digital competence and research ability, both of which are necessary in today's technologically driven environment. Overall, STEAM education educates students, regardless of origin or identity, to be active participants in a complex and rapidly evolving society (Morze and Strutynska, 2021; Perales and Aróstegui, 2021). Numerous academic inquiries have unveiled compelling evidence affirming the applicability of design thinking in facilitating the integration of STEAM education within elementary school curricula (Cook and Bush, 2018; Edelen et al., 2023; Kangas et al., 2013). When combined with a design thinking process that involves empathy elements, STEAM education has been demonstrated to boost students' competence development (Li et al., 2022; Retna, 2016). It fosters creativity and appreciation in students, encouraging them to devise solutions that benefit others (Bush et al., 2020; Cook and Bush, 2018; Edelen et al., 2020). Integrating empathy into the curriculum ensures that students will develop essential problem-solving, critical thinking, and collaboration skills (Cook and Bush, 2018). This approach also helps students appreciate different perspectives and experiences, leading to more inclusive solutions. The outcomes of numerous research endeavours unveil the potential for integrating imagination and design thinking into STEAM education to confer a heightened significance upon the STEAM discipline, advance technical education, and facilitate the cultivation of students' technological competence (Chung et al., 2020; Kant et al., 2018). Additionally, the incorporation of technology education into STEAM instruction will foster the cultivation of students' design thinking acumen, creativity, and social competencies (Cohen, 2017). Design thinking is a valuable tool for educators to address long-term challenges in STEM education (Kangas et al., 2013).

In Vietnam, some educators have applied the design thinking process to implement STEM/STEAM activities in high schools (Do et al., 2021; Ta et al., 2023). However, none of the studies have been applied to primary school students.

Every student possesses a distinct learning style, which significantly influences the calibre of their educational experience. These learning styles are commonly categorized into three groups: visual, auditory, and kinaesthetic (Wulandari and Agustika, 2020). Learning styles will influence students' learning outcomes, reflecting how students understand teachers' materials or self-learning processes (Rasheed and Wahid, 2021). Learning outcomes are also directly proportional to students' motivation to learn (Wallace and Leong, 2020). The above studies show a positive association between students' learning styles, motivation, and learning outcomes. Thus, it becomes evident that students can enhance their educational achievements when educators consistently inspire them while employing teaching methodologies tailored to their individual learning styles (Suciani et al., 2022).

In Vietnamese education, there has been a shift towards competence-based approaches that aim to foster comprehensive development. Forming and developing technological competences for students right from primary school is one of the requirements of this program (Ministry of Education and Training, 2018). This includes the development of technological competences from primary school onwards. The government's Project 146 aims for 80% of schools in Vietnam to incorporate STEM/STEAM education activities by 2030 (Prime Minister of Vietnam, 2022). However, there are currently no specific guidelines for implementing STEAM education in primary schools.

This research project aimed to investigate the following questions:

1. Is the use of the design thinking process appropriate and necessary for organizing and presenting STEAM lessons in elementary school?
2. How does teaching STEAM lessons through the design thinking process affect the development of elementary school students' technological competencies?

Literature review

Forms of teaching STEAM education in primary schools

The findings of several prior studies have indicated that the implementation of STEAM education in elementary schools can encompass the use of project-based teaching, the engineering design process (EDP), and collaborative learning.

To implement STEAM education, Liao (2019) proposes the integration of art, project-based teaching, and the maker movement for the effective execution of STEAM education. Teaching STEAM subjects in conjunction with project-based learning facilitates the application of knowledge from the realms of science, technology, art, and mathematics, enabling students to engage with society and take part in the design process within specific artistic contexts to address challenges encountered during learning activities (Lu et al., 2022). Collaborative learning, a teaching method that allows students to work together to explore, investigate, and solve problems while building knowledge, is often used in STEAM education (Gillies and Nichols, 2015). Cooperative learning within the framework of STEAM education utilizes collective and collaborative learning as a pedagogical approach, enabling students to collectively engage in exploration, investigation, and problem-solving to construct knowledge. This approach is commonly utilized in STEAM education to enhance the understanding of group members in STEAM fields, facilitating research, collaboration, and task completion (Li et al., 2022). Erol et al. (2023) demonstrated the favourable impact of EDP-based STEAM education on student creativity and creative problem-solving skills. Multiple studies suggest that STEAM education underscores the importance of creativity, aesthetics, and individuality through empathetic design for crafting solutions (Bush et al., 2020; Cook and Bush, 2018; Edelen et al., 2020). Cook and Bush (2018) argue that the empathy stage is a unique and essential aspect of design thinking, acting as a driver to inspire students and cultivate their enthusiasm for suggesting problem-solving solutions. Moreover, the design thinking process not only offers elementary school students an opportunity to share their unique viewpoints while designing and creating products but also gives educators a tool to tackle persistent issues like educational reform in STEM disciplines (Kangas et al., 2013). Moreover, findings by Henriksen (2017) posit that design and design-based thinking serve as a conduit between art, science, and other disciplines, thereby rendering design thinking a fitting approach for implementing STEAM education in elementary schools.

Teaching STEAM topics in elementary school according to the design thinking process

Design thinking is an approach to problem-solving that emphasizes empathy, creativity, and logic. It entails analysing specific contexts and devising context-specific solutions. In the context of education, design thinking can be applied to interdisciplinary STEAM instruction.

By incorporating design thinking into STEAM education, we can enhance secondary school students' technical and technological education (Edelen et al., 2023; Wrigley and Straker, 2017). Maria Montessori understood the close connection between student-centred knowledge exploration and design thinking methodology (Kant et al., 2018).

Design thinking is a blend of analytical and creative processes that relies on human competence to formulate emotionally and functionally significant ideas and to convey concepts through non-verbal means (Razzouk and Shute, 2012). Mastery of the design thinking process requires designers to adeptly amalgamate empathy, creativity, and rationality to scrutinize and devise suitable solutions for each unique context (Wrigley and Straker, 2017). Research from the Hasso Platner Institute of Design at Stanford University delineates the use of a human-centred approach in the design thinking process to generate inventive problem-solving strategies, encompassing five key steps: empathy, identification, ideation, prototype, and testing (Aflatoony et al., 2018). These steps are iteratively employed to yield a multitude of solutions. Throughout this iterative process, designers identify issues, test prototype solutions, engage with users to gather feedback, and subsequently refine the design based on the received or observed feedback. The present study utilizes the five steps of the design thinking process to structure STEAM lessons in elementary schools, as presented in Table 1.

Table 1. Process of teaching STEAM topics according to design thinking methodology.

Activity name	Teacher activities	Student activities
Empathy	- Teachers use practical situations associated with lesson tasks.	- Be aware of the problem to be solved and voluntarily think of ways to solve it.
	- The teacher develops a scenario to put students in problem situations, causing students to seek to solve problems based on empathy voluntarily.	- Solve problems with empathy through the experience of using the product and interviewing the users' needs. This empathy helps students answer questions: + What do users want about the characteristics and uses of the product? + What requirements do users have when using the product? + Do users like to send any messages to the product?
Identify the problem	- The teacher asks questions about the given situation and guides students Find out the users' needs for the product.	The student analyses and concretizes the needs and desires of users into requirements and criteria of products. The information collected and aggregated includes:

Activity name	Teacher activities	Student activities
		+ Requirements of users about the characteristics and functions of the product + User activities that have been performed for the product + Users' thoughts, beliefs, desires, and needs for products + The feelings of users when using the product
Idea Formation	The teacher organizes students to come up with product implementation plans. With details that are difficult to describe in words, teachers call for students to perform with image sketches.	Students form groups and share their thoughts and subjective experiences to support product design. Identify feasible ideas to prepare for the next stage.
Fabrication of prototypes	The teacher organizes students to build product prototypes and explore product manufacturing solutions.	Students build product prototypes. Students can improve product design through feedback from team members and product users.
Trial	The teacher organizes students to evaluate activities with prototypes.	Students conduct hands-on activities combined with personal knowledge and experience to evaluate prototypes. Students record feedback on prototypes from their own experiences and user feedback.

Assessing the technological competence of primary students in STEAM topics

According to Falloon (2020), technological competence in learners is the ability to use and evaluate digital resources, tools, and services accurately and to apply them to lifelong learning. These competencies allow students to act effectively and ethically in the learning environment.

In this study, the concept of students' technological competence is considered in implementing STEAM education in primary school to help students become technology aware, communicate and use technology appropriately and evaluate technology and design techniques.

These are the technological competence components mentioned in Vietnam's 2018 general education curriculum (Ministry of Education and Training, 2018). The study aims to document the development of technological competence in primary students by applying design thinking methodology to STEAM teaching in technology. By identifying the respective levels of technological competence components, the study seeks to provide insights into how these skills can be improved through STEAM education in primary schools.

Table 2. Assessment of the technological competence of students through teaching STEAM topics in primary school.

Element name	Code	Expression
Technology awareness	Ta1	Describe the application and importance of technology in family and educational settings.
	Ta2	Identify the purpose and meaning of individual actions when creating technology products.
	Ta3	Keep safe and eco-friendly while using tools to create products and preserve technological products.
	Ta4	State the structure and function of the technology product when viewing the sketch of the idea of making that product.
	Ta5	Recognize the size and know how to form technology products.
Technology communication	Tc1	Discuss and share about the product-making process and make adjustments to suit your team's conditions.
	Tc2	Discuss and share perceptions of technology products with others while performing activities: reading, manipulating, designing, manufacturing, testing, etc.
	Tc3	Through the sharing of others, learn about products. Respond to information sharers by gathering, analysing, and evaluating the data.
Use of technology	Ut1	Use tools to design, fabricate, and test products properly and safely.
	Ut2	Make safe and appropriate use of the prototype.
Technology Review	Tr1	Reviews of technology items' usage, functionality, and form.
	Tr2	Compare the product with its criteria.
	Tr3	Find out the pros/cons of the product creation process.
	Tr4	Suggest product improvements (if any).
Engineering design	Ed1	Presenting the task of shaping and decorating products based on understanding and empathy about the product's purpose, meaning, and uses.
	Ed2	Design object properties are analysed.
	Ed3	Sketch product design (shape, structure, decoration plan etc.)
	Ed4	Fabricate product prototypes according to the design.
	Ed5	Test and adjust products in actual conditions. Document the testing process and adjustments (if any).

Research Methodology

The study employed a pre-experimental approach to assessing the viability and efficacy of teaching STEAM subjects using design thinking approaches. Pre-experimental methods are experiments done on an experimental group without a

control group but with adequate pre- and post-experimental test conditions (Voxco, 2021). We conducted research in three classes at two different primary schools in Hai Phong City, Vietnam, with seventy-six experimental subjects. In addition, to accurately describe the development of students' technological competence, we observed five students per class and recorded their performance using Table 2, as suggested above. To facilitate data recording and analysis, we conduct student name encoding in experimental layers, assessing the behaviour of that student according to three levels: (1) not clearly showing behavioural competence; (2) some manifestation of behavioural competence; (3) demonstrating behavioural competence.

To examine how the STEAM lesson in Grade 3 technology has impacted the development of technology competencies for primary students, we developed a lesson plan with two themes: Topic 1: Making school supplies (1 week/2 lessons); Topic 2: Making toys (2 weeks / 4 lessons) – 3rd-grade technology book and applying the design thinking process to STEAM topic teaching to guide students to solve lesson tasks. The content of the two experimental teaching topics is as follows:

Table 3. Summary of a STEAM lesson as a school item - making a ruler.

Learning tasks		Design and build school supplies from materials that are easy to obtain and recycle.
Main student activities		Learn the structure, uses, and ways to make school supplies.
STEAM Field Content	Science	Structure and use of the ruler
	Technology	How to make a ruler from materials that are easy to find and recycle.
	Engineering	Outline and demonstrate the steps for creating your team's ruler.
	Art	Understand what it means to store and use the ruler properly; Appreciate the item you create.
	Math	The calculation and selection of materials and utensils necessary for making rulers.

Table 4. Summary of STEAM lesson on making toys - making a kite.

Learning tasks		Design and build school supplies from materials that are easy to obtain and recycle.
Main activities of students		Learn the structure, uses, and ways to make simple toys.
STEAM Field Content	Science	Structure and use of kite parts
	Technology	How to make a kite from easy-to-find materials.
	Engineering	Outline and demonstrate the steps of creating your team's kite.
	Art	Understand the meaning of the gift given; Use toys correctly. Appreciate the item you create.

Math	Calculations, selection of materials, and utensils necessary for making the kite.

Students will perform steps two and three of the design thinking process on the idea circle (Figure 1). Idea circles are typically drawn on paper, a calendar cover, or glued as decals onto plexiglass boards for repeated reuse. The idea circle can have three or more layers, divided into separate cells depending on the lesson content and the purpose of the student. Class B is where the characteristics of the product are recorded, while Class C states the plan for making such products. Class A is where students sketch the finished product after completing the content in Class B and Class C. If you go clockwise to perform steps 1 to 4 in Class C, this is the process of creating the product by the student. After product testing, students can draw an additional layer D (concentric with layers A, B, and C) to record or redraw product adjustments. Each edit by students can be separated from the other by one cell.

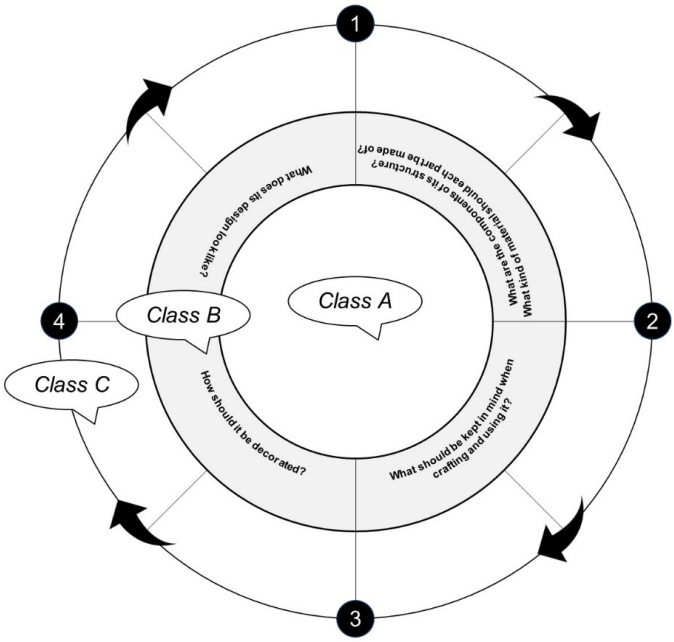

Figure 1. The circle of ideas.

Teachers at the host school will implement this lesson plan after fully understanding the lesson idea and assessment methodology. To collect data on the development of students' technological competencies by applying design thinking methodologies to

STEAM topic teaching, we follow the following process:

Phase 1: Experimental preparation
In this step, teachers assign specific tasks to ensure effective teaching and assessment in group discussions. One teacher is responsible for teaching the class, while another records the lesson. Another teacher evaluates the classroom atmosphere, checking for engagement and participation. Finally, two teachers evaluate the case of five students in the class, recording their development of technological competence over two lessons. This approach helps ensure that all aspects of teaching and assessment are covered, leading to a more comprehensive evaluation of student progress.

Phase 2: Conducting experiments
Participating teachers divide the class into groups of 4 or 6 students so that the students who intend to be assessed will be in groups. The data collected will be recorded and saved. Then, the data is analysed using the content analysis method. The analysis assessed behavioural indicators corresponding to the technological competence of the students participating in the lesson.

Phase 3: Processing experimental results
After gaining information about the student's performance in the learning process for STEAM topics, the information obtained will be reproduced and used to plot the technological competence curve of the student. The spider schema shows the curves representing the technological competence of students.

Results and discussion

The results of the study shed light on the following issues:
Appropriate and feasible design thinking process for teaching STEAM topics in primary school
In two trial implementations, we discovered that most instructors in these primary schools supported the design thinking approach in two trial deployments. The teachers taking part in the project had no prior experience teaching with the design thinking methodology. Particularly in subject topic 1, teachers struggled to perform empathy exercises since they were still unfamiliar with the design thinking methodology. Students in experimental classrooms, meanwhile, are eager to try out novel teaching methods. However, at first, children had a tough time expressing

their thoughts while suggesting ideas to design and produce school supplies since they were unused to utilizing the idea circle. In topic 2, expressing ideas for designing and creating toys is more complex than expressing ideas for designing and producing school supplies, but students do an excellent job of developing and presenting ideas for making items because they are used to the learning style of design thinking (Figure 2).

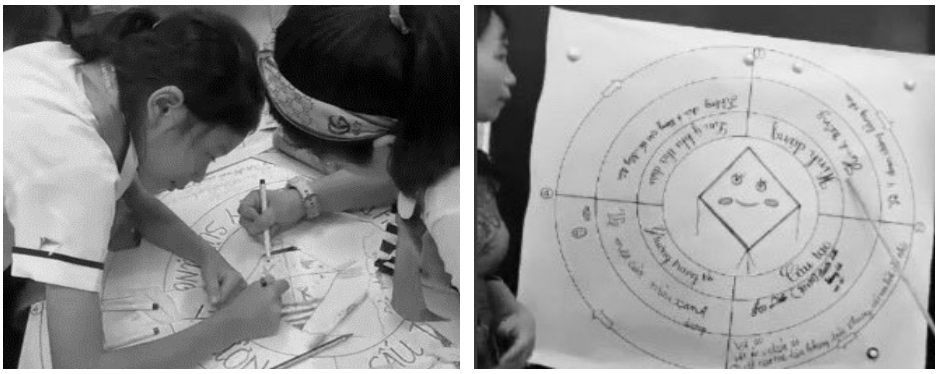

Figure 2. Students take part in activities related to the second STEAM subject, such as creating product blueprints and presenting designs.

Teaching STEAM topics helps students foster and develop technology competencies.

To evaluate the behavioural development of the components of technological competence, we compute the average score for each behavioural expression by the fifteen students chosen for evaluation, corresponding to three levels to assess the behavioural growth of the technological competence components. The proficiency level that results is then converted to a percentage (Figure 3). The degree of technological competence is not reflected in the average score, which measures how students behaved across two themes.

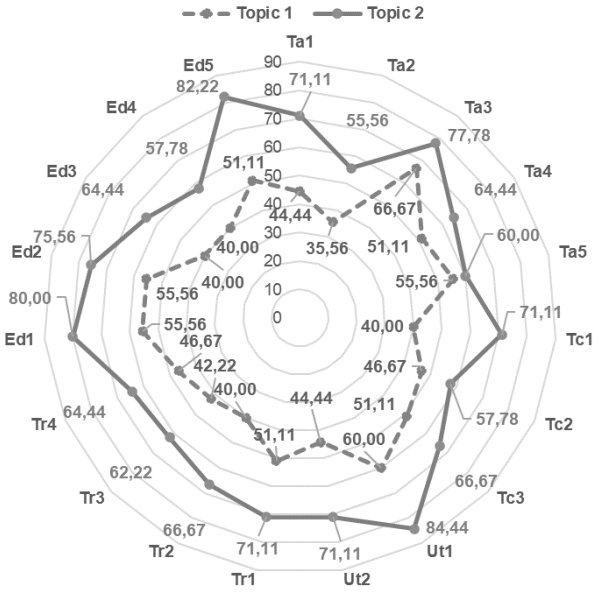

Figure 3. The average score for 15 students' behaviour through two experimental topics.

Observing and evaluating student behaviour across two experimental topics revealed that students developed components of technological competence. To further confirm this statement, we perform a T-Test for each component of technological competence as follows:

Table 6. Paired sample T-Test for components of technological competence.

Composition	Assessments	Average value	S.D.	Difference	p-value	Conclusion
Ta	Pre-test	50.67	6.57	-13.78	< 0.001	Supported
	Post-test	64.44	12.51			
Tc	Pre-test	27.55	7.10	-11.56	< 0.001	Supported
	Post-test	39.11	10.04			
Ut	Pre-test	20.89	2.34	-10.22	< 0.001	Supported
	Post-test	31.11	6.51			
Tr	Pre-test	36.00	7.89	-16.89	< 0.001	Supported
	Post-test	52.89	14.13			
Ed	Pre-test	48.44	7.33	-23.55	< 0.001	Supported
	Post-test	72.00	12.13			

Based on the results of the T-Test, it can be concluded that there are statistically significant differences in the development of students' technological competence in the two topics.

The development of students' technological competence increased unevenly

This uneven increase is related to students' learning styles and motivations. Based on the results of studies on students' learning styles and motivation (Rasheed and Wahid, 2021; Wallace and Leong, 2020). From the sharing of the classroom teacher, through observing behaviour, interests, and work performance, fifteen students were divided into three groups.

(1) For the students, the learning style is more practical, shown by actions such as Learning products in practice, remembering knowledge through experience, actively sharing product insights, working hard to create products, and loving to play assembly games. Teachers find it challenging to maintain classroom discipline with this group of children since students frequently lose attention. However, when this group of students recognized their learning goals and was willing to study, the outcomes of their behaviour aimed at increasing their technical ability over two experimental subjects were typically relatively constant, with steady growth in topic two compared to topic 1. This observation applies to all the NK3, M2, and MK5 learning outcomes.

(2) For students with observational learning styles (NK2, NK4, MĐ1, MĐ4, MĐ5, MK1, MK2, MK4), which are shown by actions such as remembering what they see, if teachers only give presentations without visual aids to illustrate, students will have difficulty acquiring new knowledge. As a result, the items produced by this group of pupils frequently lacked innovation since they witnessed teachers modelling or observing other groups and mimicking their methods. However, with the drive to achieve learning objectives, this group of students finished the product and demonstrated behaviour in two very comparable subjects; there was a development of technical ability in topic 2, but the level was not noticeable compared to the group of students (1). Teachers must entirely and diversely create visual aids, models, and tangible things to leverage this group of students' aptitude to remember via observation to assist pupils in learning knowledge.

(3) For a group of students whose learning style through listening, reading, and writing is manifested through behaviours such as enjoying listening to lectures, discussing, remembering what students hear or read, liking to read and write down personal thoughts, having difficulty memorizing images, and the rest, these characteristics coincide with the behavioural expression of students NK1, NK5, M3, MK3. Because they have trouble comprehending issues via observation and using technology to make goods, the items created by this group of pupils frequently do not match product standards or user needs. Teachers can help this set of pupils with challenging motions during the product-making process and prepare all visual aids.

Discussion

The study's findings addressed the research question of whether the design thinking process is suitable and essential for structuring the teaching of STEAM subjects in elementary schools. The utilization of the design thinking process in teaching STEAM topics yields a favourable impact on the enhancement of elementary students' technological competencies. This aligns with the insights from prior studies outlined in the introduction, emphasizing the advantages of incorporating design thinking in implementing STEAM education in elementary schools. It creates an environment for students to engage in learning activities actively, fostering creativity, problem-solving skills, and nurturing technological competencies (Chung et al., 2020; Edelen et al., 2023; Kant et al., 2018). The advancement of technological proficiency relies on the learning style and motivation of individual students, consistent with the findings of Wallace and Leong (2020) regarding the positive correlation between performance, learning style, motivation, and student outcomes. This outcome demonstrates that students can conduct procedures comparable to how designers think and work if there is a suitable teaching methodology and instructor supervision. Students learn how to conceptualize, reflect on, and express their design and fabrication ideas by performing various design activities on a range of materials. From this, it can be concluded that design thinking sets the stage for an enriching learning experience through which primary school students can perform learning tasks actively, meaningfully, and intentionally, solving practical problems based on empathy for others. These study results are consistent with other studies on design thinking in STEAM education in elementary schools (Cook and Bush, 2018; Kangas et al., 2013).

Throughout the pedagogical experiment, we closely observed the behaviour of students to draw inferences about the development of various competencies within technological proficiency. As a result, we observed that competencies, such as technology communication and technology utilization, showed lower average values in comparison to other areas. This led us to surmise that elementary school students may not have accrued adequate knowledge, skills, and experience in these domains. Therefore, they might encounter challenges when called upon to share knowledge pertaining to technological products. Additionally, there may be an objective reason: in Vietnam, the promotion of STEAM education in elementary schools has been a recent development, resulting in Vietnamese elementary teachers lacking proper training in design thinking and STEAM education. Consequently, they may face challenges in selecting teaching methods that align with students' learning styles while organizing activities in line with STEAM education. This finding correlates with the research outcomes of Duong et al. (2024) regarding the factors influencing the readiness of Vietnamese elementary school teachers to implement STEAM education.

After the pedagogical experiment, we found that primary instructors typically teach most of the courses in the classroom, except for specialist subjects, making integration across subjects more feasible than at higher levels. Teachers can easily arrange a time between subjects to implement the topic. Products for primary school students to make are usually handmade from recycled materials or materials that are easy to find. Therefore, teaching STEAM topics in the design thinking process can be advantageous to implement in primary schools. However, the increased workload as teachers implement STEAM topics is an obstacle to implementing STEAM education in schools. For more effective implementation of the design thinking process in primary school, the learning activities provided to students should stem from real-world situations, addressing practical problems through the perspective and experiences of primary children. Teachers should be provided with materials or participate in training sessions on design thinking methodology to understand the difference between design thinking and technical design processes as an empathetic organization. Teachers need to receive the support of education managers and colleagues when they need professional support regarding increasing workload.

Conclusion

The study's findings have provided preliminary validation that implementing STEAM-themed teaching activities utilizing the design thinking process at the elementary school level is suitable and viable. This endeavour by educators will aid in nurturing and cultivating the technological acumen of elementary school students. Nevertheless, the progression of technological competence is contingent upon the learning style of each student. Furthermore, the study's outcomes serve as valuable points of reference for educational administrators seeking to implement STEAM education in elementary schools adeptly. The meaningful results suggest further research and expansion with more students and a more comprehensive range of topics; it is valuable information for primary STEAM teachers and elementary school administrators to consult when implementing STEAM in primary school.
However, this study has certain limitations: because of the classroom setting and the issue of facilities, teachers frequently divided groups of students in the process of their practising product manufacture. As a result, some students were not paying attention to problem resolution, and the behavioural manifestations of technological competence components were not demonstrated. In the process of students offering ideas about and solutions to manufacturing research goods while developing a set of scales to evaluate students' behavioural manifestations via observation, researchers should also analyse students' competence growth through other manifestations. As a result, the following study direction will continue to implement new STEAM themes on experimental subjects and various alternatives for assessing the influence of STEAM education on the development of students' technological competence.

Acknowledgement

The authors thank the enthusiastic support of the Faculty of Primary and Preschool Education, Haiphong University, the Faculty of Technology Education, Hanoi National University, and the Faculty of Physics, Ho Chi Minh University of Education.

Funding

Thanh-Trung Ta was funded by the Master, Ph.D. Scholarship Programme of Vingroup Innovation Foundation (VINIF), code VINIF.2022.ThS.097.
Hoai-Nam Nguyen thanks to the support of the Mekong-Lancang Project.

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 209–221, June 2024

MOTOR EFFICIENCY IN RELATION TO BODY WEIGHT STATUS AND GENDER IN PRESCHOOL CHILDREN

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Potrjeno/Accepted
27. 2. 2024

Objavljeno/Published
27. 6. 2024

Abstract/Izvleček

Deficits in motor skills and function are associated with overweight and obesity in children. This study aimed to investigate the development of motor efficiency in 3-4-year-old children over seven months and to identify possible gender and body weight status differences in motor efficiency. In the study, there were 45 children (21 girls, 24 boys), the mean age of whom was 39 months. Analysis of the results of testing for differences in motor efficiency according to body weight status and movement components showed no statistically significant differences ($p>0.05$) between healthy weight and overweight children.

Keywords:
motor efficiency, motor abilities, body weight status, preschool child.

Motorična učinkovitost v povezavi s statusom telesne teže in spolom predšolskih otrok

Primanjkljaji motoričnih spretnosti in funkcij so povezani tudi s prekomerno težo in debelostjo pri otrocih. Namen raziskave je bil raziskati razvoj motorične učinkovitosti 3-4 leta starih otrok v sedemmesečnem obdobju in ugotoviti morebitne razlike v motorični učinkovitosti med spoloma in glede na status telesne teže. V raziskavi je sodelovalo 45 otrok (21 deklic, 24 dečkov), povprečna starost otrok je bila 39 mesecev. Analiza rezultatov testiranja razlik v motorični učinkovitosti glede na status telesne teže in komponento gibanja ni pokazala statistično značilnih razlik ($p>0,05$) med otroci z normalno telesno težo in otroci s prekomerno telesno težo.

Ključne besede:
motorična učinkovitost, motorične sposobnosti, status telesne teže, predšolski otrok.

UDK/UDC:
796.012.1-053.4

DOI https://doi.org/10.18690/rei.4487

Introduction

Motor development is among the most essential forms and functions of psycho-physical development, starting before birth and continuing throughout life. Human motor development is particularly noticeable in the first three years of life, as the child achieves motor capacities beyond the reach of any other being in the first two years. This is also reflected in the ability to walk upright. From a completely helpless new-born, unable to move their body and grasp even the most fundamental objects, the child rapidly progresses to a stage where they can independently cover distances in space and manipulate objects at will (Videmšek et al., 2003).

The development of children's motor abilities from infancy to the end of preschool is exceptionally rapid, with children making giant developmental leaps in both the range and quality of their movement patterns in just six years. This leap includes both motor development and the child's physical, cognitive, emotional, and social development. This rapid development in a relatively short period makes it paramount to consider the principle of appropriateness when planning sports and education programs, which requires that content, format, and work methods be adapted to the child's biological age. In addition, it is essential to consider the principle of acceleration or anticipation, which means that when choosing physical activities, we must anticipate to some extent the child's developmental abilities (Videmšek and Visinski, 2001).

Children's physical activity/sports participation, especially in the pre-school and early school years, is undoubtedly a reasonable basis for later involvement in more complex sporting activities. Appropriate activities strongly influence the child's motor, social, and emotional development, as well as the development of some cognitive processes. The golden age for motor learning is increasingly moving from early childhood. The minimal presence or complete absence of physical/sporting activities in the education of the growing child in later years cannot be fully compensated for, as their impact on the progression of growth, perception, and maturation is diminishing. Therefore, during this period, we must ensure the optimal development of motor abilities and the systematic transmission of fundamental motor skills. Activities should meet the child's daily need for movement, play, relaxation, and socializing, and at the same time, impact the child's health (Dekleva et al., 2017).

Systematic, integrated, engaging, and imaginative sports and movement activities based on expert and scientific knowledge are key to children's optimal motor development. Only in this way can children develop their motor and functional abilities (Šimunič et al., 2010).

In the early years of a child's life, the focus is on motor development, which develops from simple to complex forms of movement, from essential elements to more complex sporting activities later in life. If a child does not acquire these motor skills at the right time, it is very difficult for them to compensate for these later on, or if they fail to develop at all (Videmšek and Jovan, 2002).

After about two years of life, a period of active involvement in various physical activities and experimentation with the movement of one's own body begins. On their own or with the influence of their environment, children discover and develop the many motor skills and abilities they need for different types of movement. During activity, their balance improves, and their movements become more coordinated and rhythmic. Typically, by 3-4 years, they have mastered a series of movement patterns, mainly natural movements such as running, jumping, throwing an object, and catching a ball. They can also stand and move on one leg (Škof, 2007).

A 3-year-old engages in group games, which should be simple and not too complicated. The activities should be varied, as a child of this age quickly loses concentration and interest. From the age of five onwards, they want to play independently in group play. An adult is no longer necessary to be in charge of the game, but can assume the role of coordinator and observer. Concentration on the task at hand increases, and the child remembers more and more accurately (Videmšek et al., 2018)

During the preschool years, between the ages of 3 and 6, a child's motor development accelerates dramatically. Movement becomes not only more skilful but also more efficient and economical. Through appropriate activities, the child develops not only motor and functional skills but also cognitive, emotional, and social skills (Videmšek and Visinski, 2001).

During the preschool years, children can acquire a wide range of movement experiences crucial for later motor development. The foundations for more advanced movement patterns are being formed during this period, so it is extremely important that children have a quality experience.

These foundations significantly impact the child's motor development, subsequent participation in numerous sporting activities, and quality of life across their lifespan (Marjanovič Umek, 2010).

For some children, kindergarten is the only stimulating environment for motor development. Every preschool teacher's task is to promote children's development by teaching and planning content through activities. Monitoring children's development is an integral part of the preschool curriculum. The prerequisite for quality observation of children's development is not only knowing children well but also documenting and monitoring their development in a planned and systematic way. The preschool teacher's task is to promote children's development by teaching and planning content through activities. Children's development can be monitored using a variety of methods and techniques. The basic method is observation, followed by interviewing or talking to the child. Observation can be random or planned. Planned observation gives us greater objectivity (Rutar, 2013).

The acquisition of motor skills in childhood is crucial for the future development of context-specific actions that could improve adherence to physical activity. According to Vandoni et al. (2024), deficits in motor skills and function are associated with childhood obesity. This is the cause of impaired motor performance, executive functions, postural control, and motor coordination. Childhood obesity is negatively associated with basic motor skills and motor coordination, resulting in limited participation in and adherence to sporting activities, forming a vicious cycle. Han et al. (2018) suggest that developing motor skills and coordination in childhood could help to break this vicious cycle and reduce childhood obesity. Being overweight makes movement more difficult, so according to Kakebeeke et al. (2017), children with a high fat mass may be less skilled at some gross motor tasks.

Childhood obesity also has a negative impact on posture, with negative consequences for the musculoskeletal system. According to Molina-Garcia et al. (2020), physical capability could play a positive role in shaping the body posture of these children.

The impact of physical activity and weight status on motor skill development is complex. Motor skills influence children's growth and development in physiological, psychological, and cognitive domains (DuBose et al., 2018). Bähr et al. (2024) assessed children's motor performance using the ratio of body height to body weight (BMI).

They found that children's motor performance deteriorates with increasing body weight relative to height. Martins et al. (2003) found that in preschool children, irrespective of gender, BMI decreases with increasing scores on motor skills, ball skills, and general motor abilities. Children with higher perceived motor competence are also more physically active, have higher physical fitness, and have higher motor competence and lower BMI (Den Uil et al., 2023).

Barros et al. (2022) have shown, using neuromuscular performance tests, that children with a higher percentage of body fat have lower levels of moderate to vigorous physical activity and lower levels of gross motor coordination. Barnett et al. (2022) also show a strong positive association between motor competence and children's weight.

Changes in body weight during childhood are associated with children's motor competence, and Lima et al. (2021) conclude that even in preschool, body weight is a predictor of motor competence outcomes in early (5-7 years) and middle (7-9 years) childhood.

Methods

The measurements took place in the Hoče (Slovenia) kindergarten. The teachers and the author of the paper carried them out. Parental consent was obtained for all children.

This study aimed to investigate the development of motor efficiency in 3-4-year-old children over a period of seven months and to identify possible gender differences in motor efficiency. In the study, 45 children of both genders (21 girls, 24 boys) participated, and the mean age of the children was 38.8 months (girls) and 38.5 months (boys). The children were tested twice (baseline/test1 and endline/test2), seven months apart.

The measuring instrument comprised motor tests (Planinšič, 2019), which presumably define movement's energy component (power and speed) and movement's information component (coordination and balance). The data on motor efficiency were obtained using four motor tests of movement's energy component (long jump from standing/power, run 20 metres/speed, somersault/power, run zig-zag/speed) and four motor tests of movement's information component (walk on all fours through the rings backwards/coordination, Romberg test/balance, run 9-3-6-3-9 metres/coordination, circle the ball around the feet/coordination).

Data on children's body weight status were obtained by calculating BMI (Body Mass Index) and using percentiles (Flegal and Cole, 2013) as an indicator of children's healthy weight in relation to their height, age, and gender (Less than the 5th percentile – Underweight; 5th percentile to less than the 85th percentile - Healthy Weight; 85th to less than the 95th percentile – Overweight; Equal to or greater than the 95th percentile – Obese).

Statistical methods used for data processing were the t-test for dependent samples, t-test for independent samples, and ANOVA. The effect size of two variables (gender) was calculated using Cohen's d-index, where the effect was interpreted as 0-0.1 = insignificant effect, 0.2-0.4 = small effect, 0.5-0.7 = medium effect, and ≥ 0.8 = large effect (Cohen, 2013). For more than two variables, (motor efficiency) effect size was calculated as an eta squared ($\eta^2 = 0.01$ indicates a small effect; $\eta^2 = 0.06$ indicates a medium effect; $\eta^2 = 0.14$ indicates a large effect).

Results

Based on height and weight, BMI and percentile data were calculated according to age and gender (Table 1).

Table 1: Parameters of body dimensions and BMI.

Parameters	Girls (N=21)	Boys (N=24)
Age at test1 (months)	38.8	38.5
Height1	98.6	100.1
Height2	102.4	104.1
Weight1	15.5	15.9
Weight2	16.5	16.9
BMI1	15.9	15.8
BMI1 (Percentiles)	53.5	45.5
BMI2	15.7	15.6
BMI2 (Percentiles)	52.3	44.8

The effect size was calculated using Cohen's d-index (d). The difference in BMI percentiles between baseline and endline testing separately by gender (Table 2) is not statistically significant ($p>0.05$), the effect size for girls is small ($d=0.12$), while for boys, it is medium ($d=0.50$). The difference in BMI percentiles between genders is not statistically significant ($p>0.05$), and the effect size is small ($d<0.3$)

Table 2: BMI percentiles by testing by gender.

	Girls				Boys					
	N	Min	Max	Mean	N	Min	Max	Mean	p	d
test1	21	1.9	98.0	53.5	24.0	3.1	91.3	45.5	0.356	0.28
test2	21	1.4	94.6	52.3	24.0	4.6	87.2	44.8	0.424	0.24
p				0.593				0.810		
d				0.12				0.50		

In both tests, 2/3 of the girls had a body weight status of Healthy Weight. 4/5 boys had a Healthy Weight body weight status at baseline testing, and 9/10 boys attended testing (Table 3).

Table 3: Body weight status.

		test1		test2	
Children's body weight status		Frequency	Percent	Frequency	Percent
Girls	Underweight	2	9.5	2	9.5
	Healthy Weight	14	66.7	14	66.7
	Overweight	4	19.0	5	23.8
	Obese	1	4.8	/	
	Total	21	100.0	21	100.0
Boys	Underweight	2	8.3	/	
	Healthy Weight	19	79.2	22	91.7
	Overweight	3	12.5	2	8.3
	Obese	/		/	
	Total	24	100.0	24	100.0

Differences between baseline (test1) and endline (test2) motor efficiency by gender were tested with a t-test for dependent samples. The difference by gender (Table 4) was not statistically significant ($p > 0.05$), and the effect size (Cohen's d) was small to medium ($0.28 > d < 0.53$).

Table 4: Difference in motor efficiency by gender.

Motor efficiency		Gender	Mean	p	d
All motor tests	test1	Girls	0.049	0.616	0.15
		Boys	-0.043		
	test2	Girls	0.025	0.780	0.08
		Boys	-0.022		
Component of Energy	test1	Girls	-0.022	0.831	-0.06
		Boys	0.020		
	test2	Girls	-0.054	0.591	-0.16
		Boys	0.047		

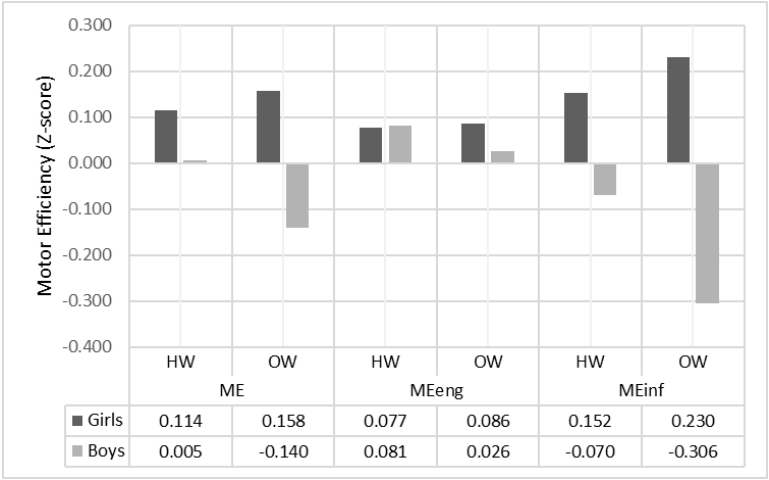
Component of Information	test1	Girls	0.120	0.282	0.33
		Boys	-0.105		
	test2	Girls	0.104	0.358	0.28
		Boys	-0.091		

Analysis of the results of testing for differences in motor efficiency according to body weight status and movement components (Table 5) showed no statistically significant differences ($p>0.05$) between healthy weight (HW) and overweight (OW) children.

Table 5: Difference in motor efficiency by body weight status by gender.

			Girls			Boys		
Motor efficiency		Children's body weight status	Mean	p	η^2	Mean	p	η^2
All motor tests	test1	HW	0.114	0.514	0.12	0.005	0.740	0.03
		OW	0.158			-0.140		
	test2	HW	-0.018	0.441	0.09	-0.064	0.290	0.05
		OW	0.240			0.444		
Component of Energy	test1	HW	0.077	0.281	0.20	0.081	0.488	0.07
		OW	0.086			0.026		
	test2	HW	-0.017	0.223	0.15	-0.030	0.093	0.12
		OW	0.066			0.897		
Component of Information	test1	HW	0.152	0.780	0.06	-0.070	0.886	0.01
		OW	0.230			-0.306		
	test2	HW	-0.020	0.420	0.09	-0.098	0.879	0.00
		OW	0.414			-0.010		

The boys' test results show a trend in the energy component of the movement ($p=0.09$). Differences between different body weight status children according to gender were tested by the t-test for independent samples. The magnitude of the effect of the independent variable (body weight status) on the dependent variable (motor efficiency) was calculated as an eta squared (η^2). The test results for boys at the final test (test2) show a small to medium effect ($\eta2<0.12$) of the independent variable (body weight status) on the dependent variable (motor efficiency). The test results for girls at both tests (test1 and test2) show a high influence ($\eta2>0.14$) of the independent variable (body weight status) on the dependent variable (motor efficiency of the energy component).



Graph 1: Motor efficiency in relation to body weight status by gender.

Graph 1 shows that in both body weight status categories (healthy weight/HW and overweight/OW) in all forms of motor efficiency (total motor efficiency, Motor efficiency of energy information component of movement, and Motor efficiency of information component of movement), girls were superior to boys.

Discussion

The survey results were obtained using an objective measurement instrument, thus excluding subjective assessment by the evaluator (Klarin et al., 2023). Some differences between girls and boys were still found to have much in common, as the most important latent motor dimensions are similar (Planinšec, 2002). This study showed a difference in motor performance in favour of children with a healthy body weight. However, given the small sample size, this difference is not statistically significant compared to the Planinšec and Matejek (2004) study. In the motor efficiency results, girls were superior to boys and, unlike the findings of Jelovčan and Zurc (2016) and Fernandes et al. (2022), more emphasis should be placed on boys when promoting children's motor development. Just under 10% of children have a body weight status of Underweight, which, according to Jelovčan and Zurc (2016), indicates the presence of mobility problems. Almost ¼ of girls have the body weight status of Overweight and Obese. Planinšec and Matejek (2004) conclude that these children tend to be less physically active.

Children with the body weight status of Underweight, Overweight, and Obese must also be provided with a rich motor environment that challenges them to develop better motor development (Sturza Milić, 2014). Associations between physical activity and fitness have been found, particularly for prolonged physical activity and more frequent vigorous exercise (Lipošek et al., 2018). Results from a study by Ljubičić et al. (2022) showed that bilateral and unilateral training significantly improves motor performance. Exercise knowledge is an essential part of a preschool teacher's competence in the motor area.
If more equipment for physical activity is added in kindergartens (Plevnik, 2021), we can expect even better motor efficiency in children.

Conclusions

The limitation of this study is the small sample size and sampling method. A random sampling technique was used, which does not guarantee a random selection of units in the sample. The number of participants was relatively low. Although the results are clear and direct, the findings are valid only for the sample used.
In future research, repeating the study on a larger, randomized sample would be worthwhile. This would make the results more relevant as they would be more representative of the population. A larger sample size also increases the study's statistical power, making the inference of differences and associations in the population more certain. This could potentially lead to more robust and generalizable findings.
The survey result was expected, as children between the ages of 3 and 4 can already learn the basic elements of sports but are still uncertain and slower (Gallahue and Ozmun, 2006).
In order to further develop motor skills, it is necessary to provide the boys with physical activities to strengthen the abilities of the movement component of information. These skills allow them better sensorimotor control when controlling movements through sports activities. For girls, it is necessary to prepare physical activities to strengthen the movement component of energy. These skills will enable them to better use their muscle work in sports activities.

The age of children is a key point in the development of motor abilities and, consequently, motor efficiency. According to Vandoni et al. (2024), early interventions prevent motor efficiency decline and influence children's overall fitness. Sports activities should be varied, numerous, and facilitated by a variety of sports equipment (Sturza Milić, 2014). Consequently, it is also necessary to gradually increase the complexity of motor content, addressing diverse domains of development from an early stage of life.

The fact that overweight and obese children tend to be less physically active (Planinšec and Matejek, 2004) and that an Underweight body weight status (Jelovčan and Zurc, 2016) is indicative of the presence of motor difficulties should be taken into account by preschool teachers when planning children's sports activities in kindergarten. The findings of the study by Molina-Garcia et al. (2020) suggest that physical fitness and functional exercise are associated with better posture in children with overweight and obesity and that for some musculoskeletal structures, they are even better predictors than their level of obesity.

Motor skills competences are key to preventing childhood obesity from an early age. To investigate a possible cause-effect relationship between motor skills and BMI from early childhood onwards, Martins et al. (2003) recommend the use of reliable longitudinal and experimental studies.

Motor competence and body weight are interrelated and equally important in child development. The findings highlighted the importance of body weight status from early childhood in developing motor competence.

Given the likelihood that body weight and motor competence promote each other synergistically (Lima et al., 2021), interventions should target both body weight status and motor competence.

According to Vandoni et al. (2024), sports activities should be fun to engage children and consider several aspects of motor development (clinical picture, fitness level, and motor abilities).

In addition to targeted physical education programs, healthy habits to maintain a normal weight during childhood should be promoted (Biino et al., 2023).

A planned, regularly implemented, and evaluated motor activity program is beneficial from early childhood onwards.

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REVIJA ZA ELEMENTARNO IZOBRAŽEVANJE
JOURNAL OF ELEMENTARY EDUCATION
Vol. 17, No. 2, pp. 223–239, June 2024

METACOGNITIVE SKILLS OF PUPILS IN PRIMARY MATHEMATICS EDUCATION

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Potrjeno/Accepted
27. 2. 2024

Objavljeno/Published
27. 6. 2024

Izvleček/Abstract

In educational theory and research, metacognition is increasingly seen as an important predictor of successful learning – it is the key to learning and academic achievement. The study investigates "off-line" metacognition (i.e. the level of prediction and the level of self-evaluation) in relation to the solving of mathematical problems by primary school pupils. The research was carried out on a group of 311 pupils of 16 classes of primary schools. We used the test consisting of five tasks, which also included questions aimed at finding out the level of pupils' prediction and their level of self-evaluation. We processed the obtained data with the intentions of a quantitative methodological approach. It follows from the research findings that students who were successful in solving the tasks achieved a higher level of prediction and self-assessment than students who were not successful.

Keywords:
Metacognition, prediction, self-evaluation, solving of problems.

Metakognitivne spretnosti učencev v primarnem matematičnem izobraževanje

V izobraževalni teoriji in raziskavah se metakognicija vedno bolj obravnava kot pomemben napovednik uspešnega učenja – je ključ do učenja in akademskih dosežkov. Študija raziskuje »off-line« metakognicijo (tj. raven napovedovanja in raven samoevalvacije) v povezavi z reševanjem matematičnih problemov osnovnošolcev. Raziskava je bila izvedena na skupini 311 učencev 16 razredov osnovnih šol. Uporabili smo test, sestavljen iz petih nalog, ki so vključevale tudi vprašanja, s katerimi smo želeli ugotoviti stopnjo napovedovanja in stopnjo samoevalvacije učencev. Uporabili smo metodologijo kvantitativnega pedagoškega raziskovanja. Iz ugotovitev raziskave izhaja, da so učenci, ki so bili uspešni pri reševanju nalog, dosegli višjo stopnjo napovedovanja in samoocenjevanja kot učenci, ki so bili pri reševanju nalog neuspešni.

Ključne besede:
komunikacijski pouk, šolska interpretacija, književno besedilo, interpretativno branje, pogledi učiteljev.

UDK/UDC:
37.015.3:51

DOI https://doi.org/10.18690/rei.3274

Introduction

The study focuses on the issue of metacognition in primary school pupils. In our previous research, we indicated the possible use of metacognition when solving tasks from the Mathematical Kangaroo competition (Nováková, 2018). This international contest, coordinated by the Center Association Kangourou sans frontières (AKSF), based in Paris, is intended for pupils aged 8-18. More than 3 million solvers in more than 60 countries across the world register each year. The competition is unique since, on the same day, all participants in their respective age categories solve the same tasks. In the Czech Republic, approximately 300,000 participants take part every year; in the Ècolier category (4th and 5th graders of primary school) almost 70,000 pupils participate. The author of this study is a guarantor of the pre-ècolier category in the Czech Republic (Nováková, 2016). It was the findings from that analysis that inspired us to prepare and implement this research.

Solving tasks from the Mathematical Kangaroo contest is indeed a useful means of assessing prediction accuracy and pupil self-evaluation. This is facilitated by the scoring system used in the competition. At the beginning of the problem-solving session, each pupil is awarded 24 points. For each incorrect solution, the pupil loses 1 point, while each correct solution earns a corresponding number of points based on the difficulty of the task (3, 4, or 5 points).

Prediction is used in this competition at the point when pupils read the problem and consider whether to start solving it or to evaluate the problem as too difficult, or time-consuming and to continue solving another problem. The competition has a time limit, which is why participants must decide which problems to solve. Self-assessment also has its place in this competition. After pupils solve respective problems, they decide whether the solutions are correct. If yes, they write them into the answer sheet. Even when a participant successfully solves a given problem, there is the option available not to record their answer, skipping it and not earning the corresponding points. We believe that this metacognitive strategy is not limited to one specific contest but can to some extent manifest itself when solving problems on any school test, not only a mathematical one. Anticipating, monitoring, and self-assessment as part of the metacognitive process can have a significant impact on the pupil's success in a test (Duckworth et al., 2009).

In our study, we have linked problem solving to a more general issue of metacognition, i.e., "the ability to reflect on one's own thinking processes and ways to improve one's thinking" (Sternberg, 2002, p. 215), because we believe that this connection has a scholarly foundation (Schoenfeld, 1992).

Theoretical framework and background

The concept of metacognition was first introduced in developmental psychology by Flavell (1979), who coined the theoretical construct and defined aspects of metacognition related to an individual's own cognitive processes. Since then, the concept of metacognition has continued to evolve and has begun to appear more and more frequently in educational theory and research, primarily because it has come to be seen as a significant predictor of successful learning.

Previous research in the field of metacognition was influenced by the contemporary paradigm of the development of cognitive functions, as proposed by Jean Piaget. It was not assumed that children who had not yet reached the stage of formal operations could develop metacognitive skills. Based on this paradigm, metacognition was considered a skill that developed later in life, which was related to pupils' inability to detect hidden meanings or subtexts, or to make inferences. Flavell (1979) pointed out the egocentrism of younger children, which prevented them from treating their own thinking process as an object of thought. However, the earlier assumption that metacognitive skills did not develop in children before the age of 10-12 is now frequently debated and challenged (Hrbáčková, 2011). Critics of Piaget argue that changes in children's cognitive processes occur not only because of maturation but also through learning, gaining experience, or systematic training (a summary of critical views is provided, e.g., by Hrbáčková, 2011).

More recent research findings support the claim that metacognition develops at a much younger age than previously thought and provide models for assessing early metacognition, executive function, and motivation (Marulis and Nelson, 2021).

For the development of advancements during school education, there is considerable empirical evidence showing that self-assessment knowledge begins to develop during the first two years of school attendance (Annevirta et al., 2007). On the other hand, the development of metacognitive knowledge about more complex learning processes (such as the deployment and effectiveness of strategies) occurs later and is not completed even by the end of primary education (Fritz et al., 2010). Azevedo (2009) emphasizes that we cannot view the development of metacognition

in a linear or hierarchical manner; the process of forming metacognition is long-term and gradual. Given the unique individuality of each person, it takes varying amounts of time and takes on an original form (Vališová and Kasíková, 2010). According to Vygotsky (2004), children under the age of ten can regulate their own learning processes. They can focus their attention to control and direct their own activities. Parents, teachers, and other people in the child's environment can make significant contributions to this process by taking gradual action to facilitate the child's learning (Duckworth et al., 2009; Sternberg, 2002). Research also confirms (Perry and Drummond, 2002; Perry et al., 2002; Perry et al., 2003) that elements of self-regulated behaviour, such as planning, monitoring, problem-solving, and evaluation, emerge in children under the age of ten when working on complex tasks related to reading and writing. Research on metacognition and self-regulation in primary school students is rarely reported, and their occurrence is not well elaborated, although some authors – Bryce et al. (2015); Hrbáčková (2011); Larkin (2010) or Perry and Drummond (2002) – suggest that even younger school-age pupils may reach a certain level of metacognition, being able to plan, monitor and evaluate their own learning. This to some extent relates to the accelerated thinking that occurs as children adapt to new demands upon starting their school education (Říčan, 2017).

Metacognition is considered a key factor in cognitive processing of information and in constructivist learning theory (Cano et al., 2014; Lokajíčková, 2014). Research on learning efficiency shows that metacognitive experiences influence children's subsequent success in school and outside (Duckworth et al.; 2009; Larkin, 2010; Lawson and Farah, 2017; Rodek, 2019). In Rozencwajg's (2003, p. 289) view, "teaching metacognitive strategies could be one way to improve pupils' school/academic success".

One line of research addresses the use of metacognitive strategies in problem solving, which includes tasks in mathematics (Schneider and Artelt, 2010; Silver, 1987) and other sciences built on exact research (biology, physics, chemistry (Listiana et al., 2016)).

Findings from empirical research demonstrate that through systematic practice, students' metacognitive potential can be developed. The intervention leads to significant positive changes in participating subjects (Schraw, 1998; Schleifer and Dull, 2009; Susantini et al., 2018).

Elements of self-regulatory and metacognitive problem-solving behaviour and their evaluation are also noted elsewhere (Perry et al., 2003; Perry and Drummond, 2002; Hnátová and Mokriš, 2020). These show that individuals assess the relative adequacy and effectiveness of the strategy in relation to themselves and to demands of the task. According to Flavell (Dawson, 2008), self-knowledge relates to knowledge about oneself, the nature of the task, and the strategies. Among the most often used methods for detecting the level of metacognitive knowledge and skills attained are self-assessment instruments capturing the frequency of metacognitive behavioural manifestations based on a dichotomous approach (item appeared × item did not appear) or on a specific response scale (Luciano et al., 2004).

In the context of our research, metacognition will be understood as a set of abilities and skills of learners to become aware of their own cognitive (learning) activities, and to predict and evaluate the procedures applied when exposed to a learning/teaching situation (Didau, 2018). Reflection on one's own activity is reflection "on action", which Desoete (2001) refers to as "off-line" metacognition. He includes two metacognitive skills among the elements of "off-line" metacognition: prediction (anticipation) and self-evaluation. In our research, the level of prediction and self-evaluation has been investigated in conjunction with solving routine and non-routine mathematical word problems. We were interested in whether students who achieve different levels of success in solving problems differ in their levels of prediction and self-assessment.

Methods

Aim, research question and research hypothesis

The aim of the research was to investigate the level of "off-line" metacognition (i.e., the level of prediction and the level of self-evaluation) among 5th-grade primary school pupils in solving routine and non-routine (non-standard) problems.

The following research questions and their related hypotheses were posed:

1) What is the level of prediction and self-assessment among pupils in the 5th grade of elementary school when solving problems?

H_1: There will be significant differences in the prediction and self-evaluation of individual pupils. A higher level of prediction and self-evaluation will be achieved in routine tasks than in non-routine tasks.

2) How does the level of prediction and self-assessment among 5th-grade elementary school pupils differ depending on the success in solving problems?

H_2: Pupils who are successful in solving tasks will achieve a significantly higher level of prediction and self-evaluation than unsuccessful pupils.

When formulating research questions and hypotheses, we operationalized the following variables:

a) Pupils' performance as their success rate at solving problems: the total number (sum) of points from the solution of a competition test consisting of 5 tasks. A correct answer was evaluated by 2 points, partially correct by 1 point, an incorrect or missing answer by 0 points. Each respondent could gain a maximum of 10 points. Based on the success rate, solvers were divided into successful (10–6 points) and unsuccessful (5–0 points).
b) Prediction rate of pupils related to solution of problems, i.e., comparison of perceived ability and actual performance (max. 10 points),
c) Level of pupils' self-evaluation, i.e. comparison of the subsequent perception of success in solving problems and actual performance (max. 10 points).

Research design: participants, research method

The research was conducted on a sample of 311 pupils in 16 primary school classes. We used a test consisting of five tasks (2 routine ones, 3 non-routine/non-standard ones), which also included questions aimed at determining the level of prediction of the pupils and their level of self-evaluation as a basic research technique.

Routine tasks:

1) Georg bought 5 two-meter planks. How many meter boards can he cut from them?
2) Jana likes walking. This morning, she walked 12 km, which was 3 km more than in the afternoon. How many kilometres did Jana walk that day?

Routine tasks with a real-life context. The solution requires performing arithmetic operations.

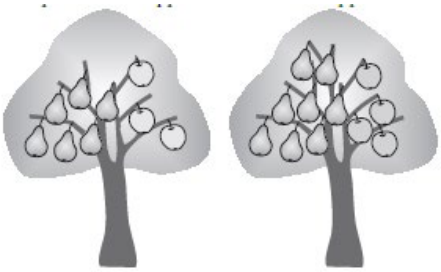
Non-routine tasks (taken from the test of the Mathematical Kangaroo competition):

3) Guests arrived at the castle celebration in black and white carriages. The colours of the carriages alternated regularly: black, white, black, white,... Each black carriage was pulled by

a black horse, each white carriage was pulled by two white horses. A total of 15 horses pulled all the carriages. How many of them were white?

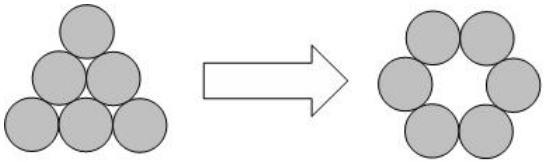
Solving the task does not require any demanding mathematical knowledge and skills. It is based on the idea of "rhythmic alternation" of the number of horses pulling the carriage: 1 + 2 + 1 + 2 +...= 15.

4) In a magic garden, there grow two kinds of magic trees. On the trees of one kind there grow 6 pears and 3 apples; on the trees of the other kind there are 8 pears and 4 apples. The sum of apples in the garden is 25. How many pears are there?



The solution is based on an intuitive understanding of direct proportionality. Every magic tree has twice as many pears as apples, so there must be twice as many pears on all the trees in the whole garden, i.e. 50.

5) Charles placed 6 identical coins in the shape of a triangle (as in the figure on the left). What is the least number of coins he had to move so that the coins formed a circle depicted in the second figure?



Solving the task is based on mental manipulation, requires spatial imagination by the solver and respect for the condition in the assignment ("...least number of coins"). Instructions for pupils:

1. *In the test, you will find some mathematical problems. Read all the tasks from 1 to 5, but do not try to solve them yet.*
2. *Try to anticipate whether you can solve each task. Tick for every task your prediction. Move from task 1 to task 5.*
3. *Now, try to solve the tasks. Under the wording of each task, write your solution.*
4. *Finally, tick the answer in the table indicating how you think you solved each task. Proceed again from task 1 to task 5.*

To each task in the test, one question has been assigned connected with prediction and one question connected with self-evaluation, which made a total of 5 questions examining the degree of prediction and 5 questions examining the level of self-evaluation. When evaluating the degree of prediction and self-evaluation, we did not consider the sum of points ticked by the pupils on the scale (i.e., their subjectively perceived value), but the real measure of their prediction and self-evaluation. This means that we compared the prediction with their actual performance in solving test tasks (in each task separately). For example, if a given pupil anticipated solving the task correctly and indeed, he did, then the pupil was awarded 2 points. If a pupil considered his correct solution as probable only and solved the task correctly, then the pupil was awarded 1 point. When pupils were sure that the task was solved correctly yet were wrong in fact, no point was awarded. The relationship between prediction and pupils' actual success on the task (score prediction rate) is described in Table1.

Table 1. Relation between prediction and actual pupil performance.

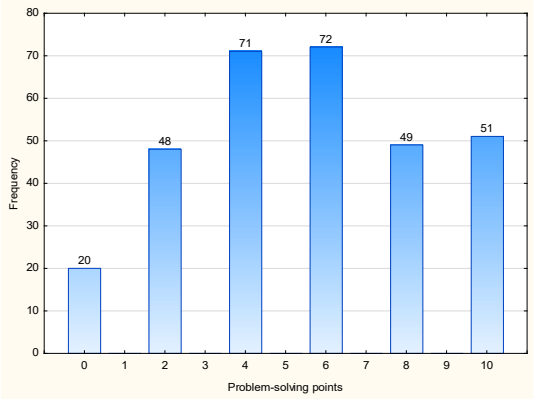
Prediction	Performance	
	Correct solution	Incorrect or no solution
I will definitely solve the task correctly	2	0
I probably will solve the task correctly	1	0
I probably won't solve the task correctly	0	1
I definitely won't solve the task correctly	0	2

Analogically, we proceeded in terms of the relation between pupil's self-evaluation, made immediately after solving the problem, and real performance.

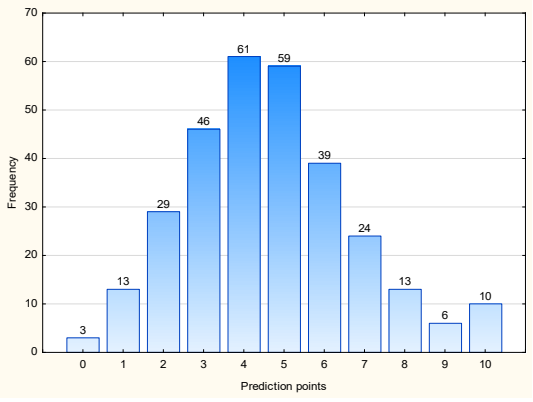
Research results

The data was processed through a quantitative methodological approach. Statistical methods and procedures were used to process the research results. The data was recorded in tables in which we expressed absolute and relative frequencies. Box plots were added for easier interpretation. We used methods of mathematical statistics (Student's t-test, Wilcoxon test) to find answers to our research questions and to test the stated hypotheses (StatSoft, Inc., 2013).

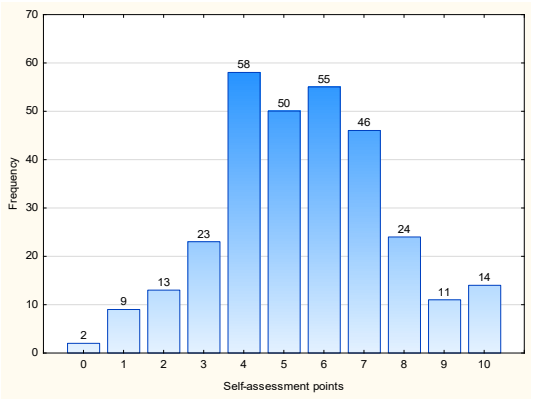
The research found a low level of success in solving the test word problems - an average success rate of 5.5 out of 10 possible points. Only 51 solvers (16.4 %) solved all problems correctly, 20 solvers (6.4 %) did not solve any problem correctly. There were 172 successful solvers (with 10–6 points) and 139 unsuccessful solvers (with 5–0 points). The average success rate for routine problems was 3.0 (out of a maximum of 4 points, i.e. 75.0 %), and for non-routine problems 2.5 (out of a maximum of 6 points, i.e. 41.8 %).



Graph 1. Bar chart of problem-solving points for all five tasks.



Graph 2. Bar chart of prediction points for all five tasks.



Graph 3. Bar chart of self-assessment points for all five tasks.

The relation between the success rate on routine and non-routine tasks is expressed by the contingency table.

Table 2. The relation between success in solving routine and non-routine tasks.

Contingency table				
non-routine points	routine points both tasks wrong	routine points just one task correctly	routine points both tasks correctly	row totals
all tasks wrong	20	43	31	94
only one task correctly	5	39	55	99
only two tasks correctly	1	17	45	63
all tasks correctly	0	4	51	55
all groups	26	103	182	311

To research question 1

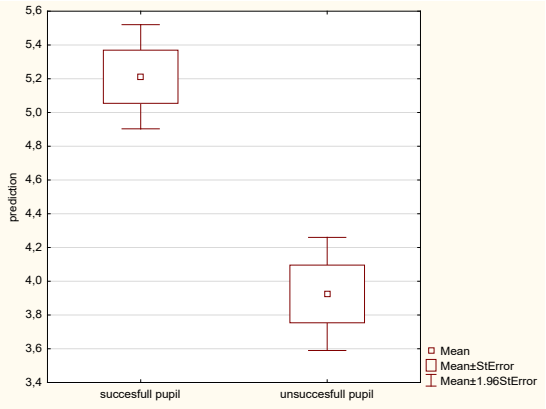
Prediction and self-evaluation scores are relatively low, with self-evaluation scores higher than prediction scores. The overall prediction level averaged 4.6 out of 10 points, and the overall self-evaluation level reached an average value of 5.5 out of 10 points.

To research question 2:

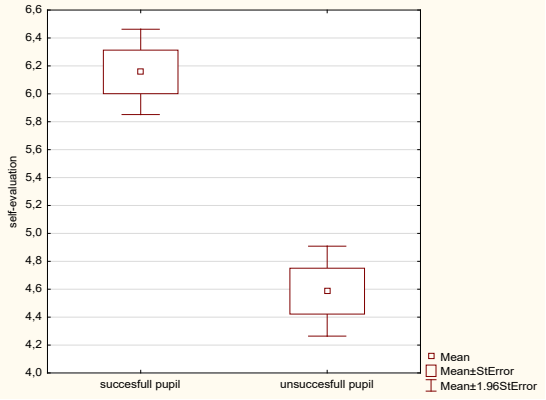
The numbers of points obtained for solution, prediction, and self-evaluation in the groups of successful and unsuccessful students are shown in the table and box plots.

Table 3. The average number of points for solution, prediction, and self-evaluation and the number of successful and unsuccessful pupils.

The variable	mean successful (%)	mean unsuccessful (%)	number successful	number unsuccessful
points solution	7.76	2.73	172	139
points prediction	5.21	3.92	170	133
points self-evaluation	6.16	4.59	172	133



Graph 6. Box plot for prediction of successful and unsuccessful pupils.



Graph 7. Box plot for self-evaluation of successful and unsuccessful pupils.

Hypothesis H_2: "The level of prediction or self-evaluation of successful pupils is at most equal to the level of prediction or self-evaluation of unsuccessful pupils" for research question 2 was tested with a two-sample Student's t-test. Testing was performed at the 0.05 significance level. The test statistic for the level of prediction takes the value of 5.5093, and the corresponding p-value for the right-sided test is close to 0. We have shown that the *prediction rate of successful pupils is higher than prediction of unsuccessful pupils*. The test statistic for the *self-evaluation level* takes the value of 6.8661, while the corresponding p-value for the right-sided test is close to 0. We show that the *level of self-evaluation among successful pupils is higher than the level of self-evaluation among unsuccessful pupils*.

Discussion, limits, and conclusions

The success rate in solving the problems was low. This could be because the solution required comprehension of the worded task in the open-ended test problems. Non-routine (non-standard) problems were solved with a significantly lower success rate of 41.8%, compared to the 75.0% correct solutions to routine problems. When solving word problems at school, pupils use the mathematical apparatus as they have learned, without considering the actual logic of the problem, which is confirmed by some foreign research (Verschaffel et al., 2000). The wording of the conditions and questions in non-routine problems (see our sample) was more complicated, more difficult to comprehend. The results lead us to confirm the view, reflecting the previous experience from Czech (Vondrová et al., 2019) and foreign (Swoboda, 2014) research, but also from the educational practice in elementary schools – that solving non-routine problems is not among the common and frequent activities in mathematics education.

For our study, we have chosen to explore the link between metacognition and solving mathematical problems. Mathematics, much like metacognition, is based on critical thinking, creativity, and ingenuity; it has the potential to enhance pupils' learning and create a "mathematical culture" that is supported by metacognition. Schoenfeld (1992) believes that the "microcosm of mathematical culture" encourages pupils to think about mathematics as an integral part of their everyday lives.

Callan and Cleary (2019) found that in terms of predictive influences, pupils' strategic planning, strategy use, and metacognitive monitoring were significantly and positively correlated with mathematics performance, with strategy use and metacognitive monitoring emerging as unique predictors of performance. In their research, Nelson and Fyfe (2019) investigated the metacognitive regulation (monitoring) of elementary school children in connection with mathematical equivalence problems, their ability to control their behaviour through strategic decisions when solving tasks. The results showed significant individual differences that were positively correlated with children's knowledge of mathematical equivalence.

As in the findings from our earlier research (Nováková, 2018; Nováková and Budíková, 2023) our expectations were confirmed that successful word problem solvers would achieve significantly higher levels of prediction and self-evaluation than unsuccessful ones. For non-routine tasks, the differences were even more significant than for routine tasks. We attribute these findings to the fact that by successfully solving non-routine tasks, pupils demonstrate a higher level of cognitive function, along with logical and critical thinking. Although such pupils do not have enough experience with systematic application of metacognitive skills by the end of primary education because metacognitive processes are used to only a limited extent by primary school pupils (Larkin, 2010), it is possible to assume a higher metacognitive potential, which in our research could be manifested.

We are aware of the limitations of our findings. Features of our research and the sample size of respondents do not allow for unambiguous categorical judgments. We did not analyse the influence of other potential variables that could intervene in the success rate at problem solving, the prediction rate and the level of self-evaluation: the personal characteristics of the respondents – gender, mathematics achievement, mathematics liking, the type and nature of the problem solved, its difficulty, the topic, or the way the problem was presented. Nevertheless, we believe that the topic of our research is current and can be further developed. However, these findings can, in our opinion, definitely be considered an impetus and inspiration, since in the Czech context, there is still a lack of research focusing on assessing the level of metacognition among primary school pupils.

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NAVODILA AVTORJEM

Osnovni namen revije je povezati širok spekter teoretičnih izhodišč in praktičnih rešitev v izobraževanju ter tako spodbujati različne metodološke in vsebinske razprave. Uredniški odbor združuje strokovnjake in raziskovalce iz več evropskih držav in s tem želi ustvariti možnosti za živahen dialog med raznovrstnimi disciplinami in različnimi evropskimi praksami, povezanimi z izobraževanjem.

Revija za elementarno izobraževanje torej objavlja prispevke, ki obravnavajo pomembna, sodobna vprašanja na področju vzgoje in izobraževanja, uporabljajo primerno znanstveno metodologijo ter so slogovno in jezikovno ustrezni. Odražati morajo pomemben prispevek k znanosti oziroma spodbudo za raziskovanje na področju vzgoje in izobraževanja z vidika drugih povezanih ved, kot so kognitivna psihologija, razvoj otroka, uporabno jezikoslovje in druge discipline. Revija sprejema še neobjavljene članke, ki niso bili istočasno poslani v objavo drugim revijam. Prispevki so lahko v slovenskem, angleškem ali nemškem jeziku.

Sprejemanje člankov v objavo

Prejete prispevke najprej pregleda urednik/založniški odbor in ugotovi, ali vsebinsko ustrezajo konceptu in kriterijem revije.

1. Če prispevek ustreza konceptu in kriterijem revije, ga uredniški odbor pošlje dvema anonimnima recenzentoma. Članek, ki je vsebinsko skladen s konceptom revije, vendar ne ustreza drugim kriterijem, lahko uredništvo vrne avtorju, da ga popravi.
2. Avtor dobi recenzirani prispevek vključno z morebitnimi priporočili za izboljšave/popravke, v primeru zavrnitve pa z navedenimi razlogi zanjo.
3. Končno odločitev o objavi članka sprejme urednik na temelju priporočil recenzentov. Pri tem utemeljitve za svojo odločitev ni dolžan navesti.
4. Besedilo prispevka mora biti pripravljeno v skladu z Navodili avtorjem.
5. Avtor jamči, da so v prispevku predstavljeni podatki natančni, verodostojni in izvirni. Ko je članek sprejet v objavo, avtor podpiše Izjavo o etičnosti raziskovanja in Izjavo avtorja o izvirnosti prispevka. Vsi prispevki gredo skozi postopek za ugotavljanje plagiatorstva.

Navodila za oblikovanje besedila

Pri pripravi besedila prispevka upoštevajte naslednja navodila:

1. Tipkopis oddajte kot dokument v programu Microsoft Windows. Nabor pisave je Times New Roman, velikost črk 12 za osnovno besedilo in 10 za povzetka v slovenskem in angleškem jeziku, literaturo in citate, če so daljši od treh vrstic, razmik med vrsticami pa je 1,5. Velikost pisave v tabelah in naslovih tabel ter grafov je 10; razmik med vrsticami pa enojni. Širina tabele naj ne presega 12,5 cm. Besedilo naj bo obojestransko poravnano. Vodilni naslovi naj bodo zapisani krepko, prvi podnaslovi ležeče, drugi podnaslovi pa navadno. Naslovov in strani ne številčite in ne uporabljajte velikih tiskanih črk.
2. Besedilo prispevka naj ne presega 38.000 znakov s presledki, vključno s povzetki, literaturo in ključnimi besedami.
3. Naslov prispevka naj ne presega 15 besed in naj bo v slovenskem in angleškem jeziku.

4. Prispevek naj ima na začetku povzetek v slovenskem jeziku ter njegov prevod v angleškem jeziku (oziroma obratno) in naj ne presega 100 besed. Za povzetkom naj bo 5 ključnih besed. Poleg povzetkov naj prispevek na koncu prispevka, pred literaturo, vsebuje daljši povzetek (500-700 besed) v angleščini, če je članek napisan v slovenščini.
5. V prispevku ne uporabljajte ne sprotnih ne končnih opomb.
6. Vire navajajte v skladu s standardom APA (American Psychological Association). V seznam literature vključite samo v tekočem besedilu navedene vire, ki jih uredite po abecednem vrstnem redu.
7. V posebnem dokumentu pošljite naslednje podatke: ime in priimek avtorja, akademski naziv, organizacijo, kjer je avtor zaposlen, elektronski naslov, naslov bivališča in naslov prispevka.

Primeri:
Knjige: priimek, začetnica imena avtorja, leto izida, naslov, kraj, založba.
Duh, M. (2004). *Vrednotenje kot didaktični problem pri likovni vzgoji*. Maribor*:* Pedagoška fakulteta.

Članki v revijah: priimek, začetnica imena avtorja, leto izida, naslov prispevka, ime revije, letnik, številka, strani.
Planinšec, J. (2002). Športna vzgoja in medpredmetne povezave v osnovni šoli. *Šport*, *50*(1), 11–15.

Prispevki v zbornikih: priimek, začetnica imena avtorja, leto izida, naslov prispevka, podatki o knjigi ali zborniku, strani, kraj, založba.
Fošnarič, S. (2002). Obremenitve šolskega delovnega okolja in otrokova uspešnost. V M. Juričič (ur.), *Šolska higiena: zbornik prispevkov* (str. 27–34). Ljubljana: Sekcija za šolsko in visokošolsko medicino SZD.

Vključevanje reference v tekst: če gre za dobesedno navedbo, napišemo v oklepaju priimek avtorja, leto izdaje in stran (Lipovec, 2005, str. 9), če pa gre za splošno navedbo, stran izpustimo (Lipovec, 2005).

Prispevke avtorji oddajo na spletni aplikaciji:
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The basic purpose of the journal *JEE* is to cover a broad spectrum of education theory and its implications for teaching practice, seeking to bridge and integrate diverse methodological and substantive research. The Editorial Board brings together academics and researchers from different European countries, who seek to promote a vigorous dialogue between scholars in various fields both central and related to scientific enquiry in education.

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Planinšec, J. (2002). Športna vzgoja in medpredmetne povezave v osnovni šoli. *Šport*, *50* (1), 11–15.

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Fošnarič, S. (2002). Obremenitve šolskega delovnega okolja in otrokova uspešnost. V M. Juričič (ur.), *Šolska higiena: zbornik prispevkov* (str. 27–34). Ljubljana: Sekcija za šolsko in visokošolsko medicino SZD.

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