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Production of Hand Music Videos in Anatomy Education for Medical Students in Malaysia

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ABSTRACT

Media are teaching resources that help teachers transmit messages and learning material to students effectively and efficiently. Music video making is one example of how educational media is used in anatomy training. The aim of our paper is to elaborate the stages of hand music video development. The three main stages of film and video production are pre-production, production, and post-production. Identifying the type of music video, script writing, song composition, music and vocal recording, and storyboard production are all parts of the pre-production stage. Shooting and selecting the music video's mood, with a few adjustments, are part of the production stage. Finally, editing is included in the post-production stage. Hand music videos were found to aid in the teaching of anatomy, with the music video containing visual, auditory, and kinaesthetic elements. Therefore, music videos can be used as an alternative teaching approach, particularly in difficult subject areas that demand extensive memorization..

Keywords: *anatomy; hand; music video; teaching; medical education*

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INTRODUCTION

The media is one of the most significant tools for use in successful class-based learning. Media are teaching aids that assist teachers in successfully and efficiently delivering messages and learning material to students. They can aid in the learning process by assisting students in concentrating and focusing on the topic matter. The creation of instructional media, such as music videos, continues to be influenced by technological advancement. With the continuous advancement of technology and knowledge in the modern world, the evolution of learning media inevitably entails the incorporation of new form of information technology. A quality education process revolves around learning. Learning is influenced by a number of variables, including educational media, as well as classmates, lecturer qualifications, other learning materials and aids, and the classroom learning environment (1).

Video is a common teaching tool at all levels and fields of education, including medical school. Although some studies have shown that using video can be beneficial, others have discovered that video can improve students' satisfaction but not their performance. Video has been employed in several levels of education in recent decades, including undergraduate and postgraduate education, residency programmes, and continuing medical education. Furthermore, this medium has been found to be beneficial in a range of clinical specialities, as well as in preclinical training. Video has been related with many information and communication technologies across time, and the Internet has recently been employed as a means of communication (2).

Video has been used in some of the more innovative teaching methods, such as problem-based learning, and as a tool for assessing and self-assessing objectives and desired competencies (3). Its application in education is notably linked to the reception learning mode, which entails the external engagement of an instructor or professor who transmits to students a systematised collection of facts on the learning topic at hand (4). In this case, teachers or experts could create movies and display them to students so that they could utilize them as learning documents (teaching videos) and study them as many times as they like. Videos can be used as pedagogic tools to deliver knowledge to students so that they can learn and apply (5). Although the usage of teaching videos may be beneficial, it cannot replace the conventional teaching style of a live professor in the classroom, where students and teacher can interact and learn together.

In medical education, self-learning has grown increasingly important, and the usage of pre-recorded lectures or podcasts has grown commonplace (6). Video streaming, which uses the Internet to provide curricular content, has recently begun to be integrated into self-learning in a way that allows students to have more choice regarding how the content is given. However, in medical education, student-created movies have been underutilised as a self-learning tool (7).

Performance, spectacle, and direct address sharing are all used in the video music clip, which has an intertextual link (2). These link can be found to variable degrees in different clips, with the mode of address having a substantial impact on the relationship between text and viewer. Live performance, story, and additional visual elements, including computer graphics and animation, are all included in the video music clip, integrating numerous representational tactics over the course of 3–4 minutes (2). This variety and mixture have been dubbed a 'postmodernist pastiche', although it may be argued that this diversity and fragmentation allow for the range of possibilities suggested by recent theorists for the observing-participating subject.

Video music clips and their related accessories, such as fashion and style, are neither totally subversive nor the result of a rebellious, non-conformist, or avant-garde impulse. Rather, because of their lack of uniformity and varied and disparate contingencies, they allow for a wide range of interpretations and applications (2).

Anatomy education, which includes gross anatomy, histology, and embryology, is one of the most essential and significant types of learning in medical studies. It necessitates a deeper comprehension of the structure of the human body (8). Anatomy education aids students in comprehending future pathologies and clinical issues (9). Due to insufficient time and cadavers for modern anatomy instruction, the practical viewpoint has been expanded from cadaveric dissection to include plastination models, prosected models, computer-assisted learning, and problem-based learning. Medical students must equip themselves with sufficient anatomy knowledge to ensure the safety of patients, as well as their own satisfaction as medical professionals.

Anatomy knowledge is critical in therapeutic settings. Students are required to use their basic science knowledge to make diagnoses (10). Few multimedia-related strategies for increasing anatomical knowledge have been proposed; however, there is paucity in the use of a music video (11-13). Previous study demonstrated the benefit of music video utilization in human skeletal teaching and learning especially in terms of comprehension and assimilation. This type of dynamic and engaging learning technique was highlighted as an excellent learning tool for teaching anatomy. This method encouraged students to take an active role in their learning by allowing them to express their creativity, curiosity, and intelligence (14, 15).
Our music video development is a first in Malaysia and represents an innovation in medical education because it has never been used in any traditional curricula. Although the use of music as a teaching and learning medium and its benefits have been widely documented in many professions, including medicine, the use of music and songs with lyrics oriented to specific related syllabuses such as anatomy is scarcely documented. Therefore, the purpose of this article is to outline the stages involved in creating a music video that is relevant to anatomy teaching about the hand. It was believed that a hand music video would aid students in honing their anatomy memorization skills. Markedly, this was the first time music video production had been implemented in a medical school in Malaysia.

METHOD

Generally, good collaboration and communication between the production team underpinned the entire process of video production. This needs to be highlighted because, on numerous occasions, there was a discrepancy between demands for artistic licence (on the multimedia side) and demands for consistency and accurate content from the anatomical perspective. Medical students from Universiti Putra Malaysia engaged in this research, which was led by educators from Malaysia's public universities.

Overall, the video creation process may be considered as an interesting learning curve in that it was both time demanding and fun. As previously stated, numerous challenges emerged during the video production process. Pre-production, production, and post-production are the three primary stages of film and video production (1) (**Table 1**). The following sections describe the challenges that developed throughout the music video creation. These are divided into issues that arose during each stage. The final music video was played for all volunteering medical students in Universiti Putra Malaysia. Our preliminary findings revealed that watching a hand music video effectively improved knowledge in relation to learning anatomy.

Pre-Production

Any activities that occur during the planning stage, prior to any filming, are referred to as pre-production. By far, the most essential factor was script writing, which is something that future anatomy educators should ponder seriously. It is important not to underestimate the amount of time required to complete the screenplay-writing process. The script's development can be compared to the plan for a construction. Because the script is constantly referred to throughout the project, even the tiniest factor should be considered at this point. Video length, source content, pacing, and sequencing are all matters to consider when producing a script writing for clinical teaching.

It is important to pay close attention to the content to ensure that it is correct and current. Journals, books, and clinically relevant facts were among the sources of information used in composing the script. Differences between the language style employed in anatomical writing and that of normal conversation were recognised when the script was created. This meant that the script's style and vocabulary had to be revised numerous times to ensure that the final product included accurate and easy-to-understand songs and spoken words. Our script was as follows:

> *"This is our hand, hand muscles consist of three groups of intrinsic muscles: thenar, hypothenar, and others. Thenar muscles are for thumb flexion, thumb abduction, thumb opposition, and thumb adduction. Hypothenar muscles are for little finger flexion, little finger abduction, and little finger opposition. The other three muscles of the hand are lumbrical muscles for metacarpophalangeal (MCP) joint flexion, interphalangeal (IP) joint extension, interossei muscles for palmar and dorsal finger movements, and palmaris brevis for improving hand grip."*

Following the script-writing process, a song was composed. A composition is a musical work written by a composer or songwriter, with or without lyrics. The recording of a performance of the underlying composition, often known as a "master" is referred to as a sound or music recording (16). Prior to production, effects such as digital photos (**Figure 1**) and flashcards, as well as the text that appears onscreen to introduce the next section of the film, were all agreed upon in advance. The multimedia experts demonstrated the better visual effects and how they may be used in different areas of the video. Some three-dimensional (3D) effects were created, which took one to two days to complete using Final Cut Pro software. Multiclip is a feature of Final Cut Pro that merges numerous takes into a single take, making switching between takes easier (17).

Actors were easy to recruit since they were compensated for their time. To kick off the demonstration, a few invitations were sent to the class representative. The students were free to create their own choreography, which was synchronised to the music and lyrics. Initially, two of the co-authors composed the music (**Figure 2**). Shortly after, song recordings were made in a sound recording studio. To make a storyboard, some film was then shot at the studio centre, making it easy to obtain the necessary equipment for the presentation (**Figure 3**). Making a storyboard can aid in determining the order in which the action of the music video will be shot (18). The action can be shot in segments or scenes, with an entire action sequence being shot at a time. Finally, the action can be captured as a series of discrete shots that each embody a different aspect of the sequence. The cameras, lighting, and sound recording equipment were secured as well. Even though a replacement actor was brought in to improve the video's quality, the choreographed movement remains the same. Digital images, especially film sequences, take up a great deal of storage space on computers. To accommodate the data for this project, a separate hard drive with at least one terabyte of storage was necessary.

Production

All actions that involve the actual recording of audio-visual information are referred to as production. This stage was comparatively trouble free in comparison to the pre-production stage. It took less than two hours of filming the scene. This involved coordinating lighting, camera angles, and actor placement. Only one camera was used to film the shots, which had a bright, colourful flashing background to emphasise the energetic mood (**Figure 4**). This allowed crucial aspects of hand anatomy to be captured both up close and from afar at the same time, breaking the monotony of a single-shot film sequence. For a music video shoot, audio playback allows the musicians and actors to follow along with the music, often lip syncing to the beat. While recording, speakers must be present for audio monitoring. Four retakes were required for each sequence, with some situations requiring up to five. It was critical to maintain continuity through the retakes. The production stage only lasted one day. The multimedia team always communicated with the clients during this period to identify the dos and don'ts for the music video. This was done in order to provide students with a realistic environment in which to frame the movie. At the end of this stage, very minor alterations, if any, were permitted.

Post-Production

The majority of the early post-production work consisted of assessing and editing the filmed material. Video editing is usually accomplished on a computer with a nonlinear editing system. The editing of music videos employs a variety of approaches, including switching scenes or camera perspectives in time with the rhythm of the music, smooth transitions between scenes, or camera views that loosely follow the structure of the song, as well as quick switching between shots. Editors have a variety of options (19). They can build their edits around the song's climax, taking into account the song's tempo. Final Cut Pro was used to compile the content (video, audio, and 3D animation clips) into a master digital video draught. All of our digital video editing was performed by multimedia experts. The majority of music videos use multiple takes of the same song portion, which are shot in various settings in terms of lighting and other factors. In order for switching to be seamless, these various takes need be coordinated (20). Given that our movie was an educational one for medical students, it was critical for producers and clients to be rigorous in analysing the substance and visual aspects of the movie. It was critical that the final result be clear, accurate, and simple to understand. In some situations, this meant deciding to reshoot. Any suggestions and opinions were taken into account and incorporated into the final product. After that, a three-minute-long music video was created. A number of copies of the MP4 and MOV files were generated in order to show the students the video.

DISCUSSION

Anatomy is considered the keystone of medical education, with solid anatomical knowledge serving as the foundation for future medical practice. Although, in many ways, the current anatomy curriculum is highly competent and serves its purpose, access to cadavers is not always feasible (21). Challenges related to coping with the limited time and resources with which to teach and learn the massive scope of anatomy have led to an evolutionary change, with the adoption of modern philosophies, approaches, and effective teaching and learning strategies (15), including the use of music videos. A study conducted among Year 1 Bachelor of Medicine & Bachelor of Surgery (MBBS) students in Barbados on the use of active and engaging learning strategies to teach the musculoskeletal system demonstrated that students found the active and engaging learning strategy beneficial, with 21% of students utilizing the songs as a learning tool (15). Active and engaging learning strategy was reported by students as helpful in encouraging creativity and peer-to-peer interaction, as well as being an active and memorable learning method, an integrated and quick way to gain knowledge, an easier way to learn in a relaxed environment, and a way to strengthen the long

term memory and retention (15). Positive student perceptions of the use of educational songs and music videos have also been demonstrated in other fields, including applied sciences (22), natural history, (23) and food service and safety (24).

A literature review assessing the scope of technology used to supplement the undergraduate anatomy curriculum at medical school demonstrated that 98% of medical students owned smartphones, exposing them to the use of medical education apps (64.3%), with 61.9% of these apps covering anatomy (25). Furthermore, the use of pre-recorded or live videos offers a realistic visual experience of anatomy that is easily accessible when required (25). The integration of video tools into the current medical curriculum was observed to be an effective teaching tool due to its positive impact on student performance (21). Although many students have positive perceptions of and embrace new approaches in teaching and learning anatomy, most still appreciate the traditional methods of learning, such as cadaveric teaching (26), with technological interventions being best designed as adjuncts or supplements to cadaveric teaching (21). However, the role of innovative teaching and learning methods in anatomy to empower students in their study of anatomy cannot be denied.

Medical education is perceived as being stressful, and a high level of stress may have negative effect on cognitive functioning and learning among students in medical school. Study method must be modified in order to reduce stress among students during learning activities. There are various learning methods such as visual, aural, reading/writing, and kinaesthetic learning, which involve various human senses.

In our study, hand music videos are used to aid in teaching anatomy. Music education focused on the multimodal aspects of popular videos and created pedagogical frameworks for ‘multimodal music learning’ that mirrored students’ current listening habits (27). Therefore, music videos can be used as an alternative teaching method, especially for challenging subjects that require more memorization, such as anatomy. Because music videos can be played repetitively, this will increase the retention of the challenging topics. The music video is an innovative and unique teaching device for supporting the teaching and learning of anatomy, and it improves the memorization of anatomy terms. While video learning is potentially the future of integrative education, other study methods work best when paired with video learning, and video learning is probably more successful as an essential introduction to the fundamentals of a subject (28).

Videos are a powerful teaching and learning tool because more spatial information can be imparted while simplifying complex concepts. Studies have shown that they are efficient and effective in grabbing and holding audiences’ attention (29). Even when the students were at home, they were satisfied after watching our music video, which differed from previous study (28). Taking into consideration the utilization of music, 3D images, and choreography which were integrated in the form of a short music video, the module is likely to be acceptable as an effective learning tool for medical students.

In anatomy, the students are required to perform dissection. However, the dissection room is sometimes placed in the basement area, which can become a frightening place for medical students. Previous studies reported that background music may reduce anxiety levels and improve academic performance among students (30). Therefore, introducing hand music videos during dissecting sessions may reduce the level of stress because the music element will reduce the anxiety level and, at the same time, allow students to develop a clear picture of what structure or body parts are to be dissected.

Entertainment-education songs have proven to be effective as a memory enhancer and learning tool, especially in teaching subjects that require a great deal of memorization. Health sciences songs are believed to be able to help students recall information, especially in anatomy and physiology because

these two subjects require more memorization and understanding. The repetitive hearing of a song may increase the memory and understanding, which may improve the academic performance of medical students (31). Music videos can also help to break up the monotony in the classroom by creating a sense of fun, enthusiasm, and encouragement (32). As an additional advantage, the usage of videos embedded in teaching and learning empowered students to learn in an active manner because they exhibited extremely high levels of motivation for self-directed learning, particularly in learning basic regional anatomy (33).

LIMITATIONS and RECOMMENDATIONS

During the development of content and music, challenges arose given the abundance of anatomy terms and the need to identify the essential ones and, further, make these terms coherent in the context of syntax and semantics. After video recording, certain challenges came into view in terms of inserting the essential words and text for anatomy terms at appropriate times and positions in the video to further highlight and display these anatomy terms visually and thus heighten the memorization abilities of students. Communication between researchers and videographers was sometimes hindered by the difference of knowledge and expertise, along with the added physical and communicative distance and limitations between researchers and videographers because of COVID-19 lockdowns and restrictions.

Students have been found to prefer direct instructional videos that focus mainly on comprehension, rather than videos that require analysis or interpretation (34). Also, videos without captions and subtitles are difficult for students to capture, acquire, and retain the memory, especially regarding a subject like anatomy (35). Educational and learning videos cannot be edited and corrected once published. This is because of the reissue of copyrights (36). In this regard, there is the option of making additional remarks in the comments or descriptions section to correct errors in videos published on video platforms, such as YouTube. This step will thus not require any re-editing of the entire video.

As either one-on-one or group learning, video learning requires so much equipment so as to be unaffordable for some students who are underprivileged and may require additional technological support from their learning institutions. Apart from this, there will be some faculty members and students who are less trained in using videos to teach or learn, and consequently, will require some more time to develop such skills. Video learning supports students' learning anatomy individually, but it is not a good medium for group learning. However, maintaining two-way communications allows lecturers to maintain a central role and location, as well as to reach students and achieve their learning objectives (37).

CONCLUSION

The importance of anatomical knowledge in Medicine cannot be overstated. Students are expected to make diagnoses using their basic science skills. There have been a few multimedia-related methods used to enhance the anatomical knowledge presented; the usage of a music video is highlighted. Overall, the video production process was a fascinating learning curve that was both time consuming and enjoyable. The three main stages of film and video production are pre-production, production, and post-production, all come with their sets of challenges.

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ETHICAL APPROVAL

The study was carried out at Universiti Putra Malaysia and was approved by the Ethic Committee for Human Subject Research (JKEUPM-2020-157).

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