Teaching listening comprehension through online academic lectures

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Abstract. Academic mobility is becoming increasingly popular for students and provides great opportunities to communicate with other people, get useful knowledge and experience and practice using a foreign language. Education abroad includes listening to lectures as one of the most common way of presenting information. Thus, students need preparation to understand foreign lecturers and be successful in their studies. Having studied 30 online lectures from diverse MOOCs, the authors identified that their structure is similar to traditional lectures. Consequently, the research was done with the use of academic lectures from the MOOC «Thermodynamics» to teach the experimental group of students from Peter the Great St. Petersburg Polytechnic University. For conducting the research the authors used a pedagogical experiment and descriptive statistical methods to analyse data received (T-statistics, chi-square and Fisher’s test). As a result, students from the experimental group showed better findings of listening comprehension skills with the average score of 65.5% compared to 44.4% of the control group. Moreover, the experimental group showed improvement in listening comprehension skills from the average score of 43% at the initial stage to 65.5% at the end of the experiment proving the effectiveness of learning activities the authors designed and used.

1. Introduction
The processes of globalization and the internationalization of education pose new challenges for higher education, such as training professional workers who can work effectively in a global market, preparing students for the difficulties associated with global processes such as migration and academic mobility and others [1-6]. Academic mobility programs are becoming more widespread, and English language has become Lingua Franca in the global academic environment. It is therefore of great importance for students to understand the language variations in the global use of academic English, develop their communicative and intercultural competence to ensure mutual understanding in communication in a foreign academic environment [7]. Thus, educators are faced with the task of developing such an EAP (English for Academic Purposes) course that will help students overcome linguistic and cultural differences in the academic environment, where the language of education and communication is English [8]. One of the most difficult aspects of learning a foreign language is listening [9, 10], which is why it is important to pay special attention to the development of listening skills in academic lectures as a part of an EAP course.

The main goal of the presented research is to develop a methodology of teaching listening comprehension involving academic lectures of online courses. To achieve this goal we had to complete the following tasks.
1. To conduct a literature review in order to provide theoretical basis of our research;

2. To carry out a comparative analysis of classroom academic lectures and lectures of online courses to identify how similar their structure and linguistic features are;

3. To select video lectures and design a set of learning activities aimed at developing students’ listening comprehension skills;

4. To conduct experimental training and perform statistical analyses of the obtained data in order to prove the efficiency of the methodology described in the paper.

An academic lecture is one of the most popular genres of academic discourse [11, 12]. Despite the fact that students attend lectures in various disciplines, they rarely encounter a lecture in a foreign language in the first years of study at university. Senior students of many technical departments at Peter the Great St. Petersburg Polytechnic University have English lectures on some core subjects in their curriculum, therefore, we consider it appropriate to start teaching students strategies to listen and outline lectures in a foreign language during their first year at university.

A lecture is an integral part of the scientific and pedagogical sphere of communication, where a lecturer significantly exceeds their audience in knowledge of the subject and has a communicative initiative. A lecture is based on informative communication, in addition to this, lecturers often use strategies to control the audience’s attention [11]. Characteristic features of this genre are the use of special lexical and grammatical elements that perform different functions, for example, encouraging students to speak, ask, confirm, disagree, and others [12-14]. Each lecture is characterized by an organizing component, the proportion of which may vary. Among the organizing markers of the lecture N.G. Burmakina distinguishes the following: markers of expression of author’s opinion, citation markers and compositional signals that help listeners to navigate during the presentation [11].

V. Malavska, having studied 3 randomly selected lectures at St. Petersburg State University and 4 lectures at Oxford and Yale universities, offers the following components of the lecture [12] (table 1).

| Move 1: Warming up | Move 2: Setting up the lecture framework | Move 3: Putting the topic in context | Move 4: Concluding the lecture |
|-------------------|---------------------------------------|--------------------------------------|-------------------------------|
| Step 1: Making a digression | Step 1: Announcing the topic | Step 1: Showing the importance of the topic | Step 1: Referring to the audience |
| Step 2: Housekeeping | Step 2: Indicating the scope | Step 2: Relating “new” to “given” | Step 2: Looking ahead |
| Step 3: Looking ahead | Step 3: Outlining the structure | Step 3: Referring to earlier lectures | Step 3: Housekeeping |
| | Step 4: Presenting the aims | | Step 4: Summarizing the content and concluding the lecture |

The effectiveness of listening comprehension increases due to the use of identification phrases and constructions in a monologue, as well as verbal visual supports [15, 16].

Many researchers and ESL practitioners are attempting to combine online and classroom foreign language training to achieve the greatest effectiveness in learning. They agree that integration of online and offline education makes an ESL course more flexible, allows quick adaptation to the changing requirements of educational systems, solves the problem of lack of classroom hours and increases the level of students’ motivation to study a foreign language [17-20]. Many online courses located on such platforms as edX.org, Coursera.org, FutureLearn.org and others, offer online lectures and other materials aimed to develop academic English speaking, listening and writing skills. The uefap.com website, developed by E. Gillett, based on his research on academic English discourse, contains theoretical material and practical exercises aimed to help the users of this website develop their academic skills within academic English. In the academic lectures section a list of identification phrases and constructions is provided, which will help students navigate through an academic lecture. The following is a list of some of them [21].
knowledge of an academic lecture structure and English identification phrases will help students navigate the teacher's monologue, highlighting the main points and predicting the content of the lecture. Many scholars are currently exploring the learning potential of massive open online courses (MOOCs). Among the advantages of MOOCs located on popular platforms, they include a laconic presentation of material, lecturers from the best universities in the world, the presence of numerous feedback channels, accessibility, and others [22].

Some modern scholars considering innovative trends in education note that the discourse of MOOCs has many similarities with academic discourse. A.V. Zubkovsky and A.S. Ogneva, studying the specifics of the MOOC discourse, cite in their work a comparative table of characteristics of the discourse of online courses and academic communication, which shows that these types of discourse have much in common [23].

Since MOOCs are an inexhaustible resource of authentic lectures in a number of different subjects, using the continuous sampling method, we selected 30 online lectures on various platforms and compared their structure with the structure of classroom lectures proposed by V. Malavska. According to the results of the study, we can conclude that the structure of online lectures is similar to the structure of classroom foreign language lectures. Consequently, MOOC lectures can be used to prepare students for academic mobility.

2. Methods

The information for the research was sourced from the review and analyses of literature concerning English language teaching and development of listening comprehension skills. For this purpose diverse scientific papers, articles and books were scanned.

The experimental training was conducted using empirical methods which included the following stages.

1. Analysing the structures of traditional and online lectures with the use of the continuous sampling method where the authors randomly selected 30 online video lectures from various MOOCs and investigated the issue under question.

2. Formulating learning activities aimed at students’ development of listening comprehension skills. This stage of the research comprised of choosing one appropriate for the experiment MOOC and formulating pre- and post-listening tasks aimed at development of students’ listening comprehension skills. Furthermore, several exercises required assessment criteria which the authors created basing on IELTS Writing band descriptors.

3. Pedagogical experiment in the experimental group of students. During the initial stage of the experiment we tested the level of students’ listening comprehension in the experimental and control groups using the set of testing tasks designed by the authors. Intermediate stages consisted of monitoring the development of listening comprehension skills of the participants from the experimental group with the use of learning activities. At the final stage we examined the development of listening comprehension skills of students from both groups to conduct further analyses.

4. Carrying out the data analysis using the descriptive statistical method to critically analyse the findings received. For this purpose we used SPSS program where T-statistics, chi-square and Fisher’s test were conducted to find statistical significance between these two groups of participants.

The study took place at Peter the Great St. Petersburg Polytechnic University, Russia. Two groups of undergraduate students were recruited to collect data for this study. The survey involved 32 first-year students studying for the Bachelor’s degree at the Thermophysics of Power Plants Department,
Institute of Energy: 16 students in the experimental group and 16 students in the control group, female \( (n=10) \) and male \( (n=22) \). All respondents volunteered to take part in the survey; they were informed about the objective of the study and guaranteed anonymity.

The choice of participants was motivated by the importance of studying English language at this department due to (1) students’ low command of English, which was proved by receiving weak results after conducting the placement test at B1 level; (2) possible participating of students in international exchange programs and demand of developing their English language skills, namely, listening comprehension skills.

3. Results and Discussion

Before conducting experimental training, we decided to investigate how much the structure of lectures of online courses corresponds to the structure of classroom lectures. Using the continuous sampling method, we selected 30 online lectures on various online platforms (such as edX.org, coursera.org and others) and compared their structure with the structure of classroom lectures proposed by V. Malavska described earlier in the paper.

We found out that online lectures and classroom lectures have a similar structure. For example, 100% of the online lectures we watched contain a forecast of the lecture content, 63% have a justification for the relevance of the lecture topic, 100% of the lectures have reference to the audience at the final stage, 55% of online lectures contain a reference to the topic of the future lecture. According to the results of the study, we can conclude that the structure of online lectures is similar to the structure of classroom academic lectures. Consequently, online lectures can be used to prepare students for academic mobility programs.

The initial stage of the experimental training consisted of selecting a massive open online course including video lectures and creating learning activities for developing students’ listening comprehension skills. We decided to choose online lectures which are connected with the students’ major. This selection is based on ideas of CLIL (Content and Language Integrated Learning) which point out that the students’ success in learning a foreign language in the CLIL classroom is higher than in a traditional ESL classroom [24-26]. For this reason, the MOOC «Thermodynamics» designed by IITBombayX (Indian Institute of Technology Bombay) based on Edx.org platform (https://courses.edx.org/courses/course-v1:IITBombayX+ME209.1x+1T2019) was chosen. This MOOC was appropriate for the participants of this research because of (1) significance of the topic studying in this MOOC for the students of the Thermophysics of Power Plants Department; (2) authentic accent of the lecturer helping students to get used to the foreign speech.

The first step in conducting the pedagogical experiment was showing students of both experimental and control groups the video lecture «Engineering and Thermodynamics» and assessing their level of listening comprehension skills with the help of 3 learning activities including exercises on (1) ticking signpost phrases they hear while listening from the list of 25 diverse phrases given; (2) identifying the function of each signpost phrase from the first task; (3) summarizing the main idea of the lecture in 4-6 sentences. Answers of the participants to the first two tasks were evaluated quantitatively giving the students the maximum of 36 points. To ensure objectivity in assessing students' works, it is necessary for researchers in the field of education to develop assessment criteria [27]. Therefore, the last task was assessed with the use of descriptors designed by the authors based on IELTS Writing band descriptors also giving the students from 1 to 9 points (table 2).

Table 2. Assessment criteria of summarizing the main idea of the lecture.

| Points | Criteria |
|--------|----------|
| 8-9    | Sentences fully reveal the main idea and main points of the lecture, parts of the sentences are logically interrelated, there are no grammatical and punctuation errors. |
| 7      | Sentences fully reveal the main idea and the main points of the lecture, but contain extra details/examples that are not significant for expressing the main idea of the text, 1-2 grammatical and/or punctuation errors are made that do not affect the understanding of the sentence |
5-6 points The topic is defined correctly, sentences reveal the main idea of the lecture, but contain extra details/examples or not enough information about the main points of the lecture, more than 2 grammatical and/or punctuation 2 errors are made that do not affect the understanding of the sentence.

0-4 points Sentences do not reveal the main idea and the main points of the lecture and/or contain unnecessary details/examples that are not typical for expressing the main idea of the text, more than 2 grammatical and/or punctuation errors that do not affect the understanding of the sentence and/or 1 mistake is made distorting the meaning of a sentence.

The results obtained showed that the average overall point in the experimental group was 17.69 (38%) and in the control group was 18.31 (39%) out of total 46 points proving the low level of listening comprehension skills of the students from both groups (table 3).

**Table 3.** The level of listening comprehension skills of the participants on the initial stage.

| Participants          | Number | Average score | Standard deviation | Standard error |
|-----------------------|--------|---------------|--------------------|----------------|
| Experimental group    | 16     | 17.69         | 6.215              | 1.554          |
| Control group         | 16     | 18.31         | 4.868              | 1.217          |

Using the T-statistic for independent samples, we found out that there were no statistically-significant differences between two groups of students in terms of their level of listening comprehension skills as the overall \( p \)-value was more than the critical \( p \)-value (\( p = 0.754, \alpha = 0.05 \)).

Dwelling on the data received on this stage of the research we can see that all the tasks were failed by the students of both groups with the average scores of 4.9 (37.6%) in the experimental group and 5 (38.4%) in the control group out of 13 points for the exercise on ticking signpost phrases while listening; 8.875 (36%) in the experimental group and 9.3 (38.75%) in the control group out of 24 points for the exercise on identifying the function of each signpost phrase; 3.875 (43%) in the experimental group and 3.9 (43%) in the control group out of 9 points for the exercise on summarising the main idea of the lecture (table 4).

**Table 4.** The average score for each task used for assessing the level of listening comprehension skills of the participants on the initial stage.

| Task                                             | Experimental group | Control group |
|--------------------------------------------------|--------------------|---------------|
| 1. Ticking signpost phrases while listening       | 4.9 (37.6%)        | 5 (38.4%)     |
| 2. Identifying the function of each signpost phrase| 8.875 (36%)        | 9.3 (38.75%)  |
| 3. Summarising the main idea of the lecture       | 3.875 (43%)        | 3.9 (43%)     |

Consequently, it can be seen that students do not figure out the signpost phrases and their functions and do not know how to summarise a lecture. That is the reason why the authors decided to design learning activities concerning these main issues in developing listening comprehension skills.

The second step in this study was giving the students of the experimental group (1) recommendations on outlining lectures including functions of the sign-post phrases and common abbreviations for outlining in English language; (2) a list of active vocabulary used in the next video lecture «Basic ideas and definitions of thermodynamics» to get acquainted with the lexis and help them understand the lecture better. After studying the recommendations and the vocabulary, the students were shown the lecture, asked to make notes on it and given an exercise to fill in the gaps in the summary of this video lecture using the words they discussed previously. This task was given to evaluate the students’ understanding of the lecture and usage of the terms used in the topic of thermodynamics. The findings were not quite satisfying as the average score of all students was 3.125 (39.06%) out of 8 points and only 7 students (43.75%) succeeded (table 5).

**Table 5.** Assessment of the level of listening comprehension skills of the students of the experimental...
group on the second step of the research.

**Intermediate stage 1 of the experiment**

| Results of the participants | Number of the participants |
|-----------------------------|-----------------------------|
| Unsatisfactory (0-3 points) | 9 (56.25%)                  |
| Satisfactory (4-5 points)   | 4 (25%)                     |
| Good (6-7 points)           | 3 (18.75%)                  |
| Excellent (8 points)        | 0 (0%)                      |

Average score = 3.125 points (39.06%)

Students succeeded = 7 (43.75%)

Students unsucceeded = 9 (56.25%)

The third step in the research was also giving the students of the experimental group a list of active vocabulary from the next lecture «The First Law of thermodynamics. Part 1». Hereafter, the students watched the video lecture, outlined it and were given a learning activity to describe the graph concerning the adiabatic process in the first law of thermodynamics using the vocabulary given previously and their notes on the lecture. The description of the graph aimed at the assessment of the students’ level of listening comprehension skills and writing skills. The task was evaluated using the assessment criteria designed by the authors. The research data were better in comparison with the second step of the study as far as the average score of all students was 5.25 (58.3%) out of 9 points and almost all students succeeded with this task — 12 (75%) (table 6).

**Table 6. Assessment of the level of listening comprehension skills of the students of the experimental group on the third step of the research.**

| Results of the participants | Number of the participants |
|-----------------------------|-----------------------------|
| Unsatisfactory (0-4 points) | 4 (25%)                     |
| Satisfactory (5-6 points)   | 7 (43.75%)                  |
| Good (7 points)             | 4 (25%)                     |
| Excellent (8-9 points)      | 1 (6.25%)                   |

Average score = 5.25 points (58.3%)

Students succeeded = 12 (75%)

Students unsucceeded = 4 (25%)

The final step of this issue was giving the students of both experimental and control groups to watch the video lecture «The First Law. Part 2» from the MOOC and asking them to outline it and summarise the main idea in 4-6 sentences as it was given in the initial part of the research. The task was assessed with the use of the assessment criteria designed by the authors and was conducted to find out the students’ level of listening comprehension skills after applying the learning activities designed by the authors in the experimental group and not developing such skills in the control group. The results illustrated that the students of the experimental group succeeded more in this task with the average score of 5.9 (65.5%) out of 9 points comparing to the average score of the students of the control group resulting in 4 points (44.4%) (table 7).

**Table 7. Assessment of the level of listening comprehension skills of all the participants on the final step of the research.**

| Task                        | Experimental group | Control group |
|-----------------------------|--------------------|---------------|
| Summarising the main idea of the lecture | 5.9 (65.5%)        | 4 (44.4%)     |

To contend the data received we used the T-statistic for independent samples and discovered that there were statistically-significant differences between two groups of students in terms of their level of
listening comprehension skills at the final stage of the research as the overall \( p \)-value was less than the critical \( p \)-value (\( p = 0.000, \alpha = 0.05 \)).

Furthermore, to prove the effectiveness of the set of learning activities applied in the study the authors used SPSS and made a chi-square test of independence and Fisher’s exact test to identify the points of convergence or divergence of the points for the exercise on summarizing the main idea of the lecture received by the students of the experimental group on the initial and final stages of the experiment (table 8).

**Table 8.** The average score for the task on summarising used for assessing the level of listening comprehension skills of the participants of the experimental group on the initial and final stages.

| Experimental group | Initial stage | Final stage |
|--------------------|--------------|-------------|
|                    | 3,875 (43%)  | 5,9 (65.5%) |

The statistically-significant difference in their level of listening comprehension skills was proven by Fisher’s coefficient where the overall \( \phi \)-value was less than the critical \( \phi \)-value (\( \phi^* = 0.005, \alpha = 0.05 \)). Thus, we can conclude that the set of learning activities used during the experiment was definitely effective for developing the undergraduate students’ level of listening comprehension.

4. Conclusions

The processes of globalization and internationalization of education have led to an increase in the number of students traveling to foreign universities in order to receive education there. Many universities offer a wide selection of academic mobility programs, however, it is also the responsibility of educators to prepare students to study in foreign universities. To survive in a foreign language academic environment, a student must possess a number of skills and abilities, including the skills of academic writing, speaking and listening.

1. The literature review revealed the relevance and necessity of improving students’ listening comprehension skills to help them succeed in their studies during exchange programs and even studying in a foreign language at their local universities.

2. The authors of this article in the search of the ways to develop students’ academic listening comprehension skills turned to video lectures of MOOCs. After a comparative analysis of online and classroom lectures, we found that they have the similar structure and, therefore, serve as an excellent tool for developing listening comprehension skills of academic lectures.

3. The authors designed learning activities and assessment criteria as pre- and post-listening tasks for video lectures from the MOOC «Thermodynamics» chosen for conducting the experiment in two groups of students form Peter the Great St. Petersburg Polytechnic University.

4. At the initial stage of the experiment students of both groups had no statistically-significant differences, after utilising our learning activities and watching 4 video lectures the findings showed statistically-significant difference between the experimental and control groups with the average score of 65.5% and 44.4% of listening comprehension skills, respectively.

5. Moreover, at the initial stage of the research the experimental group had the average score of 43% of listening comprehension skills and at the final stage showed the average score of 65.5% proving the effectiveness of using MOOCs in students’ preparation for academic mobility programs.

The results of our study will be useful both for scholars who study the issues of teaching foreign languages, and for EAP practitioners.

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