

Humor nastavnika u učionici: bibliometrijska analiza naučne literature

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Apstrakt

Humor nastavnika, kao i humor u nastavi uopšte, predstavlja važan pedagoški resurs koji doprinosi stvaranju podsticajne atmosfere u učionici, olakšava komunikaciju i unapređuje proces učenja kod učenika. Cilj ovog rada je analiza savremenih naučnih tokova u oblasti istraživanja nastavničkog humora u učionici, sa posebnim osvrtom na analizu mreža bibliografskih jedinica. Rad je zasnovan na korištenju bibliometrijske analize naučnih publikacija. Istraživanje je realizovano na uzorku od 421 naučnog članka koji istražuju temu humora nastavnika u kontekstu nastavnog procesa u učionici. Podaci su obrađeni u softverskom programu Vosviewer 1.6.20, sa ciljem konstrukcije i vizualizacije bibliometrijskih mreža, te identifikacije istraživačkih pravaca u oblasti istraživanja nastavničkog humora. Podaci pokazuju rastuću zastupljenost ove teme u naučnoj literaturi tokom posljednje dvije decenije. Takođe, ukazuje se na postojanje različitih međusobno povezanih klastera ključnih termina koji se javljaju u bibliografskim jedinicama, kao i najzastupljenije istraživačke oblasti koje se bave humorom nastavnika u učionici. Identifikovani su najproduktivniji autori i naučni časopisi u ovoj oblasti istraživanja. Dobijeni rezultati mogu da budu od koristi istraživačima u akademskoj zajednici, poslužiti kao temelj za buduća istraživanja, te da pruže smjernice istraživačima o ovoj relativno zapostavljenoj temi. Studija pruža pomoć u prikupljanju adekvatnih primarnih i sekundarnih izvora, relevantne sistematizovane informacije, kao i osnove za teorijsku razradu na kojima se grade metodološki okviri.

Ključne reči: bibliometrijska analiza, humor, nastavnik, učionica, Vosviewer.

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Uvod

Bibliometrijska analiza naučnih radova poprima sve širu primjenu, ali nije veoma zastupljena u akademskim zajednicama, dijelom zbog svog opisnog karaktera koji ne odgovara istraživačkoj orijentaciji ka objašnjavanju i tumačenju fenomena dubljih kontekstualnih značenja. To se naručito odnosi na društvene i humanističke nauke. Ipak, njena vrijednost ogleda se u mogućnosti sistematskog uvida u razvoj naučne produkcije, zbog čega bibliometrijska analiza doprinosi strateškom usmjeravanju budućih naučnih istraživanja. Ekspanzija informaciono-komunikacionih tehnologija dovela je do toga da broj citata i različiti indeksi postanu ključni pokazatelji u brojnim namjenama, a bibliometrijske analize važni argumenti akademskih zajednica (Moslavac, 2022; Weingart, 2005). Bibliometrijska analiza je značajna u praksi akademskih zajednica, a temelji se na međudjelovanju kvalitativnih i kvantitativnih pokazatelja (Wouters, 2020). U skladu sa društvenom uslovljenošću, broj programa i softvera raste, a bibliometrijska analiza pruža značajne prednosti istraživačima. Njome se izvode objektivni pokazatelji određene teme koja je predmet interesovanja, zatim bibliometrijska mreža naučnih članaka i njihovih citata, te i procjena produktivnosti i uticaj pojedinačnih autora. Inicijalno pomaže u prikupljanju podataka i sticanju uvida o datoj istraživačkoj temi, kao i vidljivosti tog pregleda, široj akademskoj javnosti. Bibliometrijska analiza se definiše kao kvantitativna procjena akademske literature putem metrika objavljivanja i citiranja. Njome se prepoznaju ključni pravci razvoja i doprinosa u određenoj oblasti (Rulijana et al., 2025). Takođe, značajna prednost bibliometrijskih analiza putem *Vosviewer* programa jeste veliki obuhvat jedinica analize (Van Eck & Waltman, 2010).

Pojedinačne jedinice analize, odnosno, naučni radovi u časopisima, osnovna su i početna sredstva u proučavanju i istraživanju određenih tema, a bibliometrijske analize su vrijedni argumenti za sistematizaciju naučno-istraživačkih pitanja. To se posebno odnosi za oblasti u kojima se očekuje porast empirijskih dokaza (Bryant et al., 1980), kao što je humor.

Teorijske osnove istraživanja

Humor i obrazovni kontekst

Složenost ljudskog jezika i mašta omogućavaju čovjeku da stvara humor u beskrajnoj raznolikosti oblika. U razvojnem smislu, smijeh je, pored plača, jedna od prvih vokalizacija kod čovjeka. Sposobnost da se uživa u humoru i da se izrazi kroz smijeh suštinski je dio onoga što znači biti čovjek u pravom smislu te riječi. Iskusiti humor znači iskusiti prijatna osjećanja emocionalnog blagostanja i veselja. To je razigrana aktivnost koja služi mnogim društvenim, emocionalnim i kognitivnim funkcijama, što ga čini interesantnim za naučna istraživanja (Rod, 2007). Pojedini autori ističu da svi pojedinci imaju smisao za humor (Kolenović-Đapo, 2012), samo na različite načine u njemu uživaju. Stoga naglašavaju da se razlike među ljudima u razvijenosti smisla za humor očitavaju na nivou slabijeg

i boljeg razvijenog smisla za humor. Smisao za humor jeste dimenzija na kojoj su svi pojedinci različito pozicionirani.

Tokom dvadesetog veka humor počinje da se ozbiljnije proučava kao dio nastavnih strategija. Ranije se njegovo uključivanje u obrazovanje smatralo nenaučnim (Korobkin, 1989). Pojedini autori ističu da je uloga humora u školi nedovoljno zastupljena, iako može doprineti efikasnijem podučavanju, kvalitetnijim odnosima nastavnika i učenika, boljem radnom učinku i pozitivnijem doživljaju učenja (Dramac i Lazzarich, 2016; Lazzarich, 2013; Mrazovac, 2021; Rod, 2007; Tong & Tsung, 2020).

Humor, u širem smislu, odnosi se na sve što pojedinac kaže ili uradi, a da to ima zabavni podsticaj (Rod, 2007). Humor se može definisati kao kvalitet ili sposobnost pojedinca da bude duhovit i nasmije drugu osobu (Lovorn & Holaway, 2015), ali i kao vid ljudske komunikacije sa svrhom da ljude učini srećnim (Stupar i sar., 2023). Bel (Bell, 2011) ističe da je humor teško definisati, ali on predstavlja specifičan način komunikacije, kojim se nešto izgovara s ciljem zabave.

U kontekstu učionice, humor je jedna od komponenti šireg skupa ponašanja nastavnika, koja doprinosi osjećaju neposrednosti u učionici, a rezultira pozitivnim evaluacijama od strane učenika, te efikasnijim učenjem (Rod, 2007). Obrazovanje koje je usmjereno na usvajanje znanja i tradicionalni pristup poučavanja zanemaruje terapijsku ulogu smijeha u školskom prostoru. Obrazovanje stalno teži ispunjavanju temeljnih vrijednosti u čovjekovom životu, no često je frustrirajuće i bez radosti, u „sivilu“ zabrana i pravila. Humor utiče na ugodnu atmosferu u nastavi, pa je međusobni odnos radosti i zdravlja bitan čimbenik u razvoju mlade osobe, a podsticajne didaktičke mogućnosti smijeha u nastavi nisu u potpunosti iskorištene (Lazzarich, 2013). Prema pojedinim autorima, humor u učionici predstavlja čin koji može biti izveden lingvističkim ili nelingvističkim sredstvima. Njega mogu ostvariti svi učesnici nastavnog procesa, bilo da je riječ o učenicima ili nastavnicima (Wagner & Urios-Aparisi, 2011). Humor je važan dio svakodnevnog života, a posebno mjesto zauzima u nastavnom procesu, gdje je njegovo prisustvo često podsticaj za opušteniju atmosferu i bolje međuljudske odnose.

Kroz svoje polivalentne uloge, nastavnik motiviše učenike, podstiče saradničke odnose, unapređuje razrednu atmosferu, te unapređuje i dinamiku artikulacije časa. Sve navedene stavke moguće je podsticati i kroz adekvatnu primjenu humora. Osim toga, humor može biti koristan za ublažavanje kritike i stvaranje grupne kohezije (Keltner et al., 2001). Na ranim uzrastima humor treba koristiti odmjereno i prilagođeno. U suprotnom, može stvoriti konfuziju i usvajanje pogrešnih informacija (Banas et al., 2011). Dodatno, humor može da smanji stres i osjećaj anksioznosti pri učenju, kao i da učini nastavu dinamičnijom, što pomaže u održavanju motivacije i angažovanosti učenika. Ipak, važno je da humor bude prikladan i da ne bude na štetu nikoga u učionici. Nastavnici koji koriste humor obično lakše skreću pažnju učenicima na gradivo, te na taj način doprinose pozitivnoj atmosferi u učionici. Međutim, humor ne smije biti previše dominantan, niti da se upotrebljava kao sredstvo za izbjegavanje ozbiljnih tema. Kompetentni nastavnici znaju ravnotežu i koriste humor kao strategiju za olakšavanje komunikacije i pozitivnog stava prema učenju. Stoga treba biti in-

kluzivan u pravom smislu te riječi, te poštovati i različite kulturne, etničke i socijalne razlike među učenicima. Takođe, raznovrsne anegdote mogu nastavnicima olakšati tumačenje nastavnog sadržaja. Nekonzistentnost rezultata istraživanja potvrđuje da humor kao područje nudi značajan potencijal za dalja istraživanja i dodatne provjere u tom smislu. Dok različiti istraživači potvrđuju pozitivan efekat humora u nastavnom procesu (Askildson, 2005; Bieg et al., 2017; Neff & Rucynski, 2017; Pexman & Olineck, 2002), postoje i ona istraživanja koja su pokazala da humor, kao i primjena šaljivih primjera u učionici, utiče na lošija postignuća na testovima (Bolkan et al., 2018).

Humor i pozitivne emocije koje ga prate povezani su sa ukupnim iskustvom učenja, dajući učenicima pozitivan stav prema obrazovanju uopšte i povećavajući motivaciju za učenje, što rezultira i boljim školskim postignućem. Novina i doživljene emocije prilikom primjene humora mogu pomoći da se privuče i održi pažnja učenika, čime se olakšava i proces usvajanja novih informacija. Neskladne mentalne asocijacije, koje su inherentna karakteristika humora, olakšavaju kognitivne procese, a posebno elaboraciju (Rod, 2007). Mnogo je lakše prisetiti se prethodno naučenog gradiva i povezati ga s novim ako je to gradivo prožeto humorom nego kada je predstavljeno na ozbiljan način.

Matijević ističe značaj humora u životu pojedinca i naglašava njegovu ulogu u nastavi. On takođe postavlja pitanje da li razlog slabe zastupljenosti humora u naučnim studijama leži u jazu između ozbiljnosti naučnika i (ne)ozbiljne prirode teme (Matijević, 1994). Humor doprinosi smanjenju tjeskobe, povećava motivaciju i efikasnost međuljudskih odnosa, a vaspitanje i nastava su prije svega obilježeni upravo međuljudskim odnosima. Kulturološki posmatrano, učenje i igra su često razgraničeni. To može biti jedan od razloga zašto nedostaju zapaženi radovi o fenomenu humora. Stupar i saradnici (Stupar i sar., 2023) upozoravaju da je neophodno adekvatno koristiti humor u nastavi, analogno pištaljci na času fizičkog vaspitanja: ni premalo ni previše, tačno kada i koliko treba, i to isključivo u vezi sa gradivom ili na sopstveni račun.

Teorijska polazišta humora

U pokušajima da se objasni uslovljenost i način javljanja humora, nastale su različite teorije ili teorijska polazišta humora. Neka od njih su: teorija superiornosti, teorija obrade instrukcionog humora, teorija nesklada, teorija iznenađenja, teorija opuštanja i teorija oscilacija. Neke od njih nisu još uvijek dovoljno razjašnjene, a često su i međusobno povezane.

Teorija superiornosti tumači humor kao oblik iskazivanja nadmoći i mehanizam odbrane od opasnosti u realnosti. Prema ovoj teoriji, humor proizlazi iz osjećaja nadmoći jednog pojedinca nad drugim koji se nalazi u inferiornoj poziciji, pa prema tome izražava superiornost ili podsmijeh (Matijević, 1994; Carrell, 2008, prema: Šahin, 2021). Ova teorija posebne implikacije ima kada se govori o vrstama neprikladnog humora.

U literaturi se takođe govori o teoriji obrade instrukcionog humora. Ova teorija nalazi se u suprotnosti sa teorijom superiornosti. Naime, teorija obrade predviđa da humor

vodi ka boljoj obradi informacija, a kao rezultat pozitivnih emocija koje se doživljavaju u humorističnim situacijama. Ova teorija sugerise da humor, u bilo kojoj oblasti, stvara pozitivan efekat, motiviše na elaboraciju i dublje pristupe u obradi informacija (Bolkan et al., 2018). Kada se humor koristi na prosocijalan način, on ima pozitivne efekte. Suprotno tome, kada se humor koristi kako bi se drugi pojedinac ponizio ili uvrijedio, onda ima negativne efekte (Wanzer et al., 2010).

Teorija nesklada humor vidi, kao što sama riječ kaže, kao rezultat suprotnosti ili razlika između ideja, očekivanja i stvarnosti. To su situacije koje se završavaju suprotno od očekivanog, te na taj način izazivaju smijeh, odnosno, situacije čiji je ishod u neskladu s očekivanim razrješenjem. Da bi poruka bila duhovita, primalac mora u njoj uočiti nesklad u odnosu na očekivani ishod unutar postojećeg konteksta poruke. Primalac poruke, prema ovoj teoriji, identifikuje pojavu koja nije u skladu sa njegovim očekivanjima za konkretni komunikacioni kontekst (Mrazovac, 2021; Wanzer et al., 2010). Berk smatra da je nesklad ili kontrast ključni element humora, i opisuje ga kao spoj očekivanog sadržaja i neočekivanog obrta (Berk, 2002). U kontekstu učionice, ili obrazovnom kontekstu, kada nastavnik koristi humor aktivira se pažnja kod učenika, jer humor sam po sebi često uključuje neku vrstu nesklada. To utiče na povećanu razradu sadržaja i efikasnije učenje (Frymier et al., 2008; Wanzer et al., 2010).

Pored pomenutih teorija, u literaturi se govori i o teoriji iznenađenja, koja ističe nagli prekid toka stvari kao glavni izvor humora, te naglašava važnost humora kao stimulansa. Takođe se pominje i teorija opuštanja, koja humor posmatra kao nusproizvod opuštanja od nervoze, te i teorija oscilacija, prema kojoj duhovito nastaje kada čovjek u isto vrijeme ima nespojive, oscilirajuće emocije (Matijević, 1994).

Navedena teorijska polazišta mogu biti korisna za teorijsku razradu budućih istraživačkih radova, budući da bi predstavljala temelje na kojima se grade metodološki okviri i time pomogla u analizi i objašnjenju dobijenih podataka.

Metod

Analizom relevantne literature nismo pronašli bibliometrijsku analizu u oblasti humora u nastavnom kontekstu. Stoga je cilj ovog rada ispitati naučne trendove u oblasti istraživanja nastavnčkog humora u učionici. Cilj je operacionalizovan kroz nekoliko istraživačkih zadataka, i to:

1. Analizirati hronološki razvoj interesovanja za istraživanje nastavnčkog humora u učionici, sa ciljem utvrđivanja dominantnih perioda;
2. Utvrditi najrelevantnije autore, časopise, najuticajnije tekstove objavljene u naučnim časopisima, te zemlje koje su se bavile nastavnčkim humorom.
3. Izvršiti ekstrakciju ključnih pojmova i njihovih veza iz uzorka relevantne literature.

Rad je zasnovan na korištenju bibliometrijske analize naučnih publikacija. Tehnika koja je korišćena jeste analiza sadržaja, pri čemu je jedinica analize naučni članak. S obzirom na to da je u pitanju bibliometrijska analiza naučne literature, korišten je softverski program *Vosviewer 1.6.20*, a cilj mu je konstruisanje i vizualizacija bibliometrijskih mreža; ovaj program funkcioniše na osnovu tehnika mapiranja i izdvajanja klastera, odnosno ekstrakcovanja veza iz bibliografskih jedinica. Program nudi kvantitativne podatke, ali dijelom i kvalitativne, izdvajajući najrelevantnije časopise, autore, naučne članke, te klaster najfrekventnijih termina u ukupnom broju naučnih članaka. Uzorak čini 421 naučni članak, a za pretragu je korišćena baza podataka *Dimensions*. Dakle, uzorak čine naučni članci objavljeni u bilo kom časopisu koji je indeksiran u navedenoj bazi podataka, a obuhvaćeni pretragom ključnih riječi. Podaci su prikupljeni putem softverskog programa *Vosviewer 1.6.20*, algoritmom koji uključuje sledeće ključne riječi u međusobnoj povezanosti: *humor and teacher and classroom*. *Vosviewer* program je dizajniran da se koristi algoritmima za detekciju i klasterisanje riječi, jer na taj način vizualizuje povezanost pojmova i tematsku strukturu podataka. Drugačiji pristup u programu nije tehnički podržan. Uključene su studije ograničene na englesko govorno područje, koje u naslovu ili apstraktu sadrže algoritam navedenih ključnih riječi. Pretraga je vršena u decembru 2024. godine.

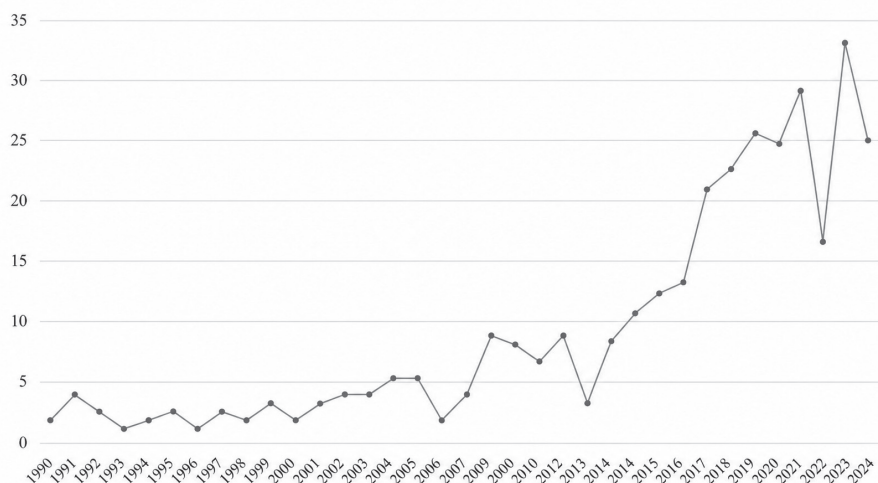
U naučnim zajednicama se za obradu podataka uobičajno koristi SPSS softverski paket, koji se po svom pristupu i funkciji znatno razlikuje od pomenutog. Stoga bibliometrijska analiza nosi inovativnost u naučnom smislu, a posebno je primjenjiva kada su u pitanju neafirmirane ili nesvakidašnje teme.

Rezultati i diskusija

Razvoj naučnog mišljenja u ovoj oblasti datira još od prije skoro četiri decenije pa do danas. Grafikon 1 identifikuje tri perioda evolucije na ovu temu. Prvi od 1990–2006, drugi od 2006–2013 sa usponima i padovima, i treći od 2013 do danas, kada ipak raste broj publikacija (primjećuje se eksponencijalni rast na grafikonu).

Na osnovu provedene analize perioda evolucije naučne produkcije, u vezi sa istraživanjem humora u nastavi, možemo da primjetimo oscilaciju tokom perioda pandemije izazvane virusom *Covid-19*. Naime, Grafikon 1, prikazuje blagi pad objave naučnih radova približno sa početkom 2021. godine, koji opada do kraja 2022, a razloge za taj pad možemo dovesti u vezu sa ograničenjima koja su u tom periodu stupila na snagu. Terenski istraživački rad bio je relativno onemogućen ili ograničen tokom tog perioda.

Grafikon 1

Evolucija naučne produkcije

Iako su postojeće činjenice o razvoju humora nekonzistentne, ipak se mogu dovesti u vezu sa rezultatima našeg istraživanja. Naime, ima autora koji navode da se poslednjih tridesetak godina povećava interes za istraživanje humora u različitim oblastima pa i u obrazovanju (Ford & Martin, 2018), što je negdje približno prikazanoj krivulji naučne produkcije. Drugi autori ističu da se humor intenzivnije istražuje tek u drugoj polovini dvadesetog vijeka (Hrebac Hlobik & Pavlin-Bernardić, 2014), što je opet u skladu sa rezultatima najcitiranijih jedinica analize i njihovom godinom izdanja, koje prikazujemo tek Tabelom 2. Kako ističu Fortunato i sar. (Fortunato et al., 2018), kao i Bornman i sar. (Bornmann et al., 2021), broj aktivnih naučnika i institucija raste konstantno, a globalna naučna produkcija povećava se u proseku za oko 4.1% godišnje. U tom kontekstu, uočeni eksponencijalni rast publikacija o humoru u nastavi može biti dijelom odraz tog šireg trenda. Ipak, specifični pomaci u pojedinim vremenskim intervalima (npr. pad tokom pandemije ili intenziviranje interesa nakon 2013. godine) ukazuju da dinamika u ovoj oblasti nije isključivo posledica opšteg porasta produkcije, već i odraz posebnog naučnog i obrazovnog interesa.

Grafikon 2 govori o najzastupljenijim istraživačkim kategorijama kojima pripada najveći broj članaka na ovu temu, te najveća citiranost. Najveći broj članaka pripada oblasti obrazovanja, jezika, komunikacije i kulture, psihologije, kreativne umjetnosti, te oblasti sociologije. Važno je napomenuti da se jedna publikacija može pojaviti istovremeno u više istraživačkih oblasti, kao i to da je baza *Dimensions* sama po sebi prilagođena standardnoj istraživačkoj klasifikaciji Australije i Novog Zelanda (Australian and New Zealand Standard Research Classification, ANZSRC, 2000).

Grafikon 2

Najzastupljenije istraživačke kategorije



Pregledom istraživačkih oblasti možemo primjetiti da je većina publikacija nastala u društvenim naukama, i to u oblasti pedagoških nauka. S obzirom da su studije iz uzorka ograničene na englesko govorno područje, strani autori ne prave distinkciju između pojmova *vaspitanje* i *obrazovanje*. Rezultati pokazuju veoma mali broj publikacija o primjeni humora u oblasti geologije, ekologije, hidrologije, fizike, hemije, biologije, ili uopšte biomedicinskih nauka, matematike te tehničkih nauka. Razlog za to može da bude sama razlika u prirodi sadržaja različitih nauka. Društvene nauke se bave ljudskim ponašanjem, društvenim odnosima i kulturološkim fenomenima, što po prirodi uključuje emocije, interakciju i kontekst, pa humor lakše nalazi mjesto kao pedagoško sredstvo za ilustraciju. Za razliku od društvenih, prirodne nauke češće zahtijevaju striktnost i apstraktno razmišljanje, gdje je prostor za humor uži. Stoga, s pravom određeni autori ističu da je nepходно poznavati specifičnosti metodologije različitih naučnih oblasti, koje, pored teorijskog, ima i aplikativnu vrijednost (Peličić i sar., 2016). Upravo te razlike u pristupu i predmetu istraživanja određuju i mogućnosti primjene pojava kao što je humor. U okviru društvenog života ljudi, humor ipak zauzima značajno mjesto.

U Tabeli 1 prikazano je pet najrelevantnijih časopisa iz oblasti istraživanja humora nastavnika. Najveći broj članaka iz ove oblasti, ali i broj citata, zastupljen je u časopisu *Communication education* ($n = 10$). Obzirom na to da je baza *Dimensions* ograničena na naučne radove sa engleskog govornog područja, te da smo već pomenuli terminološko nerazgraničenje termina *vaspitanje* i *obrazovanje*, ne čudi činjenica ni o rezultatima najistaknutijeg časopisa u ovoj oblasti (Tabela 1). Provjerom opisa ciljeva časopisa *Communication education*, u kojem je najveći broj članaka iz oblasti humora nastavnika, uočavamo

učestalost objave radova u oblasti komunikacije, i to povezane sa terminima: vaspitanje, obrazovanje, nastava, nastavnik i učenje. Procentualna stopa prihvatanja radova, impakt faktor, kao i baze u kojima je indeksiran časopis, ukazuje na visok kvalitet članaka koji se u njemu objavljuju. Najrelevantniji časopis izdaje Nacionalno udruženje za komunikaciju (National Communication Association, NCA), sa sjedištem u Vašingtonu (Washington), a ima misiju transformacije života kroz komunikaciju, te veliku pažnju pridaje humoru u obrazovanju.

Tabela 1
Najrelevantniji časopisi iz ove oblasti

Časopisi	Broj dokumenata	Broj citata
Communication education	10	1071
Teachers college record: the voice of scholarship in education	7	333
European Journal of humour research	7	62
Procedia, social and behavioral sciences	6	55
Educating the young child	6	42

U ovoj bibliometrijskoj analizi smo izdvojili sledeće: najproduktivnije autore koji su se bavili ovom temom (autore koji imaju najveći broj članaka u ovoj oblasti), jedinice analize (najcitiranije članke), i zemlje koje su se najviše bavile ovom oblašću. Vrijednost praga za najproduktivnije autore je minimalno 3 rada i minimalno 5 citata, tako da je program izdvojio 3 najproduktivnija autora (Tabela 2), od kojih je najcitiraniji autor Ann Bainbridge Frymier, sa 329 citata. Kada se radi o najproduktivnijim zemljama, dominira SAD, sa 77 radova i ukupno 2375 citatata. U Tabeli 2 se nalaze i tri najcitiranija rada u jedinici analize. Dakle, od 421 članka, koliko je sadržao uzorak, najcitiraniji rad je *Influences on classroom interest*, sa ukupno 335 citata.

Može se hipotetisati da broj objavljenih radova istraživača često korelira sa brojem njihovih citata. Prema rezultatima iz tabele 2, primjetno je da to nije apsolutno pravilo čak ni unutar iste teme. Ovakvo odstupanje može se hipotetički objasniti razlikama u kvalitetu i relevantnosti radova, ugledu časopisa u kojima su objavljeni, kao i njihovom doseg u akademskoj zajednici.

Tri najcitiranija članka, prikazana u tabeli br. 2, bave se istom problematikom – ulogom humora u odnosu na učenje i nastavni proces. Druga istraživanja potvrđuju isti obrazac, kao i značaj humora kao pedagoškog sredstva u nastavi. Ugodna subjektivna osjećanja, koja pruža humor, ispunjavaju niz kognitivnih i društvenih funkcija (Rod, 2007), kao što su: bolje rasuđivanje, bolja organizacija učenja, smanjenje fizioloških uzbuđenja i napetosti, efikasnije pamćenje (Isen, 2003), bolja pažnja i unapređivanje cjelokupnih intelektualnih resursa (Fredrickson, 2001), te i ublažavanje kritike i stvaranje grupne kohezije (Keltner et al., 2001).

Tabela 2

Najrelevantniji autori, najproduktivnije zemlje i najcitiranije jedinice analize

Autori	N	Broj citata
Ann Bainbridge Frymier	3	329
San Bolkan	3	84
Anne Pomerantz	4	56
Zemlje		
United States (SAD)	77	2375
Australia	11	257
Canada	11	79
Jedinice analize		
Bergin, A.D. (1999). Influences on classroom interest. <i>Educational Psychologist</i> , 34(2), 87-98. https://doi.org/10.1207/s15326985ep3402_2		335
Gorham, J. & Christophel, M.D. (1990). The relationship of teachers' use of humor in the classroom to immediacy and student learning. <i>Communication Education</i> , 39(1), 46-62. https://doi.org/10.1080/03634529009378786		239
Murray, G.H. (1983). Low-inference classroom teaching behaviors and student ratings of college teaching effectiveness. <i>Journal of Educational Psychology</i> , 75(1), 138-149. https://doi.org/10.1037/0022-0663.75.1.138		194

Rezultati pokazuju da se najcitiraniji autori istovremeno vezuju za univerzitete u zemljama koje imaju najveći broj objavljenih radova o humoru. Ovo ukazuje na postojanje korelacije između produktivnosti pojedinačnih istraživača i geografske raspodjele naučne aktivnosti u oblasti humora. Naime, riječ je o autorima, predstavnicima Univerziteta Zapadne Virdžinije (SAD), Misurija (SAD) te Univerziteta u Zapadnom Ontariju (Kanada). Kada su naučne publikacije u pitanju, najproduktivnije zemlje u oblasti istraživanja humora zauzimaju vodeću poziciju, što se može objasniti njihovim teritorijalnim obimom i brojnošću naučno-istraživačke zajednice. Zanimljivo je, takođe, da su Amerikanci kao nacija prvi doprinjeli „globalnom selu“, humorističnim, nama dobro poznatim TV serijama, „Prijatelji“, „Simpson“, i „Sajnfeld“. Nastanak ove humoristične produkcije potvrđuju i drugi autori (Takashi & Minako, 2021), dok ima autora koji ističu da su gorepomenute američke komedije oblikovale komične ukuse i izvan SAD, te podstakle mogućnost za maštu i u drugim oblastima (Buonanno, 2008). Zanimljiv je i podatak da je u centralnoj Kanadi, preciznije u Ontariju, nastao je i popularni humoristični crtani film Vini Pu (Milne, 1926). Navedeno, navodi na zaključak da se u ovim zemljama velika pažnja poklanja humoru uopšte, što ima implikacije i u kontekstu naučno-istraživačkog rada.

Iz ukupnog uzorka relevantne literature izdvojene su ključne riječi koje se najčešće pojavljuju. Na slici br 1. se takođe vidi i međusobna povezanost tih riječi. Od ukupno 12175 termina izdvojeno je njih 273, po kriterijumu minimalnog ponavljanja 10. Čvorovi iste boje prikazuju termine koji se najčešće koriste zajedno, a veličina čvora ukazuje na veći broj ponavljanja određene riječi. Klasteri se formiraju grupisanjem riječi koje se često javljaju zajedno u istim naučnim člancima, pri čemu algoritam grupisanja povezuje riječi sa jakim međusobnim vezama u tematske cjeline (klasterne). Na osnovu analize (Slika 1²) zaključujemo da se izdvajaju tri klastera: prvi, koji ima 65 termina, drugi 61 termin i treći sa 19 termina. U Tabeli 3 prikazujemo najfrekventnije termine po klasterima.

Tabela 3
Klasteri termina i repeticija

Klaster 1	R	Klaster 2	R	Klaster 3	R
intervju	60	godine/uzrast	40	dijete	56
percepcija	59	knjiga	39	igra	30
motivacija	55	život	37	zajednica	30
učenje	51	primjeri	36	komunikacija	20
engleski	50	mjesto	30	roditelji	17
upitnik	40	uspjeh	15	pol	15
šala	27	promjena	15		
humor nastavnika	11				
jezičke igre	11				

Veze između ključnih pojmova u klastiranju utvrđuju se analizom učestalosti njihovog zajedničkog pojavljivanja u istom kontekstu (na primjer, unutar istog članka, apstrakta). Tako zvana analiza kookurencije riječi (engl. word co-occurrence) omogućava identifikovanje pojmova koji se često javljaju zajedno, što ukazuje na njihovu tematsku ili konceptualnu povezanost. Klasteri predstavljaju grupe ključnih pojmova koji se međusobno češće povezuju, što odražava dominantne teme ili oblasti unutar analizirane literature. U praksi, termin iz jednog klastera koji je često u kookurenciji sa terminom iz drugog klastera, ukazuje na međusobnu povezanost tih tema ili pojmova. Ova vrsta veza omogućava bolje razumijevanje kako se različiti aspekti predmeta istraživanja integrišu i prepliću u dostupnoj literaturi.

Ekstrakcija ključnih pojmova i njihovih veza iz uzorka relevantne literature, navodi na nekoliko zaključaka. Naime, sva tri klastera su međusobno povezana. Tako, recimo, rezultati pokazuju da su termini upitnik i inteviju najviše povezani sa terminima *dijete*, *roditelji* i *pol* iz trećeg klastera, te terminima *život*, *uzrast*, *mjesto* i *tehnologija* iz drugog klastera. Termini iz istog klastera se najčešće pojavljuju zajedno. Tako je termin humor nastavnika povezan sa terminima *učenje*, *engleski jezik* i *fakultet*. Možemo da zaključimo

2 <https://doi.org/10.5281/zenodo.20099707>

da se navedeni rezultati ekstrakcije ključnih termina i njihovih veza podudaraju sa rezultatima istraživačkih kategorija (ili oblasti), prema kojima su oblast vaspitanja i obrazovanja, jezika i komunikacije, najzastupljenije istraživačke oblasti. S obzirom na to da je prvi klaster ujedno i najveći, zaključujemo da su to najbolje istražene veze i odnosi. To potvrđuje i analiza relevantne literature. Naime, autori sa hrvatskog područja ističu značaj humora, te niz jezičkih doprinosa i benefita u učenju stranog jezika (Leovac, 2017; Mrazovac, 2021). Takođe, kroz druga istraživanja se akcentuje uloga humora u motivaciji, odnosima sa nastavnicima, te međusobna povezanost humora i učenja (Askildson, 2005; Bratanić i Maršić, 2005; Fileš i Pavlin-Bernardić, 2021; Pavlović i Tošić-Rudić, 2009; Stupar i sar., 2023; Wanzer et al., 2010; Wanzer & Frymier, 1999). Takođe, kroz analizu ovih navedenih studija, a za potrebe diskusije, primjetna je njihova povezanost u teorijskom saopštavanju, citiranosti jedinica analize i autora, i istraživačkih oblasti, sa rezultatima koje smo dobili u ovoj studiji.

Postoje i istraživanja koja govore o tome da ipak raste naučna atraktivnost problematike humora u različitim istraživačkim oblastima. Istraživanja pokazuju da je humor ključni elemenat u komunikaciji, te efikasan metod za prevazilaženje sukoba i narušenih odnosa (Relja i Baturina, 2010). I druga istraživanja podržavaju ove nalaze, navodeći da je humor poželjna osobina važna za komunikaciju u unapređenje međuljudskih odnosa (Sprecher & Regan, 2002), a sve su to najfrekventniji termini klastera ponavljajućih riječi u našoj studiji. Humor, kao predmet naučnog interesovanja, prisutan je u gotovo svim područjima ljudskog života (Lang & Lee, 2010; Relja i Baturina, 2010). Ova činjenica ukazuje na njegov status važne ljudske karakteristike i naglašava njegov potencijal u okviru multidisciplinarnih istraživanja.

Završna razmatranja

Ova tema je nesumnjivo aktuelna među istraživačima, ali još uvijek nedovoljno istražena, i otvara neka nova pitanja koja tek mogu biti predmet istraživanja. Ovo istraživanje može biti polazna osnova za buduće istraživače, koji na bilo koji način planiraju da se bave humorom u učionici; osim toga, pruža presjek stanja i poznavanje glavnih pravaca u naučnoj literaturi ove oblasti. Završna generalizacija studije navodi na zaključak da se predviđa tendencija rasta ove istraživačke problematike.

Organičenja naše studije odnose se na pretraživanje jedne baze podataka. Program *Vosviewer* tehnički ne podržava veću raznolikost ključnih riječi, što predstavlja ograničenje studije. Međutim, iako *Vosviewer* program ograničava analizu na algoritme riječi, to istovremeno doprinosi preglednosti i fokusiranju teme bez pretjerane fragmentacije rezultata.

Sve bibliometrijske analize oslanjaju se na kvantitativne podatke kao što je broj publikacija, citata, autora, bez uvida u kvalitet publikacija, u kontekst istraživanja kao ni samu inovativnost istraživačkih ideja autora. Stoga nedostatak dublje analize predstavlja još jedno ograničenje.

Pored navedenih nedostataka, studija ima i prednosti. Naime, bibliometrijska studija prikazuje i integriše obimne vrste informacija, za koje bi u bilo kom drugom slučaju bilo potrebno mnogo vremena za sistematizaciju, kao i integrisani prikaz rezultata. U tom smislu, ova vrsta studija oslanja se na princip ekonomičnosti. Kroz bibliometrijske analize se podstiče kritičko mišljenje, jer sama struktura rezultata ne ostavlja mnogo mogućnosti za komparaciju rezultata, već naučne radnike obavezuje na domišljatost i kreativnost u diskutovanju. Najveći značaj se ogleda u razumijevanju strukture i dinamike naučnih istraživanja date problematike, zatim i sistematskog razumijevanja naučnog pejzaža kao prve etape u naučno-istraživačkom radu, te i „osluškivanju“ problema istraživanja i vaspitno-obrazovne prakse. Praktične implikacije ogledaju se identifikaciji ključnih istraživača, područja istraživanja, uvida u naučne trendove, te pomoć pri odabiru izvora znanja u nekim budućim naučnim poduhvatima istraživanja humora u učionici. Studija omogućava širem čitalačkom krugu, koji uključuje istraživače, stručnjake iz pedagoške prakse kao i iz drugih srodnih disciplina, uvid u naučne trendove iz oblasti ove problematike. Pored ovog diskursa, koji je više naučno usmeren, autori pozivaju na ispitivanje efekata humora u učionici, koji prepoznajemo kao značajan resurs u vaspitno-obrazovno procesu.

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Teacher Humor in the Classroom: A Bibliometric Analysis of the Scientific Literature

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Abstract

Teacher humor, as well as humor in teaching in general, serves as an important pedagogical resource that contributes to creating a stimulating classroom atmosphere, facilitates communication and enhances students' learning processes. This paper aims to analyze contemporary scientific trends in research on teacher humor in the classroom, with a particular focus on the analysis of bibliographic unit networks. The study is based on a bibliometric analysis of scientific publications. The study was conducted on a sample of 421 scientific articles examining teacher humor in the context of classroom instructional processes. The data were analyzed using the software VOSviewer 1.6.20, with the aim of constructing and visualizing bibliometric networks, as well as identifying research directions in the field of teacher humor studies. The findings indicate a growing presence of this subject in the scientific literature over the past two decades. Moreover, the analysis highlights the existence of distinct clusters of key terms appearing in the bibliographic units, their interconnections, as well as the most represented research areas focusing on teacher humor in the classroom. The most productive authors and scientific journals in this research domain were also identified. The obtained results may be valuable to researchers in the academic community, serve as a foundation for future studies and provide guidance to scholars on this relatively underexplored subject. The study offers support in collecting adequate primary and secondary sources, relevant and systematically organized information and a basis for theoretical elaboration upon which methodological frameworks can be developed.

Keywords: *bibliometric analysis, humor, teacher, classroom, VOSviewer.*

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Introduction

Bibliometric analysis of scientific publications remains relatively underutilized in academic communities despite becoming increasingly applied, partially due to its descriptive nature, which does not align with research orientations focused on explaining and interpreting phenomena with deeper contextual meanings. This occurs most frequently in the social sciences and humanities. Nevertheless, its value lies in the ability to provide a systematic insight into the development of scientific output, contributing to the strategic direction of future research. The expansion of information and communication technologies has led to the use of citation counts and various indices as key indicators for multiple purposes, with bibliometric analyses serving as important arguments within academic communities (Moslavac, 2022; Weingart, 2005). Bibliometric analysis holds significant practical value within academic communities and is based on the interaction of qualitative and quantitative indicators (Wouters, 2020). In line with social contingencies, the number of programs and software tools is increasing, while bibliometric analysis offers substantial advantages to researchers. It enables the generation of objective indicators for a given topic of interest, the construction of bibliometric networks of scientific articles and their citations, as well as the assessment of individual authors' productivity and impact. Initially, it assists in data collection and in gaining insights into the research topic, while also enhancing the visibility of the review to the broader academic community. Bibliometric analysis is defined as the quantitative assessment of academic literature through publication and citation metrics. It allows for the identification of key developmental directions and contributions within a specific field (Rulijana et al., 2025). Another notable advantage of bibliometric analyses conducted using the VOSviewer software is the extensive coverage of analysis units (Van Eck & Waltman, 2010).

Individual units of analysis, namely, scientific articles published in journals, serve as the fundamental and primary means for studying and investigating specific topics, while bibliometric analyses provide valuable arguments for the systematization of research questions. This is particularly relevant in fields where an increase in empirical evidence is anticipated (Bryant et al., 1980), such as humor.

Theoretical Foundations of the Research

Humor and the Educational Context

The complexity of human language and imagination allows individuals to create humor in an infinite variety of forms. From a developmental perspective, laughter, is one of the first vocalizations in humans, alongside crying. The ability to appreciate humor and express it through laughter is a fundamental part of what it means to be human in the truest sense of the word. Experiencing humor involves experiencing pleasant feelings of emotional well-being and joy. It is a playful activity that serves numerous social, emotional, and cognitive functions, making it an interesting subject for scientific research (Rod, 2007). Some authors emphasize that all individuals possess a sense of humor (Kolenović

- Đapo, 2012), though they enjoy it in different ways. Consequently, they highlight that differences among people in the development of a sense of humor are reflected in weaker or stronger humor abilities. The sense of humor is a dimension on which all individuals are positioned differently.

In the twentieth century, humor began to be studied more seriously as part of instructional strategies. Its inclusion in education was previously considered unscientific (Korobkin, 1989). Some authors emphasize that the role of humor in schools is insufficiently represented, even though it can contribute to more effective teaching, higher-quality teacher–student relationships, improved work performance and a more positive learning experience (Dramac i Lazzarich, 2016; Lazzarich, 2013; Mrazovac, 2021; Rod, 2007; Tong & Tsung, 2020).

In a broader sense, humor refers to anything an individual says or does, which carries an amusing or entertaining stimulus (Rod, 2007). It can be defined as a quality or ability of an individual to be witty and make another person laugh (Lovorn & Holaway, 2015), as well as a form of human communication aimed at making people happy (Stupar et al., 2023). Bell (Bell, 2011) emphasizes that humor is difficult to define, yet it represents a specific mode of communication in which something is expressed with the intent of entertaining.

In the classroom context, humor is one component of a broader set of teacher behaviors that contributes to a sense of immediacy in the classroom, leading to positive evaluations from students and more effective learning (Rod, 2007). When it's focused primarily on knowledge acquisition and traditional instructional approaches, education tends to overlook the therapeutic role of laughter within the school environment. Education constantly strives to fulfill fundamental values in human life, yet it is often considered frustrating and joyless, existing in a "grayness" of prohibitions and rules. Humor influences a pleasant classroom atmosphere, making the interplay between joy and well-being an important factor in the development of young individuals, while the instructional potential of laughter in teaching remains underutilized (Lazzarich, 2013). According to some authors, humor in the classroom is an act that can be expressed through linguistic or non-linguistic means. It can be enacted by all participants in the instructional process, be it students or teachers (Wagner & Urios-Aparisi, 2011). Humor is an important part of everyday life and holds a special place in the instructional process, where its presence often serves as a stimulus for a more relaxed atmosphere and improved interpersonal relationships.

Through their polyvalent roles, teachers motivate students, encourage collaborative relationships, enhance the classroom atmosphere, and improve the dynamics of lesson delivery. All of these outcomes can be fostered through the appropriate use of humor. Humor can also be useful for mitigating criticism and promoting group cohesion (Keltner et al., 2001). At early ages, humor should be used in moderation and appropriately; otherwise, it may cause confusion and the acquisition of incorrect information (Banas et al., 2011). Additionally, humor can reduce stress and feelings of anxiety during learning, make instruction more dynamic and help maintain students' motivation and engagement. However, it is important that the humor used in the classroom is appropriate and does not come at the expense of anyone in the classroom. Teachers who use humor can more

easily draw students' attention to the subject matter, thereby contributing to a positive classroom atmosphere. Yet, humor should not be overly dominant or used as a means to avoid serious topics. Competent teachers know how to strike a balance, using humor as a strategy to facilitate communication and foster a positive attitude toward learning. Therefore, it should be inclusive in the truest sense, respecting the diverse cultural, ethnic, and social backgrounds of students. Also, a variety of anecdotes can help teachers facilitate the interpretation of instructional content. The inconsistency of research findings confirms that humor remains a domain with significant potential for further investigation and validation. While various studies confirm the positive effect of humor in the instructional process (Askildson, 2005; Bieg et al., 2017; Neff & Rucynski, 2017; Pexman & Olineck, 2002), other research has shown that humor and the use of playful examples in the classroom can impact test performance negatively (Bolkan et al., 2018).

Humor and the positive emotions associated with it are linked to the overall learning experience, giving students a more favorable attitude toward education in general and increasing their motivation to learn, which in turn can lead to better academic achievement. The novelty and emotions experienced through the use of humor can help capture and maintain students' attention, thereby facilitating the process of acquiring new information. The incongruent mental associations that are an inherent feature of humor also ease cognitive processes, particularly elaboration (Rod, 2007). Recalling and connecting previously learned material is much easier when it is presented with humor than when it is delivered in a strictly serious manner.

Matijević emphasizes the significance of humor in an individual's life and highlights its role in teaching. He also raises the question of whether the limited representation of humor in scientific studies is due to a gap between the seriousness of researchers and the (perceived) lighthearted nature of the topic (Matijević, 1994). Humor contributes to reducing anxiety, increasing motivation and enhancing the effectiveness of interpersonal relationships, while education and instruction are, characterized by interpersonal interactions, above all. Culturally, learning and play are often separated, which may be one reason for the scarcity of notable studies on the phenomenon of humor. Stupar and colleagues (Stupar i sar, 2023) caution that humor must be used appropriately in teaching, analogous to a whistle in a physical education class – neither too little nor too much, applied at the right time and in the right measure, and exclusively in relation to the lesson content or self-directed humor.

Theoretical Foundations of Humor

In the attempt to explain the conditions and mechanisms underlying humor, various theories or theoretical foundations of humor have emerged. Some of these include the superiority theory, the instructional humor processing theory, the incongruity theory, the surprise theory, the relief theory and the arousal-relief (oscillation) theory. Some of these theories are not yet fully clarified and are often interconnected.

The superiority theory interprets humor as a form of expressing dominance and as a defense mechanism against threats in reality. According to this theory, humor arises

from one individual's sense of superiority over another individual who is in an inferior position, thus expressing dominance or mockery (Matijević, 1994; Carrell, 2008 as cited in Şahin, 2021). This theory has its particular implications when discussing types of inappropriate humor.

The literature also discusses the instructional humor processing theory, which contrasts with the superiority theory. Specifically, this theory proposes that humor leads to better information processing as a result of the positive emotions experienced in humorous situations. It suggests that humor produces a positive effect in any domain, motivating elaboration and deeper approaches to information processing (Bolkan et al., 2018). When humor is used in a prosocial manner, it has positive effects. Conversely, when humor is employed to belittle or offend another individual, it produces negative effects (Wanzer et al., 2010).

The incongruity theory, as the term suggests, views humor as the result of a contrast or discrepancy between ideas, expectations and reality. These are situations that end contrary to what is expected, thereby eliciting laughter, or situations in which the outcomes are incongruent with the anticipated resolution. In order for the message to be perceived as humorous, the recipient must recognize the incongruity in relation to the expected outcome within the existing context of the message. According to this theory, the recipient identifies an occurrence that does not align with their expectations for the specific communicative context (Mrazovac, 2021; Wanzer et al., 2010). Berk considers incongruity or contrast to be a key element of humor, describing it as a combination of expected content and an unexpected twist (Berk, 2002). In the classroom or educational context, students' attention is activated when a teacher uses humor, because humor often inherently involves some form of incongruity. This, in turn, enhances content elaboration and facilitates more effective learning (Frymier et al., 2008; Wanzer et al., 2010).

In addition to the aforementioned theories, the literature also discusses the surprise theory, which highlights a sudden disruption of events as the main source of humor and emphasizes the role of humor as a stimulus. The relief theory is also mentioned, viewing humor as a byproduct of the release of nervous tension, as well as the arousal-relief (oscillation) theory, which proposes that an individual's wit arises when the individual simultaneously experiences conflicting, oscillating emotions (Matijević, 1994). The theoretical foundations presented can be useful for the conceptual development of future research studies, serving as a basis for constructing methodological frameworks and aiding in the analysis and interpretation of the obtained data.

Method

An analysis of the relevant literature revealed no bibliometric studies on humor in the instructional context. Therefore, the aim of this paper is to examine scientific trends in research on teacher humor in the classroom. This objective was operationalized through several research tasks, namely:

1. To analyze the chronological development of interest in researching teacher humor in the classroom, with the aim of identifying dominant periods;

2. To identify the most relevant authors, journals, and the most influential articles published in scientific journals, as well as the countries that have addressed teacher humor;
3. To extract key terms and their relationships from the sample of relevant literature.

The study is based on a bibliometric analysis of scientific publications. Content analysis was employed, with the unit of analysis being the scientific article. Given that this is a bibliometric study of the literature, the software VOSviewer 1.6.20 was used, aiming to construct and visualize bibliometric networks through mapping and clustering techniques, that is, by extracting relationships from bibliographic units. The software provides quantitative data, as well as partial qualitative insights, by identifying the most relevant journals, authors, scientific articles; besides, it clusters of the most frequently occurring terms across the entire set of scientific publications. The sample consists of 421 scientific articles and the Dimensions database was used for the search. Thus, the sample includes scientific articles published in any journal indexed in this database and retrieved through a keyword-based search. The data were collected using VOSviewer 1.6.20, a software program that employs an algorithm involving the following interconnected keywords: humor, teacher and classroom. VOSviewer is designed to use algorithms for word detection and clustering, thereby visualizing the relationships between concepts and the thematic structure of the data. Alternative approaches within the software are not technically supported. Included studies were limited to English-language publications containing the specified keywords in the title or abstract. The search was conducted in December 2024.

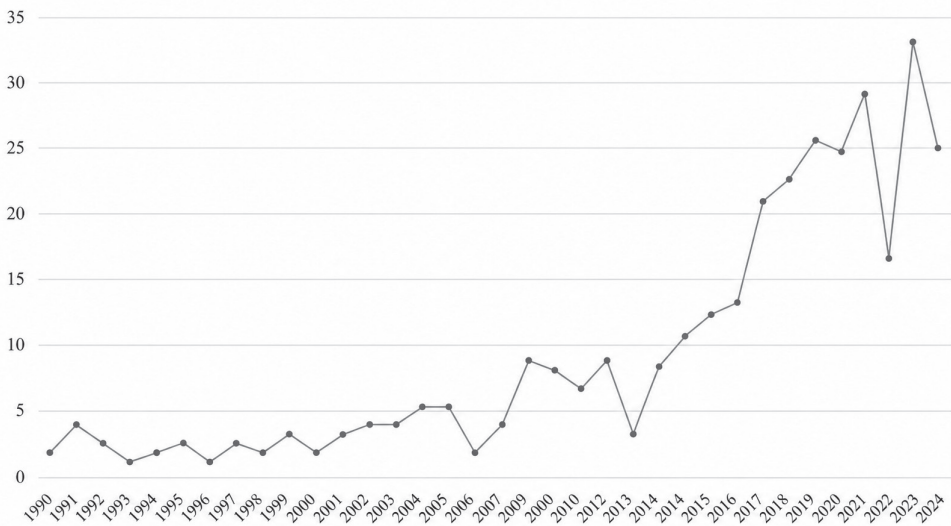
In scientific communities, the SPSS software package is commonly used for data analysis, which differs significantly in approach and functionality from the aforementioned program. Therefore, bibliometric analysis represents an innovation in the scientific context and is particularly applicable to emerging or unconventional research topics.

Results and Discussion

The development of scientific thought in this field dates back to nearly four decades and continues to the present. Figure 1 identifies three periods in the evolution of this subject. The first spans 1990-2006, the second 2006-2013, characterized by fluctuations, and the third from 2013 to the present, during which the number of publications has increased (showing an exponential growth pattern on the graph).

Based on the analysis of the evolution of scientific production in research on humor in teaching, an oscillation can be observed during the Covid-19 pandemic period. Specifically, Figure 1 shows a slight decline in the publication of scientific articles around early 2021, continuing until the end of 2022. This decline can be attributed to the restrictions implemented during that period, which relatively hindered or limited field-based research activities.

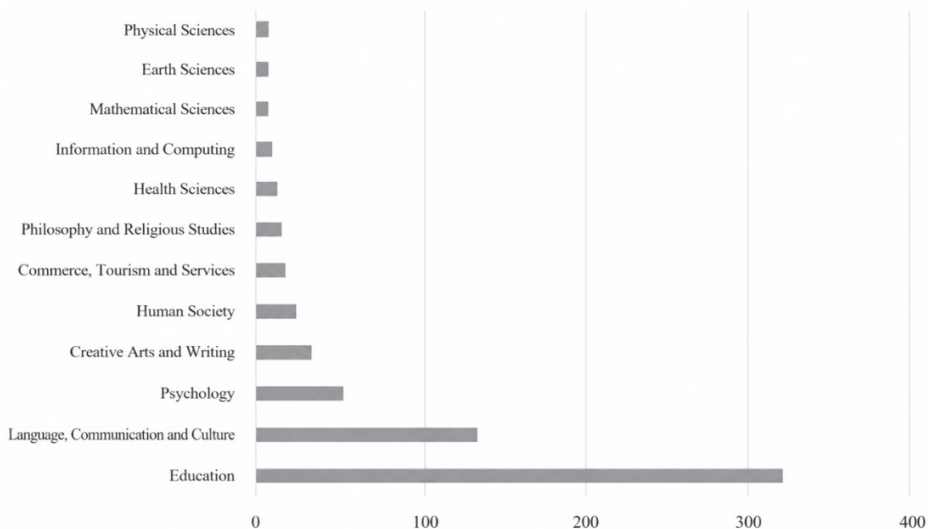
Graph 1
Evolution of Scientific Production



Although existing evidence on the development of humor is inconsistent, it can still be related to the results of our study. Some authors note that over the past thirty years, interest in researching humor has increased across various fields, including education (Ford & Martin, 2018), which is roughly reflected in the curve of scientific production shown. Other authors emphasize that humor began to be studied more intensively only in the second half of the twentieth century (Hrebac Hlobik & Pavlin-Bernardić, 2014), which aligns with the results of the most cited units in our analysis and their publication years, presented in Table 2. As noted by Fortunato and others (Fortunato et al., 2018) and Bornmann and others (Bornmann et al., 2021), the number of active researchers and institutions has been steadily increasing, and global scientific production grows on average by approximately 4.1% per year. In this context, the observed exponential growth in publications on humor in teaching may partially reflect this broader trend. However, specific shifts in certain time intervals (e.g., the decline during the pandemic or the intensified interest after 2013) indicate that the dynamics in this field do not solely represent a consequence of general production growth, but also reflect particular scientific and educational interest.

Figure 2 presents the most represented research categories to which the largest number of articles on this topic belong, as well as their highest citation counts. The majority of articles fall within the fields of education, language, communication and culture, psychology, creative arts and sociology. It is important to note that a single publication can appear in multiple research categories, as well as that the Dimensions database itself is aligned with the standard research classification of Australia and New Zealand (Australian and New Zealand Standard Research Classification, ANZSRC, 2000).

Graph 2

Most Represented Research Categories

A review of the research fields shows that the majority of publications originate from the social sciences, particularly those in the area of educational sciences. Since the studies in the sample are limited to the English-speaking context, foreign authors do not distinguish between the concepts of “education” and “instruction.” The results indicate a very small number of publications on the application of humor in fields such as geology, ecology, hydrology, physics, chemistry, biology, or in fields related to the biomedical sciences, mathematics, and engineering. The reason for this may lie in the inherent differences in the nature of various scientific disciplines. Social sciences focus on human behavior, social relationships and cultural phenomena, all of which naturally involve emotions, interaction and context, making humor easier to integrate as a pedagogical tool for illustration. In contrast, natural sciences often demand rigor and abstract thinking, leaving less room for humor. Accordingly, some authors rightly emphasize the importance of understanding the specificities of the methodologies of different scientific fields, which have both theoretical and applied value (Peličić et al., 2016). These differences in approach and subject matter also determine the possibilities for applying phenomena such as humor. Within human social life, humor nonetheless occupies a significant place.

Table 1 presents the five most relevant journals in the field of teacher humor research. The largest number of articles in this area and well as the highest number of citations are found in the journal *Communication Education* ($n = 10$). Considering that the Dimensions database is limited to English-language publications and that, as previously mentioned, there is no clear distinction between the terms “education” and “instruction”, it is not surprising that this journal emerges as the most prominent in the field (Table 1).

By examining the stated aims of the journal *Communication Education*, which contains the largest number of articles on teacher humor, we observe a frequent publication of studies in the field of communication, particularly related to the terms: education, instruction, teaching, teacher, and learning. The journal's acceptance rate, impact factor and indexing in major databases indicate the high quality of the articles it publishes. The most relevant journal is published by the National Communication Association (NCA), headquartered in Washington, with a mission to transform lives through communication, placing special emphasis on humor in education.

Table 1
Most Relevant Journals in This Field

Journals	Number of Documents	Number of Citations
Communication education	10	1071
Teachers college record: the voice of scholarship in education	7	333
European Journal of humour research	7	62
Procedia, social and behavioral sciences	6	55
Educating the young child	6	42

In this bibliometric analysis, we also identified the most productive authors who have worked on this topic, that is, authors with the highest number of articles in this field, as well as the units of analysis, namely the most cited articles, and the countries most engaged in this area of research. The threshold for the most productive authors was set at a minimum of three publications and at least five citations, which resulted in the identification of three most productive authors (Table 2), with the most cited author being Ann Bainbridge Frymier, with 329 citations. Regarding the most productive countries, the United States dominates with 77 articles and a total of 2,375 citations. Table 2 also presents the three most cited works within the unit of analysis. Thus, out of the 421 articles in the sample, the most cited work is *Influences on Classroom Interest*, with a total of 335 citations.

It can be hypothesized that the number of publications by a researcher often correlates with their number of citations. However, according to the results in Table 2, this is not an universal rule, even within the same subject. Such deviations can be hypothetically explained by differences in the quality and relevance of the articles, the reputation of the journals in which they were published, as well as by their reach within the academic community.

The three most cited articles, presented in Table 2, address the same issue: the role of humor in relation to learning and the teaching process. Other research confirms this pattern and the significance of humor as a pedagogical tool in the classroom. The pleasant subjective feelings elicited by humor fulfill a range of cognitive and social functions (Rod, 2007), such as improved reasoning, better organization of learning, reduction of physiological arousal and tension, more effective memory (Isen, 2003), enhanced attention and overall intellectual resources (Fredrickson, 2001), as well as easing criticism and fostering group cohesion (Keltner et al., 2001).

Table 2

Most Relevant Authors, Most Productive Countries, and Most Cited Units of Analysis

Authors	N	Number of Citations
Ann Bainbridge Frymier	3	329
San Bolkan	3	84
Anne Pomerantz	4	56
Countries		
United States (SAD)	77	2375
Australia	11	257
Canada	11	79
Units of Analysis		
Bergin, A.D. (1999). Influences on classroom interest. <i>Educational Psychologist</i> , 34(2), 87-98. https://doi.org/10.1207/s15326985ep3402_2		335
Gorham, J. & Christophel, M.D. (1990). The relationship of teachers' use of humor in the classroom to immediacy and student learning. <i>Communication Education</i> , 39(1), 46-62. https://doi.org/10.1080/03634529009378786		239
Murray, G.H. (1983). Low-inference classroom teaching behaviors and student ratings of college teaching effectiveness. <i>Journal of Educational Psychology</i> , 75(1), 138-149. https://doi.org/10.1037/0022-0663.75.1.138		194

The results show that the most cited authors are simultaneously affiliated with universities in countries that have the highest number of publications on humor. This indicates a correlation between the productivity of individual researchers and the geographical distribution of scientific activity in the field of humor. Specifically, these authors are affiliated with West Virginia University (USA), the University of Missouri (USA), and the University of Western Ontario (Canada). When it comes to scientific publications, the most productive countries in humor research occupy a leading position, which can be explained by their territorial size and the number of members in their research communities. Interestingly, Americans as a nation were also among the first to contribute to the "global village" through humorous, widely known TV series such as „*Friends*“, „*The Simpsons*“, and „*Seinfeld* “. The emergence of this humorous production is also confirmed by other authors (Takashi & Minako, 2021), while some note that the American comedies mentioned above have shaped comedic tastes beyond the United States and stimulated imagination in other areas as well (Buonanno, 2008). It is also noteworthy that in central Canada, specifically Ontario, the popular humorous cartoon *Winnie the Pooh* was created (Milne, 1926). This suggests that in these countries, humor in general receives considerable attention, which also has implications in the context of scientific research.

From the total sample of relevant literature, the most frequently occurring keywords were extracted. Figure 1 also shows the interconnections between these terms. Out of 12,175 terms, 273 were selected based on a minimum occurrence threshold of 10. Nodes of the same color represent terms that are most frequently used together, while the size of a node indicates a higher number of occurrences for that term. Clusters are formed by grouping words that often appear together in the same scientific articles, with the clustering algorithm linking terms with strong mutual connections into thematic units (clusters). Based on the analysis (Figure 1²), three clusters can be distinguished: the first with 65 terms, the second with 61 terms and the third with 19 terms. Table 3 presents the most frequent terms for each cluster.

Table 3
Term Clusters and Frequency

Cluster 1	F	Cluster 2	F	Cluster 3	F
interview	60	age	40	child	56
perception	59	book	39	play	30
motivation	55	life	37	community	30
learning	51	examples	36	communication	20
english	50	place	30	parents	17
questionnaire	40	success	15	gender	15
joke	27	change	15		
teacher humor	11				
wordplay	11				

The relationships between keywords in clustering are determined by analyzing the frequency of their co-occurrence within the same context (for example, within the same article or abstract). The so-called word co-occurrence analysis allows for the identification of terms that frequently appear together, indicating their thematic or conceptual connection. Clusters represent groups of keywords that are more frequently connected to each other, reflecting the dominant themes or areas within the analyzed literature. In practice, a term from one cluster that frequently co-occurs with a term from another cluster indicates a connection between those topics or concepts. This type of linkage allows for a better understanding of how different aspects of the research subject are integrated and interwoven in the available literature.

The extraction of keywords and their relationships from the sample of relevant literature leads to several conclusions. All three clusters are interconnected. For example, the results show that the terms *questionnaire* and *interview* are most strongly associated with

2 <https://doi.org/10.5281/zenodo.20099707>

the terms *child*, *parents* and *gender* from the third cluster, as well as with the terms *life*, *age*, *place*, and *technology* from the second cluster. Terms within the same cluster most frequently appear together. For instance, the term *teacher humor* is linked to *learning*, *English language*, and *university*. We can conclude that these results from the extraction of key terms and their relationships align with the findings on research categories, where education, language, and communication are the most represented research areas. Considering that the first cluster is also the largest, we can conclude that it represents the best-researched connections and relationships. This is confirmed by the analysis of the relevant literature. Authors from the Croatian context emphasize the significance of humor, as well as various linguistic contributions and benefits in foreign language learning (Leovac, 2017; Mrazovac, 2021). Additionally, other studies highlight the role of humor in motivation, teacher-student relationships and the interconnection between humor and learning (Askildson, 2005; Bratanić i Maršić, 2005; Fileš i Pavlin-Bernardić, 2021; Pavlović i Tošić-Rudić, 2009; Stupar et al., 2023; Wanzer et al., 2010; Wanzer & Frymier, 1999). Through the analysis of these studies, noticeable patterns emerge in theoretical discussion, citation of units of analysis and authors, as well as in research fields, which align with the results obtained in this study.

There are also studies indicating that the scientific appeal of humor as a research topic is increasing across various fields. Research shows that humor is a key element in communication and an effective method for overcoming conflicts and strained relationships (Relja & Baturina, 2010). Other studies support these findings, noting that humor is a desirable trait important for communication and the enhancement of interpersonal relationships (Sprecher & Regan, 2002). These are also the most frequent terms within the keyword clusters identified in our study. Humor, as a subject of scientific interest, is present in nearly all areas of human life (Lang & Lee, 2010; Relja & Baturina, 2010). This highlights its status as an important human characteristic and emphasizes its potential within multidisciplinary research.

Concluding Remarks

Undoubtedly, this topic is of considerable interest among researchers; however, it remains insufficiently explored and raises new questions that may serve as the main focus of future investigations. This study may serve as a starting point for future researchers who intend to examine the role of humor in the classroom in various ways, as it provides an overview of the current state of research and an understanding of the main directions in the scientific literature within this field. The overall synthesis of the study suggests a growing tendency for further research on this topic.

The limitations of our study primarily relate to the search conducted within a single database. In addition, the VOSviewer program does not technically support a greater diversity of keywords, which represents a limitation of the study. However, although VOSviewer restricts the analysis to word-based algorithms, this simultaneously contributes to the clarity and focus of the topic, preventing excessive fragmentation of the results.

All bibliometric analyses rely on quantitative indicators such as the number of publications, citations, and authors, without providing insight into the quality of the publications, the research context, or the innovativeness of the authors' research ideas. Therefore, the lack of a more in-depth analysis represents another limitation of the study.

In addition to its limitations, the study also has several advantages. Specifically, a bibliometric study enables the presentation and integration of large volumes of information that, under other circumstances, would require considerable time for systematization as well as for the integrated presentation of results. In this sense, this type of study relies on the principle of efficiency. Critical thinking is encouraged through bibliometric analyses, as the structure of the results itself offers limited possibilities for direct comparison, thereby requiring researchers to demonstrate ingenuity and creativity in the discussion of findings. The greatest significance lies in understanding the structure and dynamics of scientific research on a given topic, as well as in providing a systematic understanding of the scientific landscape as an initial stage of the research process, and in identifying emerging issues within both research and educational practice. The practical implications are reflected in the identification of key researchers and research areas, insights into scientific trends, and assistance in selecting relevant sources of knowledge for future research endeavors on humor in the classroom. The study also provides a broader readership, including researchers, educational practitioners and experts from related disciplines, with insight into scientific trends related to this topic. Beyond this more strictly scientific discourse, the authors call for further examination of the effects of humor in the classroom, which we recognize as a significant resource in the educational process.

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