

SELÇUK DENTAL JOURNAL

Selçuk Üniversitesi Diş Hekimliği Fakültesi resmi yayını
The official journal of Selcuk University Faculty of Dentistry

Selcuk Dent J

eISSN 2148-7529

Cilt *Volume*

12

Sayı *Issue*

**UDEG 3. Uluslararası Diş Hekimliği Eğitimi
Kongresi Özel Sayı**

Yıl *Year*

2025

Selcuk Dental Journal, 2014 yılından itibaren Selçuk Üniversitesi Diş Hekimliği Fakültesi Dergisi'nin devamı olarak online yayımlanmaktadır.



**SELÇUK ÜNİVERSİTESİ
DİŞ HEKİMLİĞİ FAKÜLTESİ**

SELCUK DENTAL JOURNAL

Cilt: 12 Sayı: Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı Yıl: 2025

Volume: 12 Issue: Udeg 3rd International Dental Education Congress Special Issue Year: 2025

Selçuk Üniversitesi Diş Hekimliği Fakültesi resmi yayınıdır
The official journal of Selcuk University Faculty of Dentistry

Yılda üç kez elektronik olarak yayımlanır / *Published electronically three times a year*

Yayın dili Türkçe ve İngilizce'dir / *Official languages are Tuskish and English*

Selçuk Üniversitesi Diş Hekimliği Fakültesi adına sahibi / *Owner on behalf of Selcuk University Faculty of Dentistry*

Prof. Dr. Hüseyin YILMAZ (Rektör / Rector)

Editör / Editor

Prof. Dr. Murat Selim BOTSALI

(selimbotsali@selcuk.edu.tr & <https://orcid.org/0000-0002-5719-5430>)

Editör Yardımcıları / Assistant Editors

Doç. Dr. Derya İÇÖZ

(deryayilmaz@selcuk.edu.tr & <https://orcid.org/0000-0001-8043-288X>)

Dr. Öğr. Üyesi Enes Mustafa AŞAR

(enesmustafa.asar@selcuk.edu.tr & <https://orcid.org/0000-0003-3432-8584>)

Yayın Kurulu / Editorial Board

Prof. Dr. Ercan DURMUŞ (edurmus@selcuk.edu.tr) (Ağız Diş ve Çene Cerrahisi Bölüm Editörü / *Department Editor of Oral and Maxillofacial Surgery*)

Dr. Öğr. Üyesi Sefa AYDINDOĞAN (sayindogan@selcuk.edu.tr) (Periodontoloji Bölüm Editörü / *Department Editor of Periodontology*)

Prof. Dr. Münir Tolga YÜCEL (munirtolga@selcuk.edu.tr) (Protetik Diş Tedavisi Bölüm Editörü / *Department Editor of Prosthodontics*)

Prof. Dr. Funda KONT ÇABANKARA (kfunda@selcuk.edu.tr) (Endodonti Bölüm Editörü / *Department Editor of Endodontics*)

Prof. Dr. Fusun YAŞAR (fyasar@selcuk.edu.tr) (Ağız Diş ve Çene Radyolojisi Bölüm Editörü / *Department Editor of Oral and Maxillofacial Radiology*)

Prof. Dr. Zeliha Müge BAKA (drmugebaka@selcuk.edu.tr) (Ortodonti Bölüm Editörü / *Department Editor of Orthodontics*)

Prof. Dr. Nevin ÇOBANOĞLU (nevincobanoglu@selcuk.edu.tr) (Restoratif Diş Tedavisi Bölüm Editörü / *Department Editor of Restorative Demtistry*)

Dr. Öğr. Üyesi Büşra MUSLU DİNÇ (busra.musludinc@selcuk.edu.tr) (Pedodonti Bölüm Editörü / *Department Editor of Pedodontics*)

Bilimsel Danışma Kurulu / Editorial Board (2020)

(alfabetik sıra / *alphabetical order*)

Doç. Dr. Sinem AÇIKMEŞE(sacikmese@khas.edu.tr)

Doç. Dr. Kamil Serkan AĞAÇAYAK(serkanagacayak@gmail.com)

Prof. Dr. Kadriye Funda AKALTAN(akaltan@ankara.edu.tr)

Prof. Dr. M. Cemal AKAY(cemalakay[at]yahoo.com)

Prof. Dr. Aylin AKBAY OBA(akbayoba@yahoo.com)

Doç. Dr. Nihat AKBULUT(nihat.akbulut@omu.edu.tr)

Doç. Dr. Merve AKÇAY(merve.akcay@ikcu.edu.tr)

Dr. Öğr. Üyesi Berat Serdar AKDENİZ(serdar.akdeniz@sbu.edu.tr)

Doç. Dr. Mehmet AKIN(mehmet.akin@alanya.edu.tr)

Doç. Dr. Melek AKMAN(makman@erbakan.edu.tr)

Prof. Dr. Serhan AKMAN(serhanakman@selcuk.edu.tr)

Prof. Dr. Müge AKSU(muge.aksu@hacettepe.edu.tr)

Prof. Dr. M. Alper ALKAN(alperalkan@bezmialem.edu.tr)

Prof. Dr. Nilgün Özlem ALPTEKİN(noalptekin[at]baskent.edu.tr)

Doç. Dr. Nuray ALTINTAŞ(dtnuray@ktu.edu.tr)

Prof. Dr. Zahir ALTUĞ(zahir.altug@neu.edu.tr)

Dr. Öğr. Üyesi Burak Kerem APAYDIN(drkeremapaydin@gmail.com)

Dr. Öğr. Üyesi Volkan ARIKAN(dr.volkankarikan@kku.edu.tr)

Prof. Dr. Hale ARI AYDINBELGE(hari@selcuk.edu.tr)

Prof. Dr. Arzu ARI DEMİRKAYA(arzu.aridemirkaya@okan.edu.tr)

Dr. Öğr. Üyesi Soley ARSLAN(soley@erciyes.edu.tr)

Doç. Dr. Belir ATALAY(batalay@istanbul.edu.tr)

Prof. Dr. Hanife ATAÖĞLU(hataoglu@biruni.edu.tr)

Prof. Dr. Derya ÇAKAN(derya.cakan@yeditepe.edu.tr)

Gazi Ünv, Ankara, Türkiye

Dicle Ünv, Diyarbakır, Türkiye

Ankara Ünv, Ankara, Türkiye

Ege Ünv, İzmir, Türkiye

Kırıkkale Ünv, Kırıkkale, Türkiye

Gaziosmanpaşa Ünv, Tokat, Türkiye

İzmir Katip Çelebi Ünv, İzmir, Türkiye

Kırıkkale Ünv, Kırıkkale, Türkiye

Alaaddin Keykubat Ünv, Alanya Türkiye

Necmettin Erbakan Ünv, Konya, Türkiye

Selçuk Ünv, Konya, Türkiye

Hacettepe Ünv, Ankara, Türkiye

Bezmialem Ünv, İstanbul, Türkiye

Başkent Ünv, Ankara, Türkiye

Karadeniz Teknik Ünv, Trabzon, Türkiye

Ankara Ünv, Ankara, Türkiye

Pamukkale Ünv, Denizli, Türkiye

Kırıkkale Ünv, Kırıkkale, Türkiye

Selçuk Ünv, Konya, Türkiye

Okan Ünv, İstanbul, Türkiye

Erciyes Ünv, Kayseri, Türkiye

İstanbul Ünv, İstanbul, Türkiye

Biruni Ünv, İstanbul, Türkiye

Yeditepe Üniversitesi, İstanbul, Türkiye

Prof. Dr. Tamer ATAÖĞLU(tamer.ataoglu@istinye.edu.tr)

Doç. Dr. Fethi ATIL(fethiati@mersin.edu.tr)

Prof. Dr. Nuray ATTAR(nuray.attar@hacettepe.edu.tr)

Dr. Öğr. Üyesi Uğur AYDIN(uguraydin@gantep.edu.tr)

Doç. Dr. Ülkem AYDIN(ulkem.aydin@kstu.edu.tr)

Doç. Dr. Mustafa AYDINBELGE(aydinbelge@erciyes.edu.tr)

Prof. Dr. Filiz AYKENT(faykent@ybu.edu.tr)

Prof. Dr. Zeliha Müge BAKA(drmugebaka@selcuk.edu.tr)

Prof. Dr. Esra BALTACIOĞLU(ebaltaci@ktu.edu.tr)

Dr. Öğr. Üyesi İlgi BARAN(ibanar@bingol.edu.tr)

Dr. Öğr. Üyesi İ.Şevki BAYRAKDAR(isbayrakdar@ogu.edu.tr)

Prof. Dr. Sema BELLİ(sbelli@selcuk.edu.tr)

Doç. Dr. Mehmet Emre BENLİDAYI(emrebenlidayi@yahoo.com)

Prof. Dr. Semih BERSUN(berksun[at]dentistry.ankara.edu.tr)

Dr. Öğr. Üyesi Elif BİLGİR(ebilgir@ogu.edu.tr)

Prof. Dr. Murat Selim BOTSALI(selimbotsali@selcuk.edu.tr)

Doç. Dr. Esin BOZDEMİR(esinbozdemir@sdu.edu.tr)

Prof. Dr. Nurcan BUDUNELI(nurcan.buduneli[at]ege.edu.tr)

Doç. Dr. Hakan BULUT(thbulut[at]yahoo.com)

Dr. Öğr. Üyesi Hatice BÜYÜKÖZER

ÖZKAN(hatice.ozkan[at]alanya.edu.tr

Prof. Dr. Şenay CANAY(secanay@hacettepe.edu.tr)

Doç. Dr. Fatih COŞKUNSES(fatih.coskuneses@kocaeli.edu.tr)

Prof. Dr. Fatma ÇAĞLAYAN(fatma.caglayan[at]atauni.edu.tr)

Doç. Dr. Eda GÜLER(edaguler@omu.edu.tr)

İstinye Ünv, İstanbul Türkiye

Kırıkkale Ünv, Kırıkkale, Türkiye

Hacettepe Ünv, Ankara, Türkiye

Gaziantep Ünv, Gaziantep, Türkiye

Başkent Ünv, Ankara, Türkiye

Erciyes Ünv, Kayseri, Türkiye

Yıldırım Beyazıt Ünv, Ankara, Türkiye

Selçuk Ünv, Konya, Türkiye

Karadeniz Teknik Ünv, Trabzon, Türkiye

Kırıkkale Ünv, Kırıkkale, Türkiye

Süleyman Demirel Ünv, Isparta, Türkiye

Selçuk Ünv, Konya, Türkiye

Çukurova Ünv, Adana, Türkiye

Ankara Ünv, Ankara, Türkiye

Osmagazi Ünv, Eskişehir, Türkiye

Selçuk Ünv, Konya, Türkiye

Süleyman Demirel Ünv, Isparta, Türkiye

Ege Ünv, İzmir, Türkiye

Ege Ünv, İzmir, Türkiye

Alaaddin Keykubat Ünv, Alanya Türkiye

Hacettepe Ünv, Ankara, Türkiye

Kocaeli Ünv, Kocaeli, Türkiye

Atatürk Ünv, Erzurum, Türkiye

Ondokuz Mayıs Ünv, Samsun, Türkiye

Dr. Öğr. Üyesi Metin ÇALIŞIR(metincalisir@adiyaman.edu.tr)

Doç. Dr. Abdulkadir Burak ÇANKAYA(cankaya@istanbul.edu.tr)

Dr. Öğr. Üyesi Ahmet Taylan ÇEBİ(ahmettaylancebi[at]karabuk.edu.tr)

Prof. Dr. Zafer ÇEHRELİ(zcehrelı@hacettepe.edu.tr)

Prof. Dr. Işıl ÇEKİÇ NAGAŞ(ısilcekcic@gazi.edu.tr)

Prof. Dr. Peruze ÇELENK(pcelenk@omu.edu.tr)

Dr. Öğr. Üyesi Rabia Merve ÇELİK KARATAŞ(klinikadana01@gmail.com)

Prof. Dr. Ali Rıza ÇETİN(alirizacetin@selcuk.edu.tr)

Prof. Dr. Burcu ÇETİNKAYA(bcetinkaya@omu.edu.tr)

Doç. Dr. Sema ÇINAR BECERİK(semacinar[at]yahoo.com)

Dr. Öğr. Üyesi Tansu ÇİMEN(tansu.cimen@alanya.edu.tr)

Prof. Dr. Nevin ÇOBANOĞLU(nevincobanoglu@selcuk.edu.tr)

Prof. Dr. Erhan ÇÖMLEKOĞLU(erhancomlek[at]yahoo.com)

Doç. Dr. Evrim DALKILIÇ(edalkilic@bezmialem.edu.tr)

Prof. Dr. Burak DEMİRALP(demiralp@hacettepe.edu.tr)

Doç. Dr. Semih DEMİRBUĞA(sezer[at]erciyes.edu.tr)

Prof. Dr. Mustafa DEMİRCİ(demirci@istanbul.edu.tr)

Doç. Dr. Ömür DEVECİ(odereci[at]ogu.edu.tr)

Prof. Dr. Cem DOĞAN(cemdogan@cu.edu.tr)

Doç. Dr. Salih DOĞAN(salihdogan@erciyes.edu.tr)

Prof. Dr. Servet DOĞAN(servetdgn[at]hotmail.com)

Prof. Dr. Doğan DOLANMAZ(ddolanmaz@bezmialem.edu.tr)

Prof. Dr. Ercan Cenk DORUK(cdoruk@cumhuriyet.edu.tr)

Prof. Dr. Can DÖRTER(dorterc@istanbul.edu.tr)

Doç. Dr. Nazmiye DÖNMEZ(ndonmez@bezmialem.edu.tr)

Prof. Dr. Ercan DURMUŞ(edurmus@selcuk.edu.tr)

Prof. Dr. Mine DÜNDAR ÇÖMLEKOĞLU(mine.dundar[at]ege.edu.tr)

Prof. Dr. Ece EDEN(eceeden[at]yahoo.com)

Doç. Dr. Hakan EL(hakanel@hacettepe.edu.tr)

Dr. Öğr. Üyesi Mesut ELBAY(mesut.elbay@kocaeli.edu.tr)

Doç. Dr. Selma ELEKDAĞ(s.elekdag@omu.edu.tr)

Prof. Dr. Abubekir ELTAŞ(abubekir.eltas@inonu.edu.tr)

Prof. Dr. Yusuf EMES(emes@istanbul.edu.tr)

Prof. Dr. Kürşat ER(kursater@akdeniz.edu.tr)

Prof. Dr. Oğuz ERASLAN(oguzeraslan@selcuk.edu.tr)

Doç. Dr. Esra ERCAN(eercan@ktu.edu.tr)

Prof. Dr. Ali ERDEMİR(erdemir@kku.edu.tr)

Dr. Öğr. Üyesi Emire Aybüke ERDUR(drerdur@gmail.com)

Prof. Dr. Zeynep ERGÜCÜ(zergucu@yahoo.com)

Dr. Öğr. Üyesi Türkan Sezen ERHAMZA(dt.turkansezen@gmail.com)

Dr. Öğr. Üyesi Merve ERKMEN ALMAZ(merveerkmenalmaz@kku.edu.tr)

Prof. Dr. R. Banu ERMİŞ(banuermis@sdu.edu.tr)

Doç. Dr. Abdullah Seçkin ERTUĞRUL(abdullahseckin.ertugrul@ikcu.edu.tr)

Dr. Öğr. Üyesi Alparslan ESEN(aese@erbakan.edu.tr)

Doç. Dr. Elçin ESENLİK(elcinesenlik@akdeniz.edu.tr)

Dr. Öğr. Üyesi Meryem ETÖZ(meryemetoz[at]hotmail.com)

Doç. Dr. Yavuz FINDIK(yavuzfindik@sdu.edu.tr)

Prof. Dr. Bülent GÖKÇE(bulentgokce[at]yahoo.com)

Doç. Dr. Nihan GÖNÜLOL(nihan.gonulol@omu.edu.tr)

Prof. Dr. Melahat GÖRDÜYSUS(melahatg@hacettepe.edu.tr)

Dr. Öğr. Üyesi Özlem GÖRMEZ(ozlemgormez@sdu.edu.tr)

Prof. Dr. Kaan ORHAN(knorhan[at]dentistry.ankara.edu.tr)

Prof. Dr. Ayşegül ÖLMEZ(aysegul@gazi.edu.tr)

Doç. Dr. Mehmet Melih ÖMEZLİ(mmelihomezli@odu.edu.tr)

Prof. Dr. Emel Olga ÖNAY(olgaonay[at]yahoo.com)

Prof. Dr. Ercüment ÖNDER(ercuonder@gmail.com)

Adıyaman Üniv, Adıyaman, Türkiye

İstanbul Üniv, İstanbul, Türkiye

Karabük Üniv., Karabük, Türkiye

Hacettepe Üniv, Ankara, Türkiye

Gazi Üniv, Ankara, Türkiye

Ondokuz Mayıs Üniv, Samsun, Türkiye

Kocatepe Üniv, Afyon, Türkiye

Selçuk Üniv, Konya, Türkiye

Ondokuz Mayıs Üniv, Samsun, Türkiye

Ege Üniv, İzmir, Türkiye

Alaaddin Keykubat Üniv, Alanya Türkiye

Selçuk Üniv, Konya, Türkiye

Ege Üniv, İzmir, Türkiye

Bezmialem Üniv, İstanbul, Türkiye

Hacettepe Üniv, Ankara, Türkiye

Erciyes Üniv, Kayseri, Türkiye

İstanbul Üniv, İstanbul, Türkiye

Osmagazi Üniv, Eskişehir, Türkiye

Çukurova Üniv, Adana, Türkiye

Erciyes Üniv, Kayseri, Türkiye

Ege Üniv, İzmir, Türkiye

Bezmialem Üniv, İstanbul, Türkiye

Cumhuriyet Üniv, Sivas, Türkiye

İstanbul Üniv, İstanbul, Türkiye

Bezmialem Üniv, İstanbul, Türkiye

Selçuk Üniv, Konya, Türkiye

Ege Üniv, İzmir, Türkiye

Ege Üniv, İzmir, Türkiye

Hacettepe Üniv, Ankara, Türkiye

Kocaeli Üniv, Kocaeli, Türkiye

Ondokuz Mayıs Üniv, Samsun, Türkiye

İnönü Üniv, Malatya, Türkiye

İstanbul Üniv, İstanbul, Türkiye

Akdeniz Üniv, Antalya, Türkiye

Selçuk Üniv, Konya, Türkiye

Karadeniz Teknik Üniv, Trabzon, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Necmettin Erbakan Üniv, Konya, Türkiye

Ege Üniv, İzmir, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Süleyman Demirel Üniv, Konya, Türkiye

Ege Üniv, İzmir, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Süleyman Demirel Üniv, Isparta, Türkiye

İzmir Katip Çelebi Üniv, İzmir, Türkiye

Necmettin Erbakan Üniv, Konya, Türkiye

Süleyman Demirel Üniv, Isparta, Türkiye

Erciyes Üniv, Kayseri, Türkiye

Süleyman Demirel Üniv, Isparta, Türkiye

Ege Üniv, İzmir, Türkiye

Ondokuz Mayıs Üniv, Samsun, Türkiye

Hacettepe Üniv, Ankara, Türkiye

Süleyman Demirel Üniv, Isparta, Türkiye

Ankara Üniv, Ankara, Türkiye

Gazi Üniv, Ankara, Türkiye

Ordu Üniv, Ordu, Türkiye

Başkent Üniv, Ankara, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Prof.Dr. Nurhan GÜLER(nurhan.guler@yeditepe.edu.tr)

Prof. Dr. Ayşe GÜLŞAHI(agulsahi[at]baskent.edu.tr)

Prof. Dr. Kamran GÜLŞAHI(kgulsahi[at]yahoo.com)

Prof. Dr. Kahraman GÜNGÖR(kahraman@gazi.edu.tr)

Prof. Dr. Metin GÜNGÖRMÜŞ(metingungormus@gantep.edu.tr)

Prof. Dr. Kahraman GÜRBÜZ(kahramangurbuz@gmail.com)

Prof. Dr. Cem Abdulkadir GÜRGAN(cagurgan@erciyes.edu.tr)

Prof. Dr. Mihtikar GÜRSEL(mgursel@biruni.edu.tr)

Prof. Dr. Sema S HAKKI(sshakki@selcuk.edu.tr)

Dr. Öğr. Üyesi Meltem HENDEK(meltemhendek@kku.edu.tr)

Doç. Dr. Bozkurt Kubilay IŞIK(kisik@erbakan.edu.tr)

Doç. Dr. Zehra İLERİ(zileri@selcuk.edu.tr)

Prof. Dr. Özgür İNAN(oinan@selcuk.edu.tr)

Dr. Öğr. Üyesi Şehnaz İŞÇİ YILMAZ(sehnazisci[at]cu.edu.tr)

Prof. Dr. Sevil KAHRAMAN(skahraman@gazi.edu.tr)

Dr. Öğr. Üyesi Firdevs KAHVECİOĞLU(firdevskahvecioglu@selcuk.edu.tr)

Prof. Dr. Abdullah KALAYCI(abdullahkalayci@selcuk.edu.tr)

Dr. Öğr. Üyesi Kadir KAPLANOĞLU(kkaplanoglu@adiyaman.edu.tr)

Doç. Dr. Haluk Barış KARA(bkara@medipol.edu.tr)

Dr. Öğr. Üyesi Özlem KARA(OKara@bezmialem.edu.tr)

Dr. Öğr. Üyesi Said KARABEKİROĞLU(skarakbekir@erbakan.edu.tr)

Prof. Dr. İnci Rana KARACA(incirana@gazi.edu.tr)

Dr. Öğr. Üyesi Nebi Cansın KARAKAN(cansinkarakan@hotmail.com)

Prof. Dr. Ali İhya KARAMAN(info@aliihyakaraman.com.tr)

Doç. Dr. Emel KARAMAN(emel.karaman@omu.edu.tr)

Dr. Öğr. Üyesi Mağnur KAZAK(mkazak@bezmialem.edu.tr)

Prof. Dr. Ayşe Diljin KEÇECİ(diljinkececi@sdu.edu.tr)

Prof. Dr. Gonca Ç. KELEŞ(gonca.keles@okan.edu.tr)

Prof. Dr. Bülent KESİM(bkesim@erciyes.edu.tr)

Prof. Dr. İsmail KESKİN(ikeskin@selcuk.edu.tr)

Doç. Dr. Erdem KILIÇ(erkilic@bezmialem.edu.tr)

Doç. Dr. Kerem KILIÇ(kkilic@erciyes.edu.tr)

Prof. Dr. Mehmet Ali KILIÇARSLAN(makilicarслан@ankara.edu.tr)

Doç. Dr. Gülperi KOÇER(gulperikocer@sdu.edu.tr)

Doç. Dr. İsmail Doruk KOÇYİĞİT(dorukkocyyigit@kku.edu.tr)

Prof. Dr. Funda KONT ÇOBANKARA(kfunda@selcuk.edu.tr)

Doç. Dr. Mahmut KOPARAL(mkoparal@adiyaman.edu.tr)

Doç. Dr. Meltem KORAY(mkoray@istanbul.edu.tr)

Doç. Dr. Emre KORKUT(ekorkut@erbakan.edu.tr)

Dr. Öğr. Üyesi Hatice KÖK(hatice.kok@selcuk.edu.tr)

Doç. Dr. Serhat KÖSEÖĞLU(armagany@iuc.edu.tr)

Prof. Dr. Alper KUŞTARCI(akustarci@akdeniz.edu.tr)

Prof. Dr. Hasan KÜÇÜKKOLBAŞI(hkolbasi@selcuk.edu.tr)

Doç. Dr. Ebru KÜÇÜKYILMAZ(ebru.kucukyilmaz@ikcu.edu.tr)

Prof. Dr. Mehmet KÜRKÇÜ(kurkcü@cu.edu.tr)

Doç. Dr. Nükhet KÜTÜK(NCelebi@erciyes.edu.tr)

Dr. Öğr. Üyesi Güldane MAĞAT(gbozdog@erbakan.edu.tr)

Prof. Dr. İsmail MARAKOĞLU(imarakoglu@selcuk.edu.tr)

Prof. Dr. Nur MOLLAOĞLU(nurmolla@gazi.edu.tr)

Doç. Dr. Ebru OLGUN(ebruerdemir@hotmail.com)

Doç. Dr. Ekim Onur ORHAN(ekimorhan@ogu.edu.tr)

Dr. Öğr. Üyesi Emre TOKAR(emretokar@gazi.edu.tr)

Prof. Dr. Hülya TOKER(hcakmak@cumhuriyet.edu.tr)

Prof. Dr. Tuba TORTOP(tubatortop@gazi.edu.tr)

Prof. Dr. Gül TOSUN(gtosun@selcuk.edu.tr)

Prof. Dr. Tülin Ufuk TOYGAR MEMİKOĞLU(toygara@ankara.edu.tr)

Yeditepe Üniversitesi, İstanbul, Türkiye

Başkent Üniv, Ankara, Türkiye

Başkent Üniv, Ankara, Türkiye

Gazi Üniv, Ankara, Türkiye

Gaziantep Üniv, Gaziantep, Türkiye

Ankara Üniv, Ankara, Türkiye

Erciyes Üniv, Kayseri, Türkiye

Biruni Üniv., İstanbul, Türkiye

Selçuk Üniv, Konya, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Necmettin Erbakan Üniv, Konya, Türkiye

Selçuk Üniv, Konya, Türkiye

Selçuk Üniv, Konya, Türkiye

Çukurova Üniv, Adana, Türkiye

Gazi Üniv, Ankara, Türkiye

Selçuk Üniv, Konya, Türkiye

Selçuk Üniv, Konya, Türkiye

Adıyaman Üniv, Adıyaman, Türkiye

Medipol Üniv, İstanbul, Türkiye

Bezmialem Üniv, İstanbul, Türkiye

Necmettin Erbakan Üniv, Konya, Türkiye

Gazi Üniv, Ankara, Türkiye

Afyonkarahisar Sağ.Bil.Ünv. Afyonkarahisar

Kocaeli Üniv, Kocaeli, Türkiye

Ondokuz Mayıs Üniv, Samsun, Türkiye

İstanbul Aydın Üniv, İstanbul, Türkiye

Süleyman Demirel Üniv, Isparta, Türkiye

İstanbul Okan Üniv, İstanbul, Türkiye

Erciyes Üniv, Kayseri, Türkiye

Selçuk Üniv, Konya, Türkiye

Bezmialem Üniv, İstanbul, Türkiye

Erciyes Üniv, Kayseri, Türkiye

Ankara Üniv, Ankara, Türkiye

Süleyman Demirel Üniv, Isparta, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Selçuk Üniv, Konya, Türkiye

Adıyaman Üniv, Adıyaman, Türkiye

İstanbul Üniv, İstanbul, Türkiye

Necmettin Erbakan Üniv, Konya, Türkiye

Selçuk Üniv, Konya, Türkiye

Selçuk Üniv, Konya, Türkiye

İzmir Katip Çelebi Üniv, İzmir, Türkiye

Akdeniz Üniv, Antalya, Türkiye

İstanbul Medeniyet Üniv, İstanbul, Türkiye

İzmir Katip Çelebi Üniv, İzmir, Türkiye

Çukurova Üniv, Adana, Türkiye

Erciyes Üniv, Kayseri, Türkiye

Necmettin Erbakan Üniv, Konya, Türkiye

Selçuk Üniv, Konya, Türkiye

Gazi Üniv, Ankara, Türkiye

Kırıkkale Üniv, Kırıkkale, Türkiye

Hacettepe Üniv, Ankara, Türkiye

Gazi Üniv, Ankara, Türkiye

Cumhuriyet Üniv, Sivas, Türkiye

Gazi Üniv, Ankara, Türkiye

Selçuk Üniv, Konya, Türkiye

Ankara Üniv, Ankara, Türkiye

Prof. Dr. Nurhan ÖZALP(nurhan66[at]yahoo.com)	Ankara Üniv, Ankara, Türkiye	Prof. Dr. Cumhuri TUNCER(tuncer@gazi.edu.tr)	Gazi Üniv, Ankara, Türkiye
Doç. Dr. Özgün ÖZÇAKA(ozgunozcaka[at]yahoo.com)	Ege Üniv, İzmir, Türkiye	Doç. Dr. Ali Rıza TUNÇDEMİR(artuncdemir@erbakan.edu.tr)	Necmettin Erbakan Üniv, Konya, Türkiye
Prof. Dr. Erhan ÖZDİLER(fezdiler@ankara.edu.tr)	Ankara Üniv, Ankara, Türkiye	Prof. Dr. Melek D TURGUT(mturgut@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye
Dr. Öğr. Üyesi Abdullah ÖZEL(aozel@medipol.edu.tr)	Medipol Üniv, İstanbul, Türkiye	Doç. Dr. Çağrı TÜRKÖZ(cturkoz@gazi.edu.tr)	Gazi Üniv, Ankara, Türkiye
Prof. Dr. Füsün ÖZER(fusunozer@hacettepe.edu.tr)	Univ of Pennsylvania, Philadelphia, ABD	Prof. Dr. Lezize Şebnem TÜRKÜN(sebnemturkun[at]gmail.com)	Ege Üniv, İzmir, Türkiye
Prof. Dr. Törün ÖZER(torun[at]deu.edu.tr)	Adnan Menderes Üniv, Aydın, Türkiye	Prof. Dr. Murat TÜRKÜN(murat.turkun[at]ege.edu.tr)	Ege Üniv, İzmir, Türkiye
Prof. Dr. Nurdan ÖZMERİÇ KURTULUŞ(nurdan@gazi.edu.tr)	Gazi Üniv, Ankara, Türkiye	Prof. Dr. Hakan H. TÜZ(tuzhakan@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye
Prof. Dr. Bircül ÖZPINAR(ozpinarb@yahoo.com)	Ege Üniv, İzmir, Türkiye	Doç. Dr. Tamer TÜZÜNER(tamertuzuner@ktu.edu.tr)	Karadeniz Teknik Üniv, Trabzon, Türkiye
Doç. Dr. Evren ÖZTAŞ(oztase@istanbul.edu.tr)	İstanbul Üniv, İstanbul, Türkiye	Prof. Dr. Sina UÇKAN(isuckan[at]medipol.edu.tr)	Medipol Üniv, İstanbul, Türkiye
Prof. Dr. Mine ÖZTÜRK TONGUÇ(minetonguc@sdu.edu.tr)	Süleyman Demirel Üniv, Isparta, Türkiye	Prof. Dr. Dilek Aynur UĞAR ÇANKAL(dugar@gazi.edu.tr)	Gazi Üniv, Ankara, Türkiye
Dr. Öğr. Üyesi Özgün Yusuf ÖZYILMAZ(oozyilmaz@bezmialem.edu.tr)	Bezmialem Üniv, İstanbul, Türkiye	Dr. Öğr. Üyesi Murat ULU(murat.ululu@ikcu.edu.tr)	İzmir Katip Çelebi Üniv, İzmir, Türkiye
Prof. Dr. Özgür PEKTAŞ(ozgurpek@hotmail.com)	Başkent Üniv, Ankara, Türkiye	Prof. Dr. Meryem UZAMIŞ TEKÇİÇEK(uzamis@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye
Doç. Dr. Serdar POLAT(serdarpolat@gazi.edu.tr)	Gazi Üniv, Ankara, Türkiye	Doç. Dr. Emel UZUNOĞLU ÖZYÜREK(emel.uzunoglu@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye
Prof. Dr. Sabri İlhan RAMOĞLU(ilhanramoglu@yahoo.com)	Altınbaş Üniv, İstanbul, Türkiye	Prof. Dr. Mine Betül ÜÇTAŞLI(uctasli@gazi.edu.tr)	Gazi Üniv, Ankara, Türkiye
Dr. Öğr. Üyesi Fatma SAĞ GÜNGÖR(fatma.saggungor@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye	Prof. Dr. Sadullah ÜÇTAŞLI(uctasli[at]dentistry.ankara.edu.tr)	Ankara Üniv, Ankara, Türkiye
Doç. Dr. Mehmet SAĞLAM(mehmet.saglam[at]inonu.edu.tr)	İzmir Katip Çelebi Üniv, İzmir, Türkiye	Prof. Dr. H. Esra ÜLKER(esraulker@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye
Prof. Dr. Şaziye SARI(ssari[at]dentistry.ankara.edu.tr)	Ankara Üniv, Ankara, Türkiye	Prof. Dr. Mete ÜNGÖR(mungor@medipol.edu.tr)	Başkent Üniv, Ankara, Türkiye
Doç. Dr. Serkan SARIDAĞ(info@okandis.com)	Kocaeli Üniv, Kocaeli, Türkiye	Prof. Dr. Nimet ÜNLÜ(nunlu@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye
Doç. Dr. Aslı SEÇİLMİŞ(asecilmis@gantep.edu.tr)	Gaziantep Üniv, Gaziantep, Türkiye	Prof. Dr. Ayçe ÜNVERDİ ELDENİZ(aunverdi@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye
Prof. Dr. Müjde SEVİMAY(mujde.sevimay@antalya.edu.tr)	Selçuk Üniv, Konya, Türkiye	Prof. Dr. Bülent ÜREYEN KAYA(bulemkaya@sdu.edu.tr)	Süleyman Demirel Üniv, Isparta, Türkiye
Dr. Öğr. Üyesi Ahmet Ertan SOĞANCI(esoganci@erbakan.edu.tr)	Necmettin Erbakan Üniv, Konya, Türkiye	Dr. Öğr. Üyesi İlknur VELİ(ilknur.veli@ikcu.edu.tr)	İzmir Katip Çelebi Üniv, İzmir, Türkiye
Doç. Dr. Sıdıka Sinem SOYDAN(sdksoydan[at]yahoo.com)	Başkent Üniv, Ankara, Türkiye	Doç. Dr. Ahmet YAĞCI(ayagci@erciyes.edu.tr)	Erciyes Üniv, Kayseri, Türkiye
Prof. Dr. Işıl SÖNMEZ(isilonmez @adu.edu.tr)	Adnan Menderes Üniv, Aydın, Türkiye	Prof. Dr. Füsün YAŞAR(fyasar@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye
Prof. Dr. Mahmut SÜMER(msumer@omu.edu.tr)	Ondokuz Mayıs Üniv, Samsun, Türkiye	Doç. Dr. İzzet YAVUZ(iyavuz@dicle.edu.tr)	Dicle Üniv, Diyarbakır, Türkiye
Prof. Dr. Pınar SÜMER(psumer@omu.edu.tr)	Ondokuz Mayıs Üniv, Samsun, Türkiye	Prof. Dr. Ayşe Rüya YAZICI(ruyay@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye
Doç. Dr. Yurdanur ŞANLI UÇAR(ysanli@cu.edu.tr)	Çukurova Üniv, Adana, Türkiye	Dr. Öğr. Üyesi Esra YEŞİLOVA(eyesilova@ogu.edu.tr)	Osmagazi Üniv, Eskişehir, Türkiye
Doç. Dr. Ülkü ŞERMET ELBAY(ulku.sermetelbay@kocaeli.edu.tr)	Kocaeli Üniv, Kocaeli, Türkiye	Doç. Dr. Enver YETKİNER(enver.yetkiner@tinaztepe.edu.tr)	Ege Üniv, İzmir, Türkiye
Prof. Dr. Emine ŞEN TUNÇ(etunc@omu.edu.tr)	Ondokuz Mayıs Üniv, Samsun, Türkiye	Doç. Dr. Derya YILDIRIM(deryayildirim@sdu.edu.tr)	Süleyman Demirel Üniv, Isparta, Türkiye
Doç. Dr. Sevgi ŞENER	Necmettin Erbakan Üniv, Konya, Türkiye	Prof. Dr. Gülsün YILDIRIM(gulsun.yildirim@alanya.edu.tr)	Alaaddin Keykubat Üniv, Alanya, Türkiye
Dr. Öğr. Üyesi Neslihan ŞİMŞEK(neslihan.simsek[at]inonu.edu.tr)	İnönü Üniv, Malatya, Türkiye	Dr. Öğr. Üyesi Mücahit YILDIRIM(mucahidyildirim@erbakan.edu.tr)	Necmettin Erbakan Üniv, Konya, Türkiye
Doç. Dr. Onjen TAK(onjen.tak@istinye.edu.tr)	Kocaeli Üniv, Kocaeli, Türkiye	Prof. Dr. Sibel YILDIRIM(sibel.yildirim@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye
Prof. Dr. Tülin TANER(tulin@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye	Dr. Öğr. Üyesi Adile Şehnaz YILMAZ(sehnazisci@cu.edu.tr)	Çukurova Üniv, Adana, Türkiye
Dr. Öğr. Üyesi Melek TAŞSÖKER(mtassoker@erbakan.edu.tr)	Necmettin Erbakan Üniv, Konya, Türkiye	Doç. Dr. Senem YİĞİT ÖZER(senemygt@hotmail.com)	Selçuk Üniv, Konya, Türkiye
Doç. Dr. Ufuk TATLI(utatl@cu.edu.tr)	Çukurova Üniv, Adana, Türkiye	Prof. Dr. Hamdi Oğuz YOLDAŞ(oguzyoldas@cu.edu.tr)	Adnan Menderes Üniv, Aydın, Türkiye
Dr. Öğr. Üyesi Neslihan TEKÇE(neslihan.tekce@kocaeli.edu.tr)	Kocaeli Üniv, Kocaeli, Türkiye	Prof. Dr. İsa YÖNDEM(isayondem@selcuk.edu.tr)	Çukurova Üniv, Adana, Türkiye
Prof. Dr. Meryem TEKÇİÇEK UZAMIŞ(uzamis@hacettepe.edu.tr)	Hacettepe Üniv, Ankara, Türkiye	Prof. Dr. Münir Tolga YÜCEL(munirtolga@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye
Prof. Dr. Uğur TEKİN(utekin[at]yahoo.com)	Ege Üniv, İzmir, Türkiye	Doç. Dr. Özgün ÖZÇAKA YÜKSEL(ozgunozcaka@yahoo.com)	Ege Üniv, İzmir, Türkiye
Prof. Dr. Mehmet Emin TEKİN(mtekin@selcuk.edu.tr)	Selçuk Üniv, Konya, Türkiye	Prof. Dr. Bülent YÜZÜGÜLLÜ(bulemy@gmail.com)	Başkent Üniv, Ankara, Türkiye
Prof. Dr. Hakan TERZİOĞLU(terzoglu[at]dentistry.ankara.edu.tr)	Ankara Üniv, Ankara, Türkiye		

Bu dergi TÜBİTAK/ULAKBİM Ulusal Tıp Veri Tabanı (TR Dizin), ERIH PLUS, EBSCO - Central & Eastern European Academic Source (CEEAS), DOAJ (Directory of Open Access Journals), EBSCO, Embase - Dentistry & Oral Sciences Source tarafından indekslenmektedir.

This journal is indexed by TÜBİTAK/ULAKBİM National Medical Database (TR Index), ERIH PLUS, EBSCO - Central & Eastern European Academic Source (CEEAS), DOAJ (Directory of Open Access Journals), EBSCO, Embase - Dentistry & Oral Sciences Source.

SELCUK DENTAL JOURNAL

İÇİNDEKİLER / CONTENTS

ARAŞTIRMA / RESEARCH

Bibliometric Analysis of Scientific Studies on OSCE in Dental Education <i>Diş Hekimliği Eğitiminde OSCE Üzerine Yapılan Bilimsel Çalışmaların Bibliyometrik Analizi</i> Seyit Bilal Özdemir, Büşra Özdemir.....	1
Comparative Evaluation of Four Large Language Models in Turkish Dentistry Specialization Exam <i>Türk Diş Hekimliği Uzmanlık Sınavında Dört Büyük Dil Modelinin Karşılaştırmalı Değerlendirilmesi</i> Ömer Ekici.....	6
Diş Hekimliği Müfredatıyla İlgili En çok Atıf Alan 50 Yayının Bibliyometrik Analizi <i>Bibliometric Analysis of the 50 Most Cited Publications on Dentistry Curriculum</i> Ömer Faruk Boylu, Nur Muhammed Demir.....	11
Student-Centered Education in Dentistry: Perspectives of Students and Academicians in Turkey <i>Diş Hekimliğinde Öğrenci Merkezli Eğitim: Türkiye'deki Öğrenci ve Akademisyenlerin Görüşleri</i> Mehmet Semih Velioğlu, Sinem Özdemir, Serkan Polat, Nimet Ünlü.....	17
Integration of Artificial Intelligence into Dental Education: Perspectives of Students and Academicians <i>Yapay Zeka'nın Diş Hekimliği Eğitimine Entegrasyonu: Öğrenci ve Akademisyenlerin Bakış Açısı</i> Mehmet Semih Velioğlu, Sinem Özdemir, Serkan Polat, Nimet Ünlü.....	25
Klinik Gözlem Ders Kurulu Dersinin Etkinliğinin Değerlendirilmesi: Anket Çalışması <i>Evaluation of the Effectiveness of the Clinical Observation Course Board Course: Survey Study</i> Kuddusi Çekiç, Nazmiye Dönmez.....	30
Are Future Dentists Ready for Aesthetics? <i>Geleceğin Diş Hekimleri Estetiğe Hazır mı?</i> Furkan Kozakoğlu, Merve Gürses, Nazmiye Dönmez, Nimet Ünlü.....	35
Comparison of Online And Face-To-Face Education Success in Dentistry <i>Diş Hekimliğinde Çevrimiçi ve Yüz Yüze Eğitim Başarısının Karşılaştırılması</i> Sedef Kotanlı, Mehmet Emin Doğan, Mehmet Veysel Kotanlı.....	42
Evaluation Of Agreement Between Peer and Faculty Assessments in Preclinical Endodontic Education: A Pilot Study <i>Klinik Öncesi Endodonti Eğitiminde Akran ve Öğretim Üyesi Değerlendirmeleri Arasındaki Uyumun İncelenmesi: Pilot Çalışma</i> Meltem Küçük.....	46

DERLEME / REVIEW

The Integration Process of Dental Faculties into the National Core Curriculum for Undergraduate Dental Education <i>Diş Hekimliği Fakültelerinin Mezuniyet Öncesi Diş Hekimliği Ulusal Çekirdek Eğitim Programına Uyum Süreci</i> Irmak Ocak.....	50
---	----

Bibliometric Analysis of Scientific Studies on OSCE in Dental Education

Diş Hekimliği Eğitiminde OSCE Üzerine Yapılan Bilimsel Çalışmaların Bibliyometrik Analizi

Seyit Bilal ÖZDEMİR^a, Büşra ÖZDEMİR^a

^aGiresun University, Faculty of Dentistry, Department of Restorative Dentistry, Giresun, Türkiye

^aGiresun Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Giresun, Türkiye

ABSTRACT

Objective: This study aims to conduct a bibliometric analysis of the Objective Structured Clinical Examination (OSCE) in dental education to evaluate global trends and academic productivity. It investigates the distribution of scientific output, the most prolific institutions, authors, and journals, along with the most frequently used keywords and highly cited publications.

Materials and Methods: A comprehensive literature search was conducted in the Web of Science database using the keywords “OSCE” and “Dental Education.” Bibliometric data were retrieved using the “Analyze Results” and “Citation Analysis” tools. Co-authorship and keyword co-occurrence networks were visualized with VOSviewer software. The number of publications, distribution by country and institution, citation counts, and keyword frequency were analyzed.

Results: A total of 112 publications were included. The leading countries were the USA, UK, Germany, Saudi Arabia, and Scotland. Harvard University and the University of London were the most productive institutions. Most OSCE-related articles were published in the *European Journal of Dental Education* and the *Journal of Dental Education*. Besides “OSCE” and “Dental Education,” common keywords included “assessment,” “objective structured clinical examination,” and “dental students.” The most cited paper was a 2008 review on predoctoral education practices.

Conclusion: This study offers a comprehensive overview of OSCE-related literature in dental education. It helps identify research trends, key contributors, and potential gaps, providing valuable insights for ongoing academic development and evidence-based education.

Keywords: Bibliometric Analysis, Dental Education, Objective Structured Clinical Examination

ÖZ

Amaç: Bu çalışmanın amacı, diş hekimliği eğitiminde kullanılan OSCE üzerine bibliyometrik bir analiz yaparak küresel eğilimleri ve akademik üretimi değerlendirmektir. Yapılan araştırmalara ilişkin bilimsel üretimin dağılımını, en çok yayın yapan kurum, yazar ve dergileri belirlemek, en sık kullanılan anahtar kelimeleri ve en çok atıf alan makaleleri açıklamaktır.

Gereç ve Yöntemler: Web of Science veritabanı kullanılarak kapsamlı bir literatür taraması yapıldı. “OSCE” ve “Dental Education” anahtar kelimeleri kullanıldı. Web of Science’ın “Analyze Results” ve “Citation Analysis” araçları aracılığıyla bibliyometrik veriler çıkarıldı. Ortak yazarlık ve anahtar kelime oluşumuna ilişkin bibliyometrik ağlar, VOSviewer yazılımı aracılığıyla gösterildi. Çalışmada yayımlanan makale sayısı, ülke ve kurum bazında dağılımı, atıf sayıları ve en sık kullanılan anahtar kelimeler değerlendirildi.

Bulgular: Analize toplam 112 makale dahil edildi. En fazla yayın yapan ülkeler Amerika Birleşik Devletleri, İngiltere, Almanya, Suudi Arabistan ve İskoçya olarak belirlendi. En üretken kurumlar arasında Harvard Üniversitesi ve Londra Üniversitesi öne çıktı. OSCE ile ilgili incelenen yayınların büyük bir kısmı *European Journal of Dental Education* ve *Journal of Dental Education* dergilerinde yayımlandı. OSCE ve Dental Education dışında en sık kullanılan anahtar kelimeler “assessment”, “objective structured clinical examination” ve “dental students” olarak belirlendi. En çok atıf alan makale ise 2008 yılında yayımlandı.

Sonuçlar: Bu çalışmada literatürün bütüncül bir analizi elde edildi. Çalışma, diş hekimliği eğitiminde OSCE ile ilgili literatür taramasını kolaylaştırmakta ve akademisyenlerin sürekli eğitime, kanıta dayalı uygulamalara katkıda bulunabilecek önemli noktaları ortaya koymaktadır.

Anahtar Kelimeler: Bibliyometrik Analiz, Diş Hekimliği Eğitimi, Yapılandırılmış Yansız Klinik Sınav

Introduction

Dentistry is predominantly a practice-based discipline.¹ During the preclinical phase, dental students undergo extensive theoretical and practical training to prepare for meeting their patients' needs and performing all essential therapeutic procedures.² Many dental faculties have adopted alternative educational strategies aimed at enhancing students' abilities in critical evaluation of knowledge, self-directed learning, and evidence-based decision-making.³ Regular and comprehensive assessments are crucial to monitor students' progress and ensure competency upon graduation. Although written examinations are relatively straightforward, they may fall short in assessing the full range of clinical skills.¹ Outcome-based approaches in clinical assessment can overlook essential attributes such as communication, practical, and procedural skills.²

In an effort to assess clinical skills in a consistent and objective manner, the Objective Structured Clinical Examination (OSCE) model was introduced by Harden and colleagues in 1975.⁴ OSCE is an innovative assessment method that evaluates not only factual knowledge but also effective communication and practical examination skills. As it is conducted in a lower-risk setting compared to real patient encounters, it allows students to feel more comfortable during the examination.⁵ Numerous studies have demonstrated that OSCE is a valid and reliable tool for the assessment of clinical competencies.^{6,7} It is an effective method for evaluating clinical and technical skills and achieving

knowledge- and skill-based educational objectives.⁸ The literature frequently emphasizes that OSCE meets key quality standards expected from an examination, such as reliability, validity, and feasibility.⁹ The OSCE has been widely used as an assessment tool in medicine and dentistry for over 40 years.¹⁰

Bibliometric analysis is an analytical method that enables the quantitative examination of research outputs within a specific field. This method allows for the investigation of trends, collaborations, and scientific productivity in the literature through visualization software.¹¹ Through bibliometric approaches, it is possible to identify publication types, the most productive authors, institutions, and countries. In addition, collaboration networks, gaps in the literature, and potential opportunities for future research can be determined. Bibliometric analyses also provide comprehensive insights by including data such as keywords and citation patterns. Citation analysis, in particular, is commonly used to evaluate the impact level of research.¹² Visualization tools such as VOSviewer (Centre for Science and Technology Studies, Leiden University, the Netherlands) facilitate the graphical representation of research areas by creating bibliometric maps.^{12,13}

Bibliometric analyses have been conducted on various topics such as the most cited articles¹⁴, areas of interest¹⁵ and the implementation of OSCE in pharmacy education.¹⁶ Despite the presence of numerous clinical studies and reviews on OSCE in dental education, there is currently no study that evaluates the literature production in this field

Gönderilme Tarihi/Received: 10 Nisan, 2025

Kabul Tarihi/Accepted: 6 Mayıs, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Özdemir SB, Özdemir B. Bibliometric Analysis of Scientific Studies on OSCE in Dental Education. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 1-5 Doi: 10.15311/ selcukdentj.1673116

Sorumlu yazar/Corresponding Author: Büşra ÖZDEMİR

E-mail: busrakbdy91@gmail.com

Doi: 10.15311/ selcukdentj.1673116

using bibliometric analysis and mapping methods. Therefore, the aim of this research is to conduct a comprehensive bibliometric analysis of the literature related to OSCE in dental education. This study aims to reveal the development and interaction networks of the literature in the field, identify leading institutions, authors, and countries, and define current research focuses and potential future directions through keyword analysis.

Materials and Methods

Database and Search Strategy

In this study, the Web of Science (WoS) electronic database provided by Clarivate Analytics (London, UK) was used. A comprehensive search was conducted within the Web of Science Core Collection using the advanced search feature. Boolean operators “AND” and “OR” were used to construct the following search query:

“OSCE” OR “Objective Structured Clinical Examination”) AND “Dental Education”

Data Extraction and Analysis

The data search was finalized as of January 28, 2025. The earliest relevant publication on the topic was from 2007, and the most recent one was published in 2024. For the bibliometric analysis, the “Analyze Results” tool of WoS was used to extract data including authors, journals, institutions, countries, publication years, keywords, number of citations, WoS categories, and research areas. Additionally, citation metrics such as total citation counts and average annual citations for the most cited publications were obtained using the “Create Citation Report” tool of WoS.

To support data visualization, bibliometric network maps were created using VOSviewer software (version 1.6.16). In this context, total records were analyzed, and co-authorship networks (by author, institution, and country) as well as keyword co-occurrences were visualized.

Statistical Analysis

No comparative statistical analyses were conducted in this study. The results were presented as frequencies and percentages. Accordingly, no hypothesis testing was performed, and no significance level was set.

Result

General Information

A total of 112 publications were included in the analysis (107 articles, 3 review articles, and 2 early access papers). The number of publications per year showed little variation before 2016. However, starting from 2018, a general upward trend was observed, with the highest number of publications reached in 2020 (Figure 1).

These publications received a total of 1389 citations, with an average of 12.4 citations per article. The annual number of citations showed little change before 2019 but exhibited a general increase thereafter, peaking at 188 citations in 2024 (Figure 1).

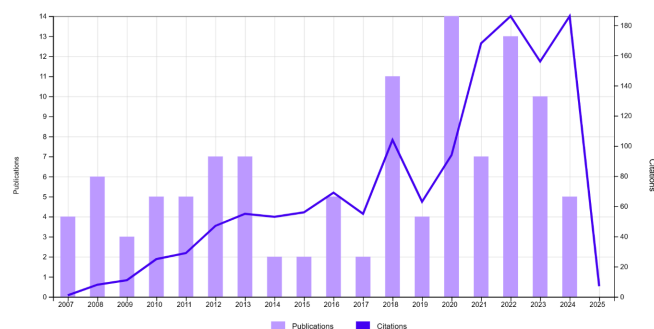


Figure 1. Total number of articles and citations by year

Leading Journals and Keywords

The top two journals in terms of the number of publications on the subject were the *European Journal of Dental Education* and the *Journal of Dental Education*, each contributing 43 articles. Together, these two journals accounted for 86 publications, representing 76.8% of the total. The number of citations for articles published in these journals was 526 (15.09 citations per article) and 471 (13.28 citations per article), respectively.

The most frequently used keywords were visualized in Figure 2. Following “dental education” and “OSCE,” the most common keywords included “assessment,” “objective structured clinical examination,” and “dental students.”

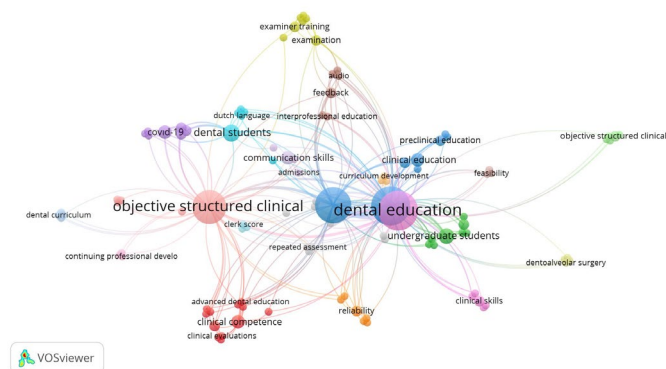


Figure 2. Visualization of the most frequently used keywords

Countries and Institutions

The top five countries in terms of the number of published articles are listed in Table 1. Among these, the United States of America (USA) ranked first in terms of publication count (39), total number of citations received (553), and total link strength (107) (Figure 3). The top five institutions by publication count were Harvard University, University of London, Academic Center for Dentistry Amsterdam, Vrije Universiteit Amsterdam, and National Taiwan University.

Table 1. The top five countries by number of published articles

Countries		Number of Publications
1	USA	39
2	England	16
3	Germany	12
4	Saudi Arabia	9
5	Scotland	9

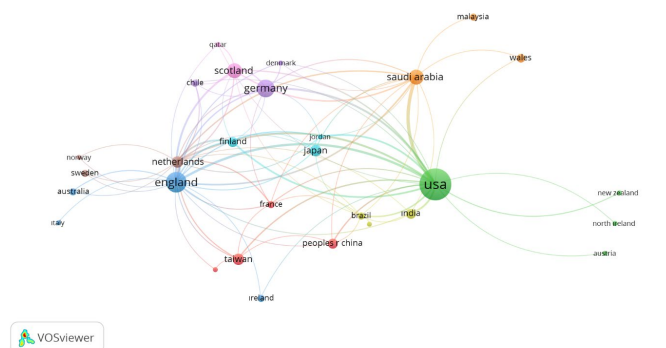


Figure 3. Visualization of international collaboration based on the number of published articles by country

Authors

A total of 470 authors contributed to the 112 publications evaluated. The top five authors in terms of the number of published articles are presented in Table 2. Schoonheim-Klein M ranked first in terms of number of publications (6), number of citations received (209), and total link strength (27) (Figure 4)

Table 2. Top five authors by number of published articles

Authors	Number of Publications
1	Schoonheim-Klein, M.
2	Karimbux, Nadeem Y.
3	Manogue, Michael
4	Lahti, Satu
5	Lai, Eddie Hsiang-Hua

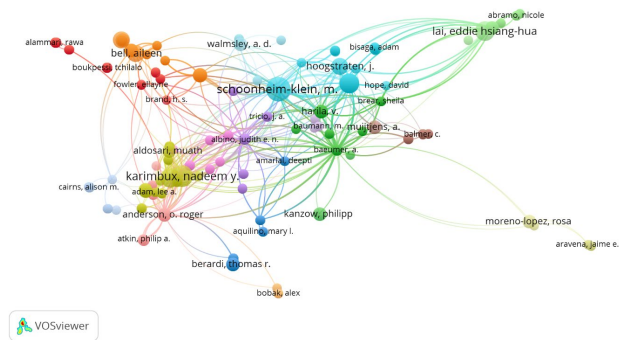


Figure 4. Visualization of citation counts by authors

Articles

The top five most cited articles are presented in Table 3. The article with the highest total number of citations was published in 2008 and was a review investigating current practices in predoctoral dental education. Table 4 presents the top five articles ranked by average annual citation count. The article with the highest average annual citation was published in 2020 and addressed the implementation and evaluation of an online examination for final-year dental students during the COVID-19 pandemic.

Table 3. The top five most cited articles

	Title	Author	Year of publication	Total Citation
1	Assessing Dental Students' Competence: Best Practice Recommendations in the Performance Assessment Literature and Investigation of Current Practices in Predoctoral Dental Education ³¹	Albino, J.	2008	123
2	Is the OSCE more stressful? Examination anxiety and its consequences in different assessment methods in dental education ³²	Schoonheim-Klein, M.	2009	104
3	Introducing a comprehensive high-stake online exam to final-year dental students during the COVID-19 pandemic and evaluation of its effectiveness ²⁸	Khalaf, K	2020	56
4	The correlation of student performance in preclinical and clinical prosthodontics ³³	Curtis, Donald A.	2007	53
5	Implementing an online OSCE during the COVID-19 pandemic ³⁴	Kakadia, Rahen	2021	51

Table 4. Top five articles by annual average citation frequency

	Title	Author	Year of publication	Citation frequency
1	Introducing a comprehensive high-stake online exam to final-year dental students during the COVID-19 pandemic and evaluation of its effectiveness ²⁸	Khalaf, K	2020	
2	Implementing an online OSCE during the COVID-19 pandemic ³⁴	Kakadia, R	2021	
3	Assessing Dental Students' Competence: Best Practice Recommendations in the Performance Assessment Literature and Investigation of Current Practices in Predoctoral Dental Education ³¹	Albino, J.	2008	
4	Is the OSCE more stressful? Examination anxiety and its consequences in different assessment methods in dental education ³²	Schoonheim-Klein, M	2009	
5	A pilot of a Virtual Objective Structured Clinical Examination in dental education. A response to COVID-19 ³⁵	Donn, J.	2021	

Discussion

Bibliometric studies not only provide an overview of the historical background of a particular subject but also help to identify its evolution over time and highlight emerging research interests in the field.¹⁷ Bibliometric analyses may focus on the evaluation of a single publication¹⁸ or a group of publications.¹⁹ Similarly, they can also be directed toward examining the scientific output of a specific country or research area.²⁰ This study aimed to comprehensively understand the prevailing academic landscape related to OSCE in dental education. By analyzing relevant research articles, a holistic evaluation of the literature was obtained.

Regarding the use of specific databases, selecting an appropriate source is essential for accurate and reliable data analysis.²¹ Citation indexes such as WoS, Scopus (Elsevier, Amsterdam, Netherlands) and Medline (National Library of Medicine; National Institutes of Health, Bethesda, MD, USA) are among the most commonly used databases in health sciences due to their broad thematic and geographical coverage. Therefore, a comprehensive search was conducted in the Web of Science database for this study. A total of 112 publications authored by 470 researchers from 156 institutions in 34 countries were included. This distribution indicates that the topic of OSCE in dental education has attracted global attention and scientific interest. The first publication related to the topic appeared in 2007, and the number of publications peaked in 2020. This suggests that the subject remains current and that there are many aspects that still require further development.

When examining the geographical distribution of author affiliations, it is noteworthy that the United States (USA) emerged as the most productive country in terms of the number of published articles, total citations, and the highest total link strength. Total link strength indicates the degree of collaboration.²² This suggests an increasing collaborative engagement within the U.S. scientific community. It has been reported that dental schools in North America began using the OSCE as early as the 1970s, and this approach later served as a model for educational institutions worldwide.²³ Additionally, the high-budget academic infrastructure of USA based universities and their access to leading scientific journals may contribute to the quantitative and qualitative prominence of publications from this country.²⁴ Therefore, the strong research infrastructure in dental education, the volume of scientific output, and the early adoption of OSCE as a clinical assessment tool may explain the USA's leading position.

While the number of publications indicates researcher productivity, citation counts are used to evaluate scientific impact by measuring how frequently a particular study is cited in subsequent publications.²⁵ In this study, the author Schoonheim-Klein, M. ranked first in terms of the number of publications, total citations, and total link strength. Citation analysis is a commonly used method in bibliometric studies to assess the impact of a publication based on how often it is cited by other authors.²⁶ An important consideration in citation analysis is that older publications tend to accumulate more citations in absolute terms over time.²⁷ However, this is not always the case. In the present study, the most cited article was published in 2008, whereas the article with the highest average annual citation rate was published in 2020.²⁸ The high annual citation intensity of the article titled "Introducing a comprehensive high-stake online exam to

final-year dental students during the COVID-19 pandemic and evaluation of its effectiveness” may be attributed to the emergence of online OSCE implementations during the COVID-19 pandemic and the growing research interest in this area.

The journal analysis revealed that the leading journals in this field not only published the highest volume of literature but also received the greatest number of citations.²⁹ This finding indicates that these journals have consistently maintained their authority as prominent sources in the field of dental education. The co-occurrence analysis of keywords can provide insight into the evolving patterns of a specific research area.³⁰ The results of the keyword analysis highlighted several notable research foci within the topic.

This study has certain limitations. Only the Web of Science (WoS) database was used, and only English-language publications were included. Additionally, early access articles identified by WoS that had not yet been assigned a volume, issue, or page number were also included, which may be considered a limitation. Future studies may benefit from including other databases such as Scopus and Medline

Conclusion

This bibliometric analysis comprehensively evaluated the global distribution, research trends, and collaboration networks of scientific publications on the OSCE in dental education. The findings indicate that OSCE has been increasingly adopted worldwide as a tool for clinical skills assessment and has regained attention particularly through online implementations in the post-COVID-19 period. USA emerged as the leading country in terms of the number of publications, citation count, and total link strength, which may be associated with its strong academic infrastructure and early adoption of OSCE. This study highlights the evolution and current focus areas of the OSCE-related literature and offers strategic insights to guide future research.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmaları CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması/ Design of Study: SBÖ(%50), BÖ(%50)
Veri Toplanması/ Data Acquisition: SBÖ(%60), BÖ(%40)
Veri Analizi/ Data Analysis: SBÖ(%50), BÖ(%50)
Makalenin Yazımı/ Writing up: SBÖ(%50), BÖ(%50)
Makale Gönderimi ve Revizyonu/ Submission and Revision: SBÖ(%40), BÖ(%60)

REFERENCES

- Donn J, et al. Virtual objective structured clinical examination during the COVID-19 pandemic: an essential addition to dental assessment. *European Journal of Dental Education*. 2023;27(1):46-55.
- Davis MH. OSCE: the Dundee experience. *Medical teacher*. 2003;25(3):255-261.
- Hendricson A. Commission on Change & Innovation (2007). Educational strategies associated with development of problem-solving, critical thinking, and self directed learning. *Journal Dental Education*. 70:925-936.
- Harden RM, et al. Assessment of clinical competence using objective structured examination. *Br Med J*. 1975;1(5955):447-451.
- Casey PM, et al. To the point: reviews in medical education—the Objective Structured Clinical Examination. *American journal of obstetrics and gynecology*. 2009;200(1):25-34.
- O'Connor H, McGraw R. Clinical skills training: developing objective assessment instruments. *Medical education*. 1997;31(5):359-363.
- Rosebraugh CJ, et al. Setting standards and defining quality of performance in the validation of a standardized-patient examination format. *Academic Medicine*. 1997;72(11):1012-4.
- Newble D. Techniques for measuring clinical competence: objective structured clinical examinations. *Medical education*. 2004;38(2):199-203.
- Smee S, Blackmore D. Setting standards for an objective structured clinical examination: the borderline group method gains ground on Angoff. *Medical Education*. 2001;35(11)
- Cidoncha G, et al. The objective structured clinical examination (OSCE) in periodontology with simulated patient: the most realistic approach to clinical practice in dentistry. *International Journal of Environmental Research and Public Health*. 2023;20(3):2661.
- Železnik D, et al. A bibliometric analysis of the *Journal of Advanced Nursing*, 1976-2015. *Journal of advanced nursing*. 2017;73(10):2407-2419.
- Guerrero-Gironés J, et al. Scientific production on silicate-based endodontic materials: evolution and current state: a bibliometric analysis. *Clinical Oral Investigations*. 2022;26(9):5611-5624.
- Hsu M-H, Chang Y-C. Haptic and force feedback technology in dental education: a bibliometric analysis. *International Journal of Environmental Research and Public Health*. 2023;20(2):1318.
- Ullah R, et al. Top-cited articles from dental education journals, 2009 to 2018: a bibliometric analysis. *Journal of Dental Education*. 2019;83(12):1382-1391.
- Kandaswamy E. Areas of Interest in Dental Education: A Bibliometric Analysis of the Last Decade. *Cureus*. 2024;16(5)
- Lim AS, et al. What's been trending with OSCEs in pharmacy education over the last 20 years? A bibliometric review and content analysis. *Currents in Pharmacy Teaching and Learning*. 2024;
- Barboza-Palomino M, et al. Thirty Years of *Psicothema*: A Bibliometric Analysis (1989-2018). *Psicothema*. 2020;32(4)
- Ahmad P, et al. The top 50 most-cited articles published in the *International Endodontic Journal*. *International Endodontic Journal*. 2019;52(6):803-818.
- Mishra L, et al. A bibliometric analysis of two PubMed-indexed high-impact factor endodontic journals: a comparison of India with other countries. *Indian Journal of Dentistry*. 2016;7(3):121.
- Shamszadeh S, et al. Regenerative endodontics: a scientometric and bibliometric analysis. *Journal of Endodontics*. 2019;45(3):272-280.
- Archambault É, et al. Comparing bibliometric statistics obtained from the Web of Science and Scopus. *Journal of the American society for information science and technology*. 2009;60(7):1320-1326.
- Meng F, et al. Bibliometric and visualization analysis of literature relating to diabetic erectile dysfunction. *Frontiers in Endocrinology*. 2022;13:1091999.
- Schoonheim-Klein M, et al. On the reliability of a dental OSCE, using SEM: effect of different days. *European journal of dental education*. 2008;12(3):131-137.
- Cowpe J, et al. Profile and competences for the graduating European dentist-update 2009. *European Journal of Dental Education*. 2010;14(4):193-202.
- Utar M. Bibliometric Analysis of the Prosthodontic Studies Used Finite Element Analysis in TR Index. *Current Research in Dental Sciences*. 2023;33(3):148-152.
- Feijoo JF, et al. The 100 most cited articles in dentistry. *Clinical oral investigations*. 2014;18:699-706.
- Luo F, et al. Exploring prestigious citations sourced from top universities in bibliometrics and altmetrics: a case study in the computer science discipline. *Scientometrics*. 2018;114:1-17.
- Khalaf K, et al. Introducing a comprehensive high-stake online exam to final-year dental students during the COVID-19 pandemic and evaluation of its effectiveness. *Medical Education Online*. 2020;25(1):1826861.
- Rawashdeh B, et al. A bibliometric analysis of the most cited journal articles in kidney transplantation. *Cureus*. 2023;15(4)
- Li H, et al. Evolutionary features of academic articles co-keyword network and keywords co-occurrence network: Based on two-mode affiliation network. *Physica A: Statistical Mechanics and its Applications*. 2016;450:657-669.
- Albino JE, et al. Assessing dental students' competence: best practice recommendations in the performance assessment literature and investigation of current practices in predoctoral dental education. *Journal of dental education*. 2008;72(12):1405-1435.
- Brand HS, Schoonheim-Klein M. Is the OSCE more stressful? Examination anxiety and its consequences in different assessment methods in dental education. *European Journal of Dental Education*. 2009;13(3):147-153.
- Curtis DA, et al. The correlation of student performance in preclinical and clinical prosthodontic assessments. *Journal of dental education*. 2007;71(3):365-372.
- Kakadia R, et al. Implementing an online OSCE during the COVID-19 pandemic. *Journal of dental education*. 2020;85(Suppl 1):1006.
- Donn J, et al. A pilot of a virtual objective structured clinical examination in dental education. A response to COVID-19. *European Journal of Dental Education*. 2021;25(3):488-494.

Comparative Evaluation of Four Large Language Models in Turkish Dentistry Specialization Exam

Türk Diş Hekimliği Uzmanlık Sınavında Dört Büyük Dil Modelinin Karşılaştırmalı Değerlendirilmesi

Ömer EKİCİ^a 

^aAfyonkarahisar Health Sciences University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Afyonkarahisar, Türkiye

^aAfyonkarahisar Sağlık Bilimleri Üniversitesi, Diş Hekimliği Fakültesi, Ağız, Diş ve Çene Cerrahisi AD, Afyonkarahisar, Türkiye

ABSTRACT

Background: The aim of the study is to evaluate the performance of four leading Large Language Models (LLMs) in the 2021 Dentistry Specialization Exam (DSE).

Methods: A total of 112 questions were used, including 39 questions in basic sciences and 73 questions in clinical sciences, which did not include the figures and graphs asked in the 2021 DSE. The study evaluated the performance of four LLMs: Claude-3.5 Haiku, GPT-3.5, Co-pilot, and Gemini-1.5.

Results: In basic sciences, Claude-3.5 Haiku and GPT-3.5 answered all questions correctly by 100%, while Gemini-1.5 answered by 94.9% and Co-pilot by 92.3%. In clinical sciences, Claude-3.5 Haiku showed an overall correct answer rate of 89%, Co-pilot 80.9%, GPT-3.5 79.7% and Gemini-1.5 65.7%. For all questions, Claude-3.5 Haiku showed a correct answer rate of 92.85%, GPT-3.5 86.6%, Co-pilot 84.8% and Gemini-1.5 75.9%. While the performance of LLMs in basic sciences was similar ($p=0.134$), there was a statistically significant difference between the performances of LLMs in clinical sciences and all questions ($p=0.007$ and $p=0.005$, respectively).

Conclusion: In all questions and clinical sciences, Claude-3.5 Haiku performed best, Gemini-1.5 performed worst, and GPT-3.5 and Co-pilot performed similarly. The 4 LLM models examined showed a higher success rate in basic sciences than in clinical sciences. The results showed that AI-based LLMs can perform well in knowledge-based questions such as basic sciences but perform poorly in questions that require knowledge as well as clinical reasoning, discussion, and interpretation, such as clinical sciences.

Keywords: Artificial intelligence, Dentistry, Dentistry specialization training, Large language model

ÖZ

Amaç: Çalışmanın amacı 2021 Diş Hekimliği Uzmanlık Eğitimi giriş sınavında (DUS) önde gelen dört Büyük Dil Modeli (LLM)'nin performansını değerlendirmektir.

Gereç ve Yöntemler: 2021 DUS sınavında sorulan şekil ve grafik içermeyen temel bilimlerde 39 soru ve klinik bilimlerde 73 soru olmak üzere 112 soru kullanıldı. Çalışmada Claude 3.5 Haiku, GPT-3.5, Copilot ve Gemini 1.5 olmak üzere dört LLM'nin performansı değerlendirildi.

Bulgular: Temel bilimlerde Claude-3.5 Haiku ve GPT-3.5 tüm soruları %100 doğru cevaplarırken, Gemini 1.5 %94,9 ve Copilot %92,3 oranında cevapladı. Klinik bilimlerde toplamda Claude 3.5 Haiku %89, Copilot %80,9, GPT-3.5 %79,7 ve Gemini 1.5 %65,7 doğru cevap oranı sergiledi. Tüm sorularda ise Claude 3.5 Haiku %92,85, GPT-3.5 %86,6, Copilot %84,8 ve Gemini %75,9 doğru cevap oranı gösterdi. Temel bilimlerde LLM'lerin performansı benzer iken ($p=0.134$), klinik bilimlerde ve tüm sorularda LLM'lerin performansları arasında istatistiksel açıdan anlamlı farklılık görüldü (sırasıyla $p=0.007$ ve $p=0.005$).

Sonuç: Tüm sorularda Claude 3.5 Haiku en iyi performansı gösterirken, Gemini 1.5 en kötü performansı gösterdi, GPT 3.5 ve Co pilot'un performansı benzer bulundu. İncelenen 4 LLM modeli temel bilimlerde klinik bilimlere göre daha yüksek bir başarı oranı gösterdi. Sonuçlar, yapay zeka tabanlı LLM'lerin temel bilimler gibi bilgiye dayalı sorularda iyi performans sergileyebileceğini ancak klinik bilimler gibi bilgi ile birlikte klinik muhakeme, tartışma ve yorum gerektiren sorularda daha düşük performans sergilediğini gösterdi.

Anahtar Kelimeler: Yapay zekâ, Diş Hekimliği, Diş Hekimliği uzmanlık eğitimi, Büyük dil modeli.

INTRODUCTION

Artificial intelligence (AI) refers to the ability of computers to mimic human intelligence to perform tasks that typically require human abilities, such as understanding, reasoning, and decision making.¹ Many tasks in everyday life have become easier thanks to the use of AI. AI software has the potential to provide a productive avenue for education and learning.² Large language models (LLMs) have a variety of applications in medicine and dentistry, representing a significant advance in the field of AI.³ Potential uses for LLMs in dentistry include clinical decision support, patient and dental education, scientific writing, and scientific education.⁴ In dentistry education, LLMs have been shown to help students create a "personalized learning experience," write dental essays, and help instructors create test questions.^{5,6}

It is well known that Chat GPT and other LLMs are rapidly innovating and evolving. Commonly known LLMs include ChatGPT, Gemini, Claude and Co-pilot developed by OpenAI, Google, Anthropic, and Microsoft. These models have advanced conversational capabilities that resemble human-like interactions. This feature offers great potential in educational environments such as virtual assistants, chatbots, and online learning support systems.⁷ These LLMs are revolutionizing medical education and practice by processing and producing human language at an unprecedented scale.⁸ The capacity of LLMs to analyze and interpret large amounts of data has made them indispensable in finding solutions to complex problems.

LLMs are increasingly popular in dentistry, with potential applications ranging from improving diagnostic accuracy to patient education.^{9,10} The increasing availability of artificial intelligence and LLMs offers the advantage of providing comprehensive information to healthcare professionals and patients in the fields of medicine and dentistry.¹¹ However, since they cover critical issues related to human health, it is extremely important that the information provided is accurate and reliable. It is important to understand the practical use of LLMs in dentistry for exam preparation and information acquisition, and their potential risks. LLMs can be used by students for information acquisition, but LLMs are prone to hallucination, meaning that LLMs can persuasively convey false information, and should therefore be used with caution.¹² Furthermore, the performance of different LLMs is not fully known, and it remains to be discovered whether one is more suitable than another for professional use. LLMs have shown promising results in medical licensing examinations around the world, demonstrating their potential to understand complex medical information. Studies have highlighted that these models have the ability to pass the United States Medical Licensing Examination (USMLE) and other national medical examinations in Japan and China. The findings suggest that LLMs may be a valuable tool in vocational training.¹³ However, ChatGPT-3.5 reportedly failed the Iranian Endodontics Specialist Board.¹⁴ No study has been found in the literature that focuses on investigating the performance of LLMs in answering the questions asked in the Dentistry Specialist Education entrance exam (DSE) in Türkiye. The aim of the study was to evaluate the performance

Gönderilme Tarihi/Received: 11 Nisan, 2025

Kabul Tarihi/Accepted: 30 Haziran, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Ekici Ö. Comparative Evaluation of Four Large Language Models in Turkish Dentistry Specialization Exam. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 6-10 Doi: 10.15311/ selcukdentj.1674113

Sorumlu yazar/Corresponding Author: Ömer EKİCİ

E-mail: dromerekici@hotmail.com

Doi: 10.15311/ selcukdentj.1674113

of four leading LLMs in the 2021 DSE and their potential application in dentistry education and practice.

MATERIAL AND METHODS

Since this study used only publicly available internet data and did not involve human participants, ethics committee approval was not required.

The following four LLMs were evaluated in this study: 1) Claude 3.5 Haiku (San Francisco, California, USA); 2) Chat GPT-3.5 (OpenAI, San Francisco, California, USA); 3) Gemini1.5 (Google LLC, Mountain View, California, USA); 4) Co-pilot (Microsoft, Redmond, Washington)

The latest exam published by the Student Selection and Placement Center (SSPC), the 2021 DSE, was included in the study. Two questions that were canceled by SSPC and six questions that included figures and graphics were not included in the study. Therefore, 112 questions were used, 39 in basic sciences and 73 in clinical sciences.

On January 15, 2025, new accounts were created for each LLM evaluated in this study (Claude 3.5 Haiku, Chat GPT-3.5, Gemini1.5, and Copilot). The models were tested using their latest publicly available versions. Cookies and internet history were deleted before queries were made. All questions were entered into the respective LLMs by a single researcher (ÖE). Before each question, the following instruction was entered in Turkish:

"You are a student taking the DUS exam. The exam consists of multiple choice questions and you must select only the most appropriate answer. Which of the following best represents the most appropriate answer?"

This answer was considered "correct" if it matched the official answers provided by SSPC.

All statistical analyses were performed with the SPSS statistical program, version 27 (SPSS Inc, Chicago, IL, USA). Standard descriptive statistics were used for statistical analysis. Chi-square analysis was used to compare correct response rates among LLMs. Pairwise comparisons between LLMs were performed using Post-Hoc Chi-Square analysis with Bonferroni correction. For Pearson Chi-Square tests, $p < 0.05$ was considered statistically significant, and for Post-Hoc comparisons, the significance level was set at $p < 0.0062$ after Bonferroni correction. $P < 0.05$ was considered statistically significant.

RESULTS

112 questions, excluding the canceled questions and questions containing figures, were analyzed. The response accuracy of four LLMs, namely Claude 3.5 Haiku, Chat GPT-3.5, Gemini 1.5 and Co-pilot, was compared to the questions asked in the 2021 DSE exam.

In basic sciences, Claude-3.5 Haiku and GPT-3.5 answered all questions 100% correctly, while Gemini 1.5 answered 94.9% and Copilot answered 92.3%. In basic sciences, Gemini 1.5 answered 80% of the Anatomy questions and 83% of the Medical Biochemistry questions correctly. Co-pilot answered 75% of the histology and embryology and medical genetics questions and 83.3% of the Medical Microbiology questions correctly (Table 1).

Table 1. Comparison of correct answers given by LLMs to questions asked in the basic sciences test.

Basic Sciences	n	Claude 3.5 Haiku n(%)	Chat GPT 3.5 n(%)	Co-pilot n(%)	Gemini 1.5 n(%)
Anatomy	5	5(100)	5(100)	5(100)	4(80)
Histology and embryology	4	4(100)	4(100)	3(75)	4(100)
Physiology	6	6(100)	6(100)	6(100)	6(100)
Medical biochemistry	6	6(100)	6(100)	6(100)	5(83.3)
Medical microbiology	6	6(100)	6(100)	5(83.3)	6(100)
Medical pathology	4	4(100)	4(100)	4(100)	4(100)
Medical pharmacology	4	4(100)	4(100)	4(100)	4(100)
Medical biology and genetics	4	4(100)	4(100)	3(75)	4(100)
TOTAL	39	39(100)	39(100)	36(92.3)	37(94.9)

LLMs: Large language models; n:number

In clinical sciences, Claude 3.5 Haiku showed 89% correct answer rate, Copilot 80.9%, GPT-3.5 79.7% and Gemini 1.5 65.7%. The minimum and maximum success of the 4 LLM models in clinical sciences were as follows: Claude 3.5 (70-100%), Chat GPT 3.5 (50-100%), Copilot (44.4-100%), Gemini 1.5 (40-88.9%). Claude 3.5 Haiku answered all orthodontics questions, Chat GPT 3.5 Oral and Maxillofacial Radiology and Endodontics questions and Copilot answered all periodontics questions correctly. Claude 3.5 Haiku showed the lowest success in prosthetic dentistry (70%), Chat GPT 3.5 in periodontics (50%), Copilot in pedodontics (44.4%), Gemini 1.5 in prosthetic dentistry (40%) (Table 2).

Claude 3.5 Haiku showed 92.85% correct answer rate in all questions, GPT-3.5 86.6%, Copilot 84.8% and Gemini 75.9% (Figure 1).

Table 2. Comparison of correct answers given by LLMs to questions asked in the clinical sciences test

Clinical Sciences	n	Claude 3.5 Haiku n(%)	Chat GPT 3.5 n(%)	Co-pilot n(%)	Gemini 1.5 n(%)
Restorative dentistry	9	8(88.9)	7(77.8)	8(88.9)	8(88.9)
Prosthetic dentistry	10	7(70)	7(70)	7(70)	4(40)
Oral and maxillofacial surgery	10	9(90)	9(90)	9(90)	7(70)
Oral and maxillofacial radiology	9	8(88.9)	9(100)	7(77.8)	6(66.7)
Periodontology	10	9(90)	5(50)	10(100)	7(70)
Orthodontics	9	9(100)	8(88.9)	8(88.9)	6(66.7)
Endodontics	7	5(71.4)	7(100)	6(85.7)	6(85.7)
Pediatric dentistry	9	8(88.9)	6(66.7)	4(44.4)	4(44.4)
TOTAL	73	65(89)	58(79.7)	59(80.9)	48(65.7)

LLMs: Large language models; n:number

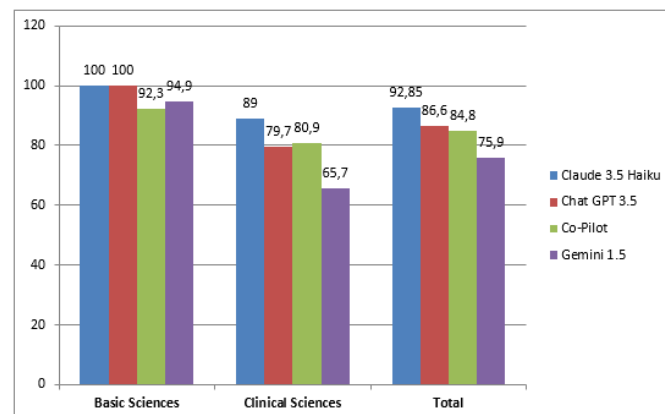


Figure 1. Comparison of correct response rates of LLMs in basic sciences, clinical sciences and all questions (%)

There was no statistically significant difference between the correct answer rates of the four LLMs in basic sciences ($p=0.134$). Statistically significant difference was observed between LLMs in clinical sciences and all questions ($p=0.007$ and $p=0.005$, respectively). Claude 3.5 Haiku showed the best performance, Gemini 1.5 showed the worst performance. Chat GPT 3.5 and Co pilot showed similar success rates (Table 3). According to the pairwise comparison results between LLMs in Clinical Sciences questions and all questions, a statistically significant difference was observed only between Claude 3.5 Haiku and Gemini 1.5 ($p < 0.001$). After Benforri correction, no statistically significant difference was observed between the performances of Claude 3.5 Haiku, Chat GPT3.5 and Co-pilot. (Table 4 and Table 5).

Table 3. Comparison of correct response rates of LLMs in basic sciences, clinical sciences and all questions

	n	Claude 3.5 Haiku n(%)	Chat GPT 3.5 n(%)	Co-pilot n(%)	Gemini 1.5 n(%)	P value
Basic Sciences	39	39(100)	39(100)	36(92.3)	37(94.9)	0.134
Clinical Sciences	73	65(89)	58(79.7)	59(80.9)	48(65.7)	0.007*
TOTAL	112	104 (92.85)	97(86.6)	95(84.8)	85(75.9)	0.005*

LLMs: Large language models; n:number; *:p<0.05

Table 4. Pairwise comparisons of LLMs' performance on clinical sciences questions

	Claude 3.5 Haiku	Chat GPT 3.5	Co-pilot	Gemini 1.5
Claude 3.5 Haiku	-	0.086	0.124	<0.001**
Chat GPT 3.5	0.086	-	0.500	0.047
Co-pilot	0.124	0.500	-	0.030
Gemini 1.5	<0.001**	0.047	0.030	-

Pearson Chi Square. *p-value is significant at p<0.05 level; **p-value is significant at p<0.01; GPT: Generative Pre-trained Transformer; LLM: large language model (p<0.0062, bonferroni correction)

Table 5. Pairwise comparisons of LLMs' performance on all questions

	Claude 3.5 Haiku	Chat GPT 3.5	Co-pilot	Gemini 1.5
Claude 3.5 Haiku	-	0.093	0.044	<0.001**
Chat GPT 3.5	0.093	-	0.424	0.029
Co-pilot	0.044	0.424	-	0.065
Gemini 1.5	<0.001**	0.029	0.065	-

Pearson Chi Square. *p-value is significant at p<0.05 level; **p-value is significant at p<0.01; GPT: Generative Pre-trained Transformer; LLM: large language model (p<0.0062, bonferroni correction)

DISCUSSION

In this study, we evaluated the correct response rates of Claude 3.5 Haiku, Chat GPT 3.5, Gemini 1.5 and Copilot in answering questions that do not contain figures and graphics asked in the 2021 DSE exam. In the study, the highest performance in all questions was obtained with Claude 3.5 Haiku (92.85%), followed by Chat GPT 3.5 (86.6%), Copilot (84.8%) and Gemini 1.5 (75.9%), respectively. A statistical difference emerged between the correct response rates of the LLM models examined in all questions. Claude 3.5 Haiku showed the best performance, while Gemini showed the worst performance.

The success of LLMs has been researched in various national dental examinations. In the 2023 Japan National Dentistry Examination (JNDE) using 185 questions, Chat GPT 4 performed best on all questions (73.5%), followed by Bard (66.5%) and Chat GPT 3.5 (51.9%). Performance of GPT 4 and Bard was significantly higher than GPT 3.5. LLMs performed worse on Professional Dentistry questions, but the order of performance was similar and no statistically significant difference was observed: GPT-4 (51.6%), Bard (45.3%), GPT-3.5 (35.9%).¹⁵ In the 2023 Japanese national dental hygienist exam, where 73 questions were analyzed, it was reported that the highest correct answer rates were seen in GPT-4 (75.3%), followed by Bing (68.5%) and GPT-3.5 (63.0%), but there was no statistically significant difference between the correct answers of the LLMs.¹⁶ GPT-4 has been successful in the Korean National Dental Hygienist Exam Questions between 63.6% and 70.3% over the last 5 years, outperforming Gemini (49.4% vs. 58.2%) and GPT-3.5 (39.2% vs. 45.5%).¹⁷ In our study, unlike these studies, we used Claude 3.5 Haiku. Claude 3.5 Haiku showed high performance like GPT-4 and the best performance among the LLMs examined. In our study, Copilot (formerly Bing) and Chat GPT 3.5 showed higher performance than Gemini (formerly Bard). In this study conducted in Türkiye, there was a significant difference between the LLMs in clinical sciences and all questions, while there was no statistically significant difference between the performances of the LLMs examined, similar to the studies conducted in Japan in the field of basic sciences. In our study, it is seen that the accuracy rates in all LLMs we examined are higher than similar studies in the literature. It should be taken into account that the results may vary from country to country or from exam to exam depending on the time the research was conducted, the content and language of the data set used.

In our study, the LLM models examined showed lower success in clinical sciences than in basic sciences. Similar to our research results, in a study conducted in Poland, ChatGPT-4's performance in clinical case-based questions (36.36% accuracy) was found to be lower than its performance in other questions (72.87% accuracy).¹⁸ The lower success of LLMs in clinical sciences is due to both the nature of medical knowledge and the limitations of current artificial intelligence models. Basic sciences have more systematic, formulated, rule-based information. However, clinical decisions include a large number of variables (patient medical history, clinical examination findings, laboratory/radiography findings). Differential diagnosis in most diseases requires clinical intuition, experience, and contextual evaluation. LLMs are still limited in understanding the context; they cannot fully mimic real clinical reasoning. In addition, there may be conflicting information in the literature, so situations such as level of evidence, risk/benefit analysis are important in clinical practices, and such evaluations are difficult for LLMs. In addition, clinical guidelines may change frequently and are updated at certain intervals. While content related to basic sciences is available on the internet in a more standard and accessible form, clinical information is more included in medical practice and is based on patient data, data is specific, limited, and restricted for ethical reasons. LLMs can be improved in clinical sciences by increasing their ability to make sense of the patient context, continuous integration of clinical guidelines, training with real case-based educational data, and feedback-based learning methods, but they can never fully replace clinical experience and physician judgment.

The success of LLMs may also vary among different clinical sciences. In our study, Claude 3.5 Haiku answered all orthodontics questions correctly, while the lowest response rate was seen in prosthodontics (70%). Copilot answered all periodontics questions correctly, while Chat GPT 3.5 could only answer half of them correctly. However, the lowest response rates were seen in prosthodontics and pedodontics in Copilot and Gemini 1.5. However, in the Polish Final Dentistry Exam, Chat GPT-4 performed better in areas such as Endodontics and Restorative Dentistry (71.74%) and Prosthodontics (80%), but showed lower accuracy in oral surgery (64%), pediatric dentistry (62.07%) and orthodontics (52.63%). The researchers explained the decrease in AI accuracy in more clinically challenging areas such as pediatric dentistry and oral surgery as AI models may have difficulty with questions that require clinical reasoning.¹⁸ In a study analyzing the performance of LLMs in solving restorative dentistry and endodontics student assessment questions, 151 questions were used for analysis, of which ChatGPT-4.0o showed the highest success (72%), followed by ChatGPT-4.0 (62%), Google Gemini 1.0 (44%) and ChatGPT-3.5 (25%).¹⁹ Similarly, Suárez reported in his study that the percentage of correct answers for GPT-4 in endodontics questions was only 57.3%, and that these models cannot currently replace dentists in clinical decision-making processes in dentistry.²⁰

Since the LLM models we examined do not have image analysis features, we did not include questions containing figures and pictures. However, a study reported that ChatGPT-4V had an overall correct response rate of 35% for image-based Japanese National Dental Examination questions. The researchers noted that ChatGPT-4V's image recognition feature is not yet reliable or comprehensive enough to be used as an educational tool in the medical and dental fields.²¹ In addition, since this study did not provide data on the response rates of questions asked in the DUS 2021 exam, we were unable to compare the success of LLM models with candidates who took the exam. In the Polish Final Dentistry Exam, GPT-4o achieved a success rate of 70.85%, but fell short of the highest human success rate of 94.97%.¹⁸ In the Korean National Dental Hygienist Examination, GPT-4 achieved an average success rate of 65.9%, but similarly fell short of the success of human candidates of over 74%.¹⁷ These studies suggest that although LLMs have the potential as a complementary educational tool in dentistry, their clinical reasoning capabilities are limited and do not yet reach the critical thinking and clinical judgment demonstrated by human candidates. Despite the promising progress in AI-based LLMs, their limitations in clinical reasoning indicate the need for continued development and improvement.

There are several limitations to this study. First, LLMs were tested only once in this study. Multiple trials may provide a more accurate assessment of response consistency. Second, LLMs were not tested on imaging questions. As image analysis capabilities improve, a new

assessment that includes these questions will be necessary. Third, rapid advances in LLM technology mean that responses to DUS questions can vary, so testing was conducted on a single day to minimize this problem. Fourth, the study assessed the correct response rates of LLM models, but not the quality and adequacy of the information and interpretations provided in the responses. Despite these limitations, this is the first study to assess the performance of leading LLM models in answering questions asked on DSE.

CONCLUSION

Claude 3.5 Haiku performed best on all questions, while Gemini 1.5 performed worst. The 4 LLM models examined showed a higher success rate in basic sciences than in clinical sciences. The results showed that AI-based LLMs can perform well on knowledge-based questions such as basic sciences, but perform poorly on questions that require interpretation along with knowledge, such as clinical sciences. It should be kept in mind in clinical education and practice that AI has limitations in skills related to clinical experience, such as combining medical history with clinical examination, clinical reasoning, discussing and interpreting ambiguous situations, etc.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmaları CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: ÖE (%100)

Veri Toplanması | Data Acquisition: ÖE (%100)

Veri Analizi | Data Analysis: ÖE (%100)

Makalenin Yazımı | Writing up: ÖE (%100)

Makale Gönderimi ve Revizyonu | Submission and Revision: ÖE (%100)

REFERENCES

1. Dashti M, Londono J, Ghasemi S, et al. Attitudes, knowledge, and perceptions of dentists and dental students toward artificial intelligence: a systematic review. *J Taibah Univ Med Sci.* 2024;19(2):327-337. doi:10.1016/j.jtumed.2023.12.010
2. Chakravorty S, Aulakh BK, Shil M, Nepale M, Puthenkandathil R, Syed W. Role of Artificial Intelligence (AI) in Dentistry: A Literature Review. *J Pharm Bioallied Sci.* 2024;16(Suppl 1):S14-S16. doi:10.4103/JPBS.JPBS_466_23,
3. Sur J, Bose S, Khan F, Dewangan D, Sawriya E, Roul A. Knowledge, attitudes, and perceptions regarding the future of artificial intelligence in oral radiology in India: A survey. *Imaging Sci Dent.* 2020;50(3):193-198. doi:10.5624/ISD.2020.50.3.193
4. Eggmann F, Weiger R, Zitzmann NU, Blatz MB. Implications of large language models such as ChatGPT for dental medicine. *J Esthet Restor Dent.* 2023;35(7):1098-1102. doi:10.1111/JERD.13046
5. Shrivastava PK, Uppal S, Kumar G, Jha P. Role of ChatGPT in Academia: Dental Students' Perspectives. *Prim Dent J.* 2024;13(1):89-90. doi:10.1177/20501684241230191,
6. Rahad K, Martin K, Amugo I, et al. ChatGPT to Enhance Learning in Dental Education at a Historically Black Medical College. *Dent Res oral Heal.* 2024;7(1). doi:10.26502/DROH.0069
7. Kasneci E, Sessler K, Küchemann S, et al. ChatGPT for good? On opportunities and challenges of large language models for education. *Learn Individ Differ.* 2023;103:102274. doi:10.1016/J.LINDIF.2023.102274
8. Thirunavukarasu AJ, Ting DSJ, Elangovan K, Gutierrez L, Tan TF, Ting DSW. Large language models in medicine. *Nat Med.* 2023;29(8):1930-1940. doi:10.1038/S41591-023-02448-8
9. Chau RCW, Thu KM, Yu OY, Hsung RTC, Lo ECM, Lam WYH. Performance of Generative Artificial Intelligence in Dental Licensing Examinations. *Int Dent J.* 2024;74(3):616-621. doi:10.1016/j.identj.2023.12.007
10. Alhaidry HM, Fatani B, Alrayes JO, Alman A, Alfhaid NK. ChatGPT in Dentistry: A Comprehensive Review. *Cureus.* 2023;15(4):e38317. doi:10.7759/CUREUS.38317
11. Huang H, Zheng O, Wang D, et al. ChatGPT for shaping the future of dentistry: the potential of multi-modal large language model. *Int J Oral Sci.* 2023;15(1):1-13. doi:10.1038/S41368-023-00239-Y;SUBJMETA=139,1449,3032,692,700;KWRD=DENTISTRY, ELECTRODIAGNOSIS
12. Ji Z, Lee N, Frieske R, et al. Survey of Hallucination in Natural Language Generation. *ACM Comput Surv.* 2022;55(12). doi:10.1145/3571730
13. Takagi S, Watari T, Erabi A, Sakaguchi K. Performance of GPT-3.5 and GPT-4 on the Japanese Medical Licensing Examination: Comparison Study. *JMIR Med Educ.* 2023;9. doi:10.2196/48002
14. Farajollahi M, Modaberi A. Can ChatGPT pass the "Iranian Endodontics Specialist Board" exam? *Iran Endod J.* 2023;18(3):192. doi:10.22037/iej.v18i3.42154
15. Ohta K, Ohta S. The Performance of GPT-3.5, GPT-4, and Bard on the Japanese National Dentist Examination: A Comparison Study. *Cureus.* 2023;15(12). doi:10.7759/CUREUS.50369
16. Yamaguchi S, Morishita M, Fukuda H, et al. Evaluating the efficacy of leading large language models in the Japanese national dental hygienist examination: A comparative analysis of ChatGPT, Bard, and Bing Chat. *J Dent Sci.* 2024;19(4):2262-2267. doi:10.1016/J.JDS.2024.02.019
17. Song ES, Lee SP. Comparative Analysis of the Response Accuracies of Large Language Models in the Korean National Dental Hygienist Examination Across Korean and English Questions. *Int J Dent Hyg.* Published online 2024. doi:10.1111/IDH.12848
18. Jaworski A, Jasiński D, Sławińska B, et al. GPT-4o vs. Human Candidates: Performance Analysis in the Polish Final Dentistry Examination. *Cureus.* 2024;16(9). doi:10.7759/CUREUS.68813
19. Künzle P, Paris S. Performance of large language artificial intelligence models on solving restorative dentistry and endodontics student assessments. *Clin Oral Investig.* 2024;28(11):575. doi:10.1007/S00784-024-05968-W
20. Suárez A, Díaz-Flores García V, Algar J, Gómez Sánchez M, Llorente de Pedro M, Freire Y. Unveiling the ChatGPT phenomenon: Evaluating the consistency and accuracy of endodontic question answers. *Int Endod J.* 2024;57(1):108-113. doi:10.1111/IEJ.13985
21. Morishita M, Fukuda H, Muraoka K, et al. Evaluating GPT-4V's performance in the Japanese national dental examination: A challenge explored. *J Dent Sci.* 2024;19(3):1595-1600. doi:10.1016/J.JDS.2023.12.007

Diş Hekimliği Müfredatıyla İlgili En çok Atıf Alan 50 Yayının Bibliyometrik Analizi

Bibliometric Analysis of the 50 Most Cited Publications on Dentistry Curriculum

Ömer Faruk BOYLU^a , Nur Muhammed DEMİR^a 

^aBolu Abant İzzet Baysal Üniversitesi, Diş Hekimliği Fakültesi, Ağız, Diş ve Çene Cerrahisi AD, Bolu, Türkiye

^aBolu Abant İzzet Baysal University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Bolu, Türkiye

ÖZ

Amaç: Bu çalışmanın amacı, diş hekimliği müfredatı ile ilgili literatürde yer alan en çok atıf alan en etkili 50 yayını bibliyometrik yöntemler kullanarak analiz etmektir. Çalışmada, yayınların ülkelere göre dağılımı, en sık kullanılan anahtar kelimeler, en çok atıf alan dergiler ve bu alandaki en etkili kurumlar belirlenerek diş hekimliği eğitiminde araştırma eğilimleri ortaya konulmuştur.

Gereç ve Yöntemler: Web of Science'da "curricu*" (Topic) ve "dent*" (Topic) ve Article ya da Review Article ya da Proceeding Paper ya da Early Access (Document Types) araması gerçekleştirilmiş ve toplamda 4362 yayına ulaşılmıştır. Yayınlar atıf sayısına göre sıralanmış ve konu ile ilgili ilk 50 yayın tespit edilmiştir.

Bulgular: Veri setindeki hatalar Microsoft Excel kullanılarak düzeltilmiş ve ardından VOSviewer ve Bibliometrix programları aracılığıyla bibliyometrik analiz gerçekleştirilmiştir. En fazla yayın yapan (16 makale) ve en fazla atıf alan ülke (3232 atıf) ABD olmuştur. En sık kullanılan anahtar kelime "dental education" (12 kez) olurken, en fazla yayına sahip dergi (6 makale) Journal of Dental Education olmuştur. Literatüre en fazla katkı sağlayan üniversite (3 makale, 1621 atıf) Toronto Üniversitesi olarak öne çıkmıştır. Yazarların kullandığı anahtar kelimelerden "dental education" ve "medical education" anahtar kelimeleri sıklık açısından dikkat çekmiştir. Fakat son yıllarda eğitimde dijitalleşme, COVID-19'un etkileri ve yapay zekanın yükselişi gibi konuların giderek daha fazla önem kazandığı görülmüştür.

Sonuç: Bu bibliyometrik analiz ile elde edilen bulgular, diş hekimliği eğitimine yönelik araştırmaların mevcut eğilimlerini ve gelecekteki potansiyel araştırma alanlarını anlamak açısından önemli ipuçları sunmuştur.

Anahtar Kelimeler: Diş hekimliği eğitimi, Diş hekimliği öğrencileri, Müfredat

Giriş

Tıp ve sağlık alanındaki eğitim sürekli bir değişim içerisinde. Yetişkin eğitiminin ortaya çıkışından bu yana, eğitimciler öğrencilerin konuya ilgi duymalarının ve öğrenme sürecine aktif katılım sağlamalarının gerekliliğini fark etmişlerdir. Geleneksel olarak, sağlık alanında eğitim gören öğrenciler teorik derslere katılmış, ardından iş başında eğitim kapsamında hasta bakımı sürecine dâhil olmuşlardır. Tıp fakülteleri, öğrencilerin klinik uygulamalara erken aşamalarda katılımının önemini kavramış; bu doğrultuda temel ve klinik bilimlerin birlikte sunulmasına "dikey entegrasyon" adı verilmiştir. İnsan sağlığıyla ilgili diğer disiplinler de öğretim sürecini gerçek ya da simüle edilmiş vakalar üzerinden yürütmenin değerini anlamışlardır¹.

Lisans düzeyindeki diş hekimliği eğitimi, kendine özgü pedagojik bir yapı olarak dikkat çekmektedir. Bu eğitim, dört ila altı yıllık programlar kapsamında gerekli klinik, akademik ve kişilerarası becerilerin kazandırılmasını hedeflemektedir. Diş hekimliği müfredatının bilimsel temelli, klinik açıdan ilgili, tıbbi olarak güncel bilgiye dayalı ve toplumsal sorumluluğu teşvik eden bir yapıya sahip olması gerektiği konusunda genel bir görüş birliği bulunmaktadır².

Güncel gelişmelerin, eğitimde dijitalleşme, COVID-19'un etkileri ve yapay zekânın yükselişi gibi diş hekimliği müfredatını doğrudan etkilediği açıkça görülmektedir. Dijitalleşme, diş hekimliği eğitiminin tüm alanlarında köklü bir dönüşüm potansiyeli sunmuştur. Öğrencilere 7/24 erişim imkânı sağlayan, motive edici, sezgisel, etkileşimli ve anlamlı bir eğitim deneyimi sunan e-öğrenme olanaklarını beraberinde getirmiştir³.

ABSTRACT

Background: This study aimed to identify and analyze the 50 most cited and influential publications related to the dental curriculum using bibliometric methods. The analysis covered publication distribution by country, commonly used keywords, the most frequently cited journals, and the leading institutions, thereby providing an overview of research trends in dental education.

Methods: A comprehensive search was conducted in the Web of Science database using the keywords "curricu*" and "dent*" under the subject category. Filters were applied to include only Articles, Review Articles, Proceedings Papers, and Early Access documents. A total of 4362 records were retrieved. These were ranked by citation count, and the top 50 most cited publications were selected for analysis.

Results: Following data correction in Microsoft Excel, bibliometric analysis was performed using VOSviewer and Bibliometrix. The United States led with 16 publications and 3232 total citations. "Dental education" was the most frequently used keyword (n = 12), and the Journal of Dental Education had the highest number of articles (n = 6). The University of Toronto emerged as the most influential institution, contributing 3 publications with a total of 1621 citations. While traditional keywords such as "dental education" and "medical education" remained prominent, recent studies have increasingly focused on topics like digital transformation in education, the impact of COVID-19, and the integration of artificial intelligence.

Conclusion: This bibliometric study provides important insights into prevailing and emerging research themes in dental education, offering guidance for future investigations in the field.

Keywords: Dental education, Dental students, Curriculum

Pandemi süreci, diş hekimliği camiası açısından büyük bir endişe kaynağı olmuştur. Çoğunlukla solunum damlacıkları ve temas yoluyla bulaşan SARS-CoV-2 virüsü (COVID-19'a neden olan etken), etkilenen bireylerin tükürük ve nazofarengeal salgılarında yüksek oranda tespit edilmiştir. Diş hekimliği uygulamalarında hekimin kan, tükürük ve diğer vücut sıvılarına maruz kalması, bu meslek grubunu enfeksiyon açısından yüksek riskli hâle getirmiştir⁴. Bu durum, dünya genelindeki diş hekimliği fakültelerinde eğitimi derinden etkilemiş; eğitim kurumları, öğrencilerin büyük bir taleple sürdürmek istedikleri eğitimi sağlamak adına "uzaktan eğitim" araçlarını uygulamak gibi önemli bir zorlukla karşı karşıya kalmıştır⁵.

Yapay zekâ, günümüz teknolojik gelişmelerinin ön saflarında yer almakta ve sağlık sektörünü köklü biçimde etkileme potansiyeline sahiptir. Yapılan çalışmalar, tıp öğrencilerinin yapay zekânın mesleklerini tehdit edeceği yönünde ciddi bir kaygı duymadıkları göstermiştir⁶. Sağlık hizmetlerinde yapay zekânın giderek yaygınlaşması, bu teknolojinin tıp eğitimine entegrasyonunu zorunlu hâle getirmiştir. Yapay zekâ, karmaşık kavramların anlaşılmasını kolaylaştırma, kişiselleştirilmiş öğrenme deneyimleri sunma ve klinik senaryoları simüle etme gibi çok sayıda fayda sağlamaktadır. Ayrıca, öğrencilerin bu teknolojilerle tanıştırılması, onları mesleki yaşamlarının gerçeklerine hazırlamaktadır⁷. Diş hekimliği, klinik bir disiplin olarak; öğrenme, öğretme ve değerlendirme yöntemleri açısından sürekli evrim geçirmektedir. Bu evrim, özellikle pandemi sürecinde hız kazanmıştır⁸.

Bu çalışmanın amacı, diş hekimliği müfredatında kullanılan anahtar kelimelerin bibliyometrik profilini değerlendirmektir. Literatürde diş

Gönderilme Tarihi/Received: 14 Nisan, 2025

Kabul Tarihi/Accepted: 23 Temmuz, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Boylu ÖF, Demir NM. Diş Hekimliği Müfredatıyla İlgili En çok Atıf Alan 50 Yayının Bibliyometrik Analizi. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 11-16 Doi: 10.15311/ selcukdentj.1675715

Sorumlu yazar/Corresponding Author: Ömer Faruk BOYLU

E-mail: dt.farukboyulu@gmail.com

Doi: 10.15311/ selcukdentj.1675715

hekimliği müfredatı ile ilgili en çok atıf alan 50 yayının bibliyometrik yöntemlerle analiz edilmesi hedeflenmiştir. Çalışmada; yayınların ülkelere göre dağılımı, en sık kullanılan anahtar kelimeler, en çok atıf alan dergiler ve bu alandaki en etkili kurumlar belirlenerek, diş hekimliği eğitiminde mevcut araştırma eğilimleri ortaya konulmuştur.

Gereç ve Yöntemler

Literatür taraması, başlangıçta Bilimsel Bilgi Enstitüsü tarafından geliştirilen ve daha sonra Clarivate Analytics tarafından sürdürülen Web of Science (WoS) veri tabanı üzerinden gerçekleştirildi. Taramada, 25 Ocak 2024 tarihinden önce yayımlanmış yayınlar dikkate alındı. Elektronik arama, tüm aranabilir alanları kapsayan "Topic" ile yapıldı. İlgili yayınları gözden kaçırmamak için arama kapsamlı tutuldu ve manuel olarak eleme yapılarak daha yüksek doğruluk elde edilmesi amaçlandı. Çalışmaya dahil edilecek yayınları belirlemek için arama çubuğuna şu terimler yazıldı: "curricu" OR "dent" (Topic). Makaleler, başlıkları ve özetleri incelenerek ve karar verilemeyen durumlarda tam metinleri açılarak tek bir yazar tarafından tarandı. Seçilen makaleler WoS'da liste oluşturularak içine kaydedildi. Bu seçilen makaleler üzerinden filtreleme işlemi yapılarak belge türü "article", "proceeding paper", "review", "early access" seçildi. Bu tarama ve filtreleme işlemlerinden sonra 4362 yayına ulaşıldı. Yayınlar atıf sayısına göre sıralandı ve konu ile ilgili ilk 50 yayın tespit edildi. Araştırma klinik çalışmaları veya hasta verilerini içermediğinden etik onaya gerek duyulmadı. Elde edilen verilerin bibliyometrik analizi ve bu analizin görselleştirilmesi için VOSviewer (Center for Science and Technology Studies, Leiden University) programı ve verilerin tablolaştırılmasında Microsoft Excel (Microsoft, Inc., Redmond, Washington) programı kullanıldı. VOSviewer, ortak atıf verilerine dayalı olarak yazarların veya dergilerin haritalarını oluşturmak veya eş-oluşum verilerine dayalı olarak anahtar kelimelerin haritalarını oluşturmak için kullanılabilir. Program, bibliyometrik haritaların tüm ayrıntılarıyla incelenmesini sağlayan bir görüntüleyici sunmaktadır⁹. VOSviewer programının resmi sitesinden ücretsiz olarak 31 Eylül 2023'te yayınlanan VOSviewer 1.6.20 sürümü indirildi. Daha önceden dışa aktarımı sağlanan ".txt" türündeki veriler VOSviewer programına aktararak işlendi. Ancak veri setindeki problemler nedeniyle programın verdiği sonuçların tam doğru olmadığı görüldü. ".txt" dosyası Microsoft Excel programı ile açılarak yazar (Lee, Jae-Hong ile Lee, J.- H. aynı yazar olmasına rağmen program farklı yazar olarak kabul etmektedir), kurum (polytech ctr kagawa ve polytechn ctr kagawa farklı kurum gibi gözükmemektedir) ve anahtar kelimelerdeki harf ve yazım farklılıklarının bağlı yayım sayısındaki uyumsuzluklar ve hatalar düzeltildi. Daha sonra veri seti VOSviewer programına yüklenerek daha doğru analiz sonuçları elde edildi.

Bulgular

Veri tabanında bulunan bilgiler ışığında; yazarlar, dergiler, ülkeler, kurumlar ve toplam atıflar dahil olmak üzere belirli konulara ilişkin veriler çıkarılmış ve tablolar halinde düzenlenmiştir. Birden fazla yayına katkı sağlayan yazarlar **Tablo 1**'de gösterilmiştir. En fazla yayına sahip dergi 6 makale ile Journal of Dental Education olmuştur (**Tablo 2**). En fazla yayın yapan ve en fazla atıf alan ülke 16 makale ve 3232 atıf ile Amerika Birleşik Devletleri olmuştur (**Tablo 3**). Literatüre en fazla katkı sağlayan üniversite 3 makale, 1621 atıf ile Toronto Üniversitesi olarak öne çıkmıştır (**Tablo 4**). En çok atıf alan 50 makale ise **Tablo 5**'de gösterilmiştir. Bibliyometrik analizler sonucunda; diş hekimliği eğitiminde, en popüler araştırma alanlarını, anahtar kavramları ve bunların zaman içindeki değişimini gösteren ağ haritası oluşturulmuştur (**Şekil 1**). Eğitimde dijitalleşme, COVID-19'un etkileri ve yapay zekânın yükselişi gibi konuların giderek daha fazla önem kazandığı görülmüştür. Yazarların anahtar kelimelerinden oluşan kelime bulutunda "dental education" ve "medical education" anahtar kelimeleri dikkat çekmiştir (**Şekil 2**).

Tablo 1. 1'den fazla yayına katkı sağlayan yazarlar

Yazarlar	Makale Sayısı	Atıf Sayısı
Hendricson, William D.	3	368
Plasschaert A.	2	369
Hunter J.	2	309
Watt-Watson J.	2	309

Tablo 2. 1'den fazla makale yayınlayan dergiler

Kaynak Adı	Makale Sayısı	Atıf Sayısı
Journal of Dental Education	6	599
BMC Medical Education	5	825
European Journal of Dental Education	5	745
Anatomical Sciences Education	3	230
Journal of Dentistry	3	224
Annals of Anatomy - Anatomischer Anzeiger	2	534
Academic Medicine	2	210
Journal of Medical Internet Research	2	161

Tablo 3. 1'den fazla yayına katkı sağlayan ülkeler

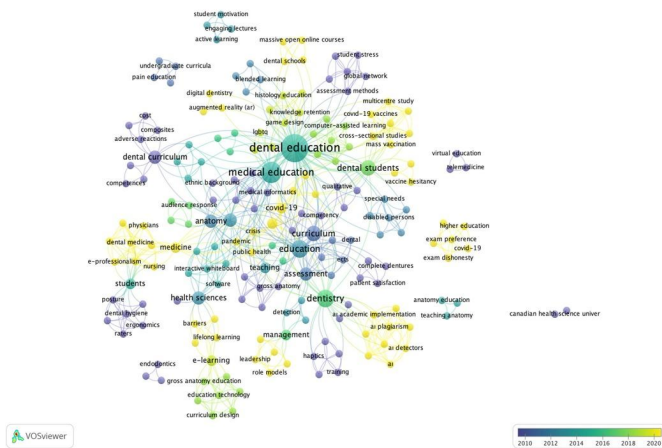
Ülke veya Bölge	Makale Sayısı	Atıf Sayısı
ABD	16	3232
İngiltere	11	1983
Kanada	6	1907
Avustralya	4	948
Almanya	4	546
İrlanda	4	451
Hollanda	3	582
Galler	3	554
İran	3	312
İsviçre	3	300
Finlandiya	2	369
İsveç	2	312
Yunanistan	2	305
Fransa	2	284
Hırvatistan	2	277
Çin	2	170
Ürdün	2	165

Tablo 4. 2'den fazla yayına katkı sağlayan kurumlar

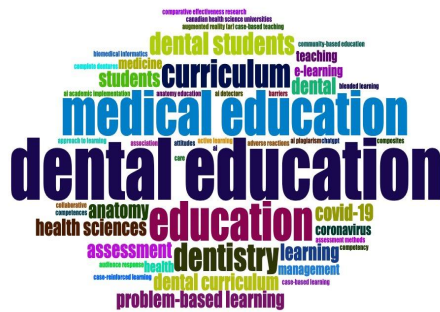
Kaynak Başlığı	Makale Sayısı	Atıf Sayısı
Toronto Üniversitesi	3	1621
Cardiff Üniversitesi	3	554
McGill Üniversitesi	3	388
Trinity Koleji Dublin	3	383
Texas Üniversitesi	3	368

Tablo 5. En çok atıf alan 50 makale

Numara	Başlık	Yazarlar	Yayın Yılı	Toplam Atıf Sayısı	Dergi Adı	Çalışma Türü
1	Technology-Enhanced Simulation for Health Professions Education A: Systematic Review and Meta-analysis	Cook, DA; Hatala, R; Brydges, R; Zendejas, B; Szostek, JH; Wang, AT; Erwin, PJ; Hanstra, SJ	2011	1312	JAMA-JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION	Derleme
2	Best teaching practices in anatomy education: A critical review	Estai, M; Bunt, S	2016	469	ANALS OF ANATOMY-ANATOMISCHER ANZEIGER	Derleme
3	Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature	McLean, SF	2016	339	JOURNAL OF MEDICAL EDUCATION AND CURRICULAR DEVELOPMENT	Makale
4	The effectiveness of case-based learning in health professional education: A BEME systematic review: BEME Guide No. 23	Thistlethwaite, JE; Davies, D; Ekeocha, S; Kidd, JM; MacDougall, C; Matthews, P; Purkis, J; Clay, D	2012	319	MEDICAL TEACHER	Derleme
5	A systematic review of the factors - enablers and barriers - affecting e-learning in health sciences education	Regmi, K; Jones, L	2020	306	BMC MEDICAL EDUCATION	Derleme
6	International Caries Detection and Assessment System (ICDAS) and its International Caries Classification and Management System (ICCMS)—methods for staging of the caries process and enabling dentists to manage caries	Pitts, NB; Ekstrand, KR	2013	304	COMMUNITY DENTISTRY AND ORAL EPIDEMIOLOGY	Makale
7	Profiles and competences for the graduating European dental education update 2009	Cowpe, J; Plasschaert, A; Harzer, W; Vinkka-Puhakka, H; Walmsley, AD	2010	270	EUROPEAN JOURNAL OF DENTAL EDUCATION	Makale
8	The academic environment: the students' perspective	Divaris, K; Barlow, PJ; Chendea, SA; Cheong, WS; Dounis, A; Dragan, IF; Hamlin, J; Hosseinzadeh, F; Kuin, D; Mitirattanakul, S; Mo'nes, M; Molnar, N; Perryer, G; Pickup, J; Reval, N; Shanahan, D; Songpaisan, Y; Taneva, E; Yaghoub-Zadeh, S; West, K; Vrazic, D	2008	213	EUROPEAN JOURNAL OF DENTAL EDUCATION	Makale; Bildiri
9	Training to reduce LGBTQ-related bias among medical, nursing, and dental students and providers: a systematic review	Morris, M; Cooper, RL; Ramesh, A; Tabatabai, M; Accury, TA; Shinn, M; Im, W; Juarez, P; Matthews-Juarez, P	2019	204	BMC MEDICAL EDUCATION	Derleme
10	Recommendations of the International Medical Informatics Association (IMA) on Education in Biomedical and Health Informatics First Revision	Mantas, J; Ammenwerth, E; Demiris, G; Hasman, A; Haux, R; Hersh, W; Hovenga, E; Lun, KC; Marin, H; Martin-Sanchez, F; Wright, G	2010	197	METHODS OF INFORMATION IN MEDICINE	Makale
11	A survey of prelicensure pain curricula health science faculties in Canadian universities	Watt-Watson, J; McGillion, M; Hunter, J; Choiniere, M; Clark, AJ; Dewar, A; Johnston, C; Lynch, M; Morley-Forster, P; Moulin, D; Thie, N; von Baeyer, CK; Webber, K	2009	175	PAIN RESEARCH & MANAGEMENT	Makale
12	In the students' own words: What are the strengths and weaknesses of the dental school curriculum?	Henzi, D; Davies, E; Jasinevicius, R; Hendrickson, W	2007	160	JOURNAL OF DENTAL EDUCATION	Makale; Bildiri
13	The evolution of rapid prototyping in dentistry: a review	Azari, A; Nikzad, S	2009	154	RAPID PROTOTYPING JOURNAL	Derleme
14	Students' and lecturers' perspective on the implementation of online learning in dental education due to SARS-CoV-2 (COVID-19): a cross-sectional study	Schlenz, MA; Schmidt, A; Wöstmann, B; Kramer, N; Schulz-Weidner, N	2020	140	BMC MEDICAL EDUCATION	Makale
15	Survey of undergraduate pain curricula for healthcare professionals in the United Kingdom	Briggs, EV; Carr, ECJ; Whittaker, MS	2011	137	EUROPEAN JOURNAL OF PAIN	Derleme
16	An integrated undergraduate pain curriculum, based on IASP curricula, for six Health Science Faculties	Watt-Watson, J; Hunter, J; Pennefather, P; Librach, L; Raman-Wilms, L; Schreiber, M; Lax, L; Stinson, J; Dao, T; Gordon, A; Mock, D; Salter, M	2004	134	PAIN	Makale
17	Teaching mindfulness in medical school: where are we now and where are we going?	Dobkin, PL; Hutchinson, TA	2013	125	MEDICAL EDUCATION	Makale
18	Attitudes of medical and dental students to dissection	Snelling, J; Sahai, A; Ellis, H	2003	123	CLINICAL ANATOMY	Makale
19	Preparing health professions students for terrorism, disaster, and public health emergencies: Core competencies	Markenson, D; Dimaggio, C; Redlener, I	2005	115	ACADEMIC MEDICINE	Makale
20	Curriculum Change in Dental Education, 2003-09	Haden, NK; Hendrickson, WD; Kassebaum, DK; Ranney, RR; Weinstein, G; Anderson, EL; Valachovic, RW	2010	113	JOURNAL OF DENTAL EDUCATION	Makale
21	In an era of uncertainty: Impact of COVID-19 on dental education	Hung, M; Licari, FW; Hon, ES; Lauren, E; Su, S; Birmingham, WC; Wadsworth, LL; Lassetter, JH; Graff, TC; Harman, W; Carroll, WB; Lipsky, MS	2021	110	JOURNAL OF DENTAL EDUCATION	Makale
22	Digital Undergraduate Education in Dentistry: A Systematic Review	Zitzmann, NU; Matthiesson, L; Ohla, H; Joda, T	2020	110	INTERNATIONAL JOURNAL OF ENVIRONMENTAL RESEARCH AND PUBLIC HEALTH	Derleme
23	Impact of Artificial Intelligence on Dental Education: A Review and Guide for Curriculum Update	Thurzo, A; Strunga, M; Urban, R; Surovkova, J; Afrashtehfar, KI	2023	108	EDUCATION SCIENCES	Derleme
24	Using online game-based platforms to improve student performance and engagement in histology teaching	Felzaghy, S; Pasonen-Seppänen, S; Koskela, A; Nieminen, P; Härkönen, K; Paldanius, KMA; Gabbau, S; Ketola, K; Hiltunen, M; Lundin, M; Haapaniemi, T; Sointu, E; Bauman, EB; Gilbert, GE; Morton, D; Mahonen, A	2019	99	BMC MEDICAL EDUCATION	Makale
25	Curriculum structure, content, learning and assessment in European undergraduate dental education - update 2010	Manogue, M; McLoughlin, J; Christerson, C; Delap, E; Lindh, C; SchoonheimKlein, M; Plasschaert, A	2011	99	EUROPEAN JOURNAL OF DENTAL EDUCATION	Makale
26	Educational Technologies in Problem-Based Learning in Health Sciences Education: A Systematic Review	Jin, J; Bridges, SM	2014	97	JOURNAL OF MEDICAL INTERNET RESEARCH	Derleme
27	Remote E-exams During Covid-19 pandemic: A cross-sectional study to students' preferences and academic dishonesty in faculties of medical sciences	Elsalem, L; Al-Azzam, N; Jum'ah, AA; Obeidat, N	2021	95	ANNALS OF MEDICINE AND SURGERY	Makale
28	A Comparison of traditional and engaging lecture methods in a large professional-level course	Miller, CJ; McNear, J; Metz, MJ	2013	95	ADVANCES IN PHYSIOLOGY EDUCATION	Makale
29	Clinical prevention and population health curriculum framework for health professions	Allan, J; Barwick, TA; Cashman, S; Cawley, JF; Day, C; Douglass, CW; Evans, CH; Garr, DR; Maeshiro, R; McCarthy, RL; Meyer, SM; Riegelman, R; Sailer, SD; Stanley, J; Swenson, M; Tellebeum, HS; Timothe, P; Werner, KE; Wood, D	2004	95	AMERICAN JOURNAL OF PREVENTIVE MEDICINE	Makale
30	Oral health care in the 21st century: Implications for dental and medical education	Hendricson, WD; Cohen, PA	2001	95	ACADEMIC MEDICINE	Derleme
31	Evaluation of a blended learning course for teaching oral radiology to undergraduate dental students	Kavadeila, A; Tsiklakis, K; Vougiouklakis, G; Lionarakis, A	2012	92	EUROPEAN JOURNAL OF DENTAL EDUCATION	Makale
32	Do traditional techniques produce better conventional complete dentures than simplified techniques?	Kawai, Y; Murakami, H; Shariat, B; Klemetti, E; Blomfield, JV; Billette, L; Lund, JP; Feine, JS	2005	88	JOURNAL OF DENTISTRY	Makale
33	Undergraduate Student Perceptions of the Use of Ultrasonography in the Study of "Living Anatomy"	Ivanusic, J; Cowie, B; Barrington, M	2010	84	ANATOMICAL SCIENCES EDUCATION	Makale
34	Global Prevalence and Drivers of Dental Students' COVID-19 Vaccine Hesitancy	Riad, A; Abdulqader, AH; Morgado, M; Domnori, S; Kosciuk, M; Mendes, JJ; Klugar, M; Kateeb, E	2021	82	VACCINES	Makale
35	How Comprehensive Are Research Studies Investigating the Efficacy of Technology-Enhanced Learning Resources in Anatomy Education? A Systematic Review	Clunie, L; Morris, NP; Joyne, VCT; Pickering, JD	2018	78	ANATOMICAL SCIENCES EDUCATION	Derleme
36	Educational Effectiveness, Target, and Content for Prudent Antibiotic Use	Lee, CR; Lee, JH; Kang, LW; Jeong, BC; Lee, SH	2015	77	BIOMED RESEARCH INTERNATIONAL	Derleme
37	Leadership in healthcare education	van Diggele, C; Burgess, A; Roberts, C; Mellis, C	2020	76	BMC MEDICAL EDUCATION	Derleme
38	COVID-19 vaccine acceptance and hesitancy among dental and medical students	Kelekar, AK; Lucia, VC; Afonso, NM; Mascarenhas, AK	2021	74	JOURNAL OF THE AMERICAN DENTAL ASSOCIATION	Makale
39	A nationwide survey of online teaching strategies in dental education in China	Wang, K; Zhang, LL; Ye, L	2021	73	JOURNAL OF DENTAL EDUCATION	Makale
40	Effect of magnification loupes on dental hygiene student posture	Maillet, JP; Miller, AM; Burke, JM; Maillet, MA; Maillet, WA; Neish, NR	2008	73	JOURNAL OF DENTAL EDUCATION	Makale
41	Students' perceptions of lecturing approaches: traditional versus interactive teaching	Meguid, EA; Collins, M	2017	72	ADVANCES IN MEDICAL EDUCATION AND PRACTICE	Makale
42	Haptic-based virtual reality for periodontal training simulator	Luciano, C; Banerjee, P; DeFanti, T	2009	72	VIRTUAL REALITY	Makale
43	The value of education in special care dentistry as a means of reducing inequalities in oral health	Faulks, D; Freedman, L; Thompson, S; Sagheri, D; Dougall, A	2012	71	EUROPEAN JOURNAL OF DENTAL EDUCATION	Derleme
44	Problem-Based Learning in Dental Education: A Systematic Review of the Literature	Bassir, SH; Sadr-Eshkevari, P; Amirikhoei, S; KarimbuX, NY	2014	70	JOURNAL OF DENTAL EDUCATION	Derleme
45	Radiographic technical quality of root canal treatment performed by dental students at the Dental Teaching Center in Jordan	Barrieshi-Nusair, KM; Al-Omari, MA; Al-Hiyasat, AS	2004	70	JOURNAL OF DENTISTRY	Makale
46	Understanding neurophobia: Reasons behind impaired understanding and learning of neuroanatomy in cross-disciplinary healthcare students	Javadi, MA; Chakraborty, S; Cryan, JF; Schellekens, H; Toulouse, A	2018	68	ANATOMICAL SCIENCES EDUCATION	Makale
47	The context of learning anatomy: does it make a difference?	Smith, CF; Martinez-Alvarez, C; McHanwell, S	2014	68	JOURNAL OF ANATOMY	Makale
48	The teaching of Class I and Class II direct composite restorations in European dental schools	Wilson, NHF; Mjör, IA	2000	66	JOURNAL OF DENTISTRY	Makale
49	Virtual microscopy: The future of teaching histology in the medical curriculum?	Paulsen, FP; Eichhorn, M; Bräuer, L	2010	65	ANALS OF ANATOMY-ANATOMISCHER ANZEIGER	Makale
50	Dangers and Benefits of Social Media on E-Professionalism of Health Care Professionals: Scoping Review	Rukavina, TV; Viskic, J; Poplasen, LM; Relic, D; Marelic, M; Jokic, D; Sedak, K	2021	64	JOURNAL OF MEDICAL INTERNET RESEARCH	Derleme



Şekil 1. Anahtar kelimelerin ağ yapısının yıllara göre görselleştirilmesi



Şekil 2. Yazarların anahtar kelimelerinden oluşan kelime bulutu

Tartışma

Bibliyometrik analiz, sağlık ve tıp araştırmaları alanında yaygın olarak kullanılan, akademik iletişim çevresinin yapısı, etkisi ve dinamiklerine ilişkin niteliksel ve niceliksel içgörüler sunmayı amaçlayan önemli bir yöntemdir. Araştırmacılar, kurumlar ve politika yapıcılar bu analizlerden; bilimsel üretkenliği değerlendirme, gelişen araştırma eğilimlerini belirleme ve araştırma fonlaması ile iş birliklerine yönelik stratejik kararlar alma süreçlerinde faydalanmaktadır. Bu bağlamda bibliyometrik analiz, akademik ve bilimsel çalışmalara ilişkin değerlendirmelerde kritik bir rol üstlenmektedir¹⁰. Bu çalışmanın amacı, diş hekimliği müfredatında kullanılan anahtar kelimelerin bibliyometrik profilini incelemektir. WoS veri tabanından elde edilen bilgiler doğrultusunda, ilgili anahtar kelimelere ilişkin bilimsel yayınların atıf analizleri ve ağ haritalamaları gerçekleştirilmiş; araştırmacılar, kurumlar ve araştırma merkezleri belirlenmiştir.

Diş hekimliği eğitimi, COVID-19 pandemisinin aniden ortaya çıkmasıyla birlikte önemli bir dönüşüm sürecine girmiştir. Geleneksel eğitim modeli, öğrencilerin klinik ve laboratuvar ortamlarında öğretim üyeleriyle birebir etkileşim içinde çalışmalarını esas alırken; pandemi sürecinde uygulanan halk sağlığı önlemleri, bu yapının sürdürülebilirliğini imkânsız hale getirmiş ve eğitime dijitalleşmeye geçişi zorunlu kılmıştır¹¹. Klinik dışı ve klinik temelli öğretim, tamamen çevrim içi ortamlarda sunulan kısıtlı eğitim içerikleriyle önemli zorluklarla karşılaşmıştır. Bu dönemde diş hekimliği alanındaki birçok araştırma ertelenmiş ya da tamamen durdurulmuştur. Bununla birlikte, pandeminin geleneksel diş sağlığı hizmetleri üzerindeki olumsuz etkileri, telediş hekimliği ve diş hekimliğinde acil müdahale konularına yönelik farkındalığın artmasına neden olmuş, aynı zamanda uzaktan eğitimin potansiyel avantajlarının daha görünür hale gelmesine katkı sağlamıştır¹². WoS veri tabanından elde edilen bilgiler doğrultusunda, diş hekimliği eğitiminde; en popüler araştırma alanları, anahtar kavramları ve bunların zaman içindeki değişimi gösterilmiştir. Eğitimde dijitalleşme, COVID-19'un etkileri ve yapay zekanın yükselişi gibi konuların giderek daha fazla önem kazandığı görülmüştür (Şekil 1).

Geleneksel ders anlatım yöntemlerinin uzun yıllar tıp ve diş hekimliği eğitiminde baskın model olarak kullanıldığı bilinmektedir. Ancak, öğrenci merkezli yaklaşımların önem kazanması, dijital araçların yaygınlaşması ve pandemi ile birlikte ivme kazanan dijital dönüşüm, çevrim içi öğrenme yöntemlerinin etkinliğini artırmıştır¹³. Nitekim analiz edilen literatürde “eğitimde dijitalleşme” teması son yıllarda önemli bir anahtar kavram olarak öne çıkmıştır (Şekil 2).

Son yıllarda yapay zekâ teknolojilerinin tıp ve diş hekimliği eğitimine entegrasyonu dikkat çekici biçimde artmıştır. Yapay zekânın önemli uygulama alanlarından biri olan sanal simülasyonlar, öğrencilerin klinik becerileri gerçek hasta üzerinde risk oluşturmadan geliştirmelerine olanak sağlamaktadır. Bu araçlar, bireysel öğrenme hızlarına uygun şekilde esnek bir eğitim deneyimi sunmakta ve tekrarlı uygulamalar yoluyla yeterlilik düzeylerinin artırılmasına katkı sağlamaktadır¹⁴.

Bibliyometrik analiz bulguları, “artificial intelligence”, “machine learning”, “deep learning” ve “virtual simulation” gibi anahtar kelimelerin diş hekimliği eğitimi literatüründe giderek daha fazla yer aldığını ortaya koymuştur^{15,16}. Elde edilen veriler, yapay zekâ teknolojilerinin eğitim içeriklerine entegrasyonunun yalnızca geçici bir trend olmadığını, aynı zamanda müfredat düzeyinde kalıcı bir dönüşümün parçası haline geldiğini göstermektedir.

Sonuç

Bu bibliyometrik analiz, diş hekimliği eğitimi alanındaki mevcut araştırma eğilimlerini ortaya koyarak, gelecekte odaklanılabilecek potansiyel konulara dair önemli ipuçları sunmuştur. Elde edilen bulgular, özellikle yapay zekâ destekli eğitim uygulamaları, problem tabanlı öğrenme yaklaşımları ve uzaktan eğitim modellerinin önümüzdeki dönemlerde diş hekimliği müfredatında daha geniş bir yer edinebileceğini göstermektedir. Çalışma, diş hekimliği eğitimi üzerine yapılan bilimsel yayınların zaman içindeki gelişimini anlamaya yönelik kapsamlı bir perspektif sunmakta; bu yönüyle hem araştırmacılara hem de eğitim politikası geliştiricilerine gelecekteki çalışmalar için yol gösterici bir kaynak olma niteliği taşımaktadır.

Teşekkür: Sayın; Aybuke Asena ATASEVER İŞLER, Yavuz Selim GENÇ, Ahmet YILDIRIM, Gülbeddin YALINIZ, Ruşen ERDEM’ a sözlü bildiriye katkılarından dolayı teşekkür ederiz.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde “sözlü bildiri” olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an “oral presentation” at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmalarını CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. |
The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: ÖFB (%60), NMD (%40)
Veri Toplanması | Data Acquisition: ÖFB (%60), NMD (%40)
Veri Analizi | Data Analysis: ÖFB (%60), NMD (%40)
Makalenin Yazımı | Writing up: ÖFB (%60), NMD (%40)
Makale Gönderimi ve Revizyonu | Submission and Revision: ÖFB (%70), NMD (%30)

KAYNAKLAR

1. McLean SF. Case-Based Learning and its Application in Medical and Health-Care Fields: A Review of Worldwide Literature. *Journal of medical education and curricular development*. 2016;3.
2. Divaris K, Barlow PJ, Chendea SA, Cheong WS, Dounis A, Dragan IF, et al. The academic environment: the students' perspective. *European journal of dental education: official journal of the Association for Dental Education in Europe*. 2008;12 Suppl 1:120-30.
3. Zitzmann NU, Matthisson L, Ohla H, Joda T. Digital Undergraduate Education in Dentistry: A Systematic Review. *International journal of environmental research and public health*. 2020;17(9).
4. Hung M, Licari FW, Hon ES, Lauren E, Su S, Birmingham WC, et al. In an era of uncertainty: Impact of COVID-19 on dental education. *Journal of dental education*. 2021;85(2):148-56.
5. Schlenz MA, Schmidt A, Wöstmann B, Krämer N, Schulz-Weidner N. Students' and lecturers' perspective on the implementation of online learning in dental education due to SARS-CoV-2 (COVID-19): a cross-sectional study. *BMC medical education*. 2020;20(1):354.
6. Amiri H, Peiravi S, Rezazadeh Shojae SS, Rouhparvarzamin M, Nateghi MN, Etemadi MH, et al. Medical, dental, and nursing students' attitudes and knowledge towards artificial intelligence: a systematic review and meta-analysis. *BMC medical education*. 2024;24(1):412.
7. Busch F, Hoffmann L, Truhn D, Ortiz-Prado E, Makowski MR, Bressemer KK, et al. Global cross-sectional student survey on AI in medical, dental, and veterinary education and practice at 192 faculties. *BMC medical education*. 2024;24(1):1066.
8. Bell A, Cairns A, Binnie V. The changing landscape of dental education - Glasgow Dental School. *British dental journal*. 2022;233(5):427-9.
9. Van Eck N, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. *scientometrics*. 2010;84(2):523-38.
10. Hassan W, Duarte AE. Bibliometric analysis: A few suggestions. *Current problems in cardiology*. 2024;49(8):102640.
11. Kerkstra RL, Rustagi KA, Grimshaw AA, Mingos KE. Dental education practices during COVID-19: A scoping review. *Journal of dental education*. 2022;86(5):546-73.
12. Li B, Cheng L, Wang H. Challenges and Opportunities for Dental Education from COVID-19. *Dentistry journal*. 2022;10(10).
13. Lee N, Huh J, Jeong H, Park W. Effectiveness of Online Interactive Education in Dental Radiology. *International dental journal*. 2024;74(5):1024-32.
14. Dave M, Patel N. Artificial intelligence in healthcare and education. *British dental journal*. 2023;234(10):761-4.
15. Schwendicke F, Krois J, Gomez J. Artificial intelligence in dentistry Chances and challenges. *Journal of Dental Research*. 2020; 99(7): 769-774.
16. Erdem R, Genç YS, Yalınız G, Gülşen İT. Dental implantolojide yapay zeka kullanımının bibliyometrik analizi. *Aydın Dental Journal*. 2024; 10(2): 155-167.

Student-Centered Education in Dentistry: Perspectives of Students and Academicians in Turkey

Diş Hekimliğinde Öğrenci Merkezli Eğitim: Türkiye'deki Öğrenci ve Akademisyenlerin Görüşleri

Mehmet Semih VELİOĞLU^a , Sinem ÖZDEMİR^a , Serkan POLAT^b , Nimet ÜNLÜ^a 

^aSelcuk University, Faculty of Dentistry, Department of Restorative Dentistry, Konya, Türkiye

^aSelçuk Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Konya, Türkiye

^bBolu Abant İzzet Baysal University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Bolu, Türkiye

^bBolu Abant İzzet Baysal Üniversitesi, Diş Hekimliği Fakültesi, Ağız, Diş ve Çene Cerrahisi AD, Bolu, Türkiye

ABSTRACT

Introduction: Student-centered education (SCE) is an instructional approach that emphasizes active student participation and learning responsibility.

Objective: This study aims to evaluate the knowledge and attitudes of academicians regarding SCE in undergraduate dental education.

Materials and Methods: The study was conducted using a Google Forms survey platform with the participation of 254 dental students (from first to fifth year) and 97 academicians. The survey assessed knowledge and awareness of SCE, current practices and experiences, encountered challenges, and recommendations for improvement. Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Selcuk University Faculty of Dentistry. Dental students and academicians across Turkey were invited to participate via email and social media. Personal data were not recorded, and responses were analyzed anonymously. Collected data were statistically analyzed using the Chi-Square test and the Kruskal-Wallis test.

Results: No statistically significant difference was observed in SCE awareness between research assistants and assistant/associate professors ($p=0.11$). However, a statistically significant difference was found in the level of knowledge regarding Problem-Based Learning (PBL) and the Flipped Classroom Model (FCM) across academic titles ($p=0.018$). A total of 36.1% of participants considered themselves competent in implementing student-centered education methods in undergraduate training. Both students and academicians identified PBL and FCM as the least preferred educational methods. The most reported challenges in implementing SCE methods were time management (65% for students, 72.2% for academicians) and insufficient technological infrastructure (68% for students, 64.9% for academicians). The most frequently cited supportive factor necessary for enhancing the effectiveness of these methods was the improvement of technological infrastructure (74.4% for students, 85.6% for academicians).

Conclusion: Although healthcare education in Turkey aligns with international standards, significant deficiencies exist in both knowledge and implementation of SCE methods. Enhancing awareness and providing targeted training on these methods can contribute to highly qualified professionals and improved healthcare services.

Keywords: Student-centered education, Learning methods, Awareness

ÖZ

Giriş: Öğrenci merkezli eğitim (ÖME), öğrencilerin aktif katılımını ve öğrenme sorumluluğunu vurgulayan bir eğitim yaklaşımıdır.

Amaç: Bu çalışma, diş hekimliği lisans eğitiminde ÖME hakkında akademisyenlerin bilgi ve tutumlarını değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntem: Bu çalışma, yaşları 18 ile 45+ arasında değişen 254 diş hekimliği öğrencisi (1., 2., 3., 4. ve 5. sınıf) ve 97 akademisyen üzerinde, ÖME hakkında bilgi ve farkındalık, mevcut uygulamalar ve deneyim, karşılaşılan zorluklar ve geliştirme önerilerine yönelik hazırlanmış bir Google Forms anket platformu kullanılarak gerçekleştirilmiştir. Selçuk Üniversitesi Diş Hekimliği Fakültesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu tarafından onaylanan bu çalışmaya, Türkiye genelindeki diş hekimliği öğrencileri ile diş hekimliği akademisyenleri e-posta ve sosyal medya aracılığıyla davet edilmiştir. Katılımcıların kişisel bilgileri kaydedilmemiş, veriler anonim olarak analiz edilmiştir. Toplanan veriler Ki Kare testi ve Kruskal Wallis testi ile analiz edilmiştir.

Bulgular: Araştırma görevlileri ile yardımcı doçent ve doçentler arasında ÖME farkındalığı açısından istatistiksel olarak anlamlı bir farklılık bulunmamıştır ($p=0.11$). Akademik unvanlar arasında Probleme Dayalı Öğrenme (PDÖ) ve Ters Yüz Eğitim Modeli (TYE) metotlarına ait bilgi düzeylerinde istatistiksel olarak anlamlı bir farklılık gözlenmiştir ($p=0.018$). Katılımcıların %36,1'i lisans eğitiminde öğrenci merkezli eğitim yöntemlerinin kullanımı konusunda kendisini yeterli gördüğü ifade edilmiştir. Hem öğrenciler hem de akademisyenler, PDÖ ve TYE metotlarının eğitimde en az tercih edilen yöntemler olduğu belirtilmiştir. ÖME yöntemlerini uygularken en çok karşılaşılan zorlukların zaman yönetimi (sırasıyla %65, %72,2) ve teknolojik altyapı yetersizliği (sırasıyla %68, %64,9) olduğu hem öğrenciler hem de akademisyenler tarafından tespit edilmiştir. Bu uygulamaların daha etkili olabilmesi için hem öğrenciler hem de akademisyenlerin en çok ihtiyaç duyduğu destekleyici faktör teknolojik altyapının geliştirilmesi (sırasıyla %74,4, %85,6) olmuştur.

Sonuç: Ülkemizde sağlık eğitimi uluslararası standartlarda iyi olsa da ÖME yöntemleri ile ilgili hem bilgi hem de uygulama düzeyinde çeşitli yetersizlikler mevcuttur. Bu konuda yapılacak eğitimler ve bilincin artırılması ile daha kaliteli bireyler yetiştirilip sağlık alanında daha kaliteli hizmet sunulabilir.

Anahtar kelimeler: Öğrenci merkezli eğitim, Öğrenme yöntemleri, Farkındalık

INTRODUCTION

In line with advancements in technology and science, dental education has become increasingly complex in terms of both content and methodology. The traditional long formal education period has gradually been replaced by apprenticeship-based learning and, more recently, by self-directed learning and the pursuit of individual competence.⁽¹⁾ Didactic lectures have been the gold standard and the most common method of traditional teaching and learning practice. Despite traditional preferences for simplicity of lecture presentations, appropriateness for crowded classes, and the ability to present massive amounts of information, making it difficult to retain, remember, and interpret. Education is a dynamic process requiring constant renewal and

development.⁽²⁾ However, today's curricula lag behind current innovative teaching techniques and remain inadequate to keep up with future advances.⁽³⁾

There have been significant changes in medical education in recent years, and student-centered education has become more widely adopted by educators. The various learning methods used in medical and dental schools include problem-based learning (PBL), case-based learning (CBL), team-based learning (TBL), competency-based education (CBE), flipped classroom (FC), simulation-based learning (SBL), peer-assisted learning (PAL), observational learning (OL).⁽⁴⁾

This study aims to investigate the knowledge and cognition of academicians and dental school students about student-centered education (SCE) in undergraduate dental education.

Gönderilme Tarihi/Received: 14 Nisan, 2025

Kabul Tarihi/Accepted: 30 Mayıs, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atrf Bilgisi/Cite this article as: Velioglu MS, Özdemir S, Polat S, Ünlü N. Student-Centered Education in Dentistry: Perspectives of Students and Academicians in Turkey. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 17-24 Doi: 10.15311/ selcukdentj.1675725

Sorumlu yazar/Corresponding Author: Mehmet Semih VELİOĞLU

E-mail: semivel@gmail.com

Doi: 10.15311/ selcukdentj.1675725

METHODS

Determining the awareness of contemporary educational methods among educators and students plays a crucial role in enhancing the quality of dental education. This study aims to evaluate the knowledge levels and perspectives of both academicians and dental students regarding SCE methods.

Within this scope, the study was conducted on 254 dental students and 97 academicians aged between 18 and 45+, using a Google Forms survey platform designed to assess knowledge and awareness of SCE, current practices and experiences, encountered challenges, and suggestions for improvement.

At the initial stage of the study, it was considered to include all students from the 1st to the 5th year; however, it was deemed appropriate to evaluate the pre-clinical classes—namely the 1st, 2nd, and 3rd year students—as a single group represented by the 3rd year cohort. This study was approved by the Non-Interventional Clinical Research Ethics Committee of Selçuk University Faculty of Dentistry (Ethics approval number 2025/20), and dental students and academicians across Turkey were invited to participate via email and social media. Participants' personal information was not recorded, and the data were analyzed anonymously. The collected data were analyzed using the Chi-Square and the Kruskal-Wallis test ($p < 0.05$).

RESULTS

Participants were asked questions under four main categories: knowledge and awareness of SCE, current practices and experiences, the effectiveness of educational methods and feedback, and encountered challenges and suggestions for improvement. A five-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree) was used for the survey. The socio-demographic characteristics of participants were shown in Table 1.

Table 1. The socio-demographic characteristics of the participants.

The socio-demographic characteristics of the participants.			
Gender	Female	247	70%
	Male	101	29%
	Not mentioned	4	1%
Age	18-20	23	7%
	21-23	190	54%
	24-26	37	11%
	27-35	82	23%
	36-45	15	4%
	45+	5	1%
Title	Class 3	69	20%
	Class 4	115	33%
	Class 5	70	20%
	Specialist	9	3%
	Research Assistant	58	16%
	Associate Professor	13	4%
	Assistant Professor	11	3%
	Professor	7	2%

The study sample consisted of 70% female participants and 94% individuals under 35. Third-, fourth-, and fifth-year dental students, along with academicians from various academic ranks, participated in this study.

To assess knowledge and awareness of SCE, participants were asked three questions. The responses of participants were shown in Table 2. No statistically significant difference was found in SCE awareness among research assistants, assistant professors, and associate professors ($p > 0.05$). However, a statistically significant difference was observed among students, specifically between third- and fourth-year students ($p = 0.029$), with fourth-year students demonstrating a significantly higher level of awareness compared to third-year students. Regarding PBL, research assistants were found to have significantly less knowledge than other academic ranks ($p < 0.05$).

Table 2. The responses of participants regarding Knowledge and Awareness of Student-Centered Education Methods

Knowledge and Awareness of Student-Centered Education Methods					
How do you assess your level of knowledge about student-centered educational methods?					
	No Knowledge	Superficial Knowledge	Undecided	Good level of Knowledge	Expert-level Knowledge
Class 3	27	22	19	1	0
Class 4*	25	35	39	14	2
Class 5	18	28	20	3	1
Specialist	1	4	2	2	0
Research Assistant	17	20	11	10	0
Associate Professor	0	0	5	8	0
Assistant Professor	0	2	3	5	1
Professor	1	0	2	3	1
Which student-centered educational methods are you only familiar with at a knowledge level?					
	Academician		Student		
Problem-based learning	37		37		
Flipped Classroom	10		11		
Team-based learning	60		107		
Simulation-based learning	61		192		
Case analysis study	52		84		
Clinical practice training	78		74		
OSCE	24		160		
Others	4		12		
Which student-centered teaching methods do you use in student education?					
	Only Academicians				
Problem-based learning	21				
Flipped Classroom	3				
Team-based learning	30				
Simulation-based learning	37				
Case analysis study	43				
Clinical practice training	85				
OSCE	11				
Others	5				

*Fourth-year students showing significantly higher level of awareness compared to the third year students.

Additionally, all academic ranks were found to have significantly lower knowledge of the FC model ($p = 0.000$). Associate Professors exhibited significantly greater knowledge of case-based analysis and Objective Structured Clinical Examination (OSCE) compared to other academic ranks ($p < 0.05$).

Regarding students' experiences with SCE, a significantly higher proportion of students reported having participated in clinical practice training (CPT) ($p = 0.000$), whereas the proportion of students who had experienced OSCE was significantly lower ($p = 0.000$). Nevertheless, the majority of students reported engaging in small-group activities such as FC, PBL, and TBL.

Participants were asked four questions regarding SCE practices and experiences, and their responses are shown in Table 3. The study also investigated whether there were significant differences in SCE practice experiences among academic ranks. While no statistically significant differences were found among the groups ($p > 0.05$), academic ranks were reported using various SCE methods except for CPT. The majority of students reported utilizing simulation-based training, particularly preclinical and phantom laboratory training.

Academicians were asked about the positive changes they observed in students due to SCE implementation. The majority reported improvements in long-term learning, motivation, and the ability to apply theoretical knowledge in practice. However, research assistants noted that they did not observe a significant improvement in students' motivation.

Participants were asked two questions regarding the effectiveness of educational methods and feedback which were shown in **Table 4a** and **4b**. The responses from academicians regarding whether SCE methods enhance students' competencies were analyzed, and no statistically significant differences were found among the groups ($p>0.05$). The majority of academic staff reported that PBL significantly improved students' problem-solving skills.

Regarding FC, SBL, CPT, and OSCE, academicians shared similar views on their impact on critical thinking, problem-solving, teamwork, clinical decision-making, professionalism, and communication skills. Concerning small-group activities, academicians agreed that these methods foster teamwork skills among students. In terms of clinical practice education, academic staff generally agreed that it enhances students' clinical decision-making and professionalism.

Table 3. The responses of participants about SCE practices and experiences

What are your thoughts on the use of student-centered educational methods in undergraduate education?						
		Very insufficient		Undecided		Very sufficient
Class 3		7(%10)	16(%23)	28(%41)	16(%23)	2(%3)
Class 4		4(%3)	21(%18)	55(%48)	34(%30)	1(%1)
Class 5		2(%3)	16(%23)	28(%40)	20(%29)	4(%6)
Specialist		2(%22)	1(%11)	3(%33)	3(%33)	0(%0)
Research Assistant		4(%7)	9(%16)	24(%41)	19(%33)	2(%3)
Associate Professor		1(%8)	4(%31)	3(%23)	5(%38)	0(%0)
Assistant Professor		0(%0)	2(%18)	5(%45)	3(%27)	1(%9)
Professor		0(%0)	1(%14)	3(%43)	3(%43)	0(%0)
Which methods are more frequently used during the undergraduate dental education?						
Method	Title	Definitely doesn't contribute	Doesn't contribute	Undecided	Contributes	Definitely contributes
Problem based Learning	Class 3	0(%0)	2(%8)	10(%40)	13(%52)	0(%0)
	Class 4	7(%13)	11(%21)	13(%25)	19(%36)	3(%6)
	Class 5	7(%17)	7(%17)	14(%34)	11(%27)	2(%5)
	Specialist	2(%22)	1(%11)	5(%56)	1(%11)	0(%0)
	Research Asistant	8(%14)	6(%10)	28(%48)	13(%22)	3(%5)
	Associate Professor	2(%15)	1(%8)	7(%54)	3(%23)	0(%0)
	Assistant Professor	2(%20)	0(%0)	3(%30)	5(%50)	0(%0)
	Professor	1(%14)	1(%14)	1(%14)	4(%57)	0(%0)
Flipped Classroom	Class 3	5(%20)	3(%12)	13(%52)	4(%16)	0(%0)
	Class 4	11(%21)	12(%23)	27(%51)	3(%6)	0(%0)
	Class 5	13(%32)	1(%2)	24(%59)	1(%2)	2(%5)
	Specialist	2(%22)	2(%22)	4(%44)	1(%11)	0(%0)
	Research Assistant	10(%17)	5(%9)	40(%69)	3(%5)	0(%0)
	Associate Professor	3(%23)	3(%23)	7(%54)	0(%0)	0(%0)
	Assistant Professor	1(%9)	4(%36)	6(%55)	0(%0)	0(%0)
	Professor	1(%14)	2(%29)	3(%43)	1(%14)	0(%0)
Simulation based Learning	Class 3	0(%0)	0(%0)	3(%12)	12(%48)	10(%40)
	Class 4	2(%4)	1(%2)	4(%8)	23(%43)	23(%43)
	Class 5	1(%2)	2(%5)	3(%7)	15(%37)	20(%49)
	Specialist	1(%11)	0(%0)	1(%11)	2(%22)	5(%56)
	Research Assistant	1(%2)	1(%2)	10(%22)	24(%41)	22(%38)
	Associate Professor	0(%0)	0(%0)	0(%0)	7(%54)	6(%46)
	Assistant Professor	0(%0)	0(%0)	1(%9)	2(%18)	8(%73)
	Professor	0(%0)	0(%0)	1(%14)	5(%71)	1(%14)
Case based Studies	Class 3	0(%0)	3(%12)	8(%32)	13(%52)	1(%4)
	Class 4	4(%8)	7(%13)	16(%30)	21(%40)	5(%9)
	Class 5	1(%3)	9(%23)	5(%13)	18(%45)	7(%18)
	Specialist	1(%11)	1(%11)	2(%22)	4(%44)	1(%11)
	Research Assistant	2(%3)	2(%3)	20(%34)	27(%47)	7(%12)
	Associate Professor	0(%0)	0(%0)	2(%15)	6(%46)	5(%38)
	Assistant Professor	0(%0)	1(%9)	1(%9)	6(%55)	3(%27)
	Professor	0(%0)	0(%0)	0(%0)	6(%86)	1(%14)
Clinical practice Training	Class 3	1(%4)	2(%8)	2(%8)	13(%52)	7(%28)
	Class 4	2(%4)	1(%2)	1(%2)	14(%26)	35(%66)
	Class 5	1(%2)	0(%0)	1(%2)	7(%17)	32(%78)
	Specialist	1(%11)	0(%0)	1(%11)	1(%11)	6(%67)
	Research Assistant	0(%0)	0(%0)	7(%12)	20(%34)	31(%53)
	Associate Professor	0(%0)	0(%0)	0(%0)	4(%31)	9(%69)
	Assistant Professor	0(%0)	0(%0)	0(%0)	3(%27)	8(%73)
	Professor	0(%0)	0(%0)	0(%0)	2(%29)	5(%71)
Team based Learning	Class 3	2(%8)	2(%8)	13(%52)	7(%28)	1(%4)
	Class 4	7(%13)	10(%19)	12(%23)	20(%38)	4(%8)
	Class 5	5(%12)	5(%12)	8(%20)	15(%37)	8(%20)
	Specialist	1(%11)	0(%0)	4(%44)	3(%33)	1(%11)
	Research Assistant	1(%11)	5(%9)	18(%31)	26(%45)	8(%14)
	Associate Professor	0(%0)	0(%0)	4(%31)	8(%62)	1(%8)
	Assistant Professor	0(%0)	1(%9)	2(%18)	7(%64)	1(%9)
	Professor	0(%0)	0(%0)	0(%0)	6(%86)	1(%14)
Traditional Lesson Learning	Class 3	0(%0)	0(%0)	3(%12)	6(%24)	16(%64)
	Class 4	2(%4)	1(%2)	2(%4)	9(%17)	39(%74)
	Class 5	2(%5)	0(%0)	0(%0)	9(%22)	30(%73)
	Specialist	1(%11)	0(%0)	0(%0)	1(%11)	7(%78)
	Research Asistant	2(%3)	0(%0)	6(%10)	18(%31)	32(%55)
	Associate Professor	0(%0)	0(%0)	0(%0)	4(%31)	9(%69)
	Assistant Professor	0(%0)	0(%0)	0(%0)	2(%18)	9(%82)
	Professor	0(%0)	0(%0)	1(%14)	2(%29)	4(%57)
Which of the following "Simulation-Based Trainings" do you use in your education?						
		Academician		Student		
Preclinic Laboratory		90(%92)		235(%93)		
Fantom Laboratory		96(%98)		233(%92)		
Virtual Reality Based Technology		8(%8)		8(%3)		
Basic life support on models		20(%20)		50(%20)		
What positive changes do you observe when student-centered educational methods are used?						
		Academician		Student		
I participate more actively.		43(%44)		75(%30)		
Learning becomes more permanent.		71(%72)		196(%77)		
I feel more motivated.		53(%54)		118(%46)		
It facilitates the transition of theoretical knowledge into clinical practice.		62(%63)		185(%73)		
I do not observe any changes.		5(%5)		8(%3)		

Students' perspectives on the competencies developed through SCE were also analyzed, revealing no significant differences among their responses ($p>0.05$). The majority of students reported that PBL improved their problem-solving abilities. Regarding FC, SBL, CPT, and OSCE, students expressed similar views on their impact on critical thinking, problem-solving, teamwork, clinical decision-making, professionalism, and communication skills. Students also agreed that small-group activities enhanced their teamwork skills and that clinical practice education strengthened their clinical decision-making and professionalism.

Two questions were posed to participants regarding the challenges of SCE. The questions and responses are shown in **Table 5**. The greatest challenges reported by both students and academicians are time management and insufficient technological infrastructure. Additionally, students frequently report a lack of resources as one of the challenges they encounter. Students have indicated that to make PBL more effective, additional educational materials and resources should be provided, technological infrastructure should be ensured, and student feedback should be considered. Academic staff, on the other hand, have emphasized that, rather than focusing on student feedback, the training of the academic staff is essential in this regard.

In the final section of the survey, a general evaluation and recommendations question was asked which were shown in **Table 6** and the general evaluation comparisons within academic ranks and student groups revealed similar patterns ($p>0.05$).

Table 4a. The responses of participants regarding Effectiveness of Teaching Methods and Feedback

Do you think student-centered educational methods enhance the following competencies of students?						
		Definitely doesn't contribute	Doesn't contribute	Undecided	Contributes	Definitely contributes
Critical thinking skills	Class 3	0(%0)	0(%0)	3(%12)	14(%56)	8(%32)
	Class 4	2(%4)	3(%6)	6(%11)	29(%55)	13(%25)
	Class 5	0(%0)	1(%2)	7(%17)	22(%54)	11(%27)
	Specialist	1(%13)	0(%0)	2(%25)	2(%25)	3(%38)
	Research Assistant	1(%2)	4(%7)	16(%28)	28(%48)	9(%16)
	Associate Professor	0(%0)	2(%15)	0(%0)	9(%69)	2(%15)
	Assistant Professor	0(%0)	1(%9)	1(%9)	8(%73)	1(%9)
	Professor	0(%0)	0(%0)	1(%14)	3(%43)	3(%43)
Problem solving ability	Class 3	0(%0)	0(%0)	2(%8)	13(%52)	10(%40)
	Class 4	1(%2)	2(%4)	5(%10)	27(%52)	17(%33)
	Class 5	1(%2)	0(%0)	2(%5)	22(%54)	16(%39)
	Specialist	1(%11)	0(%0)	1(%11)	5(%56)	2(%22)
	Research Assistant	1(%2)	3(%5)	16(%28)	28(%48)	10(%17)
	Associate Professor	1(%8)	0(%0)	0(%0)	10(%77)	2(%15)
	Assistant Professor	0(%0)	0(%0)	1(%9)	9(%82)	1(%9)
	Professor	0(%0)	0(%0)	0(%0)	4(%57)	3(%43)
Communication and Patient Relationships	Class 3	0(%0)	1(%4)	4(%16)	9(%36)	11(%44)
	Class 4	1(%2)	4(%8)	4(%8)	21(%40)	23(%43)
	Class 5	1(%2)	1(%2)	3(%7)	18(%44)	18(%44)
	Specialist	1(%13)	1(%13)	1(%13)	3(%38)	2(%25)
	Research Assistant	1(%2)	2(%3)	12(%21)	33(%57)	10(%17)
	Associate Professor	0(%0)	1(%8)	1(%8)	9(%69)	2(%15)
	Assistant Professor	0(%0)	0(%0)	0(%0)	9(%82)	2(%18)
	Professor	0(%0)	0(%0)	0(%0)	3(%43)	4(%57)
Teamwork orientation	Class 3	0(%0)	4(%16)	5(%20)	6(%24)	10(%40)
	Class 4	3(%6)	5(%9)	9(%17)	23(%43)	13(%25)
	Class 5	2(%5)	2(%5)	6(%15)	19(%46)	12(%29)
	Specialist	1(%11)	0(%0)	1(%11)	5(%56)	2(%22)
	Research Assistant	1(%2)	1(%2)	11(%19)	33(%57)	12(%21)
	Associate Professor	1(%8)	0(%0)	1(%8)	8(%62)	3(%23)
	Assistant Professor	0(%0)	0(%0)	0(%0)	9(%69)	2(%15)
	Professor	0(%0)	0(%0)	0(%0)	4(%57)	3(%43)
Clinical decision-making	Class 3	0(%0)	0(%0)	3(%12)	11(%44)	11(%44)
	Class 4	2(%4)	1(%2)	2(%4)	27(%51)	21(%40)
	Class 5	1(%2)	1(%2)	2(%5)	19(%46)	18(%44)
	Specialist	1(%11)	0(%0)	1(%11)	4(%44)	3(%33)
	Research Assistant	1(%2)	4(%7)	14(%24)	28(%48)	11(%19)
	Associate Professor	1(%8)	0(%0)	0(%0)	10(%77)	2(%15)
	Assistant Professor	0(%0)	0(%0)	0(%0)	9(%82)	2(%18)
	Professor	0(%0)	0(%0)	0(%0)	3(%43)	4(%57)

Table 4b. The responses of participants regarding Effectiveness of Teaching Methods and Feedback

Which student-centered teaching method has been the most effective for you? Why?			
		Academician	Student
PBL	It promotes critical thinking	30	75
	It enhances problem solving skills	58	152
	It fosters the spirit of teamwork	12	24
	It enhances clinical decision making	25	60
	It enhances professionalism	11	45
	It improves communication skills	12	25
FC	It promotes critical thinking	30	104
	It enhances problem solving skills	31	58
	It fosters the spirit of teamwork	16	30
	It enhances clinical decision making	15	35
	It enhances professionalism	12	50
	It improves communication skills	10	31
TBL	It promotes critical thinking	17	57
	It enhances problem solving skills	25	49
	It fosters the spirit of teamwork	59	147
	It enhances clinical decision making	20	37
	It enhances professionalism	19	43
	It improves communication skills	34	73
SBL	It promotes critical thinking	10	35
	It enhances problem solving skills	35	85
	It fosters the spirit of teamwork	17	37
	It enhances clinical decision making	46	122
	It enhances professionalism	41	123
	It improves communication skills	13	29
CBL	It promotes critical thinking	24	77
	It enhances problem solving skills	33	90
	It fosters the spirit of teamwork	15	27
	It enhances clinical decision making	46	121
	It enhances professionalism	33	97
	It improves communication skills	13	32
OSCE	It promotes critical thinking	21	56
	It enhances problem solving skills	33	76
	It fosters the spirit of teamwork	18	23
	It enhances clinical decision making	30	86
	It enhances professionalism	37	99
	It improves communication skills	20	56
CPT	It promotes critical thinking	19	72
	It enhances problem solving skills	31	109
	It fosters the spirit of teamwork	31	71
	It enhances clinical decision making	58	145
	It enhances professionalism	51	147
	It improves communication skills	40	127

Table 5. The responses of participants regarding Challenges Encountered in Student-Centered Educational Methods and Suggestions for Improvement

What are the main challenges you encounter while implementing student-centered educational methods?		
	Academician	Student
Time management	71 (%72)	165 (%65)
Lack of resources	50 (%51)	137 (%54)
Insufficient technological infrastructure	64 (%65)	173 (%68)
Inadequate preparation of faculty members	38 (%39)	68 (%27)
Students struggling to adapt to this method	39 (%40)	87 (%34)
Others	4 (%4)	15 (%6)
What supportive factors do you think should be provided to make student-centered educational practices more effective?		
	Academician	Student
More educational materials and resources	76 (%78)	182 (%72)
Improvement of technological infrastructure.	84 (%86)	189 (%74)
Education of academic staff	69 (%70)	120 (%47)
Considering students feedback	48 (%49)	179 (%70)
Others	2 (%2)	12 (%5)

Table 6. The responses about Participants' overall evaluations regarding the survey.

Do you think student-centered educational methods contribute to the overall quality of undergraduate dental education?					
Title	Definitely doesn't contribute	Doesn't contribute	Undecided	Contributes	Definitely contributes
Class 3	0(%0)	1(%6)	4(%22)	7(%39)	6(%33)
Class 4	1(%3)	0(%0)	11(%28)	11(%28)	16(%41)
Class 5	1(%4)	1(%4)	2(%9)	8(%35)	11(%48)
Specialist	0(%0)	0(%0)	0(%0)	1(%11)	8(%89)
Research Assistant	0(%0)	1(%2)	12(%21)	18(%31)	27(%47)
Associate Professor	0(%0)	0(%0)	1(%8)	3(%23)	9(%69)
Assistant Professor	0(%0)	0(%0)	0(%0)	5(%45)	6(%55)
Professor	0(%0)	0(%0)	0(%0)	2(%29)	5(%71)

DISCUSSION

This study aims to determine the cognitive levels of academics and students regarding student-centered education in dental education.

Curriculum reform in dental education is ongoing, with dental faculties progressing toward a more integrated and multidisciplinary model that enhances transparency in the relationships between basic and clinical sciences. PBL and CBL are promising tools for medical and dental educators.⁽⁵⁾

Akaltan, in his review titled "Update in Dental Education: Teaching and Learning Methods" reported that numerous educational approaches, principles, and methods are currently implemented in dental education, with the common aim of these approaches being to foster the development of learning attributes such as critical thinking, self-directed learning, and problem-solving skills.⁽⁶⁾

A review evaluating the role of PBL in dental education at Showa University School of Dentistry from its inception in 2003 to 2012 concluded that while there is no single, perfect educational method to satisfy all students and staff, PBL is indubitably effective.⁽⁷⁾ Notably, SBL has been proposed as an efficacious method for medical and dental clinical training, serving as a bridge between classroom learning and real-life clinical experience.⁽⁸⁾ Today's students, particularly Millennials, expect instant access to services, the ability to download their grades, course schedules, and other relevant information automatically, as well as access to assistance 24 hours a day. To meet these expectations, a shift in mindset within dental faculties must be encouraged, and educators should receive training in e-learning and e-teaching to facilitate both theoretical and practical knowledge transfer effectively.⁽⁹⁾

Our study indicates that educators with lower academic titles tend to have less knowledge about PBL. Additionally, the FC model appears to be a method with which educators across all academic titles have limited familiarity. When students assessed themselves in terms of their knowledge and awareness levels regarding SCE methods, it was observed that they perceived themselves to be less competent compared to academicians. Furthermore, when participants were asked to indicate which SCE methods they were familiar with only at the knowledge level, academicians ranked their familiarity as follows: CPT>SBL>TBL>CBL>PBL>OSCE>FC. In comparison, students reported their knowledge levels in the following order: SBL>CPT>TBL>CBL>OSCE>PBL>FC.

When academicians were asked, "Which student-centered education methods do you use in student training?", the most frequently used methods were reported as follows: CPT>CBL>SBL>TBL>PBL>OSCE>FC. Similarly, when students were asked, "Which student-centered education methods have you experienced?", their responses aligned with their reported knowledge levels and were ranked as: SBL>CPT>TBL>CBL>OSCE>PBL>FC.

Based on these findings, despite variations in the ranking of preferred SCE methods between students and academicians, CPT and SBL consistently emerged as the most commonly used SCE approaches in dental education. These are followed by TBL and CBL, which are also frequently utilized and associated with higher levels of knowledge. Additionally, the results suggest that although OSCE, PBL, and FC are used to a lesser extent, their presence indicates a growing trend toward the increased implementation of SCE methods in the future of dental education.

The success of PBL depends on collaboration between students and instructors. Students must come to class adequately prepared to resolve misunderstandings and fill knowledge gaps.⁽¹³⁾ The FC is an innovative pedagogical approach that integrates blended learning methodologies through online, offline, or hybrid instructional materials outside the conventional classroom environment, supported by constructivist learning theory.⁽¹⁴⁾ The FC model fosters self-directed learning by requiring students to seek supplementary resources to reinforce the provided material.⁽¹⁵⁾ Its effective implementation necessitates active engagement from both educators and students. Furthermore, it is crucial for educators to meticulously plan and structure instructional activities that enhance student preparedness and participation.⁽⁴⁾

Academicians and students emphasized that CPT enhances clinical decision-making, professionalism, and communication skills. SBL (e.g., preclinical, phantom applications) improves clinical decision-making, professionalism, and problem-solving abilities. CBL contributes to clinical decision-making, professionalism, problem-solving, and critical thinking. OSCE supports the development of professionalism, clinical decision-making, and problem-solving. PBL is particularly effective for enhancing problem-solving skills. The FC model was reported to be most effective in improving communication skills. TBL was noted to be especially beneficial in fostering team spirit and collaboration. These findings suggest that the integration of diverse SCE methods into dental education plays a crucial role in equipping students with the essential competencies required for professional practice. Moreover, the use of such methods is likely to have a significant impact on graduates' ability to meet expected standards of professionalism. When asked about the necessary supportive factors for enhancing the effectiveness of SCE practices, academicians emphasized, in order of importance: the development of technological infrastructure, the need for more educational materials and resources, the training of academic staff, and the incorporation of student feedback. Similarly, students highlighted the need for improved technological infrastructure, more materials and resources, the inclusion of student feedback, and the training of academic staff. These findings further confirm that the successful implementation of SCE in dental education is heavily dependent on access to technological infrastructure, educational materials, and learning resources. Additionally, the lack of training opportunities for academicians to learn and gain experience in applying diverse SCE models represents a significant gap that must be addressed. Equally important is the ongoing collection of student feedback, which should be systematically used to make continuous improvements to educational programs.

In our study, simulation-based education emerged as the most commonly applied model among the most frequently utilized student-centered education (SCE) methods reported by both academicians and students. Within this category, preclinical and phantom laboratory training was the most frequently employed, followed by basic life support on models. In contrast virtual reality-based education was reported to be used very infrequently.

A significant portion of the limitations encountered in the implementation of SCE methods in dental education was attributed to inadequate technological infrastructure, insufficient materials and resources, time constraints, and the lack of adequate training for academicians in these methods.

In response to survey questions aimed at evaluating the effectiveness of SCE methods and the perceived value of feedback mechanisms, both academicians and students agreed that SCE contributes significantly to various professional competencies, including teamwork, critical thinking, problem-solving, communication skills, patient interaction, and clinical decision-making.

When participants were asked, "Which student-centered education methods are more effective in student training? Which competencies do they enhance?", all groups identified CPT and SBL (e.g., preclinical, phantom applications, etc.) as the most effective SCE methods in dental education.

One of the most significant challenges in student-centered education is the necessity of considering student feedback and implementing improvements accordingly.^(15, 16) To create an effective learning environment, students' experiences, expectations, and challenges must be regularly assessed. However, inadequately structured

feedback processes or the limited influence of student opinions on educational programs can negatively impact motivation and class participation.⁽⁹⁾ Therefore, student feedback should not merely be collected as data but should serve as a key component guiding the educational process. By analyzing this feedback and making necessary curriculum adjustments, educators can enhance the effectiveness of student-centered education and encourage more active student participation in the learning process.⁽¹⁷⁾

CONCLUSION

Contemporary pedagogical methods that place the student at the center of the learning process employ innovative and creative approaches to facilitate knowledge acquisition. This approach enhances professional competence by fostering skills, expertise, and leadership within the field. Differentiated teaching models should be effectively and appropriately integrated into dental education from the preclinical years onward, which necessitates flexibility in the educational approach.

To enhance the prevailing pragmatic perspectives in dental education, it is recommended that educators consider their students' level of knowledge and the philosophical foundations of dental education. This can be achieved by providing a more comprehensive theoretical framework for dental education, ultimately improving the student learning experience. Moreover, for the successful implementation of innovative approaches, educators need to receive regular training on contemporary educational methodologies and stay up to date with advancements in the field. Additionally, providing educators and students with access to a well-established technological infrastructure will not only enhance students' motivation toward education but also elevate the quality of education, thereby contributing to the provision of higher-standard healthcare services.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmaları CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: MSV %10, SÖ. %10, SB %40, NÜ %40

Veri Toplanması | Data Acquisition: MSV %40, SÖ %40, SB %10, NÜ %10

Veri Analizi | Data Analysis: MSV %40, SÖ %40, SB %10, NÜ %10

Makalenin Yazımı | Writing up: MSV %60, SÖ %10, SB %10, NÜ %20

Makale Gönderimi ve Revizyonu | Submission and Revision: MSV %70, SÖ %10, SB %10, NÜ %10

REFERENCES

1. Field MJ. Dental education at the crossroads: challenges and change. 1995.
2. Challa KT, Sayed A, Acharya Y. Modern techniques of teaching and learning in medical education: a descriptive literature review. *MedEdPublish*. 2021; 10:18.
3. Jiraporncharoen W, Angkurawaranon C, Chockjamsai M, Deesomchok A, Euathrongchit J. Learning styles and academic achievement among undergraduate medical students in Thailand. *Journal of educational evaluation for health professions*. 2015;12.
4. Rubaia'an MAB. Dental education: a guide for novice tutors. *Cureus*. 2023;15(8).
5. Nadershahi NA, Bender DJ, Beck L, Lyon C, Blaseio A. An overview of case-based and problem-based learning methodologies for dental education. *Journal of Dental Education*. 2013;77(10):1300-5.
6. Akaltan KF. Diş hekimliği eğitiminde güncelleme: Eğitim ve öğrenim yöntemleri. *Selcuk Dental Journal*. 2019;6(5):1-20.
7. Nakamura M. Introduction of Learner-centered Education at Showa University School of Dentistry. *Dental medicine research*. 2012;32(3):162-7.
8. McLean SF. Case-based learning and its application in medical and health-care fields: a review of worldwide literature. *Journal of medical education and curricular development*. 2016;3: JMECD. S20377.
9. Zitzmann NU, Matthisson L, Ohla H, Joda T. Digital undergraduate education in dentistry: a systematic review. *International journal of environmental research and public health*. 2020;17(9):3269.
10. Gijbels D, Van de Watering G, Dochy F, Van den Bossche P. The relationship between students' approaches to learning and the assessment of learning outcomes. *European journal of psychology of education*. 2005; 20:327-41.
11. Bhat S, Madiyal A, Babu GS. Innovative teaching methods in dental education. 2021.
12. Özbıçakçı Ş, Bilik Ö, İntepeler ŞS. Assessment of goals in problem-based learning. *Nurse education today*. 2012;32(8): e79-e82.
13. Alrahlah A. How effective the problem-based learning (PBL) in dental education. A critical review. *The Saudi dental journal*. 2016;28(4):155-61.
14. Kim TH, Kim JS, Yoon HI, Lee J, Lee JJB, Byun HK, et al. Medical student education through flipped learning and virtual rotations in radiation oncology during the COVID-19 pandemic: a cross sectional research. *Radiation Oncology*. 2021; 16:1-9.
15. Hurtubise L, Hall E, Sheridan L, Han H. The flipped classroom in medical education: engaging students to build competency. *Journal of Medical Education and Curricular Development*. 2015;2: JMECD. S23895.
16. Ghosh S. Combination of didactic lectures and case-oriented problem-solving tutorials toward better learning: perceptions of students from a conventional medical curriculum. *Advances in Physiology Education*. 2007;31(2):193-7.
17. Taylor BP. Teaching ESL: incorporating a communicative, student-centered component. *Tesol Quarterly*. 1983;17(1):69-88.

Integration of Artificial Intelligence into Dental Education: Perspectives of Students and Academicians

Yapay Zeka'nın Diş Hekimliği Eğitimine Entegrasyonu: Öğrenci ve Akademisyenlerin Bakış Açısı

Mehmet Semih VELİOĞLU^a , Sinem ÖZDEMİR^a , Serkan POLAT^b , Nimet ÜNLÜ^a 

^aSelcuk University, Faculty of Dentistry, Department of Restorative Dentistry, Konya, Türkiye

^aSelçuk Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Konya, Türkiye

^bBolu Abant İzzet Baysal University, Faculty of Dentistry, Department of Oral and Maxillofacial Surgery, Bolu, Türkiye

^bBolu Abant İzzet Baysal Üniversitesi, Diş Hekimliği Fakültesi, Ağız, Diş ve Çene Cerrahisi AD, Bolu, Türkiye

ÖZ

Giriş: Yapay zekâ (YZ), son yıllarda sağlık eğitiminde giderek daha fazla yer edinmekte ve diş hekimliği alanında da çeşitli uygulamaları ile dikkat çekmektedir. Ancak, lisans düzeyinde YZ teknolojilerinin entegrasyonu ve kullanımı konusunda sınırlı sayıda çalışma bulunmaktadır.

Amaç: Bu çalışma ile diş hekimliği öğrencilerinin diş hekimliğindeki yapay zeka farkındalığı, uygulamaları ve kullanımında etik ve hukuk kurallarına ilişkin bilginin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Bu çalışma, yaşları 18 ile 60 arasında değişen 161 diş hekimliği öğrencisi ve akademisyen üzerinde, Google Forms anket platformu kullanılarak gerçekleştirilmiştir. Selçuk Üniversitesi Diş Hekimliği Fakültesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu tarafından onaylanan bu çalışmaya, Türkiye genelindeki 3., 4. ve 5. sınıf diş hekimliği öğrencileri ile diş hekimliği akademisyenleri e-posta ve sosyal medya aracılığıyla davet edilmiştir. Katılımcıların kişisel bilgileri kaydedilmemiş, veriler anonim olarak analiz edilmiştir. Anket; demografik bilgiler (3 soru), YZ farkındalığı (3 soru), YZ uygulamaları (17 soru), YZ uygulamalarının diş hekimliği eğitimine entegrasyon zorlukları ve etik zorluklar (6 soru) ile görüş ve öneriler (1 soru) olmak üzere 4 bölümden ve toplam 30 sorudan oluşmaktadır. Anket sonuçları Ki-Kare testi ve Kruskal-Wallis testi ile istatistiksel olarak değerlendirilmiştir.

Bulgular: Çalışmaya %12,4 u öğretim üyesi, %24,2 si 5.sınıf öğrencisi, %40,4 u 4. sınıf öğrencisi ve %23 u 3. sınıf öğrencisi katılım sağlamıştır. Katılımcıların %71,5 inin YZ ile ilgili bilgi seviyesi “kararsız”, “hiç bilgi sahibi olmadıklarını” ya da “az bilgi sahibi olduklarını” belirtmişlerdir. Bununla birlikte katılımcıların 28’i (%17,5) konuya ilişkin eğitim ve seminare katılma durumlarının az olduğunu da bildirmişlerdir. Kişilerin eğitim düzeyi ile diş hekimliği eğitiminde YZ farkındalığı ve YZ uygulamaları ile arasında istatistiksel olarak anlamlı bir farklılık görülmemiştir (sırasıyla p=0,671 ve p=0,496). “YZ’nin klinik eğitim alanında kullanılması gerektiğini” 4. ve 5. sınıf öğrenciler tarafından istatistiksel olarak anlamlı oranda daha fazla belirtilmiştir (p=0,015). YZ ‘nın hasta mahremiyeti, gizlilik ve veri güvenliği konularında 3. sınıf öğrencileri ile öğretim üyeleri arasında istatistiksel olarak anlamlı bir fark görülmüştür (p=0,01). Katılımcılar, YZ’nin diş hekimliğine entegrasyonundaki zorluklar konusunda 1. sırada teknolojik alt yapı eksikliği ve 2. sırada ise yeterli eğitim materyallerinin olmaması olarak belirtmişlerdir. YZ uygulamalarının eğitim müfredatında daha fazla yer alması konusunu katılımcılardan 126’sı (%88,8) tarafından desteklemiştir.

Sonuç: Diş hekimlerinin ve diş hekimliği öğrencilerinin YZ ile ilgili bilgi eksikliğinin mevcut olduğu gözlenmiştir. Bu konuda hem eğitim hem de uygulama alanlarında YZ entegrasyonunun geliştirilmesi gerektiği ortadadır. Ancak veri güvenliği ve hasta mahremiyeti konularındaki kaygıların da giderilmesi için gerekli önlemlerin alınması önemli bir çalışma konusudur.

Anahtar Kelimeler: Yapay zeka, Diş hekimliği eğitimi, Farkındalık

ABSTRACT

Introduction: In recent years, artificial intelligence(AI) has increasingly gained prominence in healthcare education, attracting attention with its various applications in the field of dentistry. However, studies examining the integration and utilization of AI technologies at the undergraduate level remain limited.

Objective: This study aims to evaluate dental students' awareness of AI in dentistry, its applications, and their knowledge regarding the ethical and legal frameworks governing its use.

Materials and Methods: The study was conducted using the Google Forms survey platform with the participation of 161 dental students and academicians aged between 18-60. Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Selçuk University Faculty of Dentistry. Third-, fourth-, and fifth-year dental students, as well as dental academicians from various institutions across Turkey, were invited to participate via email and social media. Personal data were not recorded, and responses were analyzed anonymously.

The survey consisted of four sections with a total of 30 questions:(1) demographic information(3 questions),(2) AI awareness(3 questions),(3) AI applications(17 questions),(4) challenges in integrating AI into dental education and ethical concerns(6 questions), and (5) opinions and recommendations(1 question). The survey results were statistically analyzed using the Chi-Square test and the Kruskal-Wallis test.

Results: Among the participants,12.4% were academicians,24.2% were fifth-year students,40.4% were fourth-year students, and 23% were third-year students. A total of 71.5% of participants reported their level of AI-related knowledge as "uncertain," "having no knowledge,"or"having little knowledge." Additionally,28 participants(17.5%) stated that they had limited experience attending AI-related training or seminars. There was no statistically significant difference between educational level and AI awareness or AI applications in dental education(p=0.671 and p=0.496, respectively). However, the perception that "AI should be utilized in clinical education" was statistically significantly higher among fourth- and fifth-year students(p=0.015). A statistically significant difference was observed between third-year students and academicians regarding concerns over AI's impact on patient privacy, confidentiality, and data security(p=0.01).

Participants identified the primary challenge in integrating AI into dental education as the lack of technological infrastructure, followed by the insufficiency of educational materials. Additionally,126 participants(88.8%) expressed support for the inclusion of more AI-related content in the dental curriculum.

Conclusion: The findings indicate a knowledge gap among dental students and professionals regarding AI. The need for improved integration of AI into both education and clinical practice is evident. However, addressing concerns related to data security and patient confidentiality remains a critical area of focus in future research and implementation strategies.

Keywords: Artificial intelligence, Dentistry education, Awareness

INTRODUCTION

Artificial intelligence is defined as the development of computer systems that aim to mimic human intelligence⁽¹⁾. In recent years, AI has

been increasingly utilized in the fields of medicine and dentistry, integrating not only into clinical applications but also into educational processes⁽²⁾. AI algorithms contribute to more accurate diagnoses and the development of personalized treatment plans by analyzing dental

Gönderilme Tarihi/Received: 14 Nisan, 2025

Kabul Tarihi/Accepted: 29 Mayıs, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Veliöğlu MS, Özdemir S, Polat S, Ünlü N. Integration of Artificial Intelligence into Dental Education: Perspectives of Students and Academicians. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 25-29 Doi: 10.15311/ selcukdentj.1675815

Sorumlu yazar/Corresponding Author: Mehmet Semih VELİOĞLU

E-mail: semiveli@gmail.com

Doi: 10.15311/ selcukdentj.1675815

imaging and patient records. Furthermore, the use of AI in dental education provides students with the opportunity to enhance their clinical skills through virtual simulations, eliminating any potential risks associated with real-patient interactions⁽³⁾.

AI is also employed to assess the knowledge levels of dental students, enhance knowledge retention, and offer personalized learning experiences⁽⁴⁾. Educational games, assessments, and intelligent tutoring systems increase student motivation while promoting the effective use of technological innovations in education⁽⁵⁾. However, the integration of AI into dental education presents certain ethical and practical challenges⁽⁶⁾. Over-reliance on AI may negatively impact students' critical thinking and problem-solving skills. Additionally, ensuring the accuracy and impartiality of AI algorithms is crucial to preventing erroneous diagnoses and treatment decisions⁽⁷⁾.

Another major concern regarding the use of AI in education relates to academic integrity. AI-powered tools may provide students with an unfair advantage in academic assessments, potentially undermining the credibility of the education system⁽⁸⁾. Therefore, universities must develop preventive policies within the framework of academic ethical standards to regulate the use of AI in educational settings⁽⁹⁾.

This study aims to assess the awareness of AI among dental students and academicians, examine its applications in dentistry, and assess their knowledge regarding the ethical and legal dimensions of these technologies.

METHODS

This study was conducted on 161 dentistry students and faculty members aged between 18 and 60, using the Google Forms survey platform. The study was approved (Ethics approval number 2025/21) by the Non-Interventional Clinical Research Ethics Committee of Selçuk University Faculty of Dentistry. Dental students in their 3rd, 4th, and 5th years, as well as dentistry faculty members from various institutions across Turkey, were invited to participate via email and social media. Participants' personal information was not recorded, and the data were analyzed anonymously.

The survey consisted of four sections with a total of 30 questions: demographic information (3 questions), AI awareness (3 questions), AI applications (17 questions), challenges in integrating AI into dental education and ethical concerns (6 questions), and opinions and suggestions (1 question). The survey results were statistically analyzed using the Chi-Square test and the Kruskal-Wallis test.

RESULTS

The sociodemographic distribution of participants were presented in Table 1. An analysis of the data obtained from the study reveals that 81.1% of the participants were women aged between 18 and 24 years. Additionally, 86.5% of the participants were students.

Table 1. The sociodemographic distribution of participants.

Gender	Male	111 (%67,7)
	Female	52(%31,7)
	Not mentioned	1(%0,6)
Age	18-24	133(%81,1)
	25-34	22(%13,4)
	35-44	4(%2,4)
	45 +	5(%3)
Title	Academician	22(%13,4)
	Class 3	37(%22,6)
	Class 4	66(%40,2)
	Class 5	39(%23,8)

Three questions were asked to assess the participants' awareness of artificial intelligence. The questions and the distribution of responses are presented in Table 2. Accordingly, participants' levels of knowledge, seminar attendance, and awareness regarding AI applications were evaluated.

Table 2. The responses of participants regarding the awareness of artificial intelligence.

How do you assess your level of knowledge about artificial intelligence?					
	No Knowledge	Limited Knowledge	Undecided	Have Knowledge	High level of Knowledge
Class 3	4(%11)	13(%35)	14(%38)	6(%16)	0(%0)
Class 4	3(%5)	24(%36)	17(%26)	21(%32)	1(%2)
Class 5	4(%10)	16(%41)	7(%18)	11(%28)	1(%3)
Academician	2(%9)	7(%32)	4(%18)	8(%36)	1(%5)
Have you attended any training sessions or seminars on the use of artificial intelligence in dental education?					
	Yes			No	
Class 3	4(%11)			33(%89)	
Class 4	17(%26)			49(%74)	
Class 5	5(%13)			34(%87)	
Academician	5(%23)			17(%77)	
Are you knowledgeable about the applications of artificial intelligence in dental education?					
	No Knowledge	Limited Knowledge	Undecided	Have Knowledge	High level of Knowledge
Class 3	9(%24)	15(%41)	10(%27)	3(%8)	0(%0)
Class 4	11(%17)	21(%32)	16(%24)	17(%26)	1(%2)
Class 5	7(%18)	20(%51)	7(%18)	5(%13)	0(%0)
Academician	1(%5)	9(%41)	3(%41)	8(%36)	1(%5)

The analyses conducted for all these aspects revealed no statistically significant differences ($p > 0.05$). This indicates that, in general, participants possess a comparable level of knowledge concerning artificial intelligence.

In this study, various applications of artificial intelligence (AI) in dentistry (including clinical skill development, accuracy and efficiency, personalized treatment planning, early diagnosis and treatment, database creation, simulations and inactive learning tools, and performance monitoring) were evaluated. For this purpose, 17 questions were administered to the participants, and the distribution of the questions and their corresponding responses is presented in Table 3a. Statistical analysis revealed no significant differences in the evaluation of these AI application areas among third-, fourth-, and fifth-grade students and academicians ($p > 0.05$). This finding suggests that participants hold similar views regarding the role of AI in dental education and professional practice.

Participants were asked about the areas in which artificial intelligence is currently being used, and the distribution of their responses is presented in Table 3b. Results indicated that the majority of participants agreed on the necessity of AI applications in diagnosis and treatment planning, dental imaging and analysis technologies, clinical training simulations, AI-assisted treatment applications (such as CAD/CAM and orthodontic aligner treatments), robotic surgery, and AI integration, patient management, and appointment systems, as well as data analysis and patient risk assessment methods. However, participants largely expressed that AI should not be used in student performance evaluation, forensic dentistry, and ethical-legal matters. Notably, in student performance evaluation, academicians supported the use of AI, whereas students predominantly opposed it, and this difference was statistically significant ($p = 0.042$).

Table 3a. The responses of participants regarding artificial intelligence applications.

In which areas do you think artificial intelligence should be utilized?					
					Academicians and Students
Diagnosis and treatment planning					127 (%77,4)
Artificial Intelligence Technologies in Dental Imaging and Analysis					143 (%87,2)
Clinical Training Simulations in Dentistry					117 (%71,3)
Artificial Intelligence in Treatment Applications (CAD/CAM, Orthodontic Clear Aligners)					135 (%82,3)
Robotic Surgery and Artificial Intelligence Integration in Dentistry					82 (%50)
Student Performance Evaluation in Dentistry					58 (%35,4)
Patient Management and Appointment Systems in Dentistry					122 (%74,4)
Data Analysis and Patient Risk Assessment Methods in Dentistry					111 (%67,7)
Use of Data Analysis and Artificial Intelligence in Forensic Dentistry					67 (%40,9)
Artificial Intelligence Applications in Ethical and Legal Issues in Dentistry					50 (%30,5)
Others					1 (%0,6)
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	2 (%5)	8 (%22)	17 (%46)	10 (%27)
Class 4	2 (%3)	3 (%5)	17 (%26)	30 (%45)	14 (%21)
Class 5	0 (%0)	2 (%5)	9 (%23)	16 (%41)	12 (%31)
Academician	0 (%0)	0 (%0)	3 (%14)	13 (%59)	6 (%27)
Artificial intelligence analyzes dental data, such as imaging and patient records, to detect conditions more quickly and accurately, assisting in diagnosis. It also supports accuracy and efficiency.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	1 (%3)	7 (%19)	20 (%54)	9 (%24)
Class 4	2 (%3)	1 (%2)	14 (%21)	35 (%53)	14 (%21)
Class 5	0 (%0)	3 (%8)	8 (%21)	18 (%46)	10 (%26)
Academician	0 (%0)	0 (%0)	3 (%14)	12 (%55)	7 (%32)
Artificial intelligence helps create personalized treatment plans based on the specific needs of patients.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	1 (%3)	7 (%19)	21 (%57)	8 (%22)
Class 4	1 (%2)	3 (%5)	15 (%23)	31 (%47)	16 (%24)
Class 5	0 (%0)	3 (%8)	8 (%21)	18 (%46)	10 (%26)
Academician	0 (%0)	2 (%9)	3 (%14)	10 (%45)	7 (%32)
Artificial intelligence helps predict the likelihood of specific dental issues and diseases based on patient data, contributing to their prevention, early diagnosis, and treatment.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	1 (%3)	1 (%3)	7 (%19)	18 (%49)	10 (%27)
Class 4	1 (%2)	0 (%0)	18 (%27)	35 (%53)	12 (%18)
Class 5	0 (%0)	4 (%10)	6 (%15)	19 (%49)	10 (%26)
Academician	0 (%0)	1 (%5)	1 (%5)	15 (%68)	5 (%23)
Artificial intelligence can be used to enhance information sharing by collecting large amounts of data to create a database consisting of methods and practices that can be compared with outcomes.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	2 (%5)	5 (%14)	18 (%49)	12 (%32)
Class 4	2 (%3)	1 (%2)	10 (%15)	40 (%61)	13 (%20)
Class 5	0 (%0)	0 (%0)	4 (%10)	24 (%62)	11 (%28)
Academician	0 (%0)	0 (%0)	3 (%14)	12 (%55)	7 (%32)
AI-based tools help students acquire practical skills in dental education through simulations, interactive learning tools, and various scenarios.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	0 (%0)	9 (%24)	16 (%43)	12 (%32)
Class 4	1 (%2)	1 (%2)	15 (%23)	31 (%47)	18 (%27)
Class 5	0 (%0)	2 (%5)	4 (%10)	23 (%59)	10 (%26)
Academician	0 (%0)	0 (%0)	4 (%18)	13 (%59)	5 (%23)
Artificial intelligence can provide feedback by monitoring students' performance, optimizing the learning process.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	0 (%0)	11 (%30)	19 (%51)	7 (%19)
Class 4	2 (%3)	3 (%5)	15 (%23)	31 (%47)	15 (%23)
Class 5	1 (%3)	1 (%3)	10 (%26)	19 (%49)	8 (%21)
Academician	0 (%0)	1 (%5)	5 (%23)	10 (%45)	6 (%27)
Artificial intelligence minimizes all risks by creating scenarios similar to those involving live patients, simulating clinical work performed on patients, and providing training experiences without the associated dangers.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	2 (%5)	15 (%41)	16 (%43)	4 (%11)
Class 4	1 (%2)	4 (%6)	16 (%24)	34 (%52)	11 (%17)
Class 5	0 (%0)	3 (%8)	7 (%18)	21 (%54)	8 (%21)
Academician	0 (%0)	2 (%9)	6 (%27)	10 (%45)	4 (%18)
Artificial intelligence helps students develop their skills and better prepare for real patient interactions by providing virtual patient feedback before clinical practice.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	3 (%8)	5 (%14)	22 (%59)	7 (%19)
Class 4	2 (%3)	1 (%2)	20 (%30)	31 (%47)	12 (%18)
Class 5	0 (%0)	1 (%3)	7 (%18)	24 (%62)	7 (%18)
Academician	0 (%0)	1 (%5)	3 (%14)	12 (%55)	6 (%27)
Artificial intelligence predicts an individual's age by analyzing dental development and erosion in the fields of forensic medicine and anthropology.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	3 (%8)	11 (%30)	15 (%41)	8 (%22)
Class 4	1 (%2)	2 (%3)	21 (%32)	33 (%50)	9 (%14)
Class 5	1 (%3)	2 (%5)	9 (%23)	20 (%51)	7 (%18)
Academician	0 (%0)	2 (%9)	5 (%23)	10 (%45)	5 (%23)
AI-powered systems can manage patient requests and alert dentists in emergency situations.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	1 (%3)	12 (%32)	19 (%51)	5 (%14)
Class 4	1 (%2)	3 (%5)	23 (%35)	29 (%44)	10 (%15)
Class 5	0 (%0)	1 (%3)	9 (%23)	23 (%59)	6 (%15)
Academician	0 (%0)	1 (%5)	6 (%27)	10 (%45)	5 (%23)
AI-powered chatbots can assist patients in making appointments, answering questions, and receiving education on dental care.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	2 (%5)	7 (%19)	19 (%51)	9 (%24)
Class 4	2 (%3)	2 (%3)	13 (%20)	32 (%48)	17 (%26)
Class 5	0 (%0)	1 (%3)	4 (%10)	26 (%67)	8 (%21)
Academician	0 (%0)	1 (%5)	0 (%0)	12 (%55)	9 (%41)
The AI-supported virtual dental assistant application performs various tasks in the dental office more accurately and with fewer errors, requiring less human labor for its functions.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	5 (%14)	10 (%27)	17 (%46)	5 (%14)
Class 4	3 (%5)	4 (%6)	20 (%30)	27 (%41)	12 (%18)
Class 5	3 (%8)	2 (%5)	4 (%10)	25 (%64)	5 (%13)
Academician	0 (%0)	2 (%9)	4 (%18)	13 (%59)	3 (%14)
The AI-supported virtual dental assistant application is used in clinical diagnosis, treatment planning, appointment scheduling, organizing insurance and paperwork, and many other tasks in virtual dental practice.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0 (%0)	3 (%8)	8 (%22)	19 (%51)	7 (%19)
Class 4	2 (%3)	4 (%6)	15 (%23)	26 (%39)	15 (%23)
Class 5	0 (%0)	3 (%8)	5 (%13)	25 (%64)	6 (%15)
Academician	0 (%0)	2 (%9)	5 (%23)	11 (%50)	4 (%18)

Table 5. Opinions of participants about the role of artificial intelligence in the educational curriculum.

Artificial intelligence applications should have a more prominent role in the educational curriculum.					
	Completely disagree	Disagree	Undecided	Agreed	Completely Agreed
Class 3	0(%0)	2(%5)	9(%24)	16(%43)	10(%27)
Class 4	1(%2)	1(%2)	13(%20)	30(%45)	21(%32)
Class 5	1(%3)	1(%3)	4(%10)	27(%69)	6(%15)
Academician	0(%0)	0(%0)	2(%9)	15(%68)	5(%23)

DISCUSSION

As in other fields, artificial intelligence (AI) used in the healthcare sector has rapidly gained momentum. In this context, the level of consideration and awareness of AI applications in dentistry among faculty members and students is of significant importance⁽¹⁰⁾. Shortly, dental students and practicing dentists are expected to play key roles not only in the utilization but also in the development of AI technologies. The literature includes several studies aimed at assessing the knowledge levels of dental students about the applications of artificial intelligence in dentistry^(11, 12).

In the survey study conducted by Taşöker and Akyüz with the participation of 259 students, 76.8% of the respondents answered "no" to the question, "Are you aware of the topics of artificial intelligence and deep learning discussed in radiology?"⁽¹³⁾. Similarly, in a study conducted by Özel and Büyükcavuş on 236 dental students, 76.27% of the participants responded "no" to the question, "Are you aware of developments related to artificial intelligence in the field of radiology?"⁽¹⁴⁾. In our study, 72.34% of students and 52.63% of faculty members stated that their knowledge about artificial intelligence was insufficient. These findings are consistent with the results reported in the literature.

Thanks to artificial intelligence, which enhances diagnostic accuracy, personalizes treatment approaches, and organizes data more efficiently, dentistry is undergoing a significant transformation^(15, 16). Various branches of dentistry benefit from AI tools in numerous ways, such as enabling earlier detection of diseases. However, for the successful integration of artificial intelligence into dental practice, challenges related to data management, processing capacity, and ethical considerations must be addressed⁽¹⁷⁾.

In our study, no statistically significant difference was observed among participants regarding the impact of artificial intelligence applications in dentistry on clinical skill development, accuracy and efficiency, personalized treatment planning, early diagnosis and treatment, database creation, simulations, inactive learning tools, and performance monitoring ($p > 0.05$). This result indicates that participants hold similar views on the role of artificial intelligence in dental education and professional practice.

Participants were asked in which areas of dentistry artificial intelligence is most commonly used. The responses revealed that they shared largely similar opinions regarding the necessity of AI utilization in areas such as diagnosis and treatment planning, dental imaging and analysis technologies, clinical education simulations, AI-assisted treatment applications (e.g., CAD/CAM systems, orthodontic clear aligner treatments), robotic surgery and AI integration, patient management and appointment systems, and data analysis for patient risk assessment. Based on these findings, there appears to be a consensus that artificial intelligence should be utilized as a supportive tool in nearly all areas of the dental profession excluding primarily surgical and operative procedures. Nonetheless, our study also revealed that participants expressed concerns regarding bias and privacy about artificial intelligence. In a study conducted by Kim et al., it was emphasized that ethical, impartial, responsible, and clinically validated algorithms are crucial for maximizing the benefits of artificial intelligence while minimizing the risks it poses to both patients and practitioners⁽³⁾. The same study also highlighted that artificial intelligence curricula should not only teach students how to interact with, use, and manage AI programs⁽¹⁸⁾. Still, it should also encourage critical thinking by guiding dental educators to train students in making visual estimations before consulting AI to interpret results correctly and avoid potential errors⁽¹⁹⁾. Additionally, it was suggested that curricula should include aspects related to data protection, privacy, and potential third-party interference⁽²⁰⁾.

CONCLUSION

Today, artificial intelligence has become an indispensable part of the healthcare system, promising higher quality healthcare services while also providing high efficiency and rapid access to information. Within the field of dentistry, AI-driven applications are transforming clinical practice, diagnosis, treatment planning, and patient management. Yet, the integration of AI into dentistry education requires a proactive and strategic approach to ensure its safe, ethical, and effective implementation. This study highlights that while AI awareness is growing among students and academicians, concerns regarding bias, data privacy, and ethical considerations persist. Addressing these concerns is crucial to fostering a learning environment where future dental professionals can harness AI's potential while maintaining patient safety, professional integrity, and equitable healthcare delivery.

For AI to be successfully integrated into dental curricula, it is essential to provide structured educational programs that not only enhance technical proficiency but also encourage critical thinking and ethical decision-making. Dental educators must guide students in understanding AI's capabilities and limitations, ensuring they can interpret AI-generated data effectively and avoid over-reliance on automated systems. Furthermore, curricula should incorporate modules on data protection, algorithmic transparency, and third-party interventions to equip students with a comprehensive understanding of AI-related challenges. By adopting a forward-thinking approach, dental education can align itself with technological advancements, preparing future professionals to leverage AI responsibly and ethically for the benefit of both patients and practitioners.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körlleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - iThenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmalarını CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: MSV %10, SÖ. %10, SB %40, NÜ %40
Veri Toplanması | Data Acquisition: MSV %40, SÖ %40, SB %10, NÜ %10
Veri Analizi | Data Analysis: MSV %40, SÖ %40, SB %10, NÜ %10
Makalenin Yazımı | Writing up: MSV %60, SÖ %10, SB %10, NÜ %20
Makale Gönderimi ve Revizyonu | Submission and Revision: MSV %70, SÖ %10, SB %10, NÜ %10

REFERENCES

1. Dave M, Patel N. Artificial intelligence in healthcare and education. *British dental journal*. 2023;234(10):761-4.
2. Vodanović M, Subašić M, Milošević D, Savić Pavičin I. Artificial intelligence in medicine and dentistry. *Acta stomatologica Croatica: International journal of oral sciences and dental medicine*. 2023;57(1):70-84.
3. Kim CS, Samaniego CS, Sousa Melo SL, Brachvogel WA, Baskaran K, Rulli D. Artificial intelligence (AI) in dental curricula: Ethics and responsible integration. *Journal of dental education*. 2023;87(11):1570-3.
4. Lee J, Wu AS, Li D, Kulasegaram KM. Artificial intelligence in undergraduate medical education: a scoping review. *Academic Medicine*. 2021;96(11S): S62-S70.
5. Dumić-Čule I, Orešković T, Brkljačić B, Kujundžić Tiljak M, Orešković S. The importance of introducing artificial intelligence to the medical curriculum-assessing practitioners' perspectives. *Croatian medical journal*. 2020;61(5):457-64.
6. Sun L, Yin C, Xu Q, Zhao W. Artificial intelligence for healthcare and medical education: a systematic review. *American journal of translational research*. 2023;15(7):4820.
7. Taner T, Yılmaz Z, Kütük ZB, Küçükkaya Eren S. Diş hekimliği eğitiminde simülasyon uygulamaları. *Türkiye Klinikleri J Med Educ Special Topics*. 2017;2(2):86-95.
8. Ngo B, Nguyen D, vanSonnenberg E. The cases for and against artificial intelligence in the medical school curriculum. *Radiology: Artificial Intelligence*. 2022;4(5): e220074.
9. Büyükkaya B, Altındış S, Cevahir F. DİŞ HEKİMLİĞİ ÖĞRENCİLERİ YAPAY ZEKA UYGULAMALARINA NE KADAR HAZIR? *Journal of Biotechnology and Strategic Health Research*. 2023;7(4):266-74.
10. Khanagar SB, Al-Ehaideb A, Maganur PC, Vishwanathaiah S, Patil S, Baeshen HA, et al. Developments, application, and performance of artificial intelligence in dentistry-A systematic review. *Journal of dental sciences*. 2021;16(1):508-22.
11. Sadeep H. Assessment of knowledge and awareness of artificial intelligence and its uses in dentistry among dental students. *Journal of Pharmaceutical Negative Results*. 2022;13.
12. Fernandes S, Bafna Y, Patel C, Parmar D. Knowledge attitude and practice of dental students towards artificial intelligence (AI): a questionnaire based survey. *J Xid Uni*. 2022; 1:284-91.
13. Taşöker M, Akyüz M. Diş Hekimliği Öğrencilerinin Oral Radyolojide Yapay Zekâ Kullanımına Bakış Açısı: Anket Çalışması: Kesitsel Araştırma. *Türkiye Klinikleri Journal of Dental Sciences*. 2022;28(4).
14. Özel Ş, Büyükçavuş MH. Diş hekimliği öğrencilerinin diş hekimliğinde yapay zekâ uygulamaları ile ilgili düşüncelerinin incelenmesi. *7tepe Klinik Dergisi*. 2022;18(2):55-60.
15. Al-Jallad N, Ly-Mapes O, Hao P, Ruan J, Ramesh A, Luo J, et al. Artificial intelligence-powered smartphone application, AlCaries, improves at-home dental caries screening in children: Moderated and unmoderated usability test. *PLOS digital health*. 2022;1(6): e0000046.
16. Reyes LT, Knorst JK, Ortiz FR, Ardenghi TM. Scope and challenges of machine learning-based diagnosis and prognosis in clinical dentistry: A literature review. *Journal of Clinical and Translational Research*. 2021;7(4):523.
17. Rodrigues JA, Krois J, Schwendicke F. Demystifying artificial intelligence and deep learning in dentistry. *Brazilian oral research*. 2021;35: e094.
18. Meskó B, Görög M. A short guide for medical professionals in the era of artificial intelligence. *NPJ digital medicine*. 2020;3(1):126.
19. Faiella R, Accurso B, Connelly S. Overview of artificial and augmented intelligence uses in dentistry. *ADA Standards Committee on Dental Informatics (SCDI)-Artificial Intelligence in Dentistry*. July 2022. 2022.
20. Thorat V, Rao P, Joshi N, Talreja P, Shetty AR, RAO P. Role of artificial intelligence (AI) in patient education and communication in dentistry. *Cureus*. 2024;16(5).

Klinik Gözlem Ders Kurulu Dersinin Etkinliğinin Değerlendirilmesi: Anket Çalışması Evaluation of the Effectiveness of the Clinical Observation Course Board Course: Survey Study

Kuddusi ÇEKİÇ^a , Nazmiye DÖNMEZ^a 

^aBolu Abant İzzet Baysal Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Bolu, Türkiye

^aBolu Abant İzzet Baysal University, Faculty of Dentistry, Department of Restorative Dentistry, Bolu, Türkiye

ÖZ

Amaç: Bu çalışmanın amacı, Klinik Gözlem Ders Kurulu dersinin, ilk defa klinik uygulama derslerini alan diş hekimliği 4. sınıf lisans öğrencilerinin beceri ve tutumları üzerine katkısını değerlendirmektir.

Gereç ve Yöntemler: 2023-2024 eğitim-öğretim döneminde Klinik Gözlem Ders Kurulu dersini alan öğrencilere dönem sonunda Google Forms üzerinden iki soruluk bir anket uygulanmıştır. Aynı öğrenci grubuna 2024 - 2025 eğitim-öğretim döneminde, bir önceki eğitim öğretim döneminde Klinik Gözlem Ders Kurulu kapsamında aldıkları eğitimin klinik uygulama derslerine olan katkısını değerlendirmek için klinik uygulama dersleri devam ederken Google Forms üzerinden yedi soruluk yeni bir anket uygulanmıştır. Anketler öğrencilerin memnuniyet düzeylerini sorgulayan sorulardan oluşmuştur. Muadil olarak hazırlanan sorular arasında benzerlik olup olmadığı Ki-kare testi uygulanarak kontrol edilmiştir. Branşlar bazındaki sorular için ise tanıtıcı istatistikler (frekans, % frekans) elde edilmiştir.

Bulgular: Muadil olarak hazırlanan sorular arasındaki benzerlik Ki-kare testi ile test edildiğinde: "Klinik Gözlem Ders Kurulu dersinin saatlerinin artırılmasında" her iki ankette verilen cevapların benzer olduğu ($p = 0.562$), "Klinik Gözlem Ders Kurulu dersinin işleyişi" ile ilgili olarak ilk ankette memnuniyetsiz olan öğrencilerin ikinci ankette memnuniyetsizliklerinin istatistiksel olarak anlamlı bir şekilde ortadan kalktığı gözlenmiştir ($p = 0.006$).

Sonuç: Genel olarak Klinik Gözlem Ders Kurulu dersinin işleyişi ve ders saatlerinin artırılması konusunda öğrencilerin memnun oldukları anlaşılmıştır.

Anahtar Kelimeler: Klinik Gözlem, Anamnez, Dental muayene, Dezenfeksiyon

ABSTRACT

Aim: The aim of this study is to evaluate the contribution of the Clinical Observation Course Board course on the skills and attitudes of 4th-year undergraduate dentistry students taking clinical practice courses for the first time.

Methods: In the 2023-2024 academic year, a two-question survey was applied to students taking the Clinical Observation Course Board course via Google Forms at the end of the semester. In the 2024-2025 academic year, a new seven-question survey was applied to the same group of students via Google Forms while clinical practice courses were in progress in order to evaluate the contribution of the training they received within the scope of the Clinical Observation Course Board in the previous academic year to their clinical practice courses. The surveys consisted of questions questioning the satisfaction levels of the students. The similarity between the questions prepared as equivalents was checked by applying the Chi-square test. For the questions based on branches, descriptive statistics (frequency, % frequency) were obtained.

Results: When the similarity between the questions prepared as equivalent was tested with the Chi-square test, it was observed that the answers given in both surveys were similar regarding "Increasing the hours of the Clinical Observation Course Board course" ($p=0.562$), and the dissatisfaction of the students who were dissatisfied in the first survey regarding "the functioning of the Clinical Observation Course Board course" was statistically significantly eliminated in the second survey ($p=0.006$).

Conclusion: In general, it was understood that the students were satisfied with the functioning of the clinical observation course board and the increase in course hours.

Keywords: Clinical observation, Anamnesis, Dental examination, Disinfection

GİRİŞ

Diş hekimliği fakültesinde eğitim süresi beş yıldır ve eğitim müfredatının içeriği teorik dersler, klinik öncesi uygulama eğitimleri ile klinik uygulama eğitimlerinden oluşmaktadır. Bu müfredatla öğrencilere mesleki hayatları boyunca gerekli olacak olan bilgi, beceri ve tutumların kazandırılması hedeflenir.¹ Beş yıllık lisans eğitimi boyunca eğitimciler birçok farklı eğitim ve öğretim modeli uygulamaktadır. Bu modellere örnek olarak disipline dayalı eğitim, yeterliliğe dayalı eğitim, humanistik eğitim, probleme dayalı eğitim, modüler eğitim vb. verilebilir.² İlk kez 1960 yılında "Rita Dunn" tarafından ortaya atılmış bir kavram olan "öğrenme stili" kişiden kişiye değiştiği için sürekli yeni eğitim ve öğretim modelleri geliştirilmektedir.³

Diş hekimliği klinik öncesi uygulama eğitimi, hasta üzerinde tedavi uygulama aşamasına geçmeden önce uygulanan eğitimidir. Farklı öğrenme stillerine sahip olan öğrencilerin öğrenme düzeyini artırmak amacıyla içerisinde çeşitli uygulama metodları vardır. Öğrenciler klinik öncesi uygulama eğitiminde anatomik modeller üzerinde, fantomda, çekilmiş dişler üzerinde ve simülasyonlarda uygulamalar yaparak klinik aşamaya hazırlanırlar.⁴

Klinik öncesi uygulama eğitiminin içerisinde bulunan bir diğer yöntem ise Klinik Gözlem Ders Kurulu dersleridir. Gözlem yoluyla edinilen erken klinik deneyim, diş hekimliği pratiğinin uygulanabilir bir zihinsel görüntüsünü oluşturur ve öğrencilerin, derslerin önemini daha iyi anlamalarına katkıda bulunur.⁵

Bolu Abant İzzet Baysal Üniversitesi Diş Hekimliği Fakültesi'nde 2018 yılı müfredatında Klinik Gözlem Ders Kurulu dersi 3. sınıfın bahar döneminde haftada 2 saat olarak okutulmaktaydı. 2023-2024 eğitim-öğretim döneminde müfredat değişikliği yapıldı ve diş hekimliği öğrencilerinin klinik işleyişe uyum sağlamalarını artırmak amacıyla, 3. sınıfın bahar döneminde alınan Klinik Gözlem Ders Kurulu dersinin süresi haftada 2 saatten 16 saate çıkarılmıştır. Böylece öğrencilerin haftada 4 gün boyunca 13.30 - 17.00 saatleri arasında ilgili kliniklerde bulunarak klinik işleyiş ve düzenini, temizlik, sterilizasyon ve dezenfeksiyon uygulamalarını, dijital hasta kayıt ve web tabanlı klinik otomasyon programını, rutin klinik muayene ve tedavilerini, hastadan anamnez almayı, hastaya dental anestezi yapmayı, ağız içindeki bölgelere göre çalışma pozisyonlarını vb. aktif bir şekilde gözlemleyip bizzat klinik sürecin içinde bulunmaları sağlanmıştır. Aynı zamanda Objektif Yapılandırılmış Pratik Sınav ve Objektif Yapılandırılmış Klinik Sınav (OSPE/OSCE) laboratuvarlarında da pratik uygulamalar yaparak klinik uygulamalara hazırlanmışlardır.

Ülkemizdeki diş hekimliği fakültelerinin birçoğunda Klinik Gözlem Ders Kurulu dersi uygulanmaktadır. Bu dersin uygulandığı sınıf ve dersin haftalık süresi her fakültede farklı olabilmektedir.

Klinik Gözlem Ders Kurulu dersi boyunca öğrencilerin almış oldukları eğitimin ve bu eğitimin süresinin bir üst sınıfa geçildiğinde klinik uygulama pratiğine beceri ve tutum yönünden katkısının olup olmadığına dair yapılmış bir çalışmaya rastlanılmamıştır. Bu çalışmanın

Gönderilme Tarihi/Received: 15 Nisan, 2025

Kabul Tarihi/Accepted: 7 Temmuz, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Çekiç K, Dönmez N. Klinik Gözlem Ders Kurulu Dersinin Etkinliğinin Değerlendirilmesi: Anket Çalışması. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 30-34 Doi: 10.15311/ selcukdentj.1676381

Sorumlu yazar/Corresponding Author: Kuddusi ÇEKİÇ

E-mail: kuddusi.cekic@ibu.edu.tr

Doi: 10.15311/ selcukdentj.1676381

amacı Klinik Gözlem Ders Kurulu dersinin ilk defa klinik uygulama derslerini alan diş hekimliği 4. sınıf lisans öğrencilerinin beceri ve tutumları üzerine katkısını değerlendirmektir.

GEREÇ VE YÖNTEMLER

Çalışmanın etik kurul onayı Bolu Abant İzzet Baysal Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu'ndan alındı. (2025/198)

2023-2024 eğitim-öğretim döneminde Klinik Gözlem Ders Kurulu dersini alan 3. Sınıf lisans öğrencilerine eğitim öğretim döneminin sonunda Google Forms üzerinden iki soruluk bir anket uygulandı (Tablo 1). 2024-2025 eğitim-öğretim döneminde 4. sınıfa geçmiş olan aynı öğrenci grubuna, öğrencilerin klinik uygulama dersleri devam ederken 2025 yılının ocak ayında Google Forms üzerinden yedi soruluk yeni bir anket daha uygulandı. Ankette öğrencilere her anabilim dalının klinik uygulama dersleri esnasında bir önceki eğitim-öğretim döneminde aldıkları Klinik Gözlem Ders Kurulu dersinin katkısının olup olmadığını ve memnuniyet düzeylerini sorgulayan sorular yöneltildi. (Tablo 2).

Tablo 1. 2023-2024 eğitim öğretim döneminde yapılan ilk anketin soruları

Soru 1	Klinik Gözlem Ders Kurulu dersinin saatlerinin artırılmasından memnun musunuz?
	A) Memnun değilim B) Kararsızım
	C) Memnunuz D) Çok memnunuz
Soru 2	Klinik Gözlem Ders Kurulu dersinin işleyişinden memnun musunuz?
	A) Memnun değilim B) Kararsızım
	C) Memnunuz D) Çok memnunuz

Tablo 2. 2024-2025 eğitim öğretim döneminde yapılan ikinci anketin soruları (1: düşük memnuniyet düzeyi, 5: yüksek memnuniyet düzeyi)

Soru 1	Pedodonti bölümünde almış olduğunuz "Hasta yakınları ile diyalog" eğitimini kliniğe ne kadar aktarabiliyorsunuz?
Soru 2	Restoratif Diş Tedavisi bölümünde almış olduğunuz "Röntgen'den çürük teşhis etme" eğitimini kliniğe ne kadar aktarabiliyorsunuz?
Soru 3	Protetik Diş Tedavisi bölümünde almış olduğunuz "Hareketli bölümlü protezlerde planlama" eğitimini kliniğe ne kadar aktarabiliyorsunuz?
Soru 4	Ağız Diş ve Çene Cerrahisi bölümünde almış olduğunuz "Anestezi teknikleri" eğitimini kliniğe ne kadar aktarabiliyorsunuz?
Soru 5	Endodonti bölümünde almış olduğunuz "Endodontik tedavilerde teşhis" eğitimini kliniğe ne kadar aktarabiliyorsunuz?
Soru 6	Klinik Gözlem Ders Kurulu dersinin saatlerinin artırılmasından memnun musunuz?
Soru 7	Genel olarak Klinik Gözlem Ders Kurulu dersinin size katkısını puanlar mısınız?

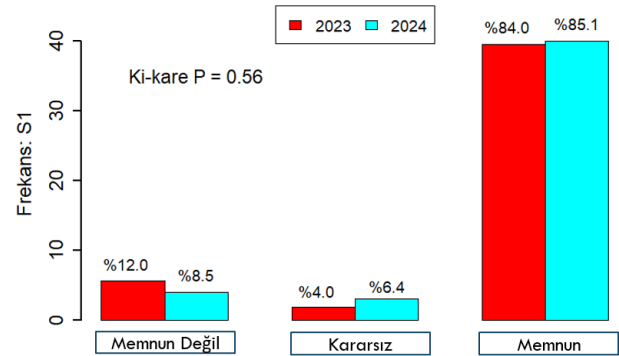
İlk yapılan anketteki iki soru ile ikinci anketteki 6. ve 7. sorular birbirinin muadili olacak şekilde hazırlandı. İkinci yapılan anketteki ilk beş soru ise anabilim dalları bazında soruldu. İlk anketteki iki soru beklenen değer, ikinci anketteki 6. ve 7. sorular gözlenen değer olarak varsayıp Ki-kare testi uygulanarak iki anketten elde edilen değerlerin benzer olup olmadığı test edildi. Bunun için anketlerdeki sık sayıları memnuniyetsizlik, kararsızlık ve memnuniyet olacak şekilde üçe

indirildi. (İlk anketteki memnunuz ve çok memnunuz şıklarına verilen cevaplar birleştirilip memnuniyeti, ikinci anketteki 1 ve 2 şıklarına verilen cevaplar birleştirilip memnuniyetsizliği, yine ikinci anketteki 4 ve 5 şıklarına verilen cevaplar birleştirilip memnuniyeti temsil etti.) $p < 0.05$ istatistiksel olarak anlamlı kabul edildi. İkinci anketteki ilk beş soruyla ilgili tanıttıcı istatistikler (frekans, % frekans) elde edildi.

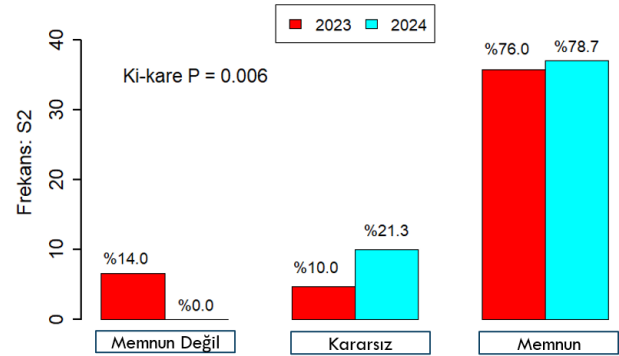
BULGULAR

Yapılan anketlerden ilkinde 50 öğrenci, ikincisine 47 öğrenci katılım sağladı. Bu sayılar oransal olarak uyumlandıktan sonra istatistiksel analizler yapıldı.

İlk ankete verilen cevaplar ile muadili olan ikinci anketteki 6. ve 7. sorulara verilen cevapların uyumu Ki-kare testi ile test edildiğinde (Şekil 1 ve Şekil 2): "Klinik Gözlem Ders Kurulu dersinin saatlerinin artırılmasında" her iki ankette verilen cevapların benzer olduğu ($p = 0.562$) (Şekil 1), "Klinik Gözlem Ders Kurulu dersinin işleyişi" ile ilgili olarak ilk ankette memnuniyetsiz olan öğrencilerin ikinci ankette memnuniyetsizliklerinin istatistiksel olarak anlamlı bir şekilde ortadan kalktığı (Şekil 2) gözlemlendi ($p = 0.006$).



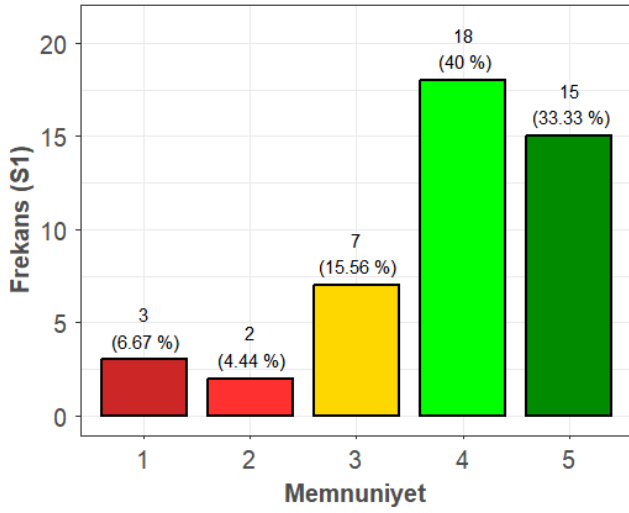
Şekil 1. İlk anketteki Soru 1 ve ikinci ankette muadili olan Soru 6'ya verilen cevapların yıllara göre karşılaştırılması



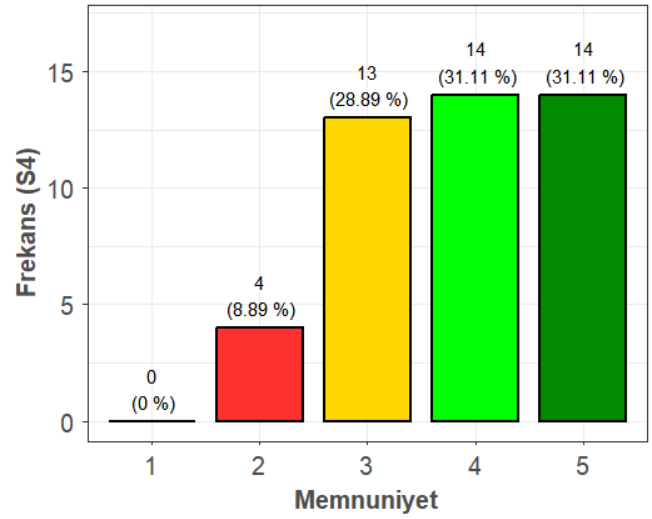
Şekil 2. İlk anketteki Soru 2 ve ikinci ankette muadili olan Soru 7'ye verilen cevapların yıllara göre karşılaştırılması

İkinci anketteki ilk beş soruda - eğitimin kliniğe aktarılmasını sorgulayan sorularda - Pedodonti, Restoratif Diş Tedavisi, Protetik Diş Tedavisi, Ağız Diş ve Çene Cerrahisi ve Endodonti derslerinin frekans (% frekans) değerleri memnun olmayanlarda sırasıyla 5 (11,11), 2 (4,35), 8 (18,18), 4 (8,89), 1 (2,22); kararsız olanlarda sırasıyla 7 (15,56), 5 (10,87), 19 (43,18), 13 (28,89), 15 (33,33); memnun olanlarda sırasıyla 33 (73,33), 39 (84,78), 17 (38,64), 28 (62,22), 29 (64,44) olarak bulundu (Şekil 3 a, b, c, d, e).

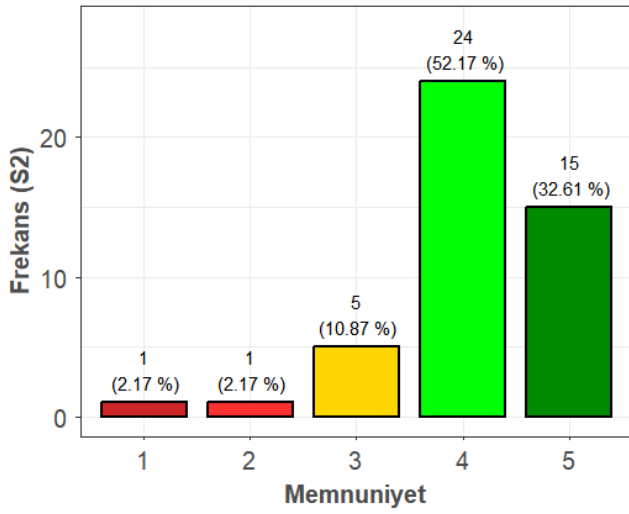
Şekil 3'teki (a,b,c,d,e) grafiklerde kırmızı tonları memnuniyetsizliği, sarı kararsızlığı ve yeşil tonları ise memnuniyeti temsil etmektedir.



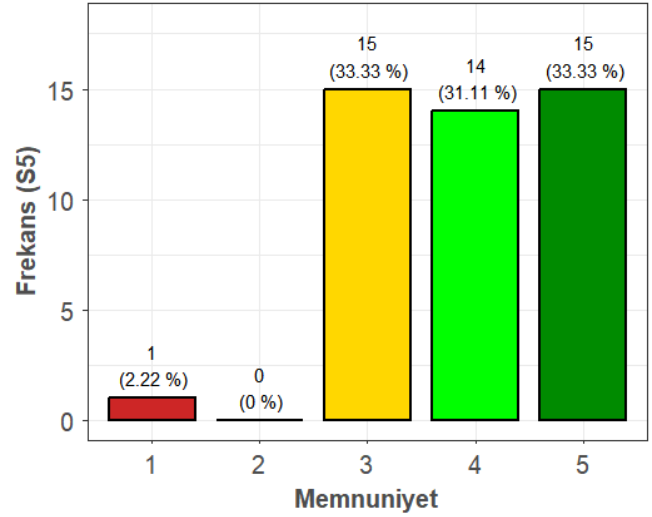
Şekil 3a. İkinci anketteki ilk soru ile ilgili tanıtıcı istatistikler.



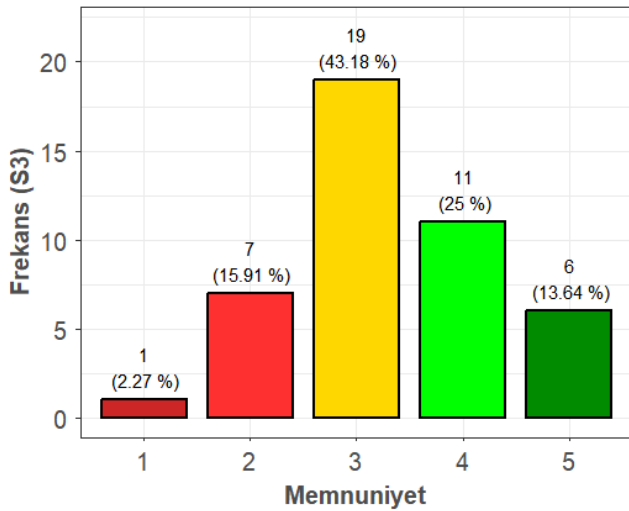
Şekil 3d. İkinci anketteki dördüncü soru ile ilgili tanıtıcı istatistikler.



Şekil 3b. İkinci anketteki ikinci soru ile ilgili tanıtıcı istatistikler.



Şekil 3e. İkinci anketteki beşinci soru ile ilgili tanıtıcı istatistikler.



Şekil 3c. İkinci anketteki üçüncü soru ile ilgili tanıtıcı istatistikler.

TARTIŞMA

Klinik öncesi eğitim, diş hekimliği lisans eğitiminin vazgeçilmez bir parçasıdır. Bu uygulamalar hasta üzerinde tedavi uygulamalarına başlamadan önce öğrencilerin el-göz koordinasyonu ve gerekli ince motor becerileri kazanmasına olanak sağlar.⁶ Farklı uygulama metotları ile öğrencilerin maksimum düzeyde verim almaları hedeflenir. Nitekim yapılan çalışmalarda öğrencilerin eğitim süreçleri boyunca onlara farklı yollar ve seçenekler sunacak çeşitli eğitim modellerine ihtiyaç duyduğu gösterilmiştir.⁷ Bolu Abant İzzet Baysal Üniversitesi Diş Hekimliği Fakültesi'nde anabilim dallarına göre 1., 2. ve 3. sınıflarda verilen klinik öncesi uygulama dersleri kapsamında çeşitli uygulama metotları kullanılmaktadır. Anatomi modellerle, fantom kafalarla, çekilmiş dişler üzerinde, OSPE/OSCE laboratuvarlarıyla ve Klinik Gözlem Ders Kurulu dersiyle öğrencilere pratik anlamda imkanlar sunulmaktadır. O hafta öğretilmesi hedeflenen bilgi ve beceriler öğrencilere uygulama yoluyla veya video kayıtları aracılığıyla aktarılır, ardından öğrenciler öğretim üyeleri ve araştırma görevlilerinin gözetiminde pratik uygulama yaparlar ve öğrencilere ödevler verilerek pratik becerilerini geliştirmeleri sağlanır. Ayrıca öğrenciler OSPE/OSCE laboratuvarlarında hasta odaklı senaryo ve provalarla, Klinik Gözlem Ders Kurulu dersiyle de bizzat klinik ortamı, malzemeleri, tedavileri ve hasta-hekim iletişimini gözlemleyerek klinik eğitime hazırlanırlar.

Klinik gözlem uygulaması diş hekimliği öğrencileri ve yeni mezun olan diş hekimleri için önemli bir yere sahip uygulamalardan birisidir. 2022-2023 eğitim-öğretim dönemi sonunda dış paydaşlara ve

öğrencilerimize yapılan müfredat değerlendirme anketi sonucunda, öğrencilerin yeterince klinik gözlem yapmadığı, pratik uygulama anlamında müfredatın daha da geliştirilmesi gerektiği alanların bulunduğu tespit edilmiştir. Bu sonuçtan hareketle 2023-2024 eğitim-öğretim döneminde Klinik Gözlem Ders Kurulu dersinin saatleri haftada 2 saatten 16 saate çıkarılarak, öğrencilerin klinikte daha çok zaman geçirmeleri, kliniğe daha çok uyum sağlamaları ve klinik eğitime başladıkları zaman alışma ve uyum sağlama sürecinin daha kısa ve kaliteli olması açısından faydalı olacağı öngörülmüştür. Choi ve ark.⁸ geleneksel olarak ve sanal gerçeklik (VR) kullanılarak yapılan klinik gözlemin sonuçlarını araştırdıkları bir çalışmada öğrencilerin memnuniyet oranlarının yüksek olduğu ve her iki yöntemin kombinasyonunun klinik gözleminde daha başarılı olacağı sonucuna ulaşmışlardır. Bu çalışmamızın sonuçlarında da Choi ve ark. nın çalışmasının bulgularıyla uyumlu olarak dersin işleyişi ve süresinin artırılması ile ilgili memnuniyet oranının arttığı belirlenmiştir.

Diş hekimliği lisans eğitiminin öğrenciler için önemli bir stres kaynağı olabileceği ve diş hekimliği öğrencilerinin genel nüfusa kıyasla daha yüksek stres seviyelerine sahip olduğu yapılan araştırmalarda görülmüştür.⁹ Hatta Schmitter ve ark.¹⁰ diş hekimliği eğitiminin tıp eğitiminden bile daha stresli olduğunu yaptıkları çalışmada belirtmişlerdir. Klinik Gözlem Ders Kurulu dersinin saatlerinin artırılmasıyla öğrencilerin klinik ortamında daha çok bulunmaları, klinik eğitime başlarken belirsizlik kaynaklı oluşabilecek stresi azaltmada önemli bir rol oynayabilir. Ayrıca klinikte uzun süre bulunmanın sonucunda edinilecek bilgi ve tecrübe, stres yönetimi açısından oldukça faydalı olacaktır. **Şekil 1** ve **Şekil 2** incelendiğinde öğrencilerin Klinik Gözlem Ders Kurulu dersinin işleyişi ve ders saatinin artırılmasından oldukça memnun oldukları görülmektedir. Hatta dersin işleyişi ile ilgili ilk ankette memnuniyetsiz olan öğrencilerin ikinci ankette memnuniyetsizliklerinin ortadan kalktığı ($p = 0.006$), bir kısmının kararsızlığa bir kısmının da memnuniyete dönüştüğü görülmüştür (**Şekil 2**). Bu durum öğrencilerin kliniğe başlayıp uygulamaları yaparak bizzat işin içine girdiklerinde bu dersin öneminin daha çok farkına vardıkları şeklinde yorumlanabilir.

Anket uygulanan sınıftaki mevcudun tamamının katılımının gerçekleşmemesi, anketin tek bir fakültede ve tüm sınıflar yerine sadece bir tek sınıfa uygulanmış olması bu çalışmanın sınırlamalarındandır. Sonraki araştırmalarda aynı soruları Klinik Gözlem Ders Kurulu dersini alan tüm sınıflara uygulayarak ve farklı fakültelerde de bu çalışmayı yaparak elde edilecek kapsamlı veriler, eğitimcilere ışık tutacaktır.

SONUÇ

Klinik Gözlem Ders Kurulu dersinin klinik uygulama derslerine katkısını değerlendirdiğimiz bu çalışmada memnuniyet oranı en yüksekten en düşüğe sırasıyla Restoratif Diş Tedavisi, Pedodonti, Endodonti, Ağız Diş ve Çene Cerrahisi ve Protetik Diş Tedavisi olmuştur.

Genel olarak Klinik Gözlem Ders Kurulu dersinin işleyişi ve ders saatlerinin artırılması konusunda öğrencilerin memnun oldukları anlaşılmıştır.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu makale, Bolu Abant İzzet Baysal Üniversitesi Diş Hekimliği Fakültesi ev sahipliğinde 20-22 Şubat 2025 tarihinde düzenlenen UDEG III. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde sözlü olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmalarını CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: KÇ (%50), ND (%50)

Veri Toplanması | Data Acquisition: KÇ (%50), ND (%50)

Veri Analizi | Data Analysis: KÇ (%60), ND (%40)

Makalenin Yazımı | Writing up: KÇ (%60), ND (%40)

Makale Gönderimi ve Revizyonu | Submission and Revision: KÇ (%50), ND (%50)

KAYNAKLAR

1. Çubukçu İ, Güleç B, Yapar Mİ? Diş hekimliği fakültesinde klinik öncesi verilen eğitimin değerlendirilmesi: Anket çalışması. Türkiye Klinikleri J Dent Sci. 2023;29(3):491-498.
2. Akaltan F. Diş hekimliği eğitiminde güncelleme: Eğitim ve öğrenim yöntemleri. Selcuk Dent J. 2019;6(5):1-20.
3. Kazancı F, Kazancı E, Memduhoğlu H, Sevimli Ş. Tıp ve diş hekimliği fakültesi öğrencilerinin öğrenme stillerinin karşılaştırılması. J Dent Fac Ataturk Univ. 2014;24(1):67-73.
4. Akaltan F. Diş hekimliğinde preklinik ve klinik eğitim çeşitliliği. Selcuk Dent J. 2019;6(5):37-51.
5. Horst JA, Clark MD, Lee AH. Observation, assisting, apprenticeship: cycles of visual and kinesthetic learning in dental education. JDE. 2009;73(8):919-933.
6. Eken Ş, Ögünç A. Preklinik eğitim sürecinin diş hekimliği fakültesi öğrencilerinin psikomotor becerileri üzerine etkisi. IJ. 2024;3(03):30-12.
7. Divaris K, Barlow PJ, Chendea SA, et al. The academic environment: the students' perspective. EJDE. 2008;12:120-130.
8. Choi Y, Lee M, Kim J, Park W. Clinical observation using virtual reality for dental education on surgical tooth extraction: A comparative study. BMC med educ. 2024;24(1):643.
9. Basudan S, Binanzan N, Alhassan A. Depression, anxiety and stress in dental students. IJME. 2017;8:179.
10. Schmitter M, Liedl M, Beck J, Rammelsberg P. Chronic stress in medical and dental education. MED TEACH. 2008;30(1):97-99.

Are Future Dentists Ready for Aesthetics?

Geleceğin Diş Hekimleri Estetiğe Hazır mı?

Furkan KOZAKOĞLU^a , Merve GÜRSES^a , Nazmiye DÖNMEZ^b , Nimet ÜNLÜ^a 

^aSelçuk University, Faculty of Dentistry, Department of Restorative Dentistry, Konya, Türkiye

^aSelçuk Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Konya, Türkiye

^bBolu Abant İzzet Baysal University, Faculty of Dentistry, Department of Restorative Dentistry, Bolu, Türkiye

^bBolu Abant İzzet Baysal Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi AD, Bolu, Türkiye

ABSTRACT

Aim: This study aimed to evaluate the knowledge, experience, awareness, and motivation of 4th- and 5th-year dental students regarding anterior aesthetic restorations.

Methods: This study was approved by the Selçuk University Faculty of Dentistry Non-Interventional Clinical Research Ethics Committee. In this study, a Google Form survey consisting of a total of 31 questions was prepared. Invitations were sent to 4th and 5th-year students from 9 different dentistry faculties via e-mail and social media. A total of 240 participants from all faculties responded to the survey study. The personal information of the participants was not recorded, and the data were analyzed anonymously. Kruskal-Wallis, Mann-Whitney U and T tests were used for statistical analysis of the survey results (p>0.05).

Results: Of the 240 participants, 59.4% were 4th-year students and 40.6% were 5th-year students. Among the respondents, 66.9% reported performing 0-5 clinical cases, and 84.9% stated that they had not received additional training in anterior restorations. Furthermore, 52.1% found their clinical education insufficient, and 85.4% believed that the curriculum did not adequately address anterior restorations. Notably, 96.1% of students expressed a desire for more hands-on practice opportunities in anterior aesthetic restorations. The Mann-Whitney U test was conducted to assess competency levels based on the number of cases performed in the clinic. Statistically, a significant difference was observed between the group that performed 0-5 cases and the other two groups (6-10 cases and 11+ cases) (p<0.001). However, there was no significant difference between the groups that performed 6-10 cases and 11 or more cases (p>0.05). To analyze the competency differences between students who received additional training in aesthetic dentistry and those who did not, the Kruskal-Wallis test was performed. It was found that there was no statistically significant difference between additional training in aesthetic dentistry and competency scores (p>0.05). A T-test was conducted to analyze the difference in competency levels between 4th and 5th-year dental students. According to the test results, no statistically significant difference was observed between the competency levels of 4th and 5th-year students (p>0.05).

Conclusion: This study reveals that 4th- and 5th-year dental students feel inadequately prepared for anterior aesthetic restorations and seek more opportunities for practical training. Expanding this preliminary study with more extensive participation and collaboration across other dental faculties is recommended.

Keywords: Smile design, Undergraduate education in dentistry, Anterior restoration

ÖZ

Amaç: Bu çalışmanın amacı, 4. ve 5. sınıf diş hekimliği öğrencilerinin anterior estetik restorasyonlara yönelik bilgi düzeyini, deneyimlerini, farkındalıklarını ve motivasyonlarını değerlendirmektir.

Yöntem: Çalışma, Selçuk Üniversitesi Diş Hekimliği Fakültesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu tarafından onaylanmıştır. Bu araştırmada, toplam 31 sorudan oluşan bir Google Form anketi hazırlanmıştır. Çalışma için 9 farklı diş hekimliği fakültesindeki 4. ve 5. sınıf öğrencilerine e-posta ve sosyal medya aracılığıyla davet gönderilmiştir. Tüm fakültelerden toplam 240 katılımcı ankete yanıt vermiştir. Katılımcıların kişisel bilgileri kaydedilmemiş, veriler anonim olarak analiz edilmiştir. Anket sonuçlarının istatistiksel analizi için Kruskal-Wallis, Mann-Whitney U ve T testleri kullanılmıştır (p>0.05).

Bulgular: Anketimize cevap veren 9 fakülteden 240 katılımcının hepsinin cevapları geçerli kabul edilmiştir. Toplam 240 katılımcının %59.4'ü 4. sınıf, %40.6'sı ise 5. sınıf öğrencilerinden oluşmuştur. Katılımcıların %66.9'u klinikte 0-5 arasında vaka yaptığını, %84.9'u anterior restorasyonlar için ek bir eğitim almadığını, %37.7'si anterior restorasyonlara yüksek ilgisi olduğunu belirtmiştir. Öğrencilerin %52.1'i klinik eğitimlerini yetersiz bulurken, %85.4'ü müfredatın anterior restorasyonlara yönelik yeterli olmadığını ifade etmiştir. Ayrıca, %96.1'lik bir oranla öğrenciler, anterior estetik restorasyonlar konusunda daha fazla pratik yapma imkânı talep etmiştir. Klinikte yapılan vaka sayısına göre yetkinlik düzeyini ölçmek için Mann-Whitney U testi yapılmıştır. İstatistiksel olarak ; 0-5 vaka yapan grup ile diğer iki grup (6-10 vaka ve 11+ vaka) arasında anlamlı fark görülmüştür (p<0.001). Ancak, 6-10 vaka ile 11 ve üzeri vaka yapan gruplar arasında anlamlı bir fark yoktur (p>0.05). Estetik diş hekimliği alanında ek eğitim alan öğrenciler ile almayan öğrenciler arasında yetkinlik farkının analizi için Kruskal-Wallis testi yapılmıştır. Estetik diş hekimliği ile ilgili alınan ek eğitimler ile yetkinlik skoru arasında istatistiksel olarak anlamlı bir fark olmadığı görülmüştür (p>0.05). 4. ve 5. Sınıf diş hekimliği öğrencilerinin yetkinlik düzeyleri arasındaki farkın istatistiksel analizi için T-testi yapılmıştır. Test sonuçlarına göre, 4. ve 5. sınıf öğrencilerinin yetkinlik düzeyleri arasında istatistiksel olarak anlamlı bir fark izlenmemiştir (p>0.05)

Sonuç: Anketimizin sonucunda 9 farklı fakülteden katılım sağlayan 4. ve 5. sınıf diş hekimliği öğrencilerinin anterior estetik restorasyonlara yönelik kendilerini yetersiz hissettiklerini ve bu konuda daha fazla klinik deneyim talep ettikleri görülmüştür. Bu öncül çalışmanın, daha fazla katılımcıyla genişletilmesi ve diğer fakültelerle birlikte desteklenmesi gerekmektedir.

Anahtar Kelimeler: Gülüş tasarımı, Diş hekimliğinde lisans eğitimi, Anterior restorasyon

INTRODUCTION

Aesthetics and beauty have been important concepts throughout human history. Today, with the advancement of technology and the improvement of living standards, patients' aesthetic expectations after treatment have significantly increased. Especially in treatments involving the anterior teeth, which are more visible and aesthetically critical, personalized smile design has become an integral part of dental practice.¹ The concept of "Smile Design" in dentistry is based on the principle of evaluating the patient's unique smile in harmony with other anatomical structures of the face, particularly before restorations involving the anterior teeth.²

Aesthetic problems in the anterior teeth may arise from various etiological factors. These include discolorations that cannot be resolved through bleaching treatments, diastemas, malalignments, caries, lesions caused by wear or erosion, trauma-induced fractures, cases of microdontia, white spot lesions, short clinical crown length, and positional abnormalities.³

As with any treatment performed in dental practice, direct composite resin restorations must also follow certain protocols. The clinician should recognize that these restorations may not be suitable for every patient or clinical scenario, and treatment selection should be made accordingly. Otherwise, failure of the restoration in a short period

Gönderilme Tarihi/Received: 15 Nisan, 2025

Kabul Tarihi/Accepted: 21 Temmuz, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Kozakoğlu F, Gürses M, Dönmez N, Ünlü N. Are Future Dentists Ready for Aesthetics?. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 35-41 Doi: 10.15311/ selcukdentj.1676837

Sorumlu yazar/Corresponding Author: Furkan KOZAKOĞLU

E-mail: kozakoglu.furkan@gmail.com

Doi: 10.15311/ selcukdentj.1676837

becomes inevitable. During the treatment process, different therapeutic alternatives should be considered based on the patient's expectations and the clinician's knowledge and experience in order to determine the most appropriate option. To achieve success, particularly in anterior aesthetic restorations, several factors are critical: accurate case selection, meticulous treatment planning, careful choice of composite resin and shade, proper isolation, appropriate preparation and adhesion techniques, application of layering principles, and thorough finishing and polishing procedures. A deficiency in any of these steps can create a domino effect that negatively impacts the long-term success of the restoration. When properly executed, direct anterior aesthetic restorations offer a minimally invasive, long-lasting, aesthetically pleasing, easily repairable, and cost-effective treatment option.⁴ As with all materials used in dentistry, the application of modern composite resins—now developed with advanced properties—must adhere to specific protocols. The long-term clinical success of aesthetic restorations in the anterior region is achievable only through the use of proper techniques. At this point, one of the most critical factors is accurate case indication and comprehensive treatment planning.⁵

This survey study aims to evaluate the knowledge, experience, awareness, and motivation of fourth- and fifth-year dental students regarding anterior aesthetic treatments—particularly aesthetic composite restorations, as detailed above—based on current scientific knowledge. The study also seeks to assess the attitudes of undergraduate dental students from different faculties toward these restorations, to increase their awareness, and to contribute to the planning of both theoretical and practical education by identifying deficiencies in current curricula in terms of knowledge and clinical application based on the findings obtained.

METHODS

This descriptive, cross-sectional survey study was designed to evaluate the knowledge, awareness, and self-perceived competencies of fourth- and fifth-year dental students regarding anterior aesthetic restorations. The study was approved by the Non-Interventional Clinical Research Ethics Committee of Selçuk University, Faculty of Dentistry, with the decision number 2025/29.

Survey data were collected using a mixed-method approach: an online form distributed via Google Forms through email, and face-to-face surveys conducted with dentists who were accessible in person. An introductory section was included at the beginning of the survey form, which contained the study purpose, instructions, the names of the researchers, and their contact information. Participation in the study was voluntary, and no personally identifiable information such as names or identification numbers was collected.

The questionnaire consisted of five main sections:

1. Participant demographics
2. Knowledge level
3. Education and awareness
4. Clinical and professional skills
5. Self-confidence and competency assessment

A total of 27 items were included in the questionnaire, each measured using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree."

Inclusion Criteria:

- Voluntary agreement to participate in the survey
- Being a 4th- or 5th-year student at a Faculty of Dentistry
- Not having any diagnosed psychological disorders
- Not having previously completed this survey

Exclusion Criteria:

- Incomplete or withdrawn survey responses
- Having a diagnosed psychological disorder
- Being a postgraduate (PhD/specialist), specialist, associate professor, or professor
- Having previously completed the same survey

Statistical Analysis

Kruskal-Wallis, Mann-Whitney U and T tests were used for statistical analysis of the survey results ($p>0.05$). The level of statistical significance was set at $p>0.05$.

RESULTS

The statistical results of the questionnaire were analyzed and are presented according to the five main sections of the study.

1. Participant Demographics

A total of 240 dental students participated in the survey. The highest number of respondents ($n=133$) were from Selçuk University, followed by Bolu Abant İzzet Baysal University with 23 participants. Due to the limitations of the study, equal representation from all faculties could not be achieved. Among the participants, 142 were fourth-year students and 97 were fifth-year students, indicating a balanced representation across upper academic years (Table 1). In this study, no gender information was collected from the participants, and no data regarding the male-female distinction was obtained.

Table 1. Distribution of Participants by University and Academic Year

University	Number of Participants
Selçuk Üniversitesi	133
Bolu Abant İzzet Baysal Üniversitesi	23
Necmettin Erbakan Üniversitesi	21
Ondokuz Mayıs Üniversitesi	20
İzmir Katip Çelebi Üniversitesi	20
Sivas Cumhuriyet Üniversitesi	9
Akdeniz Üniversitesi	8
Recep Tayyip Erdoğan Üniversitesi	3
Kırıkkale Üniversitesi	3
Academic Year of Participants	Number of Participants
4th year	142
5th year	97

Table 2 presents the participants' responses regarding their additional training, case experience, and interest in anterior aesthetic restorations.

According to statistical results, the majority of students reported limited clinical experience, with 69.9% having completed only 0-5 anterior aesthetic cases. In terms of continuing education, 203 students reported not having received any additional training in aesthetic dentistry, while only 36 had attended supplementary programs. A total of 136 students expressed a moderate level of interest in aesthetic restorations (Table 2). This table compares students who received additional aesthetic training (including whitening) to those who did not. Although students who received training showed slightly higher competence levels, the difference was not statistically significant ($p>0.05$). (Table 2)

Table 2. Participants' Additional Training, Case Experience, and Interest in Anterior Aesthetic Restorations

Additional Aesthetic Training	Number of Participants
No	203
Yes	36
Number of Completed Cases	Number of Participants
0-5 cases	167
6-10 cases	49
11 or more cases	23
Interest in Anterior Aesthetic Restorations	Number of Participants
Moderate	136
High	90
Low	14

2. Knowledge Level

Knowledge-based questions revealed that most students agreed or strongly agreed with statements related to treatment goals, material and shade selection, and treatment planning. This indicates a general awareness of the principles of anterior aesthetic restorations. However, a small group of students remained undecided or disagreed with some of these principles. (Table 3)

Table 3. Evaluation of Students’ Understanding of Core Principles in Anterior Aesthetic Restorations

Awareness of the Purposes of Anterior Aesthetic Restorations	Number of Participants
Agree	161
Neutral	47
Strongly agree	20
Disagree	9
Strongly disagree	3
Consideration of Material Selection in Anterior Restorations	Number of Participants
Agree	137
Strongly agree	46
Neutral	45
Disagree	10
Strongly disagree	2
Understanding of Shade Selection in Anterior Aesthetic Restorations	Number of Participants
Agree	144
Neutral	46
Strongly agree	41
Disagree	7
Strongly disagree	2
Knowledge of Planning Criteria in Anterior Aesthetic Restorations	Number of Participants
Agree	108
Neutral	78
Strongly agree	26
Disagree	26
Strongly disagree	2
Awareness of Factors Affecting Aesthetic Outcomes in Anterior Restorations	Number of Participants
Agree	128
Neutral	76
Strongly agree	17
Disagree	17
Strongly disagree	2

Most students expressed uncertainty regarding the management of complications following restorations and the comparison of various treatment approaches. (Table 4)

Table 4. Students’ Awareness of Complications and Comparative Evaluation of Treatment Methods

Awareness of Complications and Solutions in Anterior Aesthetic Restorations	Number of Participants
Neutral	110
Agree	84
Disagree	27
Strongly agree	13
Strongly disagree	6
Ability to Compare Treatment Methods in Anterior Aesthetic Restorations	Number of Participants
Neutral	112
Agree	65
Disagree	40
Strongly agree	14
Strongly disagree	9

Questions related to treatment methods and materials were asked, and the responses were evaluated. Participants were asked about the most preferred restorative materials, the most reliable shade selection method, the use of one-shade composites, and rubber dam application. (Table 5)

Table 5. Material Preferences and Technique Rationales in Anterior Aesthetic Restorations

Preferred Aesthetic Material in Anterior Restorations	Number of Participants
Nanohybrid composite	138
Zirconia	56
Microhybrid composite	26
Ceramic	20
Most Reliable Method for Tooth Shade Selection	Number of Participants
Digital shade measuring devices such as spectrometers or colorimeters	124
Use of VITA shade guide	58
Button technique	29
Visual comparison	18
Photographic analysis	11
Purpose of Using the Layering Technique in Anterior Restorations	Number of Participants
To achieve natural aesthetics and shade transition	119
To reduce polymerization shrinkage	107
To reinforce the tooth structure	8
To remove carious tissue in a minimally invasive manner	6
Purpose of Using One-Shade Composite Materials	Number of Participants
It provides an exact match to the natural tooth color due to the chameleon effect.	107
Restorations can be completed quickly as it saves time.	75
It offers excellent aesthetics in dark-colored teeth as it does not require layering.	58
Advantages of Rubber Dam Use in Aesthetic Restorations	Number of Participants
Provides isolation and prevents contamination	229
Reduces preparation time	11

3. Education and Awareness

Questions were asked to assess the levels of education and awareness. According to the results, it was observed that both practical and theoretical training hours were insufficient, and that students felt the need for additional education in this area. Students commonly seek information on this topic through social media platforms. (Table 6)

Table 6. Evaluation of Theoretical, Practical, and Institutional Educational Resources in Anterior Aesthetic Restorations

Theoretical Education Duration in Anterior Aesthetic Restorations	Number of Participants
2-4 hours	176
5-10 hours	56
11 + hours	8
Practical Education Duration in Anterior Aesthetic Restorations	Number of Participants
2-4 hours	185
5-10 hours	48
11 + hours	7
Institutional Seminars or Courses on Anterior Aesthetic Restorations	Number of Participants
No	198
Yes	42
Sources Used to Gain Knowledge on Anterior Aesthetic Restorations	Number of Participants
Instagram	81
Youtube	81
Lecture notes	33
Courses	24
Scientific articles and textbooks	21

4. Clinical and Professional Skills

When asked about clinical challenges, most participants indicated that establishing proximal contact points was the most difficult aspect, followed by shaping anatomical contours and achieving color harmony. Polishing and surface smoothness were reported as the least problematic. It was also observed that rubber dam isolation was not commonly practiced during anterior restorations.(Table 7)

Table 7. Students' Experience and Technique Application in Anterior Aesthetic Restorative Procedures

Stage Found Most Difficult During Anterior Restorations	Number of Participants
Establishing proximal contact points	103
Achieving shade harmony	63
Creating anatomical form	53
Polishing and surface smoothness	21
Experience with Layering Technique in Anterior Restorations	Number of Participants
Yes	130
No	110
Frequency of Rubber Dam Use in Anterior Restorations	Number of Participants
Never	158
Rarely	67
For most cases	11
For every cases	4
Experience with the Injection Molding Technique in Restorations	Number of Participants
No	233
Yes	7

5. Self-Confidence and Competency Assessment

Regarding curriculum and training, 52% of students stated they did not have sufficient practical opportunities during their clinical education, while 85% believed the current curriculum was inadequate in preparing them for anterior aesthetic procedures. Many students expressed a desire to improve their skills in techniques such as diastema closure and direct composite veneers.(Table 8) Overall, the results highlight a strong demand among future dentists for more hands-on training in aesthetic restorative procedures. This table illustrates the comparison of competence levels between fourth- and fifth-year students (Table 8). The T-test results indicated no statistically significant difference between the two groups ($p>0.05$).

Table 8. Student Perspectives on Material Selection, Competence, Training, and Technique Improvement in Anterior Aesthetic Restorations

Key Factors Considered in Material Selection for Restorations	Number of Participants
Aesthetic harmony	134
Durability	86
Ease of application	12
Cost	8
Self-Perceived Competence in Anterior Aesthetic Restorations	Number of Participants
Not competent	120
Undecided	74
Definitely not competent	27
Competent	16
Highly competent	3
Perceived Adequacy of Practical Training in Anterior Aesthetic Restorations	Number of Participants
Insufficient	122
Undecided	68
I had the opportunity	29
I definitely had no opportunity	17
I definitely had sufficient opportunity	4
Techniques in Anterior Aesthetic Restorations Students Wish to Improve	Number of Participants
Diastema closure	87
Direct composite veneer	52
Ceramic veneer	41
Minimally invasive preparation	23
Monochromatic (One-Shape) Technique	12
Injectable flowable composite technique	9
Free-hand technique	14
Stamp technique	2

DISCUSSION

A review of the existing literature reveals that there are very few studies evaluating the competence of fourth- and fifth-year dental students in performing anterior aesthetic restorations.⁶⁻¹⁰

Behera and colleagues conducted a survey study at Saveetha Dental College with the aim of evaluating the knowledge, attitudes, and practices of 150 undergraduate students regarding aesthetic composite restorations.⁶ According to the results of the study, the participants' knowledge level concerning successful aesthetic composite restorations was found to be moderate, especially when compared to their attitudes and practices. Therefore, it was recommended that dental practitioners continue their professional education and clinical training in all aspects of composite restorations. This approach would enable the achievement of desirable aesthetic outcomes within the expected timeframe. Similarly, our study also concluded that undergraduate dental students require more comprehensive theoretical and practical training in this field.

In a survey study conducted by Al-Saleh et al.⁷, the awareness and competence levels in aesthetic restorations were compared among third-, fourth-, and fifth-year dental students as well as graduate dentists. Among students, the highest level of awareness was observed in fifth-year students, followed by fourth- and then third-year students. It was reported that graduate dentists demonstrated higher awareness and competence levels compared to students. In our study, third-year students and graduate dentists were not included; however, no statistically significant difference was found between fourth- and fifth-year students in terms of awareness and competence ($p>0.05$).

In another study conducted by Khan et al.⁸ at a private dental college, data were collected via questionnaires from 100 undergraduate dental students. The results revealed that the students had sufficient knowledge and awareness regarding aesthetic dentistry, and that

female students were found to be more competent in this area compared to male students. However, in our study, no significant difference was observed between female and male students in terms of knowledge and competence related to aesthetic dentistry.

A cross-sectional study conducted at King Abdulaziz University reported that knowledge related to esthetic dentistry increased with academic progression, and that perception of smile esthetics was influenced by individual factors such as gender, age, and marital status.⁹ These findings are consistent with the results of our study, which also showed high interest in esthetic restorations among students, despite their limited clinical experience. This supports the idea that not only theoretical knowledge, but also hands-on training, plays a critical role in enhancing students' self-confidence in performing esthetic dental procedures.

In our study, it was observed that undergraduate dental students have limited knowledge and experience regarding esthetic restorations. This finding aligns with the literature emphasizing that clinical experience and level of education play a critical role in enhancing competency in esthetic procedures. For example, a study conducted by Demarco et al.¹⁰ in Southern Brazil reported that general dentists with clinical experience and postgraduate training tended to prefer more advanced techniques and materials in esthetic restorations. This highlights the importance of active clinical participation and advanced education in improving the esthetic proficiency of both students and soon-to-be graduates. Therefore, undergraduate dental education programs should be designed to increase not only theoretical knowledge but also provide ample opportunities for practical experience, ultimately strengthening the professional skills of future dental graduates.

Based on the data obtained from our study; in our study, a total of 240 students from nine different faculties, consisting of fourth- and fifth-year dental students, participated. The majority of the students reported that they had not received any additional training related to anterior aesthetic restorations. The findings of the present study revealed that the majority of participants (n=167) had completed only 0-5 anterior aesthetic restoration cases, while only a small group had performed more than 10 cases. This limited clinical experience suggests that current undergraduate dental curricula may not be providing sufficient hands-on opportunities in aesthetic restorative procedures. These results indicate that the most significant increase in perceived competence occurs once students surpass the threshold of minimal clinical experience. In other words, students begin to feel more competent in performing anterior aesthetic restorations only after they move beyond completing just a few cases.

Furthermore, although a substantial number of students (n=136) reported moderate interest in anterior aesthetic restorations, 90 participants expressed high interest. This demonstrates a strong underlying motivation to engage with aesthetic procedures, despite their limited practical exposure. This finding suggests that purely theoretical or observation-based training may be insufficient to meaningfully enhance clinical confidence.

Altogether, these results underscore the importance of incorporating more case-based and hands-on training into the undergraduate curriculum. Doing so may help to bridge the gap between interest and competence, particularly for students who currently report minimal clinical experience.

The results of the knowledge-based questions indicated that most students demonstrated a generally positive awareness regarding key principles of anterior aesthetic restorations. A large proportion of participants agreed or strongly agreed with statements related to treatment purposes, material selection, shade matching, and aesthetic outcomes. However, responses related to treatment planning and influencing factors showed a relatively higher number of neutral or disagreeing responses. This suggests that while foundational knowledge is present among students, certain clinical reasoning aspects such as planning and aesthetic evaluation may require further emphasis within the curriculum. Enhancing education in these areas could improve students' readiness and confidence in performing anterior aesthetic procedures.

The data related to educational exposure suggest that the majority of students received only limited theoretical (2-4 hours: n=176) and practical (2-4 hours: n=185) training in anterior aesthetic restorations. Moreover, a substantial number of participants (n=198) reported that no institutional seminars or courses on this topic were offered at their schools. These findings indicated a lack of structured educational opportunities in the curriculum. Additionally, students reported relying heavily on social media platforms such as Instagram and YouTube (both n=81) to gain knowledge, rather than formal academic sources. This highlights the growing influence of digital platforms in dental education and underscores the need to integrate more structured, evidence-based aesthetic training within dental programs.

The most challenging step reported by students during anterior aesthetic restorations was establishing proximal contact points (n=103), followed by achieving shade harmony (n=63) and creating anatomical form (n=53). These findings suggest that students may require additional training and guidance in executing fine details that are crucial for functional and aesthetic success. While over half of the students (n=130) had experience with the layering technique, the majority reported infrequent or no use of rubber dam isolation, with 158 students indicating they never used it. Furthermore, familiarity with modern techniques such as injection molding was extremely low (n=7), highlighting a potential gap in exposure to current restorative innovations. These results pointed to the importance of reinforcing clinical skills and updating educational content with contemporary techniques to better prepare students for real-world practice.

The majority of students (n=134) prioritized aesthetic harmony when selecting restorative materials, followed by durability (n=86), whereas cost and ease of application were much less frequently considered. These results indicated that students place greater emphasis on the visual outcomes of anterior restorations, aligning with patient expectations in modern aesthetic dentistry.

However, when assessing self-perceived competence, most students rated themselves as "not competent" (n=120) or were "undecided" (n=74), with only a very small number considering themselves competent or highly competent. This aligns with perceptions of inadequate training; more than half of the participants (n=122) felt their practical education was insufficient, and only 4 students reported having had sufficient opportunities.

When asked which techniques they wished to improve, students most frequently selected diastema closure (n=87), followed by direct composite veneer and ceramic veneer applications. These preferences suggested a clear demand for additional hands-on experience in highly aesthetic and technique-sensitive procedures. Overall, the findings highlighted the need to revise and strengthen clinical education in anterior aesthetic restorations to enhance both competence and confidence among future practitioners.

CONCLUSION

As a result of our survey, it was observed that fourth- and fifth-year dental students from nine different faculties felt inadequate regarding anterior aesthetic restorations. The students expressed a need for more clinical experience in this field. This preliminary study should be expanded with a larger number of participants and supported in collaboration with other faculties.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmaları CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: FK(%40), MG(%20), ND(%20), NÜ(%20)

Veri Toplanması | Data Acquisition: FK(%40), MG(%20), ND(%20), NÜ(%20)

Veri Analizi | Data Analysis: FK(%40), MG(%20), ND(%20), NÜ(%20)

Makalenin Yazımı | Writing up: FK(%40), MG(%20), ND(%20), NÜ(%20)

Makale Gönderimi ve Revizyonu | Submission and Revision: FK(%40), MG(%20), ND(%20), NÜ(%20)

REFERENCES

1. Güngör FS. Diastemaların ve mine defektlerinin direkt kompozit lamina ile restorasyonu: 18 ay takipli bir olgu sunumu. *Selcuk Dent J.* 2018;5(1):86-90.
2. Bhuvaneshwaran M. Principles of smile design. *J Conserv Dent.* 2010;13(4):225-32.
3. Bastos NA, Scotti CK, Zabeu GS, Bueno LS, Ferrairo BM, Bombonatti JFS. Clinical performance of the composite resin veneers: The minimally invasive approach. *Arch Health Investig.* 2018;7(9). doi:10.21270/archi.v7i9.3151
4. Korkut B. Smile makeover with direct composite veneers: A two-year follow-up report. *J Dent Res Dent Clin Dent Prospects.* 2018;12(2):146-51.
5. Demarco FF, Collares K, Coelho-de-Souza FH, Correa MB, Cenci MS, Moraes RR, et al. Anterior composite restorations: A systematic review on long-term survival and reasons for failure. *Dent Mater.* 2015;31(10):1214-22.
6. Behera K, Sandeep AH, Haripriya S. Assessment of knowledge, attitude and practice based survey towards successful restorations of composite among practitioners. *J Contemp Issues Bus Gov.* 2021;27(2). doi:10.47750/cibg.2021.27.02.044
7. Al-Saleh SA, Al-Shammery DA, Al-Shehri NA, Al-Madi EM. Awareness of dental esthetic standards among dental students and professionals. *Clin Cosmet Investig Dent.* 2019;11:373-82.
8. Khan HLA, Sinduja P, Suganya P. Knowledge on aesthetic dentistry - A survey among dental undergraduates. *Nat Volat Essent Oils.* 2021;8(5):6998-7023.
9. Mannaa AI. Knowledge and Attitude Toward Esthetic Dentistry and Smile Perception. *Cureus.* 2023 Sep;15(9):e46043. doi: 10.7759/cureus.46043.
10. Demarco FF, Baldissera RA, Madruga FC, Simoes RC, Lund RG, Correa MB, Cenci MS. Anterior composite restorations in clinical practice: findings from a survey with general dental practitioners. *J Appl Oral Sci.* 2013;21:497-504.

Comparison of Online And Face-To-Face Education Success in Dentistry

Diş Hekimliğinde Çevrimiçi ve Yüz Yüze Eğitim Başarısının Karşılaştırılması

Sedef KOTANLI^a , Mehmet Emin DOĞAN^a , Mehmet Veysel KOTANLI^b 

^aHarran University, Faculty of Dentistry, Department of Oral and Maxillofacial Radiology, Şanlıurfa, Türkiye

^aHarran Üniversitesi, Diş Hekimliği Fakültesi, Ağız, Diş ve Çene Radyolojisi AD, Şanlıurfa, Türkiye

^bHarran University, Faculty of Dentistry, Department of Pedodontics, Şanlıurfa, Türkiye

^bHarran Üniversitesi, Diş Hekimliği Fakültesi, Pedodonti AD, Şanlıurfa, Türkiye

ABSTRACT

Background: The Covid-19 pandemic has significantly impacted daily life, as well as education, and the face-to-face education in dentistry faculties has been transformed into distance education. This study aims to compare the effectiveness of online and face-to-face education by comparing the passing grades of first-year students of the faculty of dentistry in both theoretical and practical courses during the face-to-face and online learning process.

Methods: The grades of a total of 211 first-year students were included in the study. 96 of these students were students who received online education in Harran University Faculty of Dentistry in 2019-2020. The remaining 115 students were students who received face-to-face education in the 2023-2024 academic year. The grade passing scores of the students included in the study in theoretical "Knowledge of Materials" and practical "Tooth Morphology and Manipulation" courses were compared. Independent t test was used to compare paired groups with normal distribution.

Results: In our study, the practical and theoretical course passing grades of 96 online and 115 face-to-face students were compared. No statistically significant difference was found between the online education average exam scores (68,35±13,17) and face-to-face average exam scores (68,00±8,26) of the students in the practical course (p=0,276). In the theoretical course, the online average exam scores of the students were found to be higher than the face-to-face average exam scores (p=0,03).

Conclusion: While there is no difference between online and face-to-face education exam grades in practical courses, the grades of students who received online education in theoretical courses were found to be higher. We think that success is higher in online theoretical courses due to the advantages such as the ability to record lessons and watch them again after the lesson.

Keywords: Online education, Face-to-face education, Dentistry

ÖZ

Giriş: Covid-19 pandemisi, insan yaşamının her anını etkilediği gibi eğitim de önemli ölçüde etkilenmiş ve diş hekimliği fakültelerinde yüz yüze yapılan eğitim şekli, uzaktan eğitime dönüştürülmüştür.

Amaç: Bu çalışmada diş hekimliği fakültesi 1. sınıfta öğrenim gören öğrencilerin yüz yüze ve çevrimiçi öğrenme sürecinde hem teorik hem pratik derslerdeki sınıf geçme notlarının karşılaştırılması yapılarak çevrimiçi ve yüz yüze eğitimin verimliliğinin kıyaslanması amaçlanmıştır.

Gereç ve Yöntemler: Araştırmaya toplam 211 1. Sınıf öğrencisinin notları dahil edilmiştir. Bu öğrencilerden 96'sı Harran Üniversitesi diş hekimliği fakültesinde, 2019-2020 yıllarında çevrimiçi eğitim almış öğrencilerdir. Geri kalan 115 öğrenci ise 2023-2024 öğretim yılında yüz yüze eğitim almış öğrencilerden oluşmaktadır. Çalışmaya dahil edilen öğrencilerin teorik (Maddeler Bilgisi) ve pratik (Diş Morfolojisi ve Manipülasyon) derslerdeki sınıf geçme puanları karşılaştırılmıştır. Normal dağılım ikili grupların kıyaslanmasında independent t testi kullanılmıştır.

Bulgular: Çalışmamızda 96 çevrimiçi eğitim almış ve 115 yüz yüze eğitim almış öğrencinin pratik ve teorik derslerdeki sınıf geçme notları kıyaslanmıştır. Pratik derste öğrencilerin çevrimiçi eğitim sınav not ortalamaları (68,35±13,17) ile yüz yüze eğitim sınav notları (68,00±8,26) arasında istatistiksel olarak anlamlı bir fark bulunamamıştır (p=0,276). Teorik derste öğrencilerin çevrimiçi eğitim sınav not ortalamaları yüz yüze eğitim sınav not ortalamalarından daha yüksek hesaplanmıştır (p=0,03).

Sonuçlar: Pratik derslerde çevrimiçi ve yüz yüze eğitim sınav notları arasında bir fark izlenmezken, teorik derslerde çevrimiçi eğitim alan öğrencilerin notları daha yüksek hesaplanmıştır. Derslerin kaydedilebilmesi ve ders sonrasında tekrar izlenebilmesi gibi avantajları dolayısıyla çevrimiçi teorik derslerde başarının daha yüksek olduğunu düşünmekteyiz.

Anahtar Kelimeler: Çevrimiçi eğitim, Diş hekimliği, Yüz yüze eğitim

INTRODUCTION

Coronavirus disease (COVID-19) has affected many countries around the world, including Türkiye, in a short period of time.¹ With the spread of the pandemic, it has been seen that similar practices such as maintaining social distance, banning international flights, restricting intercity travel, enforcing quarantine, and implementing curfews have been put into effect in every country.² During this process, universities have also undergone a transformation in line with the global trend. In many countries, face-to-face education has been suspended and distance education has been adopted.^{1,3} While online education has just started to become part of daily life with developing technological opportunities, it has become normalized during the COVID-19 pandemic.⁴ And thus, the opportunity and necessity to experience dental education through distance education has emerged.

Dental education is an education model in which theoretical knowledge is supported by intensive practice in both preclinical and clinical stages in Türkiye, as is the case worldwide. Depending on the number of students, the provision of theoretical education on site and the implementation of preclinical laboratory training in crowded environment has undoubtedly made conditions difficult during the COVID-19 pandemic. During this period, practical dental education has been suspended at different levels all over the world. First of all, online

courses, case studies and problem-based learning techniques have been tried to be implemented, especially during pandemic periods, in order to prevent individuals from gathering together as much as possible and to minimize infection risk by avoiding close contact.⁵ It has been reported in the literature by many studies that there is a need for much improvement and development in this area.^{6,7} While the ability to provide theoretical training online over the internet is seen as a reasonable solution in this area, especially clinical practice training should be reprogrammed in the most effective way suitable for the skills to be acquired and the opportunities of technology should be utilized to the maximum extent.⁸

MATERIAL AND METHODS

Before starting the study, the necessary permissions were obtained from the Dean of Harran University Faculty of Dentistry to retrospectively examine student grades. The study included the grades of 211 first-year students in total. Of these, 96 students received online education at Harran University Faculty of Dentistry during the 2019-2020 academic year. The remaining 115 students received face-to-face education during the 2023-2024 academic year.

Online education was delivered via computer or phone using the Zoom platform. In face-to-face education, the direct explanation method

Gönderilme Tarihi/Received: 20 Nisan, 2025

Kabul Tarihi/Accepted: 18 Ağustos, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atrf Bilgisi/Cite this article as: Kotanlı S, Doğan ME, Kotanlı MV. Comparison of Online And Face-To-Face Education Success in Dentistry. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 42-45 Doi: 10.15311/ selcukdentj.1680222

Sorumlu yazar/Corresponding Author: Sedef KOTANLI

E-mail: sedefakol@harran.edu.tr

Doi: 10.15311/ selcukdentj.1680222

and the demonstration-based hands-on method were used. Each lesson lasted approximately 45 minutes, and around 100 students attended each session.

The students included in the study were compared in terms of passing grades in theoretical (Materials Knowledge) and practical (Tooth Morphology and Manipulation) courses. When selecting practical and theoretical courses whose grades would be compared, it was taken into account that both online and face-to-face education were given by the same instructor.

The data were tested for normal distribution using the Kolmogorov Smirnov test, and the Student t test was used to compare normally distributed features in two independent groups. Categorical variables were analysed using the Pearson chi-square test. SPSS Windows version 23.0 software package program was used for statistical analyses and $p < 0,05$ was considered statistically significant.

RESULTS

In our study, the practical and theoretical passing grades in lessons of 96 online and 115 face-to-face students were compared.

Table 1 shows the practical passing grades in lessons of the students. No statistically significant difference was found between the online education exam grade point averages ($68,35 \pm 13,17$) and face-to-face education exam grades ($68,00 \pm 8,26$) of the students in the practical lesson ($p=0,276$). The students' passing grades in the theoretical lesson are shown in **Table 2**. In the theoretical lesson, the students' online education exam grade point averages were found to be higher than their face-to-face education exam grade point averages ($p=0,03$).

The effect size for practical lessons was calculated as 0.03 (Cohen's $d=0,35/10,77$). This is a very small effect size. When the effect size was calculated for theoretical lessons; it was found as Cohen's $d=0,59$ (medium effect size).

Table 1. Success scores of students in practical lessons

	N	Mean $\pm$ SD	p
Online	9600%	68,35 $\pm$ 13,165	0,276
Face-to-face	11500%	68,00 $\pm$ 8,263	
Total	21100%	68,16 $\pm$ 10,747	

Table 2. Success scores of students in theoretical lessons

	N	Mean $\pm$ SD	p
Online	9600%	78,29 $\pm$ 12,381	0,003*
Face-to-face	11500%	71,60 $\pm$ 10,354	
Total	21100%	74,30 $\pm$ 11,659	

DISCUSSION

Analysing the success of the courses named "Materials" and "Morphology of Tooth and Manipulation" in dental education in our country provides important insights to measure the students' understanding of basic concepts. Examining the differences in grade distributions in face-to-face and online education periods is important for shaping dental education in the future. There are many survey studies in the literature evaluating the opinions of students about face-to-face and distance education.^{1,9-12} However, studies comparing students' course success grades are limited⁴. To the best of our knowledge, our study is the first study to compare face-to-face and online education in dentistry quantitatively.

Serçemeli et al.¹² conducted a study evaluating students' views on online education and concluded that most students had a negative view of distance education. The participants' positive views on online education were as follows: "It makes the subjects more memorable when we feel the need." The participants' negative views on online education were as follows: "It is difficult to reach the teacher when we want to ask questions."

Kurnaz and Ağgöl¹³ obtained positive results from using the flipped classroom model in accounting education in their study.

Alaca et al.¹⁴ compared online and face-to-face education in terms of

satisfaction and perceived learning outcomes among second-year students of the physiotherapy and rehabilitation department, and concluded that most of the courses practical courses met the perceived learning outcomes regardless of whether they were delivered face-to-face or via synchronous online education. It was also found that in online courses, satisfaction with instructors and course materials was high, while satisfaction with the infrastructure, exams and assignments was low. This may show us that the applied education system of the department is a system that can be applied when necessary.

In a study examining distance education methods applied in accounting courses¹⁵, it was concluded that since accounting courses are practice-oriented and require interaction with students, face-to-face lectures and exams are more suitable in terms of learning efficiency.

Kahramanoglu et al.¹⁶; in their study, which aimed to compare the self-confidence of 5th grade students while performing prosthetic treatment before and after Covid-19, they found that their self-confidence scores significantly decreased after the pandemic compared to before the pandemic.

Bellini et al.¹⁷ reported that Covid-19 had a negative effect on clinical studies and face-to-face theoretical education among dentistry students in their study.

In a study conducted on anatomy with medical and dental students by Singal et al.¹⁸ the majority of students (68%) admitted that they had difficulty in time management and that their attention was distracted due to home comforts or discomfort.

Eroğlu and Kalaycı¹ concluded, as a result of their interviews with 50 students who received face-to-face and online education, that distance education applications that are rearranged in a way that is blended with face-to-face education for some courses and/or programs are the most important investment that universities can make for the future. They made the following recommendations:

*Teaching staff should acquire new technological knowledge and skills related to this educational application and should be able to transfer this technological knowledge and skills they have learned to the education-training process.

*Certain standards should be established by the Council of Higher Education for distance education applications and evaluation studies should be carried out at regular intervals.

In our study comparing student grades in face-to-face and online education, no difference was observed between exam grades in practical courses, while students who received online education in theoretical courses had higher grades. This may be due to the advantages of online education, such as the ability to record lessons and watch them again after the lesson. Since this method cannot be applied effectively in online lessons, a significant increase in the success of the practical lessons may not have been observed even though the courses can be recorded and watched again. The fact that students have lower anxiety levels in their home environment may be one of the reasons why success in theoretical lessons increases in online education. In addition, another reason for the results of our study may be that in this process, students have the opportunity to reinforce practical training with theoretical training and can devote more time to theoretical training.

The main limitations of the study are that it was a single centre study, only one course was selected for theory and practice, and only first-year students were included in the study. Another limitation of the study is that the number of students receiving online education and the student population in the face-to-face class are not the same in terms of demographic characteristics and knowledge level. Future studies can be planned as multi centre studies by increasing the sample size.

CONCLUSION

While there is no difference between online and face-to-face education exam grades in practical courses, the grades of students who received online education in theoretical courses were calculated higher. We believe that success is higher in online theoretical courses due to the advantages such as the ability to record lessons and watch them again after the lesson.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmaları CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: SK (%30), MED (%35), MVK (%35)

Veri Toplanması | Data Acquisition: SK (%30), MED (%40), MVK (%30)

Veri Analizi | Data Analysis: SK (%50), MED (%25), MVK (%25)

Makalenin Yazımı | Writing up: SK (%30), MED (%30), MVK (%40)

Makale Gönderimi ve Revizyonu | Submission and Revision: SK (%60), MED (%20), MVK (%20)

REFERENCES

1. Eroğlu F, Kalaycı N. Üniversitelerdeki zorunlu ortak derslerden Türk dili dersinin uzaktan ve yüz yüze eğitim uygulamalarının karşılaştırılarak değerlendirilmesi. *Ana Dili Eğitimi Dergisi*. 2020;8(3):1001-27.
2. Yaman B. Covid-19 pandemisi sürecinde Türkiye ve Çin’de uzaktan eğitim süreç ve uygulamalarının incelenmesi. *OPUS International Journal of Society Researches*, 2021;17(Pandemi Özel Sayısı):3298-308.
3. Aubusson P, Schuck S. Teacher education futures: Today’s trends, tomorrow’s expectations. *Teacher Development*. 2013;17(3):322-33.
4. Ektik D, Ünkaya G. Muhasebe eğitiminde temel kavramların algılanmasında yaşanan zorluklar: yüz yüze eğitim-çevrimiçi eğitim karşılaştırması. *Muhasebe ve Finansman Dergisi*. 2023(97):1-12.
5. Alzamo A, Delilbaşı E. Covid-19 pandemisinde diş hekimliği eğitimi. *ADO Klinik Bilimler Dergisi*, 2022;11(1):85-9.
6. Galibourg A, Maret D, Monsarrat P, Nasr K. Impact of COVID-19 on dental education: How could pre-clinical training be done at home? *Journal of dental education* 2020;84(9):949.
7. Prieto D, Tricio J, Cáceres F, Param F, Meléndez C, Vásquez P, et al. Academics’ and students’ experiences in a chilean dental school during the COVID-19 pandemic: A qualitative study. *European Journal of Dental Education*, 2021;25(4):689-97.
8. Kılıçarslan M. Covid-19 pandemisi sürecinde diş hekimliği uygulamaları. *Sağlıkta Kalite ve Akreditasyon Dergisi*, 2020;3(1):36-42.
9. Eroğlu F, Kalaycı N. Üniversitelerdeki zorunlu ortak derslerden Atatürk ilkeleri ve inkılap tarihi dersinin uzaktan ve yüz yüze eğitim uygulamalarının karşılaştırılarak değerlendirilmesi. *Bayburt Eğitim Fakültesi Dergisi*, 2022;17(34):474-511.
10. Zeytun AŞ, Nuhoglu H. Matematik Öğretmen Adaylarının Öğretmenlik Uygulaması Derslerine Yönelik Beklentilerinin Analizi: "Yüz yüze ve Çevrim içi Öğretim Deneyimleri". *Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi*, 2025(63):386-415.
11. Karaaslan İ, Nimet Ö, Yavuz A. Covid-19 Döneminde Öğrencilerin Online Eğitimi Değerlendirmeleri Üzerine Bir Araştırma: Ege Üniversitesi İletişim Fakültesi Örneği. *The Journal of Academic Social Science Studies*, 2025;17(Year: 17-Number: 102):393-414.
12. Serçemeli M, Kurnaz E. Covid-19 pandemi döneminde öğrencilerin uzaktan eğitim ve uzaktan muhasebe eğitimine yönelik bakış açıları üzerine bir araştırma. *Uluslararası Sosyal Bilimler Akademik Araştırmalar Dergisi*, 2020;4(1):40-53.
13. Kurnaz E, Ağgül S. Ters Yüz Edilmiş Sınıf Modeline Muhasebe Eğitimi Alan Öğrencilerin Bakış Açıları: Bayburt Üniversitesi Ve Kafkas Üniversitesi Örneği. *Journal MSAI*.2018;6(2):332-44.
14. Alaca N, Kaba H, Safran EE, Öztürk Ö. Fizyoterapi ve Rehabilitasyon bölümünde uygulama içeren ikinci sınıf derslerinin memnuniyet ve algılanan öğrenim çıktıları açısından karşılaştırılması: Covid-19 öncesindeki yüz yüze eğitim ile Covid-19 sırasındaki çevrimiçi eğitim. *Sağlık Profesyonelleri Araştırma Dergisi* 2022;4(1):1-11.
15. Bağdat A. Covid-19 pandemisinde muhasebe derslerinde uygulanan uzaktan eğitim yöntemlerinin incelenmesi ve bir model önerisi. *Uluslararası Yönetim İktisat ve İşletme Dergisi*,2021(17):20-34.
16. Kahramanoglu E, Helvacioğlu Özkardeş M, Cüre AÇ. 2019-nCoV Pandemisinin 5. Sınıf Diş Hekimliği Fakültesi Öğrencilerinin Protetik Diş Tedavisi Eğitiminde Oluşturduğu Etkinin Araştırılması. *7tepe Klinik*, 2024;20(1).
17. Bellini P, Iani C, Zucchelli G, Franchi M, Mattioli AV, et al. Impact of the COVID-19 pandemic on dental hygiene students in the Italian region of Emilia-Romagna. *Minerva Stomatol* 2020; Dec 14.
18. Singal A, Bansal A, Chaudhary P, Singh H, Patra A. Anatomy education of medical and dental students during COVID-19 pandemic: a reality check. *Surg Radiol Anat* 2021; 43(4): 515-21.

Evaluation Of Agreement Between Peer and Faculty Assessments in Preclinical Endodontic Education: A Pilot Study

Klinik Öncesi Endodonti Eğitiminde Akran ve Öğretim Üyesi Değerlendirmeleri Arasındaki Uyumun İncelenmesi: Pilot Çalışma

Meltem KÜÇÜK^a 

^aNear East University, Faculty of Dentistry, Department of Endodontics, Mersin, Türkiye

^aYakın Doğu Üniversitesi, Diş Hekimliği Fakültesi, Endodonti AD, Mersin, Türkiye

ABSTRACT

Objective: This pilot study aimed to evaluate the agreement between peer and faculty assessments of dentistry students' performance in a preclinical endodontic practical course.

Method: Data were collected from second-year dentistry students enrolled in the preclinical endodontics practical course at Near East University. Participation in the study was voluntary. Following a theoretical explanation of the endodontic access cavity course by the course coordinator, a demonstration was conducted on preparing endodontic access cavities in both upper and lower premolars. The scoring rubric was then explained to the students in detail. Students were then asked to evaluate their peers' performances anonymously based on the endodontic access cavities prepared during the course. After the peer evaluations, a faculty member graded the students' performances using the same scoring scale. The agreement between peer and faculty evaluations was analyzed using Wilcoxon signed-rank tests, with a significance level set at 0.05.

Results: A significant difference was found between peer and faculty scores for access cavities opened in upper and lower premolars ($P < 0.05$). Faculty evaluation scores were significantly lower than those given by peers. The most common error found by peers was the access cavities being opened too small, whereas the most frequent mistake identified by faculty members was failing to completely remove the pulp chamber roof or horns.

Conclusion: Disagreement was observed between faculty and peer assessments regarding the access cavity preparation during the preclinical endodontic course. Peer evaluation skills of dentistry students can improve through practical training and feedback, aligning them more closely with faculty evaluations.

Keywords: Endodontic, Peer assessment, Dentistry student, Endodontic Curriculum

ÖZ

Amaç: Bu çalışmanın amacı, diş hekimliği öğrencilerinin klinik öncesi endodonti pratik dersindeki performansları ile ilgili akran ve öğretim üyesi değerlendirmeleri arasındaki uyumu incelemektir.

Materyal ve Metot: Veriler, Yakın Doğu Üniversitesi'nde klinik öncesi endodonti pratik dersine kayıtlı olan ve çalışmaya gönüllü olarak katılan 2. Sınıf diş hekimliği öğrencilerinden toplanmıştır. Ders koordinatörünün endodontik giriş kavitesi dersini teorik olarak anlatmasının ardından alt ve üst premolar dişlerde endodontik giriş kavitesi preparasyonu için elde bir demonstrasyon yapılmıştır. Daha sonra açılan kavitelerde dereceli puanlama anahtarını kullanımı öğrencilere detaylı bir şekilde açıklanmıştır. Öğrencilerden, derste açılan endodontik giriş kavitesi ile ilgili akran performanslarını anonim bir şekilde değerlendirmeleri istenmiştir. Akran değerlendirmelerinden sonra, bir akademik personel de aynı dereceli puanlama anahtarını kullanarak öğrenci performanslarını değerlendirmiştir. Akran ve öğretim üyesi değerlendirmeleri arasındaki uyum 0,05 anlamlılık düzeyine sahip Wilcoxon işaretli sıralar testi kullanılarak karşılaştırılmıştır.

Bulgular: Alt ve Üst premolar dişlere açılan giriş kavitelerinde akran ve öğretim üyesi değerlendirme sonuçları arasında anlamlı bir farklılık bulunmuştur ($P < 0.05$). Öğretim üyesi değerlendirme notları, akran değerlendirmesi notlarına kıyasla anlamlı derecede daha düşük bulunmuştur. Tespit edilen hataların türü ve sıklığı incelendiğinde, akranlar tarafından en sık görülen hata, giriş kavitelerinin çok küçük açılması olurken; öğretim üyeleri tarafından en sık tespit edilen hata, pulpa odası tavanı veya boynuzunun tamamen uzaklaştırılmaması olmuştur.

Sonuç: Klinik öncesi endodonti eğitimi sırasında giriş kavitesi preparasyonu konusunda öğretim üyeleri ve akran değerlendirmeleri arasında farklılık gözlemlenmiştir. Öğretim üyesi değerlendirmelerine daha yakın olması için uygulamalı eğitim ve geri bildirim yoluyla diş hekimliği öğrencilerinin akran değerlendirme becerileri geliştirilebilir.

Anahtar Kelimeler: Endodonti, Akran değerlendirmesi, Diş hekimliği öğrencisi, Endodonti Müfredatı

Introduction

Dental education aims to ensure that students acquire the knowledge, skills, and attitudes necessary for practicing professional dentistry independently¹. This encompasses general skills, subject-specific skills, and attitudes². Successfully teaching endodontic procedures, such as opening endodontic access cavities, should enable students to develop psychomotor skills in addition to theoretical knowledge³. To provide the best dental care to patients, students must acquire these skills, which can be achieved by effectively completing preclinical courses^{4,5}.

In dental education, accurate assessment of students' learning processes by both faculty and students is essential to measure students' knowledge and skills⁶. Besides, assessment also enhances students' learning processes if immediate feedbacks are provided⁷. The validity and reliability of assessments can be ensured, particularly through consistent evaluations by faculty members. However, alternative assessment methods, such as peer assessment, can be employed in dental education to assess students' progress more effectively⁸.

Peer assessment is one of the assessment tools in which students rate the work or performance of their peers according to specific criteria⁹.

This method is grounded in the philosophies of active learning and the development of critical thinking¹⁰. A meta-analysis study highlighted that peer assessments in the medical field tend to be consistent with instructor assessments. It was also noted that introducing assessment criteria to students is a crucial factor for the successful implementation of the assessment process¹¹. Other studies provided evidence that incorporating peer assessment into medical student curricula fosters the development of students' learning skills and yields measurable improvements in professionalism, particularly in clinical skills, which can be maintained in the medium and long term^{12,13}. However, peer assessment has rarely been implemented in dentistry training¹⁴. Endodontics is a challenging and intricate subject, and numerous students often feel unprepared when taking endodontic training¹⁵. Introducing peer assessment into the dental curriculum could enhance the understanding of endodontic procedures¹⁶. Therefore, this pilot study aimed to evaluate the skills of opening endodontic access cavities among dental students in a preclinical endodontic practice course through anonymous peer and faculty assessments, as well as the agreement between these evaluations. The null hypothesis of this study was that faculty and peers demonstrate similar agreement in the assessment of access cavity preparation during the preclinical endodontic training.

Gönderilme Tarihi/Received: 17 Nisan, 2025

Kabul Tarihi/Accepted: 2 Eylül, 2025

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atıf Bilgisi/Cite this article as: Küçük M. Evaluation Of Agreement Between Peer and Faculty Assessments in Preclinical Endodontic Education: A Pilot Study. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: 46-49 Doi: 10.15311/ selcukdentj.1678399

Sorumlu yazar/Corresponding Author: Meltem KÜÇÜK

E-mail: dt.meltem@gmail.com

Doi: 10.15311/ selcukdentj.1678399

Materials and Methods

This pilot study received approval from the Human Resources and Ethics Committee (approval number: YDU/2024/131-1938) and was conducted using data collected from second-year dental students (n:25) enrolled in the preclinical endodontics practical course at Yakın Doğu University. Students were selected from those continuing the preclinical endodontics course who voluntarily agreed to participate in this study. The evaluation of students' skills in opening endodontic access cavities was carried out by their peers and a faculty member.

After the course coordinator theoretically explained the endodontic access cavity course, a hands-on demonstration was provided for both upper and lower premolars. The course coordinator designed a rubric to assess the students' work on a 10-point scale and then shared it with students (Table 1). The scoring method using the rubric for endodontic access cavities was explained to the students in detail. To provide students with easy access, the scoring key was created using Google Forms, where points were deducted for each error or deficiency.

Table 1. Instructions that include a scoring method of access cavity in the preclinical endodontic course.

Assessment scores based on detected errors		
Proper access cavity (10 Points)	Moderate deviation from proper (-1 Point for each error)	Unacceptable access cavity (-10 Point)
1. Entire roof of the pulp chamber was removed 2. Direct straight-line access to the apical third of the root canals was achieved 3. Sound tooth tissue was conserved	1. Access cavity is too large 2. Access cavity is too small 3. Incomplete deroofing/pulp horn removal 4. Pulp Chamber Walls are not Smooth 5. improper outline/shape 6. Access in the wrong location	1. Perforation on the floor/walls 2. Destroying the cusp tip

Following the completion of the opening access cavities on upper and lower premolar teeth, anonymous peer and faculty evaluation stages were carried out. Evaluations were conducted through the Google Forms platform, which was a Data Collection Tool. The form included assessment stages focused on identifying errors and allowed every student to evaluate using a 10-point scoring scale. The evaluation processes occurred in the following order:

Anonymous Peer Evaluation

Students who have completed the opening of their access cavities moved on to the peer evaluation stage, which was organized anonymously by faculty staff. A masked (anonymized) evaluation process was implemented. Students evaluated the access cavity prepared by another student without knowing their identity and scored their peer's work using the scoring scale. During this process, students focused solely on the quality of the work, with the identity of the evaluated student remaining confidential. Faculty staff also did not disclose which student evaluated which cavity, promoting objectivity and reducing biases stemming from personal interactions.

Faculty Member Evaluation

Finally, a faculty member evaluated the access cavities opened by students using the same scoring method without knowing the students' identities. Maintaining anonymity ensured objectivity in the evaluation process. Following the evaluation of each student's performance, constructive feedback was provided to support students' ongoing development.

Data Analysis

Statistical analysis was conducted using SPSS software version 24.0 (IBM Corp, Armonk, NY, USA). The Wilcoxon signed-rank test was used to compare two assessment data: anonymous peer assessment and faculty assessment, with a significance level set at 0.05, as the obtained data do not conform to a normal distribution. Agreement between faculty and peer assessment was evaluated using Intraclass Correlation Coefficient (ICC) analysis. Additionally, performance variations related to identified errors within each assessment category were analyzed using descriptive statistics.

Results

A significant difference was observed between peer and faculty scores for access cavities opened in upper and lower premolars ($P < 0.05$). Faculty evaluation scores were significantly lower than those provided by peers ($P < 0.05$) (Figure 1). The findings of ICC revealed a weak reliability and a low level of agreement between peer assessment scores and those provided by faculty when evaluating both upper (ICC = 0.164, 95% CI = -0.102 to 0.466) and lower (ICC = 0.163, 95% CI = -0.172 to 0.493) premolar access cavities. When examining the frequency of errors identified in the evaluation of the opening access cavities of both lower and upper premolar teeth, the most common error found by peers was the access cavities being opened too small, whereas the most frequent mistake identified by faculty members was failing to completely remove the pulp chamber roof or horn (Figure 2).

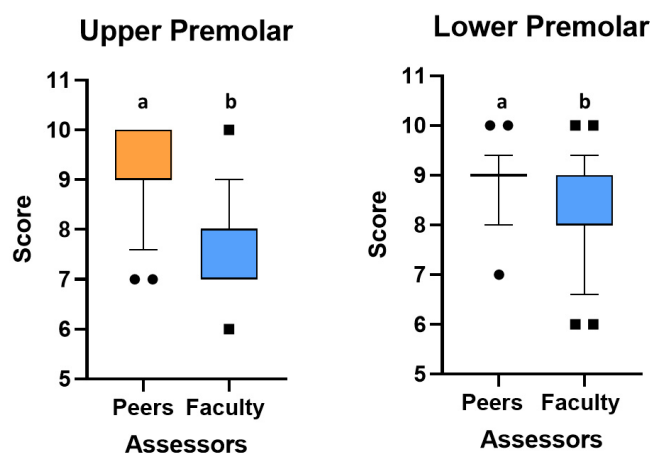


Figure 1. Scores attributed by students and a faculty member regarding tooth type and access cavity preparation. Box plots represent the interquartile range. The line inside each box marks the median, and the whiskers extend to the 10th and 90th percentiles. Different lowercase letters indicate significant differences between groups ($p < 0.05$, Wilcoxon signed-rank tests).

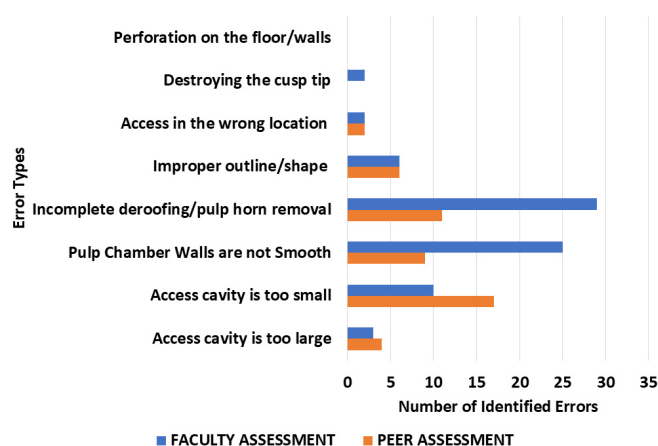


Figure 2. Procedural errors of access cavity recorded by students and a faculty member

Discussion

Peer assessment improves students' assessment skills by enhancing their understanding of assessment criteria and their ability to apply these criteria when evaluating peers' work¹⁷. Agreement between student and faculty assessments depends on several factors, including clarity and relevance of assessment criteria to the evaluated skill, as well as students' level of conceptual understanding¹⁸. Consistent with the results of the previous study, our findings revealed disagreement

between faculty and peer assessments regarding access cavity preparation¹⁹. Therefore, the null hypothesis was rejected. We observed a significant difference between the scores given by peers and faculty members during the evaluation of the access cavity prepared on the upper and lower premolar teeth ($P < 0.05$). Faculty members assigned significantly lower scores compared to peer evaluations. Students tended to overestimate their performances, consistent with a previous study that reported that peers assigned higher scores than faculty members⁸. Literature has similarly shown that evaluations made by faculty members are often lower than student evaluations, particularly regarding preclinical skills²⁰⁻²². To effectively address this discrepancy in dental education, it is essential to implement objective evaluation criteria. This approach will not only enhance the integrity of assessments but also ensure a more consistent and fair learning experience for all students²³.

The results of peer assessment carry important implications regarding the perception of evaluation criteria during the educational process²⁴. However, some students may exhibit a more favorable approach to their peers, which contributes to the development of interpersonal relationships and a harmonious environment. This could lead students to rate their peers excessively high, particularly in preclinical or early clinical stages^{25,26}. In contrast, faculty members may adopt a more critical stance, adhering to standardized and rigorous evaluation criteria, leading to lower scores in their evaluations. Thus, training, experience, and constructive feedback enhance students' peer assessment skills and attitudes⁸.

The findings of our study suggest that peer evaluation processes should be more objective. During the educational process, faculty evaluations can provide a clearer understanding of student development²⁷. Therefore, it is advisable to use both evaluation methods in a balanced way within educational programs, establishing detailed feedback mechanisms to help students assess themselves more effectively^{16,27}. Moreover, one research has indicated that peer assessment can foster critical thinking skills and enhance self-assessment abilities²⁸. However, for peer assessment to be effective, evaluation criteria must be clearly defined, and students should receive proper training beforehand²⁹. To reduce biases, such as students' tendency to give each other high scores, assessment processes should be supported by rubrics and guided by faculty members³⁰.

Several limitations should be considered when interpreting our results. First, the study was conducted at a single dental school with a small number of participants who might be the most motivated and interested in peer assessment. Second, faculty assessments were made by a single investigator, which may introduce bias and limit external validity, making it difficult to generalize findings to all undergraduate dental students. Future research should include a larger cohort of students and faculty members from various universities. Additionally, involving students from multiple universities through random selection would facilitate the analysis of additional variables, such as curriculum type, facilities, time allocated for endodontic education and training, and the staff-to-student ratio, which may help clarify the conflicting results reported in previous studies. Third, we did not analyze the gender of the students, and a previous study has shown differences in assessment ability between male and female students³¹. Future studies should explore whether gender differences are underlying potential reasons. Lastly, we did not assess students' clinical experience since only second-year students were included in this study. Including higher-level students in future research would enable the evaluation of the association between peer assessments and clinical experience.

Conclusion

Faculty and peer assessments showed disagreement regarding the access cavity preparation during the preclinical endodontic course, with students overestimating their performance. This suggests that students' peer evaluation skills can be improved through practical training and feedback to become closer to faculty evaluations. Thus, students can graduate with sufficient knowledge and skills to perform endodontic procedures.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmaları CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması | Design of Study: MK (%100)

Veri Toplanması | Data Acquisition: MK (%100)

Veri Analizi | Data Analysis: MK (%100)

Makalenin Yazımı | Writing up: MK (%100)

Makale Gönderimi ve Revizyonu | Submission and Revision: MK (%100)

REFERENCES

1. Qutieshat A. Active involvement in dental education and the way to meaningful knowledge: The viewpoint of a dental educator. *J Dent Res Rev.* 2022;9(2):191-193.
2. Escribano N, Belliard V, Baracco B, Da Silva D, Ceballos L, Fuentes MV. Rubric vs. numeric rating scale: agreement among evaluators on endodontic treatments performed by dental students. *BMC Med Educ.* 2023;23(1):197.
3. Decurcio D, Lim E, Chaves G, Nagendrababu V, Estrela C, Rossi-Fedele G. Pre-clinical endodontic education outcomes between artificial versus extracted natural teeth: a systematic review. *Int Endod J.* 2019;52(8):1153-1161.
4. Khattak O, Ganji KK, Iqbal A, Altassan M, Khan FH, Anis R. Beyond labs: unveiling dynamics of dental students' transition from pre-clinical to clinical training in a Saudi dental school. *PeerJ.* 2024;12:e18019.
5. Kucuk M, Ratakonda M, Piasecki L. Teaching a new obturation technique in preclinical endodontic training: assessment of student learning experience, performance, and self-evaluation. *J Endod.* 2024;50(11):1634-1641.
6. Teich S, Demko C, Lang L. Students' perception of peer-assessment in the context of a treatment planning course. *Eur J Dent Educ.* 2015;19(1):8-15.
7. Manogue M, Kelly M, Bartakova Masaryk S, Brown G, Catalanotto F, Choo-Soo T, Delap E, Godoroja P, Morio I, Rotgans J, Saag M. Evolving methods of assessment. *Eur J Dent Educ.* 2002;6(Suppl 3):53-66.
8. Alfakhry G, Mustafa K, Alagha MA, Zayegh O, Milly H, Shwikani FA, Jamous I. Peer-assessment ability of trainees in clinical restorative dentistry: can it be fostered? *BDJ Open.* 2022;8(1):22.
9. Ibarra-Sáiz MS, Rodríguez-Gómez G, Boud D. Developing student competence through peer assessment: the role of feedback, self-regulation and evaluative judgement. *High Educ.* 2020;80(1):137-156.
10. Ndoye A. Peer/Self Assessment and Student Learning. *Int J Teach Learn High Educ.* 2017;29(2):255-269.
11. Li H, Xiong Y, Zang X, Kornhaber ML, Lyu Y, Chung KS, Suen HK. Peer assessment in the digital age: a meta-analysis comparing peer and teacher ratings. *Assess Eval High Educ.* 2016;41(2):245-64.
12. Brierley C, Ellis L, Reid ER. Peer-assisted learning in medical education: A systematic review and meta-analysis. *Med Educ.* 2022;56(4):365-373.
13. Nofziger AC, Naumburg EH, Davis BJ, Mooney CJ, Epstein RM. Impact of peer assessment on the professional development of medical students: a qualitative study. *Acad Med.* 2010;85(1):140-147.
14. Al Mortadi N, Al-Houry SS, Alzoubi KH, Khabour OF. Effectiveness of peer evaluation in learning process: a case from dental technology students. *Open Dent J.* 2020;14(1)
15. AlRahabi MK, AlKady AM, Ghabbani HM. Agreement between faculty member assessments and student self-assessments in a preclinical endodontic programme. *Aust Endod J.* 2019;45(3):346-351.
16. Awooda EM, Elzaki WM, Al-Nazhan SA. Agreement between students' self/peer and faculty assessments of the radiographic technical quality of root canal treatment performed during preclinical and clinical endodontic courses. *Saudi Dent J.* 2025;15(1):53-58.
17. Brkić L, Mekterović I, Fertilj M, Mekterović D. Peer assessment methodology of open-ended assignments: Insights from a two-year case study within a university course using novel open source system. *Comput Educ.* 2024;213:105001.
18. Alfakhry G, Mustafa K, Ybrode K, Jazayerli B, Milly H, Abohajar S, Hassan H, Alhomsy K, Jamous I. Evaluation of a workplace assessment method designed to improve self-assessment in operative dentistry: a quasi-experiment. *BMC Med Educ.* 2023;23(1):491.
19. Baracco B, Escribano N, Da Silva D, Belliard V, Ceballos L, Fuentes V. Factors influencing the agreement between teachers and students in the assessment of preclinical endodontics using a rubric. *BMC Med Educ.* 2025;25(1):1-9.
20. Sojka J, Gupta AK, Deeter-Schmelz DR. Student and faculty perceptions of student evaluations of teaching: A study of similarities and differences. *Coll Teach.* 2002;50(2):44-49.
21. Wagner ML, Suh DC, Cruz S. Peer-and self-grading compared to faculty grading. *Am J Pharm Educ.* 2011;75(7):130.
22. Foley JI, Richardson GL, Drummie J. Agreement among dental students, peer assessors, and tutor in assessing students' competence in preclinical skills. *J Dent Educ.* 2015;79(11):1320-1324.
23. Bizhang M, Adib Shaban H, Vahlenkamp A, Zimmer S, Möltner A, Ehlers J. Reduction of discrepancies between students and instructors in the assessment of practical tasks through structured evaluation sheets and peer feedback. *Sci Rep.* 2024;14(1):1514.
24. Alzaid JM. The Effect of Peer Assessment on the Evaluation Process of Students. *Int Educ Stud.* 2017;10(6):159-173.
25. Tandiono R, Limijaya A. Understanding rater bias in self and peer assessment among university students: a cultural psychology perspective. *Asia Pac Educ Res.* 2025;34(4):1561-1571.
26. Lerchenfeldt S, Mi M, Eng M. The utilization of peer feedback during collaborative learning in undergraduate medical education: a systematic review. *BMC Med Educ.* 2019;19(1):321.
27. Stančić M. Peer assessment as a learning and self-assessment tool: a look inside the black box. *Assess Eval High Educ.* 2021;46(6):852-864.
28. Kumar T, Soozandehfar SMA, Hashemifardnia A, Mombeini R. Self vs. peer assessment activities in EFL-speaking classes: impacts on students' self-regulated learning, critical thinking, and problem-solving skills. *Lang Test Asia.* 2023;13(1):36.
29. Vu TT, Dall'Alba G. Students' experience of peer assessment in a professional course. *Assess Eval High Educ.* 2007;32(5):541-556.
30. Jonsson A, Svingby G. The use of scoring rubrics: Reliability, validity and educational consequences. *Educ Res Rev.* 2007;2(2):130-144.
31. Kornmehl DL, Patel E, Agrawal R, Harris JR, Ba AK, Ohyama H. The effect of gender on student self-assessment skills in operative preclinical dentistry. *J Dent Educ.* 2021;85(9):1511-1517.

The Integration Process of Dental Faculties into the National Core Curriculum for Undergraduate Dental Education

Diş Hekimliği Fakültelerinin Mezuniyet Öncesi Diş Hekimliği Ulusal Çekirdek Eğitim Programına Uyum Süreci

Irmak OCAK^a 

^aHacettepe University, Faculty of Dentistry, Department of Orthodontics, Ankara, Türkiye

^aHacettepe Üniversitesi, Diş Hekimliği Fakültesi, Ortodonti AD, Ankara, Türkiye

ABSTRACT

The National Core Curriculum for Undergraduate Dental Education (DUÇEP) is a national framework document designed to enhance the quality of education in dental faculties across Türkiye by establishing minimum educational standards. Achieving compliance with these standards within faculty programs requires the simultaneous evaluation of numerous parameters, making the process particularly challenging for institutions. The initial step in this process should be the formation of a multidisciplinary committee. Following this, structured revisions must be implemented for each section outlined within DUÇEP. These sections—namely national qualifications, signs and symptoms, core diseases/conditions, and professional practices—should be systematically reviewed in relation to the existing curriculum, and necessary modifications should be made accordingly. The main challenges encountered during this process include academic staff adaptation, ensuring equivalency with the previous curriculum, and convincing all stakeholders of both the importance and feasibility of the integration. The implementation of DUÇEP aims to establish a competency-based and objective assessment approach, and the entire process is inherently dynamic, requiring continuous updates and the active contribution of all parties involved.

Keywords: Dental education, DUÇEP, Education programme

ÖZ

Mezuniyet Öncesi Diş Hekimliği Ulusal Çekirdek Eğitim Programı (DUÇEP), Türkiye'deki diş hekimliği fakültelerindeki eğitimin kalitesini artırmayı hedefleyen ve asgari standartları belirleyen ulusal bir çerçeve belgesidir. Bu asgari standartların fakülte programına uyumu için çok sayıda parametrenin bir arada değerlendirilmesi gerekmektedir ve bu süreç fakülteler için zorlayıcı olabilmektedir. Bu süreçteki ilk aşama, multidisipliner bir komitenin oluşturulması olmalıdır. Ardından, DUÇEP içerisinde yer alan her bir bölümle ilgili düzenlemelere geçilmelidir. Ulusal yeterlilikler, belirtiler ve bulgular, çekirdek hastalıklar/durumlar ve mesleki uygulamalar şeklindeki bu bölümler için sırasıyla eğitim programı gözden geçirilmeli ve ihtiyaç duyulan düzeltmeler yapılmalıdır. Süreçte yaşanan başlıca zorluklar arasında öğretim üyelerinin adaptasyonu, eski müfredat ile denkliklerin sağlanması ve tüm paydaşların sürecin önemi ve uygulanabilirliği bakımından ikna edilmesi yer almaktadır. DUÇEP'in uygulanmasıyla birlikte yetkinlik temelli ve nesnel ölçme yaklaşımlarına geçilmesi hedeflenmektedir ve bu süreç, sürekli güncellenen ve tüm tarafların katkısını gerektiren dinamik bir yapıya sahiptir.

Anahtar Kelimeler: Diş hekimliği eğitimi, DUÇEP, Eğitim program

1. INTRODUCTION

The continuous updating of educational programs in the field of health sciences is of critical importance for the standardization of professional competencies and the improvement of the quality of public healthcare services. Dental education comprises a complex structure that integrates both theoretical and practical knowledge, and the necessity of aligning this structure with minimum educational standards is becoming increasingly significant. In line with this need, the National Core Education Program for Undergraduate Dentistry (DUÇEP) has been developed to establish a unified competency framework and ensure standardization across dental curricula.¹

DUÇEP does not focus on a single domain; rather, it comprehensively defines the minimum required competencies in the domains of knowledge, skills, and attitudes essential for dental education. Furthermore, it updates these competencies in accordance with contemporary requirements. At the faculty level, it facilitates the structuring of existing program outcomes and educational curricula in line with these standards. DUÇEP consists of four fundamental components: graduate (program) competencies, the list of signs and symptoms, the list of core diseases and conditions, and the list of professional procedures. Through these components, DUÇEP aims to establish an educational model that ensures national and international standards and enables comparability across institutions.

During the integration of DUÇEP into faculty programs, it is essential to prioritize different components based on the specific needs of each faculty, as the process is inherently multi-layered. Therefore, for the successful implementation of this integration, all parameters must be reviewed individually, and progress must be made systematically in

accordance with the specific requirements of each faculty. Only through such a structured and needs-oriented approach can the integration process be fully realized with the support of all stakeholders.

2. ESTABLISHMENT AND ORGANIZATION OF THE COMMITTEE DURING THE INTEGRATION PROCESS

The committee established during the integration of DUÇEP into the faculty program should not function as an isolated structure specific only to this process, but rather be organized to operate in coordination with existing institutional committees. To ensure effective implementation, the relationship between this committee and other faculty-level bodies—such as the Education and Training Coordination Board, the Assessment and Evaluation Commission, and the Program Evaluation and Accreditation Commission—should be clearly defined, and responsibilities must be explicitly distributed. Otherwise, it may give the impression that the entire PDCA (Plan-Do-Check-Act) cycle is being carried out by a single committee, which would not be conducive to healthy process management.

In this context, the DUÇEP Integration Committee should serve as a coordinating body that collaborates with relevant faculty commissions during the stages of planning, implementation, monitoring, and continuous improvement. For instance, during the process of updating educational curricula, it should work in coordination with the Education Commission; in restructuring assessment methods based on learning outcomes, it should collaborate with the Assessment and Evaluation Commission. This approach would not only ensure a more holistic management of the process from an academic quality perspective but also contribute to a balanced operation within the

Gönderilme Tarihi/Received: 6 Nisan, 2025

Kabul Tarihi/Accepted: 12 Haziran, 2024

Yayınlanma Tarihi/Published: 19 Eylül, 2025

Atf Bilgisi/Cite this article as: Ocak I. The Integration Process of Dental Faculties to the National Core Curriculum For Undergraduate Dental Education. Selcuk Dent J 2025; Udeg 3. Uluslararası Diş Hekimliği Eğitimi Kongresi Özel Sayı: Doi: 10.15311/ selcukdentj.1531173

Sorumlu yazar/Corresponding Author: Irmak OCAK

E-mail: irmakpartal@hotmail.com

Doi: 10.15311/ selcukdentj.1670782

institutional framework. Furthermore, periodic input from student representatives and external stakeholders would be beneficial in enhancing the overall process.

At the outset of the process, the committee should have convened initial meetings to collectively review the DUÇEP document, assign specific responsibilities, and plan feedback mechanisms. Core operational mechanisms of this committee should include curriculum development workshops, the systematic collection of feedback from internal and external stakeholders, and a structured process of monitoring and updating through periodic meetings. Following each meeting, it is essential that the decisions taken are documented in written minutes and shared with the relevant academic units.

In its interactions with academic departments and stakeholders, the committee should emphasize that DUÇEP is a living document and that responsibility for its implementation extends beyond the committee to include all individuals involved in education. This perspective would encourage educators to view DUÇEP not merely as a formal requirement, but as a strategic tool for educational transformation.

3. DETERMINATION OF GRADUATE COMPETENCIES AND THEIR INTEGRATION WITH DUÇEP

The component of DUÇEP that should ideally be addressed first—yet is often reached at the final stage—is the definition of graduate competencies, as it specifies the knowledge, skills, and attitudes that graduating students must possess. DUÇEP outlines these competencies comprehensively under the categories of core and key competencies required of dental graduates. In the integration process, faculties may choose to compare their existing program-level competencies with those defined in DUÇEP and develop a mapping matrix as a methodological approach. If a faculty is in the process of developing its program competencies from the ground up, it would be beneficial to use DUÇEP as a reference and incorporate input from all academic departments.

During this preparatory phase, the principles of the Bologna Process, international qualifications frameworks, and requirements related to academic mobility should also be taken into consideration. Subsequently, it is important to align the entire curriculum and course content with the updated program competencies and to document any necessary revisions. This approach clarifies the framework within which changes are to be made and ensures the preservation of curricular coherence.

In addition, today's graduate competencies are expected to go beyond technical knowledge and clinical skills. They should also include competencies known as 21st-century skills—such as communication, critical thinking, teamwork, ethics, and leadership. These skills are critical for enabling dentists to communicate effectively with the public, manage complex clinical cases, and adapt to the evolving body of professional knowledge.²

4. INTEGRATION OF DUÇEP'S CLINICAL COMPONENTS INTO THE EDUCATIONAL PROGRAM

The clinical components outlined in DUÇEP consist of three main sections: signs and symptoms, core diseases and clinical conditions, and professional procedures. Each section defines the clinical competencies that students are expected to acquire before graduation, along with their corresponding learning levels. While each section has its own specific structure, a similar methodological approach can be followed for integrating all three into the educational program.

As an initial step, a file should be prepared to highlight the parts of the DUÇEP tables relevant to each academic department, also recalling any revisions previously identified regarding program competencies. This file serves to associate each clinical component with the relevant academic discipline, thereby creating a framework through which instructors can compare and align their course content with the clinical competencies defined in DUÇEP.

The signs and symptoms component is designed to enhance students' clinical decision-making abilities. For topics that span multiple departments, feedback should be collected from all relevant disciplines, with final decisions made by the integration committee. A similar approach should be adopted for the sections on core diseases and conditions and professional procedures. In the core diseases and conditions section, students are expected to be capable of

recognizing, managing, and/or treating these conditions. The topics in this table are organized systematically using codes such as diagnosis, treatment, rehabilitation, and dental approach, which guide the expected level of student engagement with each condition.

The third component, professional procedures, comprises the practical skills required for students to function as independent clinicians following graduation. These competencies are categorized into four learning levels. Each academic department must conduct a comprehensive review of its areas of responsibility to determine under which course each clinical condition falls and at what learning level it should be addressed. Furthermore, the target learning level for each professional procedure should be clearly defined, along with the practical training content and assessment methods designed to meet that level.

During this evaluation process, the integration committee may request departments to assess each clinical component either as a whole or by examining each parameter individually. The integration of DUÇEP's clinical components into the educational program should not be limited to adjusting theoretical course content. It must also include the simultaneous planning of practical training activities, the adoption of new assessment methods aligned with the revised curriculum, and ensuring that all teaching staff are adapted to this updated educational framework.

5. RESTRUCTURING THE ASSESSMENT AND EVALUATION PROCESS WITHIN THE FRAMEWORK OF DUÇEP

Even if an educational program is ideally designed, it cannot be deemed truly effective without the establishment of a robust assessment and evaluation system. Therefore, the final and perhaps most critical stage is the creation of an objective and comprehensive assessment structure. In this context, it is necessary to move away from traditional evaluation methods and adopt competency-based, multidimensional assessment approaches.

Diversifying assessment and evaluation methods enables the measurement of not only knowledge but also skills, and helps prepare students for post-graduation professional life. To this end, methods such as Objective Structured Clinical Examinations (OSCEs), scenario-based theoretical exams, rubric-based practical assessments, and case-based written/oral examinations may be employed. These methods not only assess students' knowledge but also evaluate their ability to apply knowledge holistically, including decision-making, communication, and professional behavior. In doing so, they provide a feedback mechanism through which students can develop work habits applicable to their future clinical practice.³ However, the extent to which each domain is reflected in the assessment process should be determined by the respective course instructors.

The learning levels defined for each clinical component in the DUÇEP tables should not be interpreted solely as instructional levels; they should also guide the corresponding level of assessment. This approach helps concretize what is expected of students.

When reviewing assessment methods, it is also advisable for faculty leadership to evaluate the institutional infrastructure supporting these processes. Both the scope and quality of assessment tools—as well as their validity and reliability—should be regularly monitored. Stakeholders must receive periodic and structured feedback regarding these outcomes. Providing tailored feedback to both instructors and students based on their respective roles contributes significantly to achieving the desired competencies. To facilitate smoother integration, it may be helpful to initiate the process through pilot courses or a pilot phase. This allows for the full implementation of the system and ensures its effective operation.

6. CHALLENGES ENCOUNTERED DURING THE DUÇEP INTEGRATION PROCESS AND PROPOSED SOLUTIONS

Transforming a faculty program into a structure compatible with DUÇEP is not merely a technical process; it also entails institutional change, cultural shifts in education, and the management of multi-stakeholder engagement. Perhaps the most prominent challenge is the difficulty that faculty members may face in adapting to the process. Changes in long-established educational practices, restructuring of learning outcomes, and transformation of assessment systems naturally give rise to resistance. To address this issue, it is essential to involve educators regularly in the process, solicit their feedback, and foster their ownership of the initiative. It must be

remembered that achieving competency in students' professional and adaptive skills relies heavily on the personalization of education, the provision of increased hands-on opportunities, and the establishment of effective communication among stakeholders—all of which fall within the core responsibilities of faculty leadership and academic staff.⁴

Another likely challenge lies in coordination and equivalency issues that may arise during curriculum integration. Since many common topics fall under the purview of multiple departments, ensuring curriculum coherence can be time-consuming. In this regard, departmental representatives participating in the multidisciplinary integration committee play a crucial role. Coherence can be achieved through regular meetings and by working collaboratively on shared curriculum maps.

Yet another challenge involves the inability of stakeholders—particularly students—to align their expectations with the process, or insufficient collection of stakeholder feedback. For this reason, it is recommended that faculties take a leading role in the design and implementation of the educational program.⁵ Increased participation of student representatives will enhance awareness of DUÇEP among students, foster a more holistic understanding of dental education, and ultimately improve the overall efficiency of the curriculum. From the perspective of external stakeholders, the transparency and measurability of graduates' competencies will serve as a strong indicator of qualified human capital in recruitment processes. Moreover, basing the curriculum on a standardized core structure will provide a solid foundation for institutional prestige and for fostering national and international collaborations. Consistently communicating the importance of this process to all stakeholders can help mitigate potential resistance.

In their evaluation of the DUÇEP integration process, Karaca et al.⁶ recommend utilizing educational software to support implementation. Such digital tools can offer rapid solutions by clearly visualizing the current curriculum structure and identifying areas in need of revision. Additionally, they enhance traceability and contribute to time efficiency in the restructuring process.

7. CONCLUSION

In conclusion, it should be recognized that the integration of DUÇEP into faculty educational programs not only ensures standardization but also contributes to an overall improvement in quality. In practice, the implementation of phased transition models and the establishment of regular feedback mechanisms are of critical importance. The integration process becomes more effective when an environment of open communication and collaborative engagement is established among faculty members, students, and external stakeholders. Moreover, it must be emphasized that the incorporation of DUÇEP into the educational system is not a one-time initiative; instead, it is an active process that requires continuous updating, evaluation, and improvement. Throughout this ongoing effort, collaborative work and effective communication play a key role.

Değerlendirme / Peer-Review

İki Dış Hakem / Çift Taraflı Körleme

Etik Beyan / Ethical statement

Bu çalışma 20-22 Şubat 2025 tarihlerinde Bolu Abant İzzet Baysal Üniversitesi'nde düzenlenen UDEG 3. Uluslararası Diş Hekimliği Eğitimi Kongresi'nde "sözlü bildiri" olarak sunulmuştur.

Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.

This study was presented as an "oral presentation" at the UDEG 3rd International Dentistry Education Congress held at Bolu Abant İzzet Baysal University on 20-22 February 2025.

It is declared that during the preparation process of this study, scientific and ethical principles were followed and all the studies benefited are stated in the bibliography.

Benzerlik Taraması / Similarity scan

Yapıldı - ithenticate

Etik Bildirim / Ethical statement

dishekimligidergisi@selcuk.edu.tr

Çıkar Çatışması / Conflict of interest

Çıkar çatışması beyan edilmemiştir.

Telif Hakkı & Lisans / Copyright & License

Yazarlar dergide yayınlanan çalışmalarının telif hakkına sahiptirler ve çalışmalarını CC BY-NC 4.0 lisansı altında yayımlanmaktadır.

Finansman / Grant Support

Yazarlar bu çalışma için finansal destek almadığını beyan etmiştir. | The authors declared that this study has received no financial support.

Yazar Katkıları / Author Contributions

Çalışmanın Tasarlanması / Design of Study: IO (%100)
Veri Toplanması / Data Acquisition: IO (%100)
Veri Analizi / Data Analysis: IO (%100)
Makalenin yazımı / Writing up: IO (%100)
Makale Gönderimi ve Revizyonu / Submission and Revision: IO (%100)

REFERENCES

1. Mezuniyet Öncesi Diş Hekimliği Ulusal Çekirdek Eğitim Programı (DUÇEP). 2024. Web sitesi: https://www.yok.gov.tr/Documents/Kurumsal/egitim_ogretim_dairesi/Ulusal-cekirdek-egitimi-programlari/dis-hekimligi.pdf. Erişim tarihi: 06.04.2025.
2. Akaltan KF. Diş Hekimliği Eğitiminde Beceri Kavramı: 21. Yüzyıl Becerileri. Selcuk Dent J. 2019;6(5):21-36. <https://doi.org/10.15311/selcukdentj.568429>
3. Sennhenn-Kirchner S, Goerlich Y, Kirchner B, et al. The effect of repeated testing vs repeated practice on skills learning in undergraduate dental education. Eur J Dent Educ. 2018;22:42-47.
4. Akaltan KF. Diş Hekimliğinde Preklinik ve Klinik Eğitim Çeşitliliği. Selcuk Dent J. 2019;6(5):37-51. <https://doi.org/10.15311/selcukdentj.563351>
5. Yüzbaşıoğlu E. Diş Hekimliği Eğitiminde Sorunlar ve Çözüm Önerileri. 2014. Web sitesi: <https://sdplatform.com/dis-hekimligi-egitiminde-sorunlar-ve-cozum-onerileri/>. Erişim tarihi: 06.04.2025
6. Karaca B, Atalayın Özkaya Ç, Gürkan A. Dindaroğlu F, Ersin N. Mezuniyet Öncesi Diş Hekimliği Eğitim Programının Ulusal Çekirdek Eğitim Programına Göre Uyumlandırılması: Ege Üniversitesi Diş Hekimliği Fakültesi Deneyimi. EÜ Dişhek Fak Derg. 2022;43(3),211-218.