

# The changing landscape of dental education – Glasgow Dental School

Aileen Bell,<sup>\*1</sup> Alison Cairns<sup>2</sup> and Vivian Binnie<sup>3</sup>

## Key points

There have been marked changes in applicant and student demographics and numbers over the years, resulting in the enrichment of the student body and dental community.

The evolution of educational methods and the development of digital and technology-enhanced learning and teaching has had a significant and positive impact on the delivery of the dental programme.

Student support, health and wellbeing, as well as acquisition of generic and translational skills, are a key feature of the modern dental curriculum.

## Abstract

Glasgow Dental School was set up in 1879, and since that time, dental education has been changing and evolving into the current landscape we recognise today. Changes in demographics and numbers of dental students have led to a more diverse community of students from wide and varied backgrounds. The years have also seen the development of educational theory and practice, and in more recent times, the introduction and expansion of digital and technology-enhanced learning and teaching have revolutionised the delivery of the dental curriculum. One of the most notable changes in the dental programme is the incorporation of student support, health and wellbeing. The modern dental course takes a more holistic approach to education, with the provision of training in generic and life skills, as well as the clinical skills required in an ever-expanding field. The demands and pressures of studying dentistry in the setting of modern, fast-paced life cannot be underestimated and the course must be ever-changing to reflect this. However, the one thing that has not changed is the enduring Glasgow Dental School community.

## Introduction

Glasgow Dental School was set up in 1879 as part of the Faculty of Medicine at Anderston's College and the first dental qualification, the Licentiate in Dental Surgery (LDS), was conferred by the Faculty of Physicians and Surgeons of Glasgow in 1880. It was a further 17 years before the first female student enrolled and the Dental School did not become part of the University of Glasgow until 1947, with the Degree of Bachelor of Dental Surgery (and Master of Dental Surgery) introduced.

Dental education has been a changing landscape since this time with perhaps the greatest acceleration in its evolution occurring in more recent years. The changing demographics and numbers of students studying dentistry has seen a marked increase in overall numbers on the dental programme, with a significant increase in the proportion of women. This is by no means limited to Glasgow but is a national trend in our dental schools.

One of the most notable changes has been the implementation of widening access schemes to make the study of dentistry more accessible and inclusive to a wider range of students from varied backgrounds.

In addition to changing demographics, there have been marked developments in education as a whole, with much greater clarity and structure on how courses are constructed, delivered, assessed and quality assured. There has been a significant effort to harmonise the delivery of a surgical and operative craft speciality with educational theories and concepts and today, we are not only overseen and quality assured by clinical regulatory authorities, but also by

educational bodies. We have welcomed this development in Glasgow and feel that our programme is the better for it.

The development and availability of technology has had a major effect on how dental education is delivered in more recent years and staff at Glasgow Dental School have been early adopters of technology enhanced learning and teaching. This has also fuelled a desire for, and facilitated engagement with, scholarship and research associated with dental education. We have seen the tide of opinion change in recent years, with far greater value placed on teaching and educational research than ever before.

## Major developments since the foundation of Glasgow Dental School

The major developments in course structure, delivery, assessment and quality assurance have already been alluded to in the introduction and, particularly in the last few decades, there has been a marked departure from the model of clinical experts imparting knowledge that

<sup>1</sup>Head of Glasgow Dental School, Professor of Oral Surgery and Dental Education, Honorary Consultant in Oral Surgery, University of Glasgow, Glasgow, UK; <sup>2</sup>Director of Dental Education and Clinical Senior Lecturer/Honorary Consultant in Paediatric Dentistry, Glasgow Dental School, University of Glasgow, Glasgow, UK; <sup>3</sup>Deputy Director of Dental Education and Clinical Senior Lecturer in Dental Public Health, Glasgow Dental School, University of Glasgow, Glasgow, UK.

\*Correspondence to: Aileen Bell  
Email address: aileen.bell@glasgow.ac.uk

Accepted 7 July 2022  
<https://doi.org/10.1038/s41415-022-4902-6>

they feel is important to the position we are in today, with constructive alignment of course content, teaching and assessment to learning outcomes that have been agreed as necessary for dental students, new graduates and effective dental practitioners.<sup>1</sup>

A significant change over the years has been the inclusion of generic skills, such as communication; management and leadership; and professionalism in the modern dental curriculum, so not only is there a holistic approach to patient care, but this holistic approach extends to the education and development of our students. Dental education is much more patient- and student-focused than ever before.

The years have seen a rapid and large-scale expansion of dental techniques and dental materials, as well as the marked changes in education. If this is considered alongside the scrutiny and pitfalls of social media, much is required of the modern-day dental student and appropriate support is required.

The provision of student support and pursuit of student wellbeing is undoubtedly one of the most fundamental shifts in focus in the delivery of the undergraduate curriculum here in Glasgow Dental School over the last 143 years. The effects of modern, fast-paced living on students trying to deal with study- and work-related stress, financial and housing worries, pressure to succeed and constant comparison with others in the digital age, cannot be underestimated. This has been further accentuated by the COVID-19 pandemic, which has affected all areas of education but has had very particular and devastating effects on dentistry and dental education. We are witnessing a time like no other in the lives of our dental students where there has been much uncertainty in relation to the delivery of the practical aspects of a dental course, followed by the difficulties involved with remobilisation of dentistry as a whole. Some dental students have experienced heightened anxiety and fear for their own health, as well as loss of family members as a consequence of COVID-19.

Student wellbeing is key to the student experience and to our goal of producing well-rounded dentists who are safe beginners, life-long learners and consummate professionals. Glasgow has implemented a range of support mechanisms, including a network of academic staff who provide a student support advisory system, which acts as an easy access point of contact to pastoral support and assists

with signposting to appropriate services. In addition to this, there is a well-structured mentorship programme where students are assigned to a staff mentor in small groups. The group remains with the mentor throughout their time at Dental School and a mentorship programme of activities is designed to help them with the transition to university and to develop them as reflective and self-directed life-long learners, throughout the course and beyond. Elements of peer mentoring are integrated into the mentorship programme, with more senior students working alongside a staff mentor to help with Year 1 activities. Induction also features heavily at the start of each academic year and is a significant element of the first year. As well as providing practical and logistic details for new students, care is taken to nurture and transition them towards independent learning and appreciation of the requirements of a professionally regulated university programme of study.

The age-old tradition of dental student social and sporting events continues, but in recent years, they have developed a more structured and significant role in fostering a sense of dental school community and belonging, as well as raising large amounts of money for charities. Examples include: the annual dental school pantomime; a series of first and final year student buddying events; 'Strictly Come Dentist' shows; and inter-year/inter-school field days.

During the pandemic, the dental school delivered its first 'health and wellbeing week'. Over 20 different presenters shared a wide range of expertise and experience covering topics related to mental and physical health. This included the importance of sleep, posture in the dental profession, diet, impact of suicide and personal journeys in adversity and mindfulness. Several inspirational speakers with lived experiences provided the high points of the event.

In recent times, a student-led peer wellbeing supporter programme has been introduced. This encompasses three interrelated strands: support for students, training and supervision. It runs in addition to the staff pastoral advisory system and aims to provide confidential early intervention with trained students engaging with peers who are experiencing emotional upset or distress. It is an additional gateway for access to further support services as required.

Another major development since the early days of dental courses is the emphasis placed on evaluation of the effectiveness

of all aspects of the programme and this includes our student support mechanisms. Support processes are reviewed with formal staff-student partnerships set up to carry this out. Evaluation also takes place through our usual processes of student representatives, staff student liaison committees, student feedback questionnaires and individual informal feedback.

Current work that is not specific to Glasgow but is taking place throughout UK dental schools is that of embedding equality, diversity and inclusion into our programmes and decolonisation of the curriculum. Staff at Glasgow are working in partnership with students to progress this work.

## Changes in methods of dental education

Both the clinical discipline of dentistry and universal learning, teaching and assessment methods are constantly evolving and this evolution has increased in pace during the pandemic. The 'chalk and talk' of 140 years ago has been radically superseded. Glasgow Dental School has used a student-centred approach to adapt and introduce different forms of teaching and assessment, revolutionising our approach to active learning and technology enhanced learning and teaching.

Although the challenges of the pandemic have been unprecedented, with challenge comes opportunity. Some of our teaching teams were early adopters of technology-enhanced learning and blended learning approaches, such as the flipped classroom<sup>2,3,4,5</sup> and were ready for some of the difficulties experienced during the pandemic. One innovative approach was the introduction of the virtual objective structured clinical examination as a new form of assessment in the final- and third-year examinations when face-to-face assessment was not possible. This form of assessment remains at our disposal for future-proofing in the event of further difficulties. The introduction of the assessment was so successful it resulted in dissemination via two international publications<sup>6,7</sup> and a College of Medical, Veterinary and Life Sciences Teaching Excellence Award (Team Award).

The pandemic necessitated an acceleration in the adoption and development of blended learning approaches within the wider academic community of the school. The school has a Lead for Digital and Online

Learning and this role has proved invaluable for providing the support required by staff and students embarking on the blended learning journey. This lead member of staff has not only supported and guided staff and students but has inspired many to excel in the use of blended and technology enhanced hybrid approaches.<sup>8</sup>

Simulation has seen significant development over the years and we are now using haptics and 3D modelling to develop clinical skills, in addition to the more traditional phantom head simulated teaching.

At Glasgow Dental School, we recognise the value of active learning and provide podcasts, videos, massive open online courses and quizzes for student use in self-directed learning. Delivering teaching on practical skills was particularly problematic for periods during the pandemic but we were able to innovate with activities such as online suturing tutorials. Pre-session digital learning materials were made available to students, as well as physical suturing packs to use in the safety of their own home. Live online tutorials were then conducted with students following practical instruction and this allowed them to gain suturing experience at home.

Virtual microscopy (a computer-based, interactive, digital slide viewer) provides another active learning approach to the teaching of histology. The advantage over traditional microscopy lab sessions is that the focus of each session is on the interpretation of histological images and identification of functional structures, as opposed to learning how to use a microscope. When using the virtual microscope, students are guided to view, navigate, annotate slides and answer quiz questions. An important and additional benefit of the virtual microscopy system is that it better enables collaborative group learning through interaction with peers. In addition, students can access digital textbooks and lecture notes through their devices to help with their interpretation and understanding of the material.

As dentistry continues to evolve, we increasingly turn to the digital environment in areas such as radiology, patient record keeping, digital surgical planning, digitally guided surgery and computer-aided design/computer-aided manufacturing of restorations. We continue to develop our curriculum to reflect this shift, not only in the content that we teach, but also in how we deliver the teaching.

## Perception of academia and research in the development of dental education

In years gone by, there was a perception that academia and research necessitated involvement in scientific projects and clinical trials. In recent years, this view has been expanded to encompass teaching based on the evidence provided by such research. With time, there has been a much greater acceptance and acknowledgement of the importance of scholarship, evidence-based dentistry and educational research. Glasgow Dental School has its own Community of Dental Educational Research and Scholarship, encouraging staff to join national groups, attend conferences and publish widely in this important area.<sup>2,3,4,5,6,7,8,9,10,11</sup>

## Changes in the nature and demographics of applicants in recent times

Admission to dental school remains an extremely competitive process, with large numbers applying for a limited number of places. The profile of our applicants has changed through the generations, with the current Generation Z applicants having high digital expectations and a perceived increased requirement for pastoral support. Glasgow Dental School has greater multicultural diversity than at any previous time, reflecting the wider changes in general society and increasing internationalisation within the university.

There has been a realisation that the dental profession needs to represent growing cultural diversification and that a lack of academic or social privilege should not be a barrier to entry to the programme. Through the programme of widening participation we strive to realise this goal, with an admissions process that is as equitable as possible, offering all groups an equal chance of becoming a dental student at the University of Glasgow.

We recognise that not everyone progresses to university directly from school and there are a range of other options for those returning to education after some time out, or for those who have left school without the required grades for entry to the programme. We accept several 'access' courses for adult returners for entry to the Bachelor of Dental Surgery, providing returners with valuable routes of entry. The 'access' courses contain a 'preparation for higher education' element, helping students prepare for the transition to university and students also normally benefit from the opportunity to

attend bespoke sessions run by staff. We are engaged with potential applicants with refugee status, seeking asylum, those with caring responsibilities, care experienced or estranged from family via a process of contextualised admissions for applicants living in Scotland and associated programmes and summer schools, such as the Reach Programme and Sutton Trust.

## Conclusions

One thing that has perhaps not seen change over the years is the fact that our current students and previous graduates are our greatest advocates, both at home and abroad, and they are testament to the enduring Glasgow Dental School community.

### Ethics declaration

The authors declare no conflicts of interest.

### Author contributions

The article was written by Aileen Bell, Alison Cairns and Vivian Binnie. The writing was led by Aileen Bell with written contributions and revisions by all three authors. Information and examples were provided by all three authors.

## References

- Biggs J. Enhancing Teaching through Constructive Alignment. *Higher Educ* 1996; **32**: 347–364.
- Bissell V, McKerlie R A, Kinane D F, McHugh S. Teaching periodontal pocket charting to dental students: a comparison of computer assisted learning and traditional tutorials. *Br Dent J* 2003; **195**: 333–336.
- McKerlie R A, Cameron D A, Matthew R G S. Evaluation of computer-assisted learning courseware to reinforce the teaching of removable partial denture design theory. *Pract Evid Scholarsh Teach Learn Higher Educ* 2006; **1**: 22–36.
- Crothers A J, Bagg J, McKerlie R. The Flipped Classroom for pre-clinical dental skills teaching – a reflective commentary. *Br Dent J* 2017; **222**: 709–713.
- McKerlie R A, Rennie E, Hudda S *et al*. Facilitation of student-staff partnership in development of digital learning tools through a special study module. *Int J Students Partners* 2018; **2**: 121–129.
- Donn J, Scott J A, Binnie V, Bell A. A pilot of a Virtual Objective Structured Clinical Examination in dental education. A response to COVID-19. *Eur J Dent Educ* 2021; **25**: 488–494.
- Donn J, Scott J A, Binnie V, Mather C, Beacher N, Bell A. Virtual objective structured clinical examination during the COVID-19 pandemic: An essential addition to dental assessment. *Eur J Dent Educ* 2022; DOI: 10.1111/eje.12775.
- McKerlie R A, Malcolm J, Varsou O *et al*. A rapid transition to blended learning: the journey of a dental degree programme pivoting online. *J Perspect Applied Acad Pract* 2021; **9**: 169–180.
- Freeman Z, Cairns A, Binnie V, McAndrew R, Ellis J. Understanding dental students' use of feedback. *Eur J Dent Educ* 2020; **24**: 465–475.
- Cairns A M, Bissell V, Bovill C. Evaluation of a pilot peer observation of teaching scheme for chair-side tutors at Glasgow University Dental School. *Br Dent J* 2013; **214**: 573–576.
- Orsini C A, Binnie V I, Jerez O M. Motivation as a Predictor of Dental Students Affective and Behavioural Outcomes: Does the Quality of Motivation Matter? *J Dent Educ* 2019; **83**: 521–529.