

Surface Hub Teaching Session 15th June 2017

Introduction

This is an account of a teaching session delivered between two sites using a Microsoft Surface Hub on June 15th, 2017. The near end (where the tutor was located) was at the Anatomy Department at the University of Bristol, and the far end was at the Clinical Academy of the Royal United Hospital, Bath. Observation of the session was carried out from the far end. This was a three-hour teaching session that combined both remote and face to face teaching. Given that the focus of this project is the Surface Hub then this report will focus on the parts that used the Surface Hub, but will include a brief description of the other components.

Setup and participants

The near end appeared to be a classroom equipped with a Surface Hub and other teaching aids including a flipchart and 3D anatomical models. The far end was a large classroom with the Surface Hub and several rows of four chairs arranged in front of it. The closest chairs were around 2 metres from the Surface Hub, leaving a space in front enough for about 10 people to stand comfortably.

There were no students at the near end. The students at the far end were sixteen 3rd year medical students. These were divided into two groups of 8 students ('blue' group and 'red' group) who swapped over activities at certain points in the session but came together as a whole group at other points.

Structure

The subject matter of the session was stroke. The aim was to link together background knowledge of relevant anatomy with teaching of clinical skills, specifically neurological examinations, and experience of an actual stroke patient.

The session was structured in 3 main stages:

- 1) The first parallel session, in which one of the groups took a small group tutorial reviewing basic neurological anatomy delivered via the Surface Hub by tutors based in Bristol, while in a separate room the other group did hands on practice of carrying out a clinical examination of the peripheral nerves. Each session lasted half an hour, after which the groups swapped over.
- 2) This stage involved the whole group and was delivered almost completely face to face. A patient who had recently suffered a serious stroke was present at the session, and students were guided to ask her questions to elicit her history and symptoms. One of the tutors then carried out an examination of her cranial nerves to demonstrate the persisting effects of the

stroke. The tutors based in Bristol were also listening to this session and made a few ad hoc interjections.

- 3) The students divided again into 2 groups. One group did a session with the tutors in Bristol in which students were guided to work out what had been going on anatomically with the patient they had seen. Meanwhile the second group worked in a different room where they did hands-on practice of the cranial nerve examination.

Detail of the components delivered via the Surface Hub: Session 1

Set up and Structure

This half-hour session was mainly organized around a series of tasks that the students did together on PowerPoint slides presented on the Surface Hub from the far end. Initially the sound volume on the far end Surface Hub was low and the near end tutor was able to instruct the students how to adjust this.

The session was presented by 2 tutors who alternated the tasks that they presented. Visual material was mostly in the form of separate colour-coded version of their slides for the each of the two ('blue' and 'red') groups. The students stood in front of the Surface Hub and two of them had a Surface Hub pen.

At the beginning the tutor asked the students to introduce themselves, asked if they had used the Surface Hub before (which they had), and told them to use it like a giant iPad.

Tasks and interaction

Task 1:

The tasks mainly followed a form of the Initiation – Response – Feedback sequence. The interaction was initiated by the tutor setting the task – the first of which for example was that the tutor had drawn a sketch on a PowerPoint slide of the cerebral lobes which the students had to label and add comments about the function of each of the lobes. The students carried out the task collaboratively, with most of them contributing ideas and suggestions for those wielding the pens to add to the diagram. When necessary they seemed to have no problem asking the tutor for and receiving clarification about the task. As the students were completing the task the tutor gave some feedback. He did not say which labels were correct or incorrect, and remained silent for periods to allow the students to work on the task, but did make some comments such as “there’s one thing you might have to change in a minute but so far you’re doing fairly well”. Once they had completed the labelling, he gave them overall feedback “that’s mostly right” and then questioned one or labels “are you sure motor is done by the parietal lobe?” and then gave them the opportunity to correct it themselves, which they did. Where there were labels missing the tutor pointed this out and elicited further labels: “balance is right but think of one more

thing that the cerebellum does. Think of how you examine cerebellum". Where the students weren't able to work out the answer from the tutor's prompts he then gave them the answer "what I'm thinking of is fine motor control....." and the students then added this to the slide.

At the end of the task the tutor related it to the clinical part of the teaching that came later in the session. "When you see the patient later on you need to work out which parts of the brain have been knocked out".

The tutor explained that the students could keep a copy of the annotated PowerPoint slides so that they should make it user-friendly.

Task 2:

In this the students reviewed the elements of the nerve examinations by completing a table. The tutor's role in this was more active than in the first task. She structured the task, for example by eliciting the broad categories of what is tested for in the neurological examination (tone, power, reflex etc). She then used this a structure to elicit the effects of neural lesions "so let's start with tone then, what happens in an upper motor neurone lesion and a lower motor neurone lesion?". The students then answered and the tutor accepted their answer by instructing them to write it in the table on the PowerPoint slide.

Task 3:

The tutor then invited the students to maximize the video from the near end so that she could show them a flipchart. She checked they had done this "is it filling the whole screen now?" She then gave a brief talk using the flipchart to illustrate, interspersing her talk with occasional questions to the students. The students remained standing at the Surface Hub throughout.

Task 4:

The students were instructed to switch back to the PowerPoint and go to the next slide. Their task was to draw a diagram of the blood supply to the brain. Scaffolding for this task was provided by a list of all the arteries involved so that students just had to recognize where they would go on the diagram. When they had got as far as they could the tutor instructed them to switch back to full screen video and he drew his own version on a manual whiteboard.

Examinations

There were two sessions in which students learned and practiced neurological examination, each of which ran parallel to the two anatomy sessions delivered via the Surface Hub. The first covered the peripheral nerve examination, and the second the cranial nerves.

The same basic format was followed for both sessions. There were 2 tutors, with four students to each tutor. For the peripheral nerve examination, they used a special kit containing the equipment needed (e.g. rubber hammer, tuning fork etc). One student took the role of the patient. The tutor demonstrated each part of the test and then got one of the students to do it. He used mnemonics such as drilling the students in the different types of test “Ok we’ve done Tone, now we’re going to do ...?” “Power”.

Once they had gone through all the tests the tutor recapped these, and then the students paired up and practiced on each other, with the tutor watching and commenting as necessary.

Interviewing the patient

During this part all 16 students were brought together and were introduced to a patient who had suffered a serious stroke. The tutor prompted the students to ask the patient questions, for example tutor “when someone tells you they’ve got pain what else do you want to know?”

During this session the students did not make use of the Surface Hub. However, the Anatomy tutors at the near end of the call were listening and at one point interjected and asked the patient some questions.

The tutor then carried out a cranial nerve examination on the patient to demonstrate how the stroke had affected her and to demonstrate how to carry out the examination. The students were also able to take the patient’s hand to feel how the stroke had affected the power in her right hand.

Detail of the components delivered via the Surface Hub: Session 2

The overall purpose of this session was to apply the clinical material presented during the session with the patient to the anatomy presented to in the first session.

Tasks and interaction

Task 1: This was to enter onto a PowerPoint slide the most important features of the patient’s history and examination. The tutor explained that the next stage would be to work out from this which bit of the brain was affected and why. The tutor gave the students a few minutes to start entering their ideas and then he began

commenting and prompting e.g. “did she mention something to do with her vision?”. This resulted in the students recalling to each other what the patient had said and what their own thoughts and questions had been in response to that. “I was wondering”. The tutor elicited further observations with prompts such as “something that the patient didn’t mention but she was showing the whole time”. The students responded, “her speech” and the tutor then told them to medicalise that to elicit the term “dysarthria”.

Task 2: This was to ask the students to interpret the information they had written on the slide. In this the tutor was much more active. First, he summarized the history and features of the patient’s presentation and then got the students to go back to the slide from the previous session where they’d mapped the lobes of the brain to their different functions and think about which lobes had been affected by this patient’s stroke. The tutor did most of the talking but students asked and answered questions prompted by the tutor.

Tutor: So she did complain with something to do with the sight, but it’s not an occipital lobe problem...

Student: (talking over the tutor) Is it like a motor thing with the sight?

Tutor: It’s to do with the extra-ocular muscles yes – it’s not a brain problem as such..... (.....) Why am I telling you it’s not an occipital lobe problem? What would it be like if it was?

Student A: Blurry?

Student B: Blacked out?

Tutor: Blurry ...or blacked out

The tutor guided the students to realize that the eye rotation problem that the patient complained of is related to one of the cranial nerves, and that since a stroke cannot affect the cranial nerves then the eye problem was not caused by the stroke. The tutor used a model of the brain to illustrate this and to emphasise the importance of asking specific questions to avoid being led down the wrong diagnostic path.

Task 3: The tutor revisited the diagram of the blood supply to the brain that the students drew in the first session and got them to label specific elements of the diagram. At one point she used the flipchart to indicate where they had gone wrong. They then considered which blood vessels supplies which part of the brain and labelled the diagram accordingly. The tutor gave guidance and feedback as the students were doing this. The students also conferred with each other about where to draw the labels.

Task 4: The final task was to get the students to put the patient’s signs and symptoms into a stroke classification table in order to try and classify her stroke. She talked them through the patient’s signs and took a very active role in identifying the type of stroke, rather than leaving the students to work it out. This was because they were running out of time.

Participation

The level of participation by the students was generally very high in all parts of this session. During the elements where the students stood in front of the Surface Hub all 8 of them participated actively in answering the tutor's questions and in completing the tasks, although two or three students tended to be somewhat more dominant. The examination skills section involved a high tutor to student ratio (4:1) and a practical task so all the students were fully engaged throughout. There was much greater variation in how much students participated in the plenary section involving the patient and all 16 students seated in rows.

Use of visuals

A variety of formats were used to present visual elements of this session.

- 1) Small video picture and PowerPoint slides. The students were invited to draw on and annotate slides. These could be pre-prepared by the tutors and amended by the students, who could also then save the slides containing their annotations. However, it was noted by the tutor that annotations could only be added from one end of the call, meaning that the tutor could not correct or overwrite the students' annotations.
- 2) A flipchart shown by video from the near end. The tutor drew on this, enabling them to develop diagrams in real time while leaving the students to work on the pre-prepared diagrams on the PowerPoint slides.
- 3) A manual whiteboard shown by video from the near end. This was used in a similar way to the flipchart. The disadvantage was that it reflected the light shining on it which made the tutor's drawings less clearly visible at the far end.
- 4) Anatomical models of the brain and brain stem shown by video from the near end. These generally seemed very clear. Interestingly the Surface Hub enabled these to be seen from closer up than if they had been in the same room.

Picture and Sound

The sound quality of the tutor's speech was generally very clear and always audible. Due to the distance that the tutor was from the microphone and the acoustics of the room the sound received at the far end was not quite as 'dry' as it would be ideally, although this was not a significant problem. Another phenomenon was that when students were speaking to each other and the tutor interjected the sound took a moment to cut in, which did slightly interfere with the smoothness of the interaction. Both of these issues seemed to be more pronounced when the tutor was standing back from the Surface Hub rather than up close to it.

Unlike another observed session in which the near end tutor's video picture was kept small throughout the session, the tutors in this session alternated between using full screen video and dividing the screen between PowerPoint and video. This

did seem to contribute to a sense of the tutor's virtual presence. The lighting at the near was good and the picture of the tutors and of the models and diagrams they showed was clear at all times. The only exception to this was when the tutors drew a diagram on a manual whiteboard; light reflected from the whiteboard making the diagram a little hard to see.

Participant feedback

Unfortunately there was no opportunity to collect feedback from the participants at the end of this session.

Some observations and conclusions

This session can be seen as particularly relevant as a prototype for delivery of the forthcoming MB21 curriculum, with its requirement to deliver teaching of bioscience to medical students located in hospitals and its philosophy of increased integration between scientific and clinical components of the curriculum.

As in the other session observed, the Surface Hub does not seem to present a barrier to participants at the remote end from interjecting and taking part almost as naturally and spontaneously as if they were present in the same room. This was particularly noticeable when the anatomy tutors interjected during the interview with the patient. However, this did produce a momentary sense of disconnect because up to that point the anatomy tutors at the near end had not been visible on camera, so it hadn't been clear that were participating.

This session differed in several ways from the other session so far observed, mainly:

- 1) instead of being seated in different positions in a classroom, in this session the students stood at the Surface Hub, close together and at a more or less equal distance from the device. It may be that this promotes more active and relatively equal engagement by all students. Possession of the pen did not seem to affect the level of participation.
- 2) As students were only present at one site there was no issue about the balance of participation between students at opposite ends of the call.
- 3) One of the logistical difficulties of this session was to synchronise the two groups so that the parallel sessions ended at the same time. There were some issues of timing during this session, and it can be supposed that synchronizing parallel sessions, pacing sessions and keeping strictly to time may be more difficult with the reduced sense of control that a tutor may have when teaching remotely.
- 4) In this session the main visual medium used was PowerPoint slides. It would be interesting to know the tutors' rationale for using this format rather than a pre-prepared whiteboard to present diagrams for students to draw on. The whiteboard is more specifically designed for collaborative drawing, but is there any way in which

the whiteboard is actually better for this purpose? The rationale may be that the PowerPoint file can more easily be pre-prepared, and also saved as a single file rather than a series of individual images.

One issue identified by the tutor with this approach was that drawing onto the slide could only be done from one end of the call, which meant that if the students had annotated a slide incorrectly the tutor could not draw on it to show where they had gone wrong.

What is the process of saving the PowerPoint slides that are displayed from the near end but annotated at the far end? Is it possible for the far end to save this? What happens if, as in this case, the Surface Hub experiences a problem before the file is saved – will the annotations be lost at both ends?