



DOI: 10.2478/jolace-2019-0013

Teaching Medical English through Professional Captioning Videos

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Abstract

Since the Barcelona objective released on 16 March 2002, European Union met an ambitious goal: to promote learning of “at least two foreign languages from an early age” (European Commission 2019). Thus, bilingualism, multilingualism, and linguistic diversity became a part of European policy (Pokrivčáková 2013a; Pokrivčáková 2013b; Schunz 2012). Nevertheless, English language is still considered to be the global language, used as *lingua franca*. English is the language of international dialogue facilitating further educational and professional development, it is the language of international communication, science, academia, and the Internet (Dearden 2014). English is the first foreign language taught in Slovakia, and therefore majority of Slovak medical students chose the course of Medical English during their study. To develop communicative competence and performance in students, it is necessary to offer a very wide range of stimulating activities in English classes. Videos published on the Internet offer enormous potential for foreign or second language (L2) acquisition at every level according to Common European Framework of Reference for Languages (CEFR) in almost all learning phases, covering a significant variety of authentic topics (Barnau, Džuganová, Malinovská 2018). Our study is particularly aimed at watching of YouTube professional medical videos with/without captions and their effect on English language skills, especially listening comprehension in medical students at Jessenius Faculty of Medicine in Martin, Comenius University in Bratislava, Slovakia (JFM UC).

Key words: medical English, captions, videos, listening comprehension, questionnaire, t-test

Introduction

Listening comprehension is the ability to listen effectively to spoken discourse in a foreign language, to understand it and gain necessary information from it. Improvement of listening skills belongs to the priorities in L2 teaching especially in teaching and learning English for special purposes (ESP). In medical science, it is necessary to understand the patients' complaints and description of their health states as well as the results of laboratory tests communicated via telephone. Many

mistakes come not only from the lack of lexical or grammatical knowledge but are made due to misunderstanding of speech produced by native speakers in an authentic situation. Moreover, a huge amount of new information in the field of Medicine requires active participation in the international conferences (Antić, 2009; Milosavljević, 2008; Mičić, 2013; Džuganová, 2019). Put in other words, good listening skills in English for Medical Purposes (EMP) improve understanding as well as increase communicative competence of every learner.

Krashen considers comprehensible input as one condition, which is related to other affective factors influencing language acquisition (Krashen, 2009; Rashtchi & Yousewfi, 2017). Oral speech, visual images such as people and their actions, objects, different setting, and written text are different kinds of input that may facilitate the L2 comprehension as well as learning of L2 vocabulary and content (Baltova, 1999). Videos with captions combine sound, picture and text and in this way, they are one of the unique possibilities to provide comprehensible input for L2 learners.

In this connection, Vanderplank suggests a model of “attentively watching”, which means focusing on the extensive comprehensible input as offered by subtitled films or videos “consciously, systematically, and reflectively” (Vanderplank, 2016). Except for attention, Vanderplank argues for adaptation of foreign language intake. It means that advanced L2 learners are listening attentively as well as absorbing the content of the video in the foreign language. It is necessary to stress that watching the medical videos and reading the captions place medical English into a meaningful context, as for example medical presentation of illnesses, their symptoms, methods of examination and medication. Thus, specific input leads to attentive watching and appropriate production of spoken or written foreign language (Vanderplank, 2016).

Authentic situation presented in the audiovisual setting provides comprehensible input and, consequently, supports and activates L2 learning (Béřešová, 2015). Therefore, it is necessary to use a variety of audiovisual materials in language acquisition (Džuganová & Barnau, 2017). One of the best audiovisual sources are the videos presented on the Internet that provide authentic language in the audio mode as well as the written text in the captions or subtitles as necessary input for effective comprehension (Džuganová & Balková, 2011).

Two general models of audiovisual perception, *bottom-up* and *top-down processing*, describe how the brain transforms aural and visual stimuli into meaningful patterns (Barnau, 2015). In the first mentioned processing strategy (*bottom-up*), the brain brings together specific shapes or features to form patterns that the recipient can compare with stored images or sounds she/he has noticed before. In the second mentioned *top-down* model, processing is based on acquired knowledge and experience (Barnau, 2018).

These two processing strategies are designed and valid for all proficiency levels. It means that even advanced L2 learners need to work on bottom-up aspects of language processing in a specific medical context when dealing with fast speech of a native speaker as well as on top-down strategies which presuppose a kind of prior or background knowledge in order to make predictions about the content of the incoming information.

It is necessary to stress that every learner perceives and interprets one and the same audiovisual material in a different way. An important role of audiovisual processing is therefore played by previously gained knowledge, which is influenced by situational aspects, psychological factors and interests of L2 learners (Barnau, 2014/2015).

According to the research carried out by Barnau and Džuganová, in a specialized medical video, often with a noisy background; the learners rely on their prior knowledge on the topic and context (Barnau & Džuganová, 2017). Thus, they rely on top-down strategy in order to deal with unreliability in the original sound, unfamiliar vocabulary or language structures, which can be an obstacle to bottom-up language processing. If the learners are unable to understand anything they hear, they will not be able to participate in discussion or answer the questions in the post-listening activities. It means that top-down processing is limited.

All the above-mentioned facts play an important role in designing good teaching plans and learning conditions for EMP students. Therefore, it is important to set up such learning situations, in which students can connect their background knowledge and expectations based on it, can ask themselves why they failed in their expectations and, finally, can begin to think something different from what they previously thought (Barnau, 2018). Such a new learning situation is offered in English language courses for medical students in the activities supported by audiovisual materials (Barnau & Džuganová, 2017; Almurashi, 2016).

Audiovisual material complemented with automatic generated captions, where the text is in the same language as the sound, is a possible tool that improves L2 listening comprehension skills in advanced learners. Captions or intra-lingual subtitles transfer oral language production into the written text. This method was originally used for deaf or hard-of-hearing people, but later was applied as a useful didactic tool for L2 acquisition which can "improve the effectiveness of audiovisual presentations and develop viewers' language skills" (Danan, 2004). Captioned professional videos are considered an outstanding pedagogical tool bringing authentic medical language and authentic situation into the classroom, which enhance second or foreign language acquisition (Barnau, 2014/2015). Audiovisual information combined with written text increases language acquisition in L2 students (Barnau & Džuganová, 2017).

Several studies have stress the decisive importance of cognitive processes which effect the ability of the learners to convert input into the intake (linguistic

information) that L2 listeners acquire as exposed to audiovisual modalities through attentive listening or watching, cognitive strategies of retention as well as through communicative interaction or feedback (Brown, 2000; Vanderplank, 2016; Garza, 1991; Neuman & Koskinen, 1992). Thus, visual information complemented with written text increases language acquisition in L2 learners.

Tetyana Sydorenko in her research refers to several study results that deal with combination of captions or subtitles and videos (Sydorenko, 2010). Most scholars consider subtitled or captioned videos to be helping L2 learners to comprehend foreign or second language. Moreover, they have positive effects on vocabulary acquisition and retention as well as communicative performance (Baltova, 1999; Garza, 1991, Neuman & Koskinen, 1992; Vanderplank, 2016). The present study follows the results of this scientific research.

1. Methodology

1.1 Setting

Present English curriculum specially designed for medical students at JFM UC contains 24 lessons. In summer semester, 12 lessons are devoted to the following medical topics: Pediatrics, Neurology, Sleep, Mental Disorders, Infectious Diseases, Respiratory Diseases, Cancer, HIV/AIDS, Examination of the Patient, Communication with the Patient, Hospital Admission, and Surgery. Each lesson consists of four parts. Video watching activity follows *Lead in* activity and *Reading comprehension*, finally, the student take part in *Conversation* on a given medical topic. It means that didactically modified exercises and tasks enhance tested listening comprehension of the videos in the L2 learners.

1.2 Sample

Thirty-six English language students from JFM UC participated in the research study during their regular classes. Although all students are independent users of the language (B2) according to CEFR, there are slight differences in their abilities to understand text spoken fast by a native speaker or produce a clear, detailed text on the specific medical subjects with an explanation of their viewpoints on the topical issues. The students were divided into two groups, male and female, N_F was the sample size of group one and N_M was the sample size of group two ($N_F = 22$, $N_M = 14$).

1.3 Aim

The purpose of present study was to investigate whether comprehensible input in the form of medical videos with/without captions might affect the first-year students' medical English acquisition as well as to examine enhancement of their listening comprehension.

Learners' perception and preferences has been identified via a questionnaire administered at the end of the second semester and compared with the test results. The responses collected in the questionnaire expressed students' preferences to watch the videos either with or without subtitles.

The three proficiency tests (T1, T2, T3), an oral presentation of a given topic, and final exam (Exam) administered in two semesters, were intended to measure writing, listening and speaking skills in EMP acquired during two semesters. Thus, the tests assessed English language speaking and writing proficiency as well as listening comprehension and required test takers to have specialized knowledge of Medicine.

2. Procedure

2.1 Medical videos

In the present study, authentic Medical English videos were taken from YouTube channel. Each video, approximately 2 to 5 minutes in length, was devoted to one medical topic and related to a given subject. All participants watched each video twice. Some videos were watched first time without automatically generated captions and second time with captions, some of the videos were presented only with captions. An example of basic structure of the lesson plan is presented in Table 1.

Tab. 1: The lesson plan

Time	Phases	Forms	Materials
10 min.	Lead in activity	Dialogue	PC, Data projector
10 min.	Introduction of new topic	Dialogue, Brain-storming	PC, Data projector
25 min.	Reading comprehension	Whole-class discussion	Textbook
5 min.	New vocabulary review, Pre-watching activity	Work in pairs, Whole-class discussion	Textbook, Handout
30 min.	Video watching (with or without captions) Listening comprehension	Individual work, Work in pairs	Textbook, Handout
10 min.	Post-listening activity, Conversation	Work in pairs, Whole-class discussion	Handout, Textbook

The background knowledge was activated first, in pre-watching activities during the classroom discussion and, second, in activities aimed at reading comprehension (Bojović, 2017). The students tried to predict the content of the scheduled video using information about the topic and context, pictures, vocabulary and linguistic phrases. Thus, all activities focused on topic prediction and unknown vocabulary acquisition through studying the unfamiliar words in medical context.

2.2 Questionnaire

The influence of captions on listening comprehension as well as students' perception and preferences were investigated in the questionnaire given to the study participants at the end of the second semester (Dorney, 2003). The participants were asked to respond to the following statements:

1. I had seen the video with the same theme in English before its presentation in the class.
2. I was able to read the captions while watching the video.
3. Speaking skills of a lecturer/speaker in the video disturbed me
4. Known context helped me to understand the content of the video.
5. The presentation of medical topics in English was new for me.
6. It was hard for me to concentrate on the content of the video while reading the captions.
7. I was already familiar with more than 50% of English medical words while watching the video.
8. Subtitles in the video disturbed me.
9. Visible captions helped me to understand video content.
10. The captions contributed to my confidence in understanding spoken English.
11. I prefer to watch the video first time without captions, but second time with captions.
12. I can only concentrate on the content of the uncaptioned videos.
13. In order to understand the content, I had to watch the videos only with captions.

What helped you most to understand the video content?

What prevented you from better understanding?

The five-point Likert scale was used to evaluate all statements: 1 = Strongly disagree, 2 = Disagree, 3 = No opinion, 4 = Agree, 5 = Strongly agree. As the students of JFM CU are obliged to pass demanding entrance exam, they are very well educated in natural sciences, such as biology, chemistry and physics. Thus, it was possible to presuppose that their scientific background knowledge would be serious with a very high level of proficiency.

2.3 Comprehension tests

First-year students at JFM UC are obliged to take three tests in two semesters as well as final exam at the end of the summer semester. The tests focusing on enhancement of listening comprehension and new medical vocabulary acquisition had been administered. In the comprehension tests, only a correct answer received 1 point.

In our statistical analyses, we compared two groups of students (Female, Male), and the three test results taken during the first and second semesters (T1, T2, T3) and the final exam taken at the end of the second semester. For data analyses we used a *paired sample t-test* comparing the test results in male and female students.

3. Results and discussion

The first item "I had seen the video with the same theme in English before its presentation in the class," was answered negatively, with an average rating of 1.92 points on the Likert scale. It means that the majority of students had not seen the medical videos before. Nevertheless, the known context helped the students understand the content of the video, as has been proved in evaluation of the fourth item (3.97 points) and a majority of the students was already familiar with more than 50% of English medical vocabulary (3.94 points). It means that familiar topic enhanced comprehension of a particular medical video. The fifth item "The presentation of medical topic in English was new for me" was rated with different scores ranging from 1 to 5 points with an average of 3.28 points.

The evaluation of the second statement "I was able to read the captions while watching the video" received an evaluation of 4.36 points on the Likert scale. It proved the fact that reading the written captions while watching and listening medical English videos was not disturbing. The third statement "Speaking skills of a lecturer/speaker disturbed me while watching the video," was answered negatively (1.56 points). Some students admitted, however, the speech of a native speaker had disturbed them while watching the video.

The sixth statement "It was hard for me to concentrate on the content of the video while reading the subtitles," was answered negatively, with an average rating of 2.00 points on the Likert scale. The evaluation of the eighth item (1.81 points) proved that captions did not disturb students while watching the videos. The tenth statement "The subtitles contributed to my confidence" received a rating of 3.47 points. The ninth item "Visible subtitles helped me to understand video content," was answered positively, with an average rating of 3.94 points on the Likert scale.

Concerning the statement "I prefer to watch the video first time without captions, but second time with captions," students did not express any significant preferences (3.06 points on the Likert scale). The thirteenth item "In order to understand the content, I had to watch the videos only with captions," was

answered negatively, with an average rating of 2.22 points. It means that the students at JFM CU considered captions as contributing to their confidence in understanding spoken English. However, they did not perceive them as ultimately decisive to comprehend the content of the viewed videos.

Two open questions in the questionnaire “What helped you most to understand the video content” and “What prevented you from better understanding of the video?” revealed that students considered captions used while viewing the video as well as watching the video more than once as both being of great help. Negative aspects listed included background noise, native speaker accent, fast speech of a speaker, or difficulties with concentration.

Paired sample t-test was used to test if the means of two paired measurements have been significantly different. In the present study, we compared the results of the first, second and the third tests (T1, T2, T3) with the final test (Exam) results. According to the paired sample t-test comparing the results of the first test (T1) taken at the beginning of the first semester and the final test, male participants achieved significantly higher score ($p_{m1} = 0.040$) proving enhancement of their listening comprehension in comparison to female students ($p_{f1} = 0.401$). Concerning the comparison of the T2, T3 results and Exam, there was not a statistically significant difference observed ($p > 0.05$).

Quantitative results are presented in Table 2 showing the number of participants as well as their mean scores (Mean), standard deviation (SD) and standard error of the mean (SEM).

Tab. 2: Quantitative results of the tests T1 and Exam

Listening comprehension tests				
Group	Female		Male	
	T1	Exam	T1	Exam
Mean	89.41	86.73	87.8	91.75
SD	7.29	17.42	7.53	10.38
SEM	1.56	3.71	2.01	2.77
N	22	22	14	14

Despite the above mentioned t-test results, it is necessary to say that the eleventh item of the administered questionnaire “I prefer to watch the video first time without captions, but second time with captions,” was rated with different scores with an average of 3.06 points. Figure 1 presents the variety of rating in particular students. It shows the fact that the participants do not have any preference to watch the video first time without captions, but the second time with

captions. They consider, however, captions to be helpful in order to understand the content of the videos. Figure 2 shows rating of the tenth statement “The subtitles contributed to my confidence” (an average rating of 3.47 points), and figure 3 points to rating of the ninth item “Visible subtitles helped me to understand video content,” an average rating of 3.94 points).

Fig. 1: The rating of the eleventh item

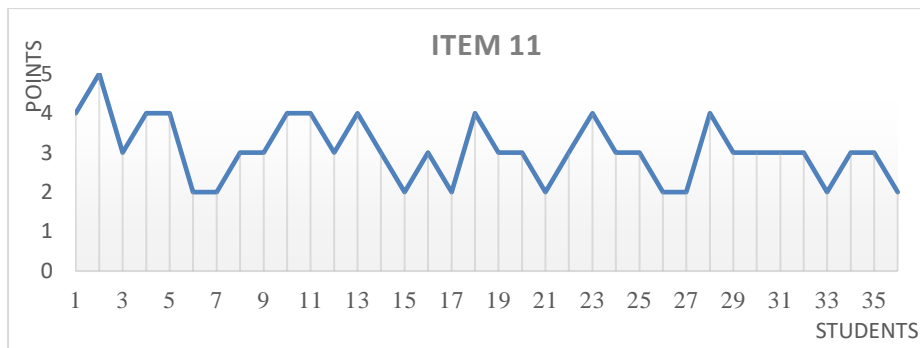


Fig. 2: The rating of the tenth item

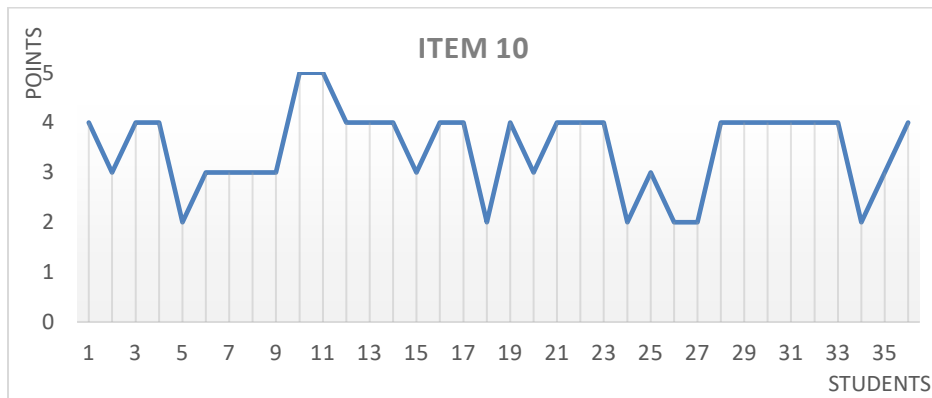
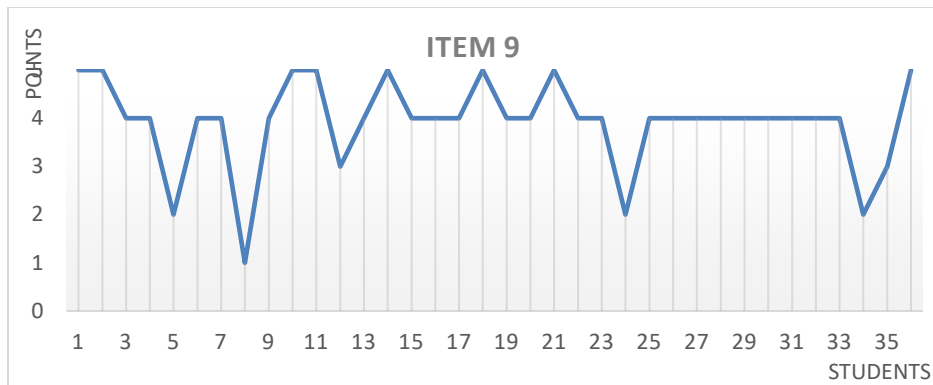


Fig. 3: The rating of the ninth item



Conclusion

Automatic speech recognition programs enable to use automatically generated captions even in the medical videos posted to a YouTube channel. Even in clean acoustic environment, however, speech recognition is limited. It is necessary to stress that automatic sound and words recognition expressed in captions is a great help for L2 students (Brooke & Scott, 2012). Captions improve language skills by helping students visualize what they hear, increase L2 comprehension and production as well as students' motivation.

We can conclude that captions contributed significantly to better listening comprehension of authentic medical videos. Data collected from the questionnaire revealed that students are able to read subtitles while video watching as well as concentrate on the content of the video. Some students complained that they had not been able to follow some of the videos watched because of the accents. Although fast speech of the native speaker and unfamiliar accent (American English or regional accent) is rather disturbing, the study participants consider captions as contributing to their confidence in understanding spoken English. Thus, captioned videos are an important tool for medical English students enhancing L2 learning and teaching.

Interestingly, the native speakers in the viewed authentic medical videos spoke mostly American English (AE), but the L2 students have been learning British English (BE) standard since the primary school. Therefore, the impact of AE on listening comprehension in advanced learners should be the subject of our further research in this area.

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