

# Evaluation of the first year of Dental Health Partnerships: a web-based distance learning partnership between UK dental educators and students from low-resource countries

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## Key points

Discusses Dental Health Partnerships and the first year of its collaboration with Amoud Dental University.

Discusses the outcome of the pilot study and the positive response to this collaboration.

Discusses the use of e-learning to enable online teaching across borders.

**Aim** To introduce and discuss the results of a newly-founded online, distance learning organisation, Dental Health Partnerships. The motivation behind the project is to bridge the gap between dental educators in the UK and dental students in low-resource communities. The results of the first partnership with Amoud Dental University, Somaliland, are presented. **Method** Sixteen tutorials were conducted between February 2016 and June 2016 for the final year dental students via an online virtual classroom (WizIQ). Sixteen students participated in the weekly tutorials, each of which lasted for approximately 90 minutes. The students were sent online questionnaires at two stages during the study to qualitatively evaluate their experience. **Results** Nine of the sixteen students responded to both questionnaires. One-hundred percent of the participants were 'very satisfied' or 'satisfied' with the programme at the end of the year. The attendance and participation rates for the weekly sessions were positive. The students had theoretical knowledge of the topics, however, the application of theoretical concepts to clinical scenarios was a challenge. **Conclusion** The results of the first year of the partnership indicates the relevance of case-based tutorials to dental practice in Somaliland, equipping students with the clinical-based knowledge to be effective in the field after graduation.

## Background

The global burden of oral conditions is substantial.<sup>1</sup> Oral conditions, primarily dental caries and periodontitis, affect the majority of the global population and cause significant morbidity. Health is a basic right which those in low-resource countries are deprived of due to:

- A lack of access to preventative measures (for example, advice or education)
- The reparative care of a health worker.

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The inequality in the global healthcare system extends to dentistry. It is thus the responsibility of dentists in developed countries to partake in the effective training of health workers in low resource settings through the sharing of knowledge and skills that will leave a lasting impact and empower the local dental workforce.<sup>2,3</sup> This latter point was reiterated by the World Health Organisation and Global Health Workforce Alliance in their most recent report, which focussed on the need for quality and productivity of the health workforce.<sup>4,5</sup> Better education is a key factor in achieving positive health outcomes. The collaboration and development of sustainable healthcare partnerships between health workers across borders remains a key element in attaining tangible health benefits.

Furthermore, the advancement of technology and connectivity has enabled the provision of real time, online teaching across borders; facilitating an effective approach for global knowledge transfer. Thus far, dental educators have largely failed to capitalise on this invaluable resource.

Dental Health Partnerships or DHP ([www.dentalhealthpartnerships.org](http://www.dentalhealthpartnerships.org)) is a non-profit organisation which was established in February 2016 with the aim to bridge the gap between dental educators in the UK and dental students in low-resource communities. The project was inspired by Medicine Africa; an online platform that connects UK medical workers with Somaliland, Sierra Leone and Ghana<sup>6,7</sup> and Ox-Pal Medlink which connects students and doctors at Oxford University and medical

students at Al-Quds Medical School in the occupied territory of Palestine.<sup>8</sup>

DHP utilises an online platform, WizIQ (www.wiziq.com), to provide case-based tutorials to final year dental students in low resource countries. WizIQ facilitates a virtual classroom with audio and video outputs, a whiteboard and an instant messenger, all at a low bandwidth internet for a sustained connection throughout the tutorials. The tutorials are conducted once per week, with the weekly topic being chosen by the students based on their needs or by the tutor. Each tutorial consists of a clinical case including anonymised patient history, clinical photographs and radiographs, if available, followed by clinical questions which the students attempt and respond to via the online messenger. Through these interactions, the motivation is to refine the clinical skills, diagnostic skills and develop the participants' ability to formulate appropriate patient treatment and management plans. The first partnership that DHP has formed is with the Amoud Dental University in Somaliland.

Somaliland, in the horn of Africa, declared independence from Somalia in 1991, following a prolonged civil war; it is yet to be recognised as a sovereign state. It is democratically governed without international recognition and due to this, the Somaliland government does not receive any foreign aid. The

population of Somaliland is estimated to be 2 to 3.5 million.<sup>9</sup> The political context within Somaliland means the healthcare workers are unable to access resources to enhance their clinical skills. Amoud Dental University was established in the year 2009 in the Borama District, Awdal region, and is the only university to teach dentistry in Somaliland. The first cohort of students at the dental university graduated in 2013. Each year, no more than 25 students enrol onto the course which takes four years to complete.

Thus far, the author has conducted the tutorials. This has enabled a close relationship to be formed between the Amoud University students and the author, allowing the students to openly ask questions during the tutorials and email any questions they have regarding their clinical cases. The aim of this article is to discuss the results of this pilot study carried out in the first year of this partnership.

## Method

In the first year between February 2016 and June 2016, a pilot study was carried out with the final year dental students at Amoud Dental University. A needs assessment was carried out through informal discussions with the dean of the dental university, and an appointed student prior to starting the tutorials. A feedback

questionnaire was used after the first two tutorials to ascertain the relevance of the topics covered. The tutor also assessed the ability of the students to apply the theoretical knowledge to patient case scenarios during each tutorial and altered future tutorials accordingly. Although a formal questionnaire or a clinical field visit were not carried out, the informal discussions with the students and dean enabled an initial understanding of the needs of the students and provided a starting point for the clinical cases to be selected.

Sixteen tutorials were conducted during this period, with each tutorial lasting between 90 minutes and 120 minutes. Each case was derived from real patient cases in dental practice; the cases were anonymised to maintain patient confidentiality and meet ethical requirements. Where necessary, mock clinical photographs and radiographs were obtained from the internet to supplement the cases. All the tutorials were conducted by the author. The tutorials were conducted, recorded and saved on the online WizIQ platform (www.wiziq.com). Sixteen students voluntarily participated in the tutorials each week. A wide range of clinical dental topics were discussed as shown in Table 1. The final four tutorials were OSCE-style case discussions in preparation for the year-end exams that were occurring in June 2016.

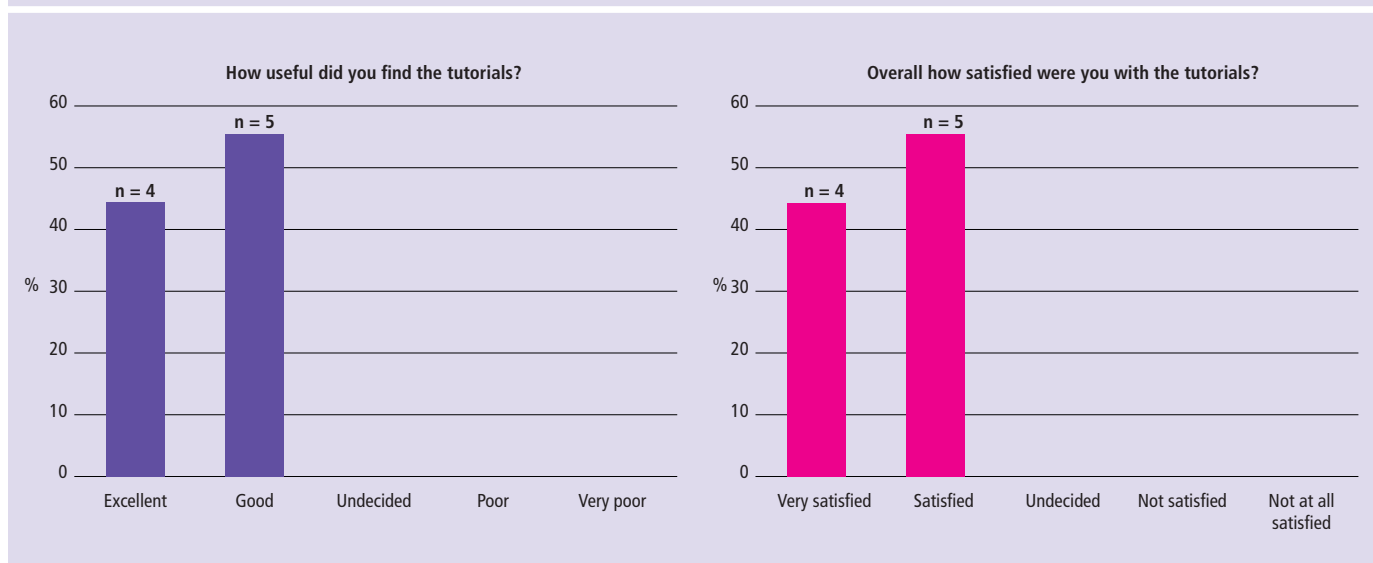
The author used their personal computer with an activated microphone to conduct the tutorials. The students attended the tutorials using their personal devices and sometimes logged onto the sessions in small groups and shared one device. Using the whiteboard on the WizIQ virtual classroom, the case history, relevant diagrams, photographs and radiographs were uploaded. Every tutorial followed a similar approach whereby the students were encouraged to deliver their responses to a series of questions that followed the clinical history. The students were asked to communicate by typing on the instant messenger while the tutor used verbal communication to ensure optimum sound quality and reduce background noise. The responses were visible to all participants. After each question, the tutor would engage in a discussion with the students, enabling the development of sound reasoning skills. The virtual classroom also enabled the tutor to carry out polls and questionnaires in real time to assess if the key messages were understood by the participants.

Student feedback was attained at two stages during the pilot study. The first questionnaire

**Table 1** First 16 pilot study tutorials

Tutorial number	Topic of discussion
1	Dry socket
2	Facial swelling
3	Facial swelling
4	Pericoronitis
5	Facial pain
6	Oral ulcers
7	White patches
8	Restorative dentistry – tooth replacement
9	Oral cysts
10	Caries and restorative materials
11	Trauma to immature teeth
12	Periodontitis and oral hygiene education
13	OSCE-style multiple cases
14	OSCE-style multiple cases
15	OSCE-style multiple cases
16	OSCE-style multiple cases

**Fig. 1 Participant assessment of the adequacy of the tutorials at the start of the pilot study**



was given after the first two tutorials of the pilot study and second questionnaire was given at the end of the sixteen tutorials. The surveys were produced using SurveyMonkey (www.surveymonkey.com). The aim of the survey at the beginning of the study was to assess the interest in participation, the pace and quality of teaching and the relevance of the tutorials to patient treatments in Somaliland. The year-end survey was to gauge feedback on the adequacy of the tutorials, ideal class size for future tutorials, in addition to the relevance of the tutorials to patient treatment in Somaliland and the overall teaching quality.

## Results

### Findings from the first questionnaire

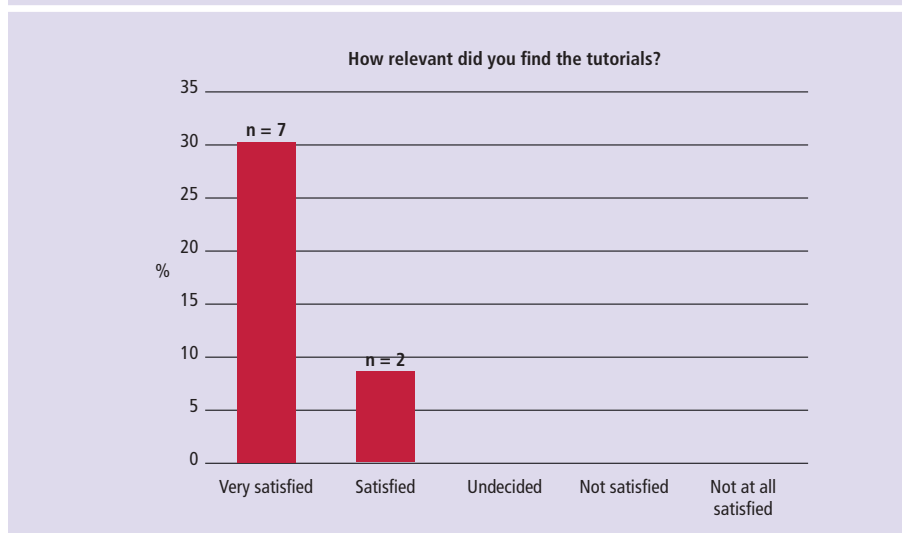
Nine of the sixteen students responded to the questionnaire. The overall response was positive. On a five-point scale, 100% of the participants found the tutorials 'excellent' or 'good' and were 'very satisfied' or 'satisfied' with the programme (Fig. 1). Of the students, 78% believed the tutorials to be 'very relevant' to dental practice in Somaliland (Fig. 2).

Qualitative findings demonstrated that the students enjoyed partaking in the online tutorials. The students noted that the sound quality improved after voice control was taken away from them.

### Findings from the questionnaire after the completion of the pilot study

Nine of the sixteen students who participated in the tutorials responded to the year-end survey. One-hundred percent of the students

**Fig. 2 Participant assessment of the relevance of the tutorials to dental practice/training in Somaliland at the start of the pilot study**



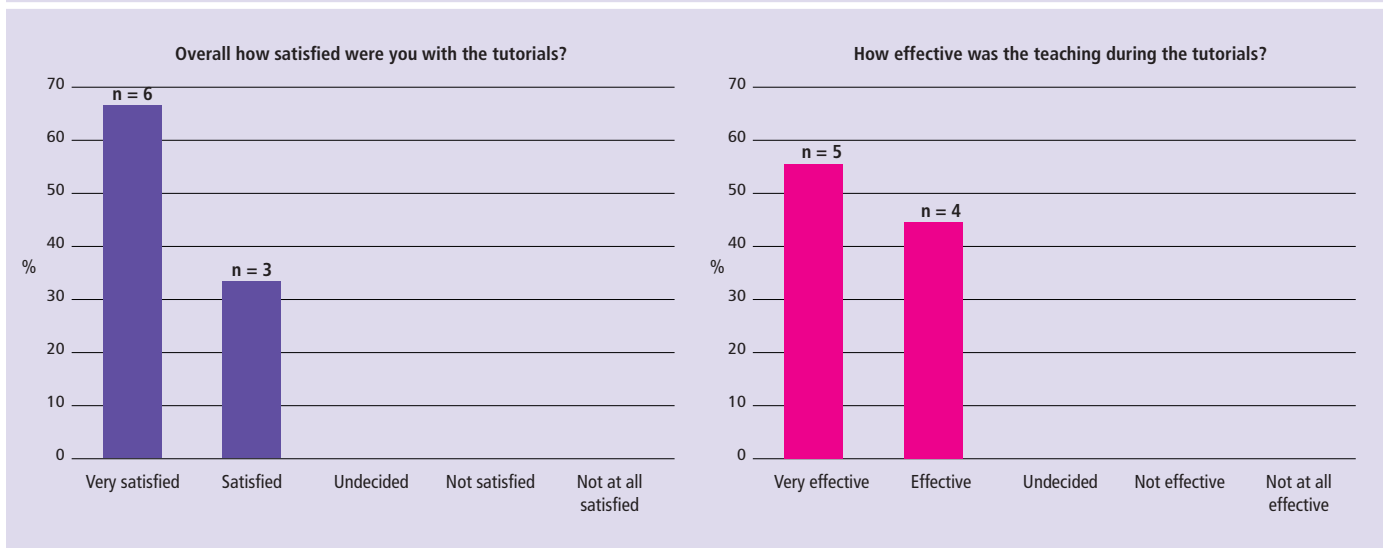
were 'very satisfied' or 'satisfied' with the programme (Fig. 3, left) and felt the teaching was 'very effective' or 'effective' during the tutorials (Fig. 3, right). One-hundred percent of the students believed the tutorials were either 'very relevant' or 'relevant' to dental practice and training in Somaliland (Fig. 4). The students' responses to the ideal number of students per session varied between 5 and 25 students as shown in Figure 5. Qualitative feedback, in terms of content and delivery of the tutorials, reflected overall satisfaction with the programme. It was suggested that the use of videos in the tutorials would be effective. The main criticism was the drop in the local internet connection intermittently and the difficulty associated with using the WizIQ

platform on mobile devices. The students also suggested having online access to the recorded tutorials should they miss a session.

In their feedback, one of the students wrote: 'it is very important for everyone who is in dental bachelor degree to share case discussions in such experienced ones especially in Somaliland. We got more knowledge and experience we didn't have before. Please and please continue this tutorial to benefit more students [sic]'.

Qualitative assessment by the author suggested that the students at Amoud Dental University had a sound theoretical knowledge of the content and were very keen to attend the tutorials. The students showed commitment and attended regularly. The keenness of the

**Fig. 3 Participant assessment of the adequacy of the tutorials and effectiveness of teaching at the end of the pilot study**



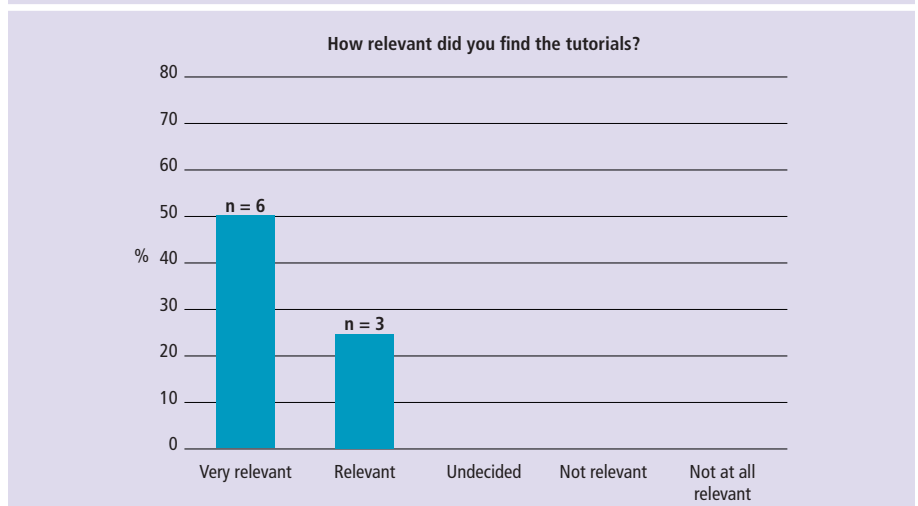
students was demonstrated by the timings of the tutorials; the students would attend after lectures and clinical sessions at the university, sometimes at 7 pm East Africa time. Although the students had theoretical knowledge of the topics, they lacked in clinical reasoning skills and the practical aspects of dentistry. Applying the theoretical concepts to clinical scenarios was the greatest challenge. The students showed improvement over the course of the tutorials and applied the skills learnt through patient case discussions. All sixteen students passed their year-end exams and graduated from Amoud Dental University.

Since the pilot study, the collaboration between Amoud Dental University and DHP has continued. Currently, the third cohort of students are attending weekly case-based tutorials, and a similar paradigm is being implemented. The students have been given access to the recordings of the tutorials if they missed a session and video content is being used, where possible, for the tutorials as well. Thus far, forty-six tutorials have been conducted since the inception of DHP.

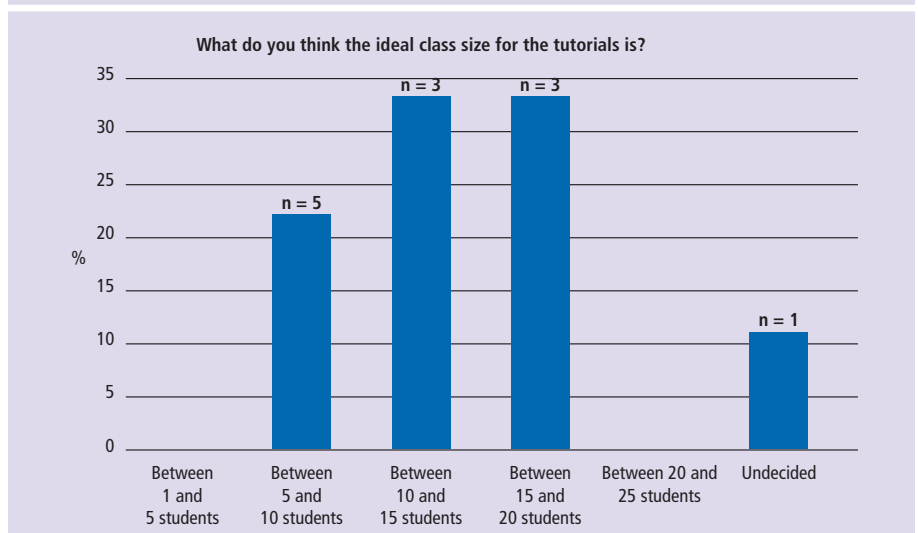
### Discussion and future work

This article has presented the results of the first year of the establishment of a collaboration between Amoud Dental University and Dental Health Partnerships. It aims to emphasise the potential of online, real time knowledge-sharing by UK dentists to empower dental students and future dentists in low resource communities. The tutorials carried out by the author have been perceived as beneficial to the students and have the potential of improving

**Fig. 4 Participant assessment of the relevance of the tutorials to dental practice/training in Somaliland**



**Fig. 5 Participant assessment of the ideal class size for the tutorials at the end of the pilot study**



the dental students' clinical reasoning and patient management skills.

Although, the study was based on a small number of pupils and a single tutor, the potential of such a collaboration cannot be underestimated. The number of students participating in the tutorials and the feedback responses needs to be increased. Furthermore, the author aims to increase the number of tutors to provide a wider range of online, real-time courses with specific learning outcomes, whilst maintaining the case-based approach. Quantifying improvements in clinical reasoning and patient management is a challenging task. Thus far, the study has relied on qualitative feedback from the tutor and the participants. As DHP expands and further collaborations are formed, it is vital to utilise quantitative methods to assess clinical reasoning skills. The Script Concordance Test (SCT)<sup>10–12</sup> is a relatively new but promising format which is used in various medical specialties to measure the clinical reasoning ability of the examinees by comparing the responses made by examinees with expert clinicians when faced with a range of clinical scenarios. This model can be applied in dentistry and it could be utilised to measure the impact of such partnerships.

DHP is now focussed on forging new partnerships with other dental universities within Africa. The author is currently collaborating with the Dental Institute of the University of Addis Ababa, Ethiopia, and both parties have mutually agreed to incorporate real-time online tutorials into the five-year dental curriculum at the university. The Dental Institute is currently in the process of establishing a viable internet connection to enable the tutorials to be conducted in one classroom. DHP is structuring course modules, based on the needs of the dental students in Addis Ababa, with specific outcomes within the specialties of restorative dentistry, prosthodontics, orthodontics and oral surgery, including dental trauma. The

specialties have been carefully assessed and chosen by the staff members at the University of Addis Ababa after evaluating the needs of the university and its students.

In addition, the University of Nigeria has shown interest in collaborating and introducing weekly online tutorials for the dental students at the university. A test tutorial has been carried out and the internet connection is viable to enable the WizIQ platform to be run without disconnection.

Moving forward, DHP plans to introduce an online forum, such as Slack (<https://slack.com>), that enables real-time messaging between users. This will encourage students and tutors to engage in discussions outside the scheduled tutorial hours. It will enable social networking between dental students and tutors to be expanded and facilitate conversations between students from different institutions to take place in the presence of a wider network of students and faculty members. The forum will enable the newly qualified dentists to have an international support system to share their experiences with other dentists and dental students.

DHP falls within the context of global health partnerships. One of the key challenges that such teaching partnerships face is to make them sustainable. Long term, DHP aims to conduct yearly field visits that include bed-side teaching and training days for the university lecturers, thereby making the partnership self-reinforcing.

## Conclusion

With the advancement of information technology, the use of e-learning, particularly live teaching between dental educators in high resource settings and healthcare workers in developing communities, is a real possibility and may have a lasting impact within these communities. In addition to traditional

teaching methodologies, the building of partnerships and collaborations between healthcare workers across borders is a low-cost, efficient way of two-way learning and sharing of knowledge and expertise.

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