Helping medical students with online videos

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Many Saudi pre-medical students have difficulty understanding lectures in specialized courses such as biology, biochemistry, anatomy and physiology. To help students fill the gaps in their background knowledge, class lectures can be supplemented by online videos in medical courses. This paper aims to show the advantages of integrating online videos, give samples of websites where online medical videos can be downloaded, describe criteria for selecting videos, show how online videos can be integrated in medical courses, outline skills that can be developed through supplementary online videos, types of tasks that can be designed based on the online videos selected, and present a scheme for phases of teaching and learning with online videos. In the end, it will describe the process of evaluation and assessment of instruction with online videos.

Keywords: Medical Terminology; Online Videos; EFL Students; Listening Comprehension; Reading Comprehension; ESP

1. Introduction

Due to latest developments in technology, use of online and digital video, as an exciting emerging technology in teaching and learning, is growing. Since online videos integrate audio, video, animation, color, text and music, they bring courses alive by allowing learners to use their visual and auditory senses to learn complex concepts and difficult procedures. They provide the learner with content, context, and language, and play an increasing role in both ESL classroom instruction and self-study (Burt, 1999). Interactive digital videos provide students with control of computer visualization techniques and allow them to collect, analyze, and model two-dimensional motion data (Escalada & Zollman, 1997). They can support, extend, and/or change pedagogy and curriculum outcomes (Schuck & Kearney, 2006). Incorporating YouTube into science lessons can energize teaching and motivate students (Everhart, 2009).

A review of the literature has shown that use of digital video in ESL classrooms, in general, and medical and science courses, in particular,

enhance students' listening comprehension skills of lectures. Use of authentic web-delivered video was found to enhance the incidental acquisition of vocabulary and listening comprehension of ESL adult learners at a major Midwestern university in the USA (Smidt and Hegelheimer, 2004). In another study, video-linked lectures allowed healthcare students across multiple sites, and between university and hospital bases to come together for the purposes of shared teaching. Recording and streaming video-linked lectures allowed the students to view them at a later date and provided an additional resource to support student learning (Wang, Mattick and Dunne, 2010). In a third study, third-year medical students, enrolled in a pediatrics clerkship, who learned in a virtual modality with a digital video case, engaged in more critical thinking (Kamin, O'Sullivan, Deterding & Younger, 2003).

The effect of using multimedia materials, such as video clips, and collaborative communication tools on learning outcomes among medical students was assessed by Romanov and Nevgi (2007). Results showed that 68.6% of the students viewed two or more videos. Female students were significantly more active video-watchers. Video-watching was associated with better course grades. The study concluded that students who watched video clips were more active in using collaborative eLearning tools and achieved higher course grades.

To increase the perceived relevance of pre-clinical science courses to undergraduate students, Seddon (2008) introduced a context-based assessment item to a genetics course that occurs early within a five-year veterinary science program. The assignment was contextualized by students' presenting their results as a role-play video of a veterinarian/client consultation. Contextualization was found to be responsible for the deeper style of learning that was adopted by the majority of students. It was concluded that making explicit links between pre-clinical content and its use in a workplace setting can lead to improved learning outcomes.

When compared with face-to-face instruction, integration of digital video proved to be more effective. Hakkarainen, Saarelainen and Ruokamo (2007) reported results of a case study in which two different course versions: A face to face version and an online version were used. Findings showed that designing, producing, and solving the digital video-supported cases promoted especially the active and

contextual aspects of the students' meaningful learning as well as the students' positive emotional involvement in the learning process.

In physics courses, Escalada and Zollman (1997) found that the majority of participants perceived discussion and computer visualization techniques as being very effective in helping them learn physics. The results indicated that sophisticated instructional video software can be perceived as easy to use and effective by students who are novices and experts in using computers. The researchers concluded that interactive digital video tools and activities have the potential of providing physics teachers with the latest technology to bring the active process of learning physics to their classroom.

In medical schools where English is used as a medium of instruction and students are non-native speakers, there is a great need for integrating online medical videos in class lectures as many freshman medical students have difficulty comprehending medical lectures delivered in English and reading English material in medical courses such as physiology, biology, biochemistry, anatomy, histology and others. For example, results of a survey showed that students enrolled in the Nelson R. Mandela School of Medicine, in Durban, South Africa felt that they lacked the basic conceptual foundations essential for the learning and understanding of physiology. Difficulties that the students identified were mainly terminological and conceptual in nature (Tufts and Higgins-Opitz, 2009). In another study at a Taiwan medical school, students reported a need for a basic freshman-year English course, with focus on listening as the most important skill to improve. They indicated that they needed more than one year of English-language study (Chia, Johnson, Chia & Olive, 1999). Likewise, students of low initial English proficiency at a medical university in Bahrain were reported to translate more and use less metacognitive strategies when reading medical texts in English (Malcolm, 2009).

Like EFL pre-medical students in other countries, Saudi pre-medical students, in particular, have difficulties comprehending medical lectures delivered in English, understanding abstract and complex medical concepts, remembering too many details using unfamiliar medical terms, understanding, visualizing, connecting, recalling, retaining structures, classifications, definitions, causes, whole-part, processes, descriptions of organs and systems, and reviewing large amounts of material for exams within a limited amount of time. To help

pre-medical students overcome those difficulties, supplementary online medical videos can be used. The present study demonstrates how online medical videos such as video lectures, video courses, science animations, lecture notes, online tests and lecture presentations can supplement medical class lectures. Specifically, the present study shows how online medical videos can be used to help freshman medical students learn, comprehend, retain and apply medical terminology and basic knowledge in medical courses such as biology, biochemistry, anatomy and physiology. It shows how online medical videos can be used to fill in gaps in the students' medical knowledge.

Online medical videos with a variety of medical specialties, topics, speakers, difficulty levels and lengths can be easily downloaded to the students' laptops or mobile phones for free. Students can view them anywhere, anytime and as many times as they wish. Students can select videos that match their proficiency level and background knowledge and can help them understand abstract, and difficult ideas and information.

2. Context

In Saudi Arabia, Arabic is the medium of instruction in public schools and in Colleges of Education, Liberal Arts, Business and Home Economics. English is the medium of instruction in Colleges of Medicine and engineering, where class lectures are delivered in English and students read authentic textbooks, take exams, do assignments, write reports and term papers in English. In the first semester of college, medical students take English for medical purposes, in addition to introductory courses in biology, biochemistry and physics. In the second semester, they take anatomy (14 hours), physiology (2 hours), histology (2 hours), biochemistry (4 hours) and gynecology (2 hours) a week.

Results of a questionnaire-survey with open-ended questions administered to a sample of 42 medical students in their freshman year, at Umm Al-Qura University, in Mecca, Saudi Arabia showed that many EFL pre-medical students have several difficulties in comprehending medical class lectures and reading material in English, in specialized courses such as biochemistry, biology, physiology, anatomy and histology. Results showed that many students have the

following difficulties: Following instructors while delivering lectures in English, comprehending the content of medical class lectures, inability to cope with the amount of material covered in class, too many new medical terms with which the students are unfamiliar, having to read about 70 pages per day, reading slowly, lack of reading comprehension skills and translating and looking up meanings of too many difficult terms in the dictionary. Some students suffer, cry, are stressed out, fail exams, drop or change majors.

3. METHOD

3.1. Materials and tasks

The course instructor may make a list of useful supplementary videos related to the topics to be covered in the course. He/she may assign weekly videos. Students can also search for videos on their own by enclosing the topic of interest such as *"introduction to physiology", "upper limb",* or *"biology exams"* in quotation marks in the Google or You Tube search box. Medical videos can be downloaded from YouTube or Learners TV (http://www.learnerstv.com/), a comprehensive website that provides thousands of free downloadable video lectures, live and online tests in different subject fields such as biology, physics, chemistry, medicine, dentistry and nursing. It provides free video and audio lectures of whole courses delivered by instructors from reputed universities around the world. There are also science animations that provide students with fun and innovative ways of learning. Free live timed online tests with instant feedback and explanations help the students refine their test taking skills. Examples of free downloadable videos are:

Free Interactive Animations

- Physics Animations: http://www.learnerstv.com/animation/animationcategory.php?cat=physics
- Chemistry Animations: http://www.learnerstv.com/animation/animationcategory.php?cat=chemistry

- Biology Animations: http://www.learnerstv.com/animation/animationcategory.php?cat=biology
- human anatomy animation diagrams of the human body:

  http://www.youtube.com/watch?v=1vFbQjGEhcQ&p=76BAF6203A1485B2&playnext=1&index=58

Free Lecture Notes

- Biology Lecture Notes: http://www.learnerstv.com/lecturenotes/notescategory.php?cat=Biology&page=1
- Physics Lecture Notes:

  http://www.learnerstv.com/lecturenotes/notescategory.php?cat=Physics&page
- Chemistry Lecture Notes:

  http://www.learnerstv.com/lecturenotes/notescategory.php?cat=Chemistry&page=1
- Medical Lecture Notes

  http://www.learnerstv.com/lecturenotes/notescategory.php?cat=Medicine&page=1

Free Online Medical Tests

- http://www.learnerstv.com/onlinetest/medicine/index.php

Medical PowerPoint Presentations

- http://www.learnerstv.com/presentation/presentationcategory.php?cat=Medical

Introduction to

- http://www.youtube.com/results?search_query=introfuction+to+biology&aq=f
- http://www.youtube.com/results?search_query=introfuction+to+biochemistry&aq=f

Other medical videos:

- http://www.youtube.com/results?search_query=physiology+lecture&aq=1
- http://www.youtube.com/results?search_query=anatomy+and+physiology+lectures&aq=6
- http://www.youtube.com/results?search_query=biology+lecture+1&aq=6
- http://www.youtube.com/watch?v=PXNz22Cwwcc

Videos selected should be related to the course topics under study. The video length in minutes, content difficulty level, and speed of the speaker should be taken into consideration as well. They should also be based on their capacity for inspiration, motivation, interest, content, clarity of message, pacing, graphics, length of sequence(s), independence of sequence(s), availability and quality of related materials, and potential classroom use (Burt, 1999). Closed captioned medical videos can be also selected as they were found to provide an effective tool for presenting nanotechnology information as part of teaching science to ESL students in a meaningful way (Kumar and Scarola, 2006). Subtitled movies enriched undergraduate Iranian students' processing and comprehension of the target language (Yekta, 2010). Winke, Gass and Sydorenko (2010) also found that captioning during video-based listening activities with fourth-year learners was more effective than no captioning. Captioning during the first showing of the videos was more effective for performance on aural vocabulary tests. Learners reported that they used captions to increase their attention, improve processing, reinforce previous knowledge, and analyze language. Learners also use captions as a crutch.

3.2. Instructional strategy with online videos

Instruction with online videos can proceed in the following steps:

(i) Before watching a video: The instructor can set goals for watching videos, introduce the video, give the title and summarizing the content, tell the students what they need to do and focus on, give pre-questions that will help the students understand the content of the video lecture. The students can watch a video on their own, at home either before or after taking a class lecture. The instructor can serve as a facilitator. The teacher's guidance is crucial in

facilitating use of digital video to improve students' communication skills.

(ii) While watching the video: Watching the medical video should help the students develop the following skills: (a) Listening for main ideas and supporting details; (b) listening for organizational clues (descriptions, classifications, definitions, processes, whole-part and cause-effects relationships); (c) deriving meanings of difficult medical terms from the spoken context; (d) note-taking skills while listening to class lectures; (e) connecting information; and (f) outlining the content of the lecture.

To help students make the most of medical videos, they should avoid watching videos passively. Cherrett, Wills, Price, Maynard and Dror (2009) indicated that passively observing a video is not cognitively engaging and challenging, and therefore learning is not as effective as it can be. Therefore, the students should watch interactive videos in which they take an active role. While observing the video, the students should be required to engage, participate, respond and be actively involved. They can take notes of main ideas, important details, medical terms, pay attention to specific information while listening, answer questions while listening or make an outline of the lecture. Results of a study that they conducted with a group of second-year undergraduate civil engineering students showed that the students' learning experience was enhanced using interactive videos (Cherrett, Wills, Price, Maynard and Dror, 2009).

(iii) After watching the video: The students can work in groups or in pairs, discuss answers to questions, summarize or retell video content orally, use a flow chart, diagrams, photos, and mind-maps to show information details and relations. To motivate students to watch online videos, the instructor can give credit, include video content on tests and give written assignments.

3.3. Guidelines for dealing with complex scientific concepts

Although use of web-based videos in science and medical classrooms is becoming more and more common, these videos are often fast-paced, information rich and pose cognitive difficulties. Therefore, scientific concepts should be fragmented and embedded within larger issues. The following guidelines, adopted from the National Science Education

Standards (NRC 1996), can help reduce cognitive issues, enrich students' understanding and help students learn to identify scientific concepts embedded in web resources and popular media.

- Develop a framework of goals for students.
- Select content to meet the interests, knowledge, understanding, abilities, and experiences of students.
- Select teaching and assessment strategies that support the development of student understanding.
- Work together as colleagues.
- Focus and support inquiries while interacting with students.
- Challenge students to accept and share responsibility for their own learning.
- Encourage all students to participate fully in science learning.
- Encourage and model the skills of scientific inquiry.

4. Conclusion and recommendations

Use of web-based videos in classrooms is becoming more and more popular. To help pre-medical students who are non-native speakers comprehend medical lectures delivered in English, the present study recommends use of online videos as a supplement to class lectures. The students can download digital videos from Internet websites such as You Tube and Learners T.V. Face-to-face lectures can be also audio- and video-recorded, and the recordings uploaded on the university server and made available for the students.

Wieling and Hofman, (2010) found that offering recordings of face-to-face lectures is an easy extension of a traditional course and is of practical importance, because it enables students who are often absent from regular face-to-face lectures to be able to improve their course grade by viewing the lectures online. Online on-demand video recordings of face-to-face lectures and the offering of online quizzes with appropriate feedback has an additional positive impact on the performance of these students compared to the traditional face-to-face course approach

Therefore, the present study also recommends that a digital medical video library be created by Colleges of Medicine in Saudi Arabia, which integrates MPEG-4 encoding, full text indexing, high-resolution streaming, and Synchronized Multimedia Integration Language (SMIL),

for delivering on-line digital video, for enabling content-based search for certain segments of a video clip stored in a repository of medical digital videos. This medical digital video library will allow instructors and medical students' quick and easy access to a medical digital video repository via the Internet. Students and instructors will be able to store, search and retrieve catalogued streaming digital medical video content to be used for educational purposes. A flash-based repository system of medical digital videos can be also developed. Those are believed to enhance teaching and learning in Saudi medical schools.

The Author

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