Fostering digital skills and peer teaching: Integration of a digital media project based in Microsoft SWAY into an anatomy module

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Description

In this case study, students are guided through the use of several web applications and tools to create a Microsoft SWAY-based resource that is used for peer learning. Students create a video (using screen capture with voiceover) detailing the anatomy of a specific region, they must incorporate a mnemonic, relevant summarised case from the literature and an assessment element. These elements are embedded within a "SWAY" which are shared among the class and marked by peers and lecturers. The aim of this assessment is not only to foster detailed anatomical knowledge but also to develop communication, digital literacy and critical evaluation skills. This case is transferrable to any subject, training documents and an example SWAY are available via links in the case.

Motivation and Aims

Motivation

Many assume a level of competence in our students with regard to digital skills, due to the fact that they have grown up surrounded by technology and immersed in the digital world. The idea of generations of "*digital natives*" was proposed in 2001, students in this new millennium were purported to have a characteristic aptitude and confidence with technology (Prensky, 2001). These assertions are repeated often despite a lack of empirical evidence (Bennett, Maton and Kervin, 2008; Corrin *et al.*, 2019). My experience with my own students does not accord with this claim of inherent ability and confidence with digital technology. I am often surprised how they can struggle with aspects of Microsoft Office, converting documents to pdf, cloud computing and collaborative working. A wider survey of 37,720 UK tertiary students in 2018 carried out by the Joint Information System Committee (JISC) reported that only 41% felt university prepares them for the digital workplace (Newman, Beetham and Knight, 2018). This lack of digital competence is a significant issue for university students entering employment.

The other major factor contributing to the deficit is student attitude. I find that students assume that the discipline-specific learning outcomes such as "*understand the anatomy of the foot*" are the sum total of the learning expected of them, they do not place the same importance on skills development, whether this be soft skills such as communication, critical appraisal of a piece of work, and creativity or technical skills such as digital media communication. This is in direct conflict to the attitude of educators and employers (Jorre de St Jorre *et al.*, 2019; Succi and Canovi, 2019).

Aim

In order to foster digital skills in students, we should follow the concept of constructive alignment (Figure 1), these skills should be integrated into learning activities and assessment activities should align to test the level of skill competency (Biggs and Tang, 2011). In this assessment, I aimed to cultivate digital, communication, critical thinking and creative skills, and to assess student perceptions of same.

> "Constructive alignment is common sense. Mothers... use it all the time. What is the intended outcome? That the child can tie her shoes. What is the [learning activity]? Tying her shoes. What is the assessment? How well she ties her shoes."
>
> Biggs, J., & Tang, C. (2007). Teaching for quality learning at university, p. 61.

Figure 1 Constructive Alignment

Methodology

Students were assigned a specific topic related to the gross anatomy of the head and neck and asked to use specific web applications and software to create a learning resource based in Microsoft's SWAY platform. They were asked to incorporate several elements into this SWAY which are described below using tools described in Figure 2 and Figure 3.

- A **video** created via desktop and voice recording (iSpring) of a PowerPoint, utilising animations or other dynamic aspects such as gifs (ScreentoGif).
- A **collaborative noticeboard tool** (Padlet) containing at least one student-generated mnemonic, viewers of the SWAY have the opportunity to add to the Padlet for each topic.
- A **summary of a relevant scientific article** including a reference for this article generated using a reference manager software (RefWorks or Mendeley).
- A **quiz** (Google Forms) that viewers of the SWAY could attempt.

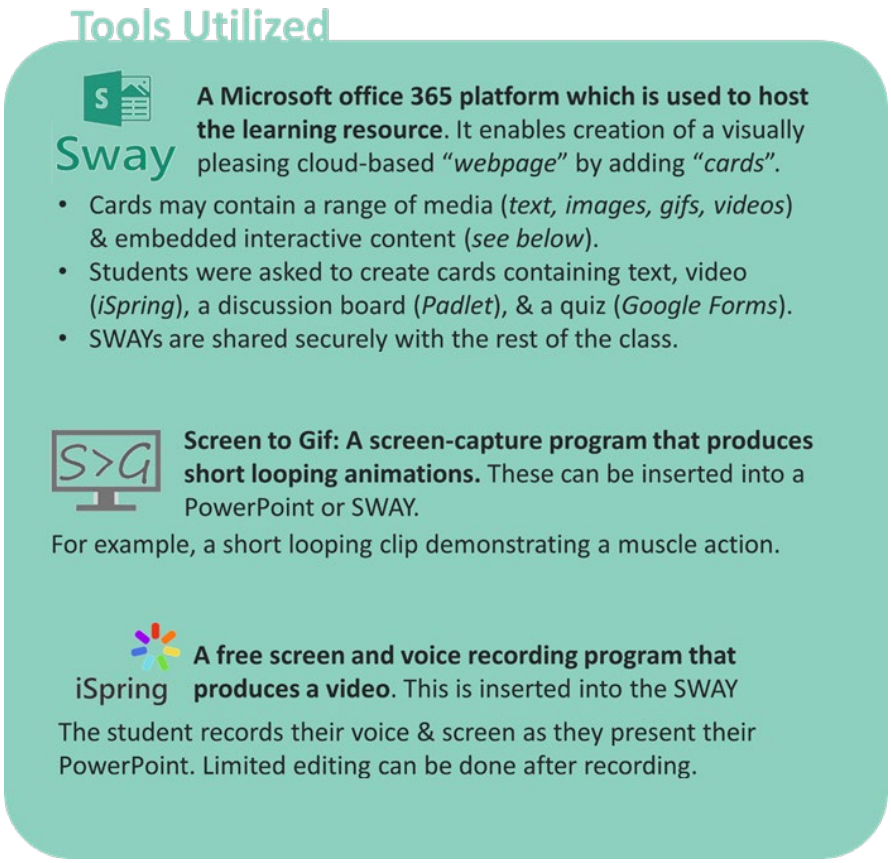


Figure 2 Web applications used by students in this assessment

Training and Support

Students were given face to face training on each of the technologies they were obliged to incorporate into the SWAY-based resource. Training documents were also placed on their virtual learning environment which may be **downloaded here: www.tinyurl.com/swaysweeney**. A sample SWAY was also provided, which can be accessed here: **www.tinyurl.com/samplesway**. Recording facilities (quiet room, laptop, microphone) were offered for all students so as not to disadvantage those without a laptop.

Peer Teaching and Marking

When all projects are complete, the students can submit links to their SWAY via Canvas to the lecturer (ensuring "edit" rights are included in this link"), the lecturer can copy each SWAY to their own Microsoft account and then embed each in Canvas for the purposes of peer teaching and marking, see Figure 4.

The assignment is marked by the instructor but also by a subset of the peers who have viewed the SWAY. Peer marking was carried out using Google Forms. The peer mark comprised 25% of the overall project mark with the remainder from the instructors mark. As a result of peer marking, innovative approaches were shared, critical evaluation skills were honed and students mutually benefitted from exploring their peer's projects with regard to their anatomical knowledge. This project serves as an innovative learning experience for the student that creates the SWAY and for those that view it.

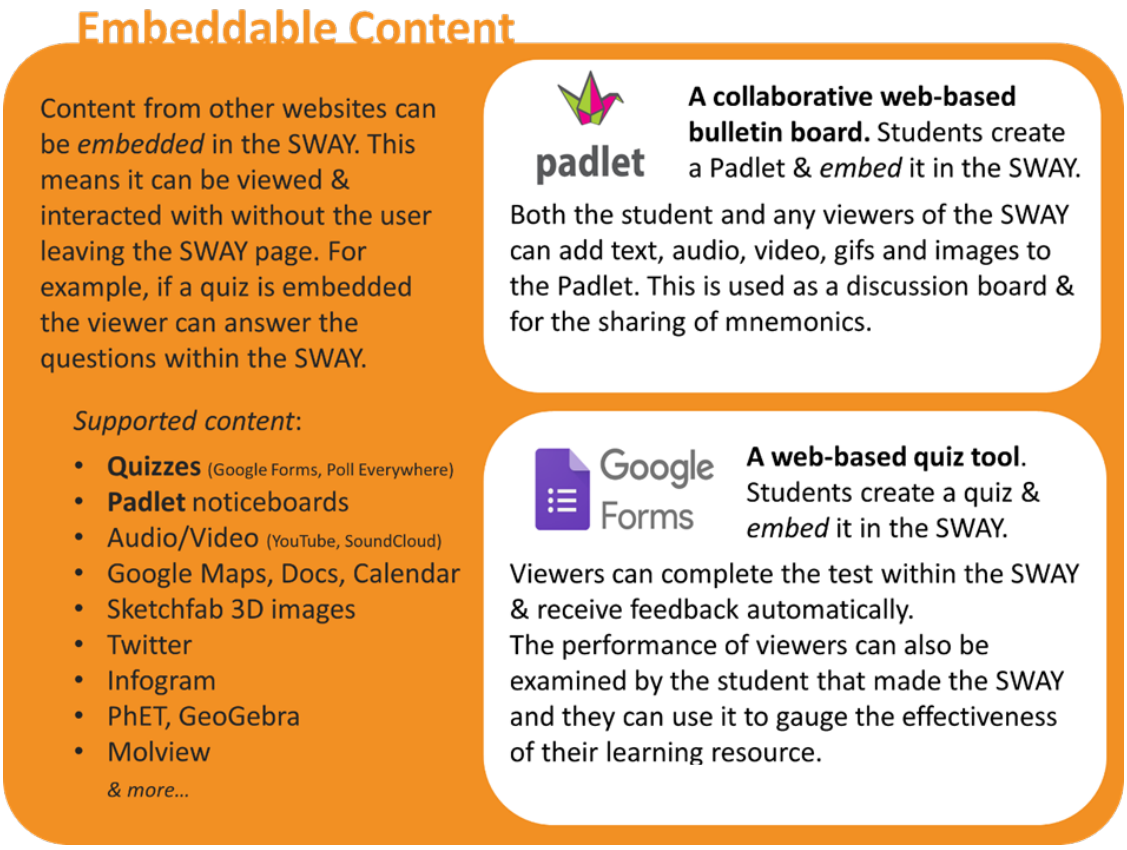


Figure 3 Tools embedded in SWAY as part of the digital media project

Data Collection

Students were asked to fill out an evaluation survey at the end of the project focused on the following aspects:

- The time commitment of the project
- Skills gained during the project
- Usefulness of skills gained
- Whether the training provided was adequate
- Whether they were impeded by technical difficulties.
- Aspects that they enjoyed most and least.

Comments were also gathered from the end of year module evaluations.

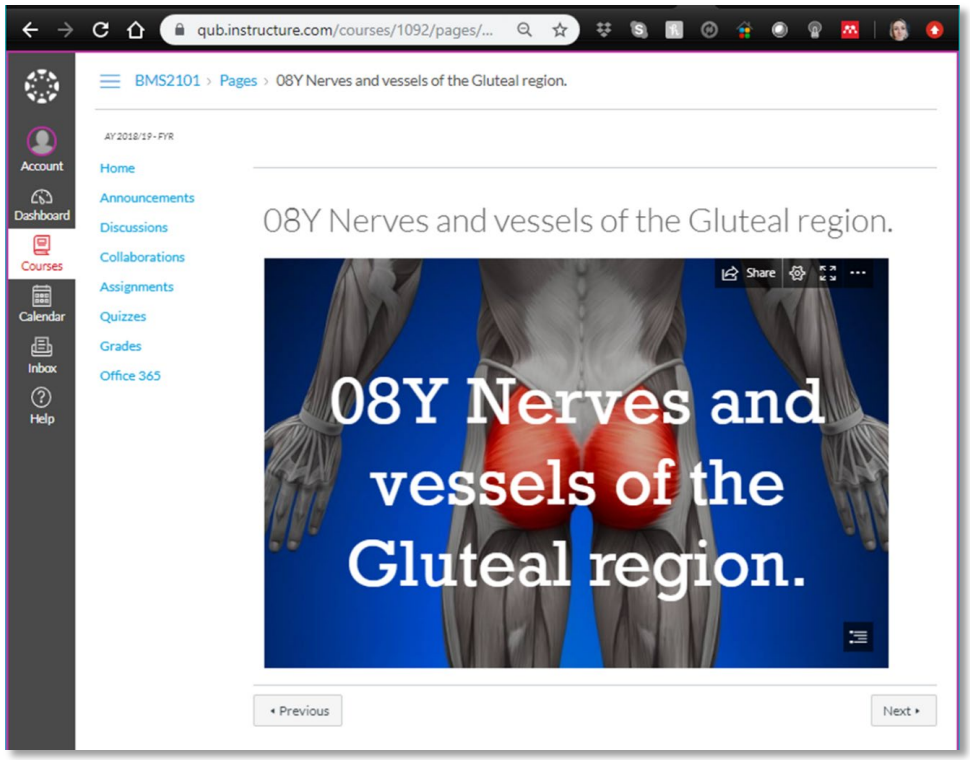
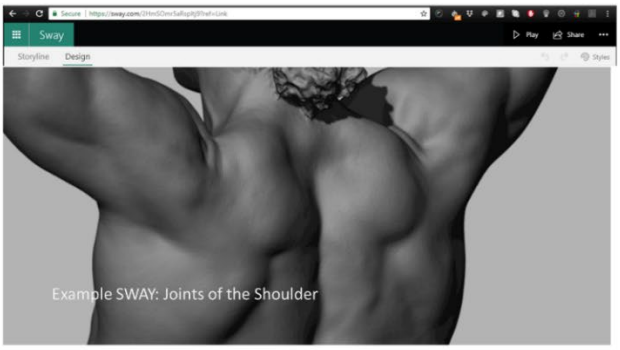


Figure 4 Student SWAY directly embedded in Canvas

Successes| Lessons Learned



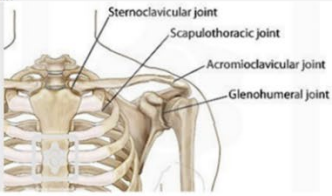
Learning Objectives

1. **Be able to identify and describe the following list of joints and ligamentous structures.**
   a. **Joints of the Shoulder Joint**
      i. Sternoclavicular Joint (saddle synovial joint)
      ii. Acromioclavicular Joint (plane synovial joint)
      iii. Glenohumeral Joint (ball & socket synovial joint)
   b. **Ligamentous structures of the Shoulder Joint**
      i. Costoclavicular ligament
      ii. Coracoclavicular ligament (2 parts)
      iii. Transverse humeral ligament
      iv. Coracoacromial ligament
      v. Coracoacromial arch
2. **Be able to state what bones participate in each joint**
3. **Be able to state the joint classification and what movements may occur at each joint.**

The Shoulder Complex

The shoulder complex is composed of 4 joints:

- **Sternoclavicular**
- **Acromioclavicular**
- **Glenohumeral**
- **Scapulothoraic** (not a true joint but rather represents the interface of the concave subscapular fossa of the scapula with the convex surface of the thoracic cage. We will not examine it in detail.)

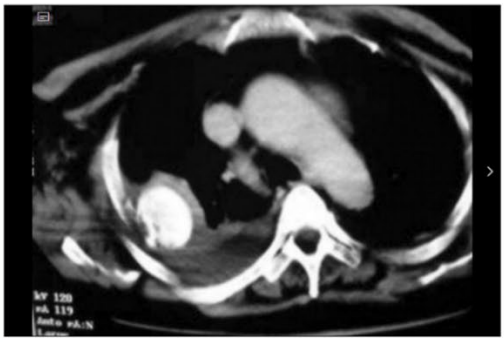


Video demonstration of Shoulder Joints

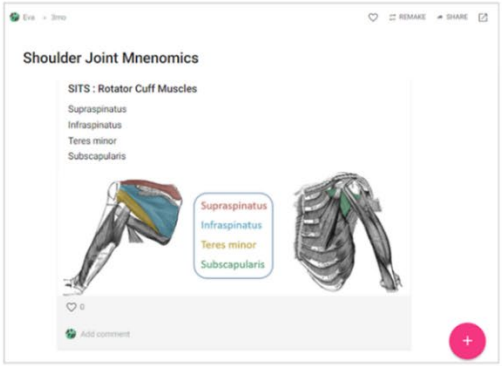
Related scientific article: Female with pain in the right shoulder and chest.

This case describes fracture and dislocation of the humeral head into the thoracic cavity, a rare injury that can occur in cases of high force trauma.

Following a motor vehicle accident a 58-year-old woman presented to the ER with shoulder and thoracic wall pain. Although alert, she was in pain and movement of the arm was restricted due to the pain. X-ray was performed and showed fractures of the scapula and of the surgical and anatomical necks of the humerus. The head had



Mnemonics Padlet



Formative Assessment

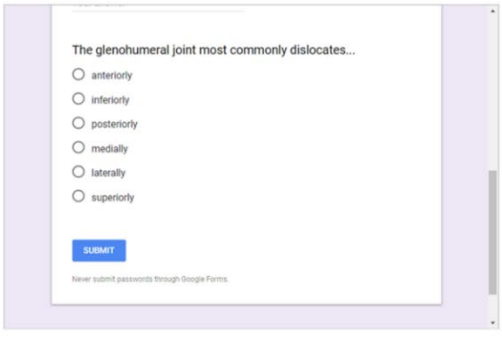


Figure 5 Example SWAY

An example SWAY created by the instructor is given in Figure 5. The quality of the projects submitted by students was very high (in fact a lot better than the sample SWAY provided). Students received extensive feedback from both lecturer and peers.

Skills

At the outset of the project the majority of students were naïve to all technologies used in the project with the exception of PowerPoint animations, see Figure 6. This further refutes the notion of the "*digital native"* as so many were unaware of basic skills like RefWorks reference management software and screen capture.

The usefulness of the skills gained was rated **8.2 ± 1.6** on a Likert scale (35/39 respondents), where 10 represents a "*yes, definitely*" agreement to the statement "*Do you feel you gained any skills that will be useful for future university or personal projects or employment?*" and 0 represents the response "*no, not at all*". The lowest response (from 1 student) was "2" and the rest rated 6-10", indicating that overall they felt it was a worthwhile exercise.

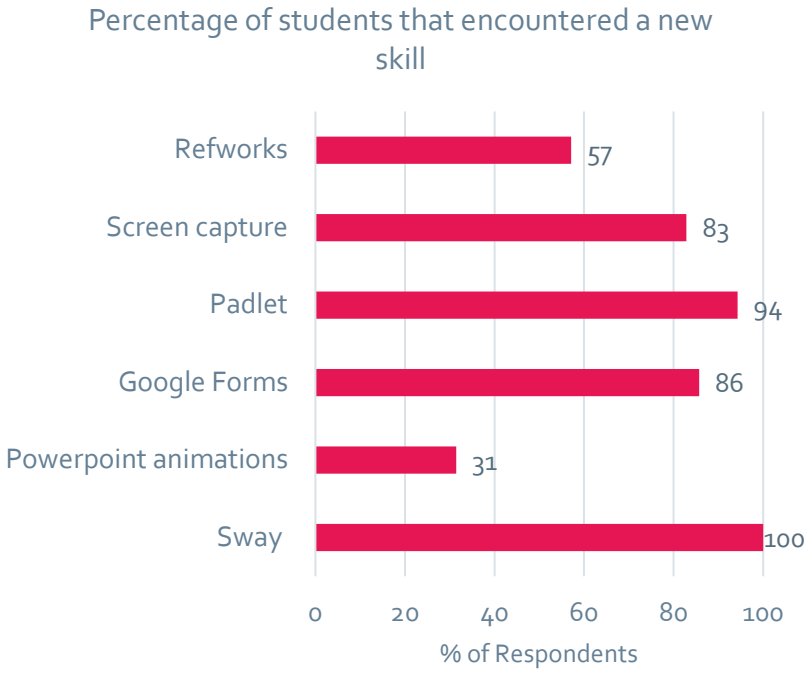
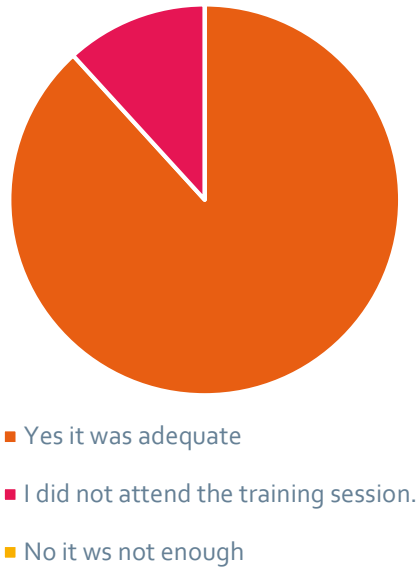


Figure 6 Survey response from BMS2101 in 2017-18 (35/39 students responded)

Training adequacy and difficulties encountered

5 students did not attend the training sessions, all of the remaining respondents (30) attended and agreed in response to the statement ""*Was the training provided adequate? (PC session, example SWAY, training document) If not please state where more training would be beneficial*". No student responded "*No it was not enough",* see Figure 7.



When asked "*Did you have any major technical difficulties during the project: e.g. unable to upload files, could not record audio*" 23 students responded "No", of the remaining 12 students their specific difficulties are given in Table 1. 10 of these 12 comments involved the students own laptop/microphone (highlighted in blue), this issue would have been mitigated had students used the recording facilities offered (only 1 student availed of this service). A future development of this could be to set up a "*recording studio*" consisting of a laptop with the software installed in a quiet room, where timeslots could be booked via Canvas. This more automated approach may be more utilised as students are loath to contact the lecturer directly for special arrangements.

Figure 7 Student response to "*Was the training provided adequate?*" (35/39 students responded)

Table 1 Comments in response to query regarding whether technical difficulties were encountered. Coded student number is given in first column. Difficulties related to student's laptop are highlighted in blue.

4	making gifs
5	recording was difficult
9	voice over recording presented difficulties
12	recording kept crashing
16	gifs wouldn't work with my laptop
21	had issues with installing refworks, even whilst using the instructions provided. Although it may have been issues generated from my own laptop
22	Could not get refworks on my computer at home.
24	The microphone on my laptop had trouble picking up the sound and was coming out muffled but i got it sorted in the end
27	Although I managed to record audio easily enough, getting good quality, clear sound was almost impossible due to the quality of my laptop's microphone.
31	Yes issues with using a mac
33	Recording was an issue and getting the software to make a gif as I was using an apple device
34	Yes, some. It was much easier to drag a word document into sway rather than create a sway on the actual software itself.

Aspects enjoyed most and least

Student's comments are presented in Table 2 the major themes are discussed below. Comments were positive but 17/35 students (in orange) indicated it was *too time consuming for the weight of marks awarded* (3% of the module mark). This was reiterated in the free text comment section of the survey by 7 students and in the end of module review:

> *"Only thing would be about the marks, I'd maybe put sway with 10%, HPTP 15%, each spot test 10% and the poster as 5%. No other recommendations, actually really enjoyed this module!"* – BMS21010, April 2019

This module is worth 40 Credit Accumulation and Transfer Scheme (CATS) points, each CATS point equates to 10 study hours, so this assessment should equate to 12 hours of work. Student's self-estimate of the number of hours to complete project (which does not include the 2 hours of training sessions) was **19.5 ± 9.7 hrs** (35/39 students responded). It is evident that the project weighting is too low, to avoid demotivation, marks awarded to such a project should concur with the time invested to learn new skills. To remedy this, in 2018-19 I increased the weighting to 10% in 2019-20, feedback will be monitored to gauge whether this is an appropriate weighting.

A number of interesting comments were made indicating students enjoyed "*the finished product*", "*Being creative"* and being "*…in complete control of it all, with the exception of the topic. I was able to decide how deep into the theory I wanted to go. The freedom was refreshing."* Developing students' agency is an important aspect of the sociocultural theory of education (Vygotskii and Cole, 1978). Project work which allows a degree of creativity and has a sense of purpose for the students is more satisfying and more representative of real life work projects.

Few students commented on the *peer marking aspect* of the project in the project-specific survey, with only one student responding to "*what aspect did you least enjoy*" with "*marking them*". In the end of

module feedback **90% of students agreed that feedback was helpful** and the remainder had no strong views. Peer marking fosters an ability to make critical judgements on their own work and the work of their peers (Bostock, 2000). Increasing the number of assessors and tutor moderation has been suggested as methods to avoid the failings of peer marking (e.g. variability in marks, mark over-inflation) and so five peers mark each project (Boud, Cohen and Sampson, 1999). Provision of a detailed marking proforma is also beneficial, and I have evolved the Google form-based marking sheet to contain more questions to ensure students analyse many facets of a peers work (Orsmond, Merry and Reiling, 1996).

Table 2 Aspects students enjoyed most and least.

#	What did you enjoy most about the project?	What did you enjoy least about the project?
1	Learning the information	Time consuming
2	Researching and making the PowerPoint, and recording the presentation	N/A
3	Learning in more detail about the trigeminal nerve	It seemed like a lot of work for very little weight towards the final module mark
4	learning new skills	how much effort was required for the amount it was worth
5	creating and designing powerpoint-learn most information from this	Very time consuming- took away from study time for labs and other modules
6	It was a challenge and I learnt a lot of new skills that I wouldn't have pushed myself to learn without the project	It was very time consuming and a lot of work for 3%
7	Researching my topic	It took too much time for so few marks
8	making the powerpoint	the time that it took
9	the idenpendant learning aspect and it helped with learning about the head and neck	the limited time for the video presentation
10	It was something I'd never she before	The amount of time it took to complete everything as most of it required intricate attention to detail when editing powerpoint animations and video etc
11	The finished product	Not really knowing how much detail to go into
12	Really enjoyed learning how to make animations	Technical problems with the recordings
13	Self directed learning	The technology
14	being able to present but without the nervousness of being in front of a whole class	it was very time consuming for only being worth 3%
15	yes	the stress of making errors when recording the video
16	i found making the powerpoint itself quite enjoyable	doing the voiceover
17	Making the animations for the PowerPoint	making the padlet- didn't really know how to use it
18	Making a video helping you revise	Time consuming
19	creating the sway page	it was time consuming
20	learning how to record video clips with audio and the creation of GIFS	I felt like the percentage the project is worth for the module was not worth the amount of time and effort required for its completion.
21	The research and collating information	The time spent setting up equipment
22	Learning new skills.	Felt the topic I had was too expansive and struggled when researching to cut it down.
23	creating the powerpoint	marking them
24	the topic itself was really interesting to learn about and i enjoyed reading the different case studies related to the topic	there were a lot of different technology/computer programmes to get used to which were completely new to me and took time to understand how to use them
25	I was in complete control of it all, with the exception of the topic. I was able to decide how deep into the theory I wanted to go. The freedom was refreshing.	The amount of time it actually took, but that may mostly be down to the fact I quite wanted things to be 'perfect' or as close to perfect as they could be.
26	Learning about the new technologies and thinking of the best and easiest way to teach someone a new topic	How long it took for how small a percentage the mark is worth
27	Creating a learning resource was enjoyable, particularly searching for relevant online resources such as gif's and videos to emphasise my points.	The amount of work required for the marks was off-balance. Perhaps allocating the weighting of marks for both semster's 1 & 2's projects could have been better.
28	animations in powerpoint	voice over
29	doing animations	I didn't like the voice over
30	the interactivity	how much work it was for little marks
31	making the powerpoint	Not having prior knowledge to the subject
32	Being creative with the PowerPoint, making our own GIFS and seeing the project as a finished product	Voice recording
33	It taught good skills that can be used for final year and beyond	The time it took to upload the individual pieces and the different formats needed
34	Learning the different tools and systems available for use to display work.	It was difficult getting the voice over correct, so I needed to repeat several times.
35	Researching the topic.	Making the PowerPoint and using Sway.

Highlights: comments related to time commitment (orange), researching the topic (blue) and creativity (green).

Table 3 Free text comments regarding SWAY project

#	Any other Comments?
5	was very computer/ technical based which took alot of time but did learn about powerpoint/ animations and external sources available -most info learned from making powerpoint
10	I feel it should have been worth more for the amount of time and effort put into making it even half decent- 3% of the module is not enough for the amount of time put into this as it took away from other studies
12	This was a brilliant project - learned lots that I never expected I would on Human Bio course, maybe make this project worth more than 3% - lots of work so slightly demotivating that it was worth so little
16	found it required a lot of time for all it was worth
14	was a very good way to learn the topics
18	the project was quite a lot of work considering what it counted towards our final mark
21	Thanks very much for all your help with this project - found it really enjoyable to present in a new way
25	The weighting of how much the SWAY project was worth overall in the module was also very low for the amount of work that was required for it.
29	it was too much work for such a small percentage
32	Great for revision purposes
34	It was a big project for a little percentage of overall score. It should have been worth more.
35	I do not feel this was a fair piece of work. It required too much work to only be worth 3% of our module!

Highlights: comments related to time commitment (orange)

One beneficial aspect of the project I had not considered was raised in the comments, one student responded "*being able to present but without the nervousness of being in front of a whole class*" as an aspect he/she enjoyed. Presentations are a major source of anxiety among university students (Preuß *et al.*, 2010; Vitasari *et al.*, 2010) and self-recorded assessments of this sort may remove the anxiety of making a mistake as they can just re-record their video. This aligns with cognitive load theory (Sweller, 1994), where learning is built upon cumulatively so students are guided through levels of accomplishment and difficulty. This assessment could serve as a stepping stone for some students to become more confident presenters.

Most students **(19/35) stated learning a technical skill as the aspect they enjoyed most** but **9/35 students (in blue) indicated they enjoyed researching the topic** most, of the latter 4 indicated technical aspects were what they least enjoyed. In the end of module feedback, **4 students protested at the use of computer/technical skills in assessment**, an example is given below.

> *"Maybe adjust the CA (continuous assessment) to involve some assessments less computer based for those that don't have a lot of computer skills."* - BMS2101 student, 2017-18

This was surprising as only 2 (of 7) assessments required digital skills, these were only worth 6% collectively in 2017-18, they were not advanced-level skills and training was provided for both. The main issue is that some students see these transferable skills as inferior and separate to the discipline-specific learning objectives. Another aspect of this resistance to digital assessments is merely a lack of experience, which can be overcome if students are exposed regularly to a range of digital communication tools in a scaffolded environment with sufficient support. The level of this support is important as you must ensure they are not just following instructions blindly, the student must be challenged but their task should be achievable (Vygotskii and Cole, 1978). It should be noted that the majority of students did not view the development of technical skills negatively, with one noting the immediate benefit "*It taught good skills that can be used for final year and beyond".*

Scalability | Transferability | Conclusions

The project is transferable to any discipline. In terms of scalability, it takes a short amount of time (~1-2 min) to copy and embed each SWAY in Canvas so it could certainly be scaled up further than the 40 students in this case. Possible issues may arise if multiple students request recording facilities. Students have gained **new skills** through completion of the project and appreciate the worth of the skills gained. Issues that must be overcome include the **effect of inadequate personal computing** and **student's reticence to come forward and request help in the form of** the offered recording facilities. One major theme that arose was student's appreciation that the **weighting of an assessment must concord with the effor**t required, this feedback has influenced changes in the assessment for subsequent years. A surprising finding of this study was the **opposition of some students to the digital/technical aspects of the assessment**, this indicates we must convey a higher import on the skills learning to match the weight given to discipline-specific knowledge.

These results provide evidence of the multiple benefits of a creative multimedia based assessment, for the development of digital skills and confidence, to foster critical judgement of peer work and in addition gain discipline-specific knowledge in a novel way. This supports the implementation of this assessment for future cohorts.

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