University Teachers' Verbal and Nonverbal Behavior as a Factor of Students' Evaluating Online-lectures

Vladimir Panferov [0000-0002-3528-3122], Svetlana Bezgodova [0000-0001-5425-7838], Svetlana Vasileva [0000-0002-6052-3431], Artem Ivanov [0000-0001-8377-309X], Anastasia Miklyaeva [0000-0001-8389-2275]

Herzen State Pedagogical University of Russia, Saint-Petersburg, Russia
48 Moyka Embankment, St. Petersburg, 191186, Russia
v-panferov@mail.ru, s.a.bezgodova@gmail.com, vivatvsv@mail.ru, ivan0vartems@yandex.ru, a.miklyaeva@gmail.com

Abstract. The significance of psychological investigations of e-learning corresponds with intensive development of online education. The article presents the results of the study, which was aimed at analyzing the features of the university teachers' verbal and nonverbal behavior as a factor of students' evaluating the effectiveness of online-lectures. Students (n=453) watched videos of 30 online lectures (10-12 minutes, 50% female lecturers) and evaluated their content (parameters "Quality of content", "Usefulness for future professional activities") and emotional impression. The verbal and nonverbal behavior of lecturers was described by two experts with such parameters as "Kinetics", "Paralinguistic", "Interaction with students" and "Lecture content". The results of cluster analysis reveal three behavior models of online-lecturers: "open communicative position with spontaneous verbal behavior", "open communicative position with drafted verbal behavior" and "closed communicative position with drafted verbal behavior". Multivariate analysis identified the models of verbal and nonverbal behavior of male and female lecturers, which determine the highest evaluation of lectures: open communicative position with drafted verbal behavior for female lecturers and closed communication position with spontaneous verbal behavior for male lecturers.

Keywords: online-lecture, university teacher, verbal behavior, nonverbal behavior, students, students' subjective evaluation of lecture effectiveness.

Introduction

Nowadays, there is a rapid growth of distance learning technologies in education, including the spread of online-lectures. These technologies are expanding the pool of potential students [25], providing educational opportunities for employed students as well as for students with health problems, members of racial and ethnic minorities [16]. Thus, online technologies make educational services more accessible. At the same time, online learning places high demands on students' academic motivation and self-regulation [9, 18]. Therefore, the problem of its effectiveness in general and the

effectiveness of online lectures in particular is related to the students' interest in learning, readiness for autonomous working with educational materials and using them to complete various educational tasks. Psychological factors of students' interest and motivation in offline learning are studied fairly completely to date. Psychological studies of offline learning show that developing and improving of students' interest in offline learning is largely determined by verbal and non-verbal behavior of the teacher, which manifests his personal and professional traits [3, 13]. Effective and ineffective models of the teacher's offline behavior are described in previous studies. However, "teacher-student" interaction in online learning differs appreciably [44], therefore it is not possible to transfer this information directly. Currently, the patterns of effective and ineffective models of the teacher's online behavior have not been sufficiently studied [7]. This study analyzes the features of verbal and non-verbal behavior of an online-lecturer, which contribute to improving the effectiveness of online-lecture (by students' evaluating).

1 Verbal and nonverbal behavior of online-lecturer

1.1 Online-lecture as a form of "teacher-student" interaction

An online-lecture is a form of transmission of educational material using the Internet. Experts identify three forms of online-lectures: public media-lecture (monologue of the lecturer to the real learners in a classroom, which is filmed and posted on the Internet); lecture-visualization with audio (a lecturer comments some slides or clips, but there are no his/her image in the video); media-lecture without audience (lecturer gives information in the studio without learners) [46]. This classification is based on two parameters: the availability/absence of a teachers' image and real learners in a video. Each of these parameters could influence the students' perception of educational information.

The availability of a teacher's image in a video was evaluated negatively in the early stages of online technologies, since it was assumed that it added excess information to educational materials and provided an excessive cognitive load on students [14]. However, the recent studies have shown that the students usually prefer video-lectures, which include the images of the teachers. Moreover, the students are more involved in this type of online-lecture. The availability of the teacher's image in the video contributes to the perception of various social signals, which contribute to improving the outcomes of learning [12, 36]. Experiments show that students spend no more than 25 % of the time to perceiving of the teacher, and it does not disrupt the assimilation of knowledge and does not increase the time to process the information [19]. Students are more engaged in the content of video-lecture if the teacher's image is available [26]. The quality of assimilation of the information improves if online-lecturer is personalized [33]. In addition, the availability of a teacher's image assures students that they are able to complete the educational tasks, which are shown in the video [29]. However, the effectiveness of the video with a teacher's image varies depending on the type of knowledge: this image could contribute to the assimilation of declarative knowledge, but interfere with the development of procedural skills [28].

In general, research data mainly support the theory of social presence [43] as a more relevant framework for studying online communication “teacher-student”. This theory argues that social signals from the teacher (eye contact, facial expressions, gestures, etc.) contribute to better understanding of the information by the students [48, 49].

The problem of the audience's presence in the video-lecture remains debatable. Some researchers believe that the availability of the real learners in the video is more preferable, since it contribute to developing an emotional background of “teacher-students” communication, which catalyzes the transfer of the teacher’s personal experience [30]. And, the lecturer’s behavior highlights his/her personal and professional individuality if the learners are available, because it is the most common context of “teacher-students” interaction [24]. “Student-student” interaction also is a significant part of online learning [42]. Thus, the students’ demand for presence some learners on the video could be quite strong. At the same time, the availability of some learners in the video could promote the reduction of the students’ subjective contact with the teacher and the decrease the degree of their involvement in the online-lecture.

1.2 Examination of verbal and nonverbal behavior of the online-lecturers

Currently, the online-lecturers’ behavior and its impact on the effectiveness of online learning are not enough detailed in empirical studies, despite the fact that other aspects of online communication (for example, social networks or on dating sites) are described more completely. The main research focus is on verbal and nonverbal means for expressing the social presence of the teacher, which is crucial for attracting online students [4, 39]. The most important predictors of social presence in a virtual classroom are social cues, and teachers should provide them for their online students [38, 45]. The researchers emphasize that, a presence does not emerge automatically in the Internet environment, but it needs intentional development [34]. In this regard, the issue of the ways to establishing and maintaining a presence of the teacher is relevant for online education [35]. Another issue concerns the teacher’s means of encouraging social presence of students, as it is considered an important factor in the development of interest in learning and its effectiveness [47]. The online-lecturer has the greatest impact on maintaining the presence, as carried a dominant communicative load [21].

Several verbal and nonverbal aspects of the teacher’s online-behavior is proved as the factors, which contribute to enhancing social presence and thus to improving the effectiveness of online learning. Some experts describe elements of nonverbal behavior that affect the effectiveness of online-lectures: relevant use of paralinguistic means (pauses, timbre, rapidity of speech, expressiveness, etc.) [11]; bodily signals supporting a sense of presence [8]; teacher’s immediacy as a complex behavioral model [6]; kinetic aspects of communication (gestures, facial expressions, pantomime) [17]. Other researchers describe the features of the online-lecturer's verbal behavior: the special introductory messages to manage students’ impressions [40]; the peculiar techniques for constructing and maintaining the expert status [20]; the methods for personification of the lecture communications, including the use of personal pronouns *Me* and *We* [37]. Special attention is paid to the presentation of educational information in a video lecture, which is implemented by use of verbal techniques too [42].

The content of the online-lecture should be as informative as possible, but clear and structured, in order to avoid excessive cognitive load [32]. The importance of text structuring also reveals in other genres of online communication [15].

In general, studies of online-lecturer's verbal and nonverbal communication show its relevance for the social presence, and, consequently, for the effectiveness of online-lecture, but the complete models of the effective verbal and nonverbal behavior of online-lecturer have not yet been described.

We should note that the gender specificity of verbal and nonverbal behavior is found out in terms of offline communication [5, 27, 31], in particular gender specificity of the teachers' behavior [1]. Moreover, students could interpret the same behavior of male and female teachers differently [10, 22]. But, we have not found information about gender characteristics of verbal and nonverbal behavior of the online-teachers.

Thus, we can assume the proven contribution of the teacher's verbal and nonverbal behavior to the effectiveness of online-lecture. But, many issues of the effectiveness of the online-lecturer's verbal and non-verbal behavior remain unclear. It determines the importance of studying the relationship between the verbal and nonverbal behavior of an online-lecturer and its relation to students' evaluating of a lecture.

2 The present study

This study was aimed at analyzing the features of the teacher's verbal and nonverbal behavior as a factor of students' evaluating the effectiveness of online-lecture. Firstly, we hypothesize that it is possible to identify generalized models of verbal and nonverbal behavior of teachers, which are connected with high students' evaluates of online-lecture. Secondly, we predicted the difference between the models of verbal and nonverbal behavior of male and female online-lecturers that allow students to rate an online-lecture highly.

2.1 Participants and procedures

483 participants took part in the study, among them 30 teachers (aged 27-77, M=43.17; SD=11.56, 50 % female, teaching experience 12.13±8.52 years) and 453 students of pedagogical faculties (aged 18-24, M=19.10; SD=1.27, 79.6 % female). For the study, a video recording of 30 lectures was made in the format of a media-lecture without audience (video characteristics: 25 frames/sec, 1920x1080; 117 kilobits/sec, 48000 kHz, stereo). All lectures were presented as part of the Educational psychology course. The teachers chose the topics for their lectures on their own. To unify the shooting conditions, we asked teachers not to use multimedia presentations during the lecture, but if necessary, teachers could use the whiteboard. Each lecture lasted 10-12 minutes. According to the research protocol, students who participate in the study watched an online-lecture by an unknown teacher, and then evaluated it using the questionnaire. We invited 15-18 students to watch every online-lecture. The students and the teachers took part in the study was voluntary; each participant was informed about the research program and signed an informed consent.

2.2 Measures

2.2.1. Analysis of the lecturer's verbal and nonverbal behavior

Two independent experts carried out the analysis of the lecturer's verbal and nonverbal behavior using the scheme, which is presented at Table 1. In accordance with the literature review, we identified kinetic (location in the frame, gestures, poses, eye contact; facial expressions) and paralinguistic (intonation) parameters of nonverbal behavior, as well as content (structuring and drafting the lecture) and interactive (method of self-presentation, speech tempo, involvement of the audience in communication) parameters of verbal behavior. Developing the analysis scheme, we took into account the opportunity to objective evaluation of these parameters. The experts had detailed descriptions of the parameters. We used the schemes for analysis of verbal and nonverbal behavior in "face-to-face" communication [20, 23, 38] to make the descriptions of verbal and nonverbal parameters of online-lecturers' behavior. Afterward, the experts' rates were averaged.

Table 1. The scheme for analysis of lecturers' verbal and nonverbal behavior

Parameters	Indicators	Measures
	Nonverbal behavior	
Kinetics	Location in the frame: sitting; standing; moving	Dichotomous score (1–sign is present, 0–absent)
	Gestures: illustrators; adapters; concern about appearance	Absolute units
	Posture: open posture – closed posture; facing the audience –removed	% of total time
	Eye contact with the camera	% of total time
	Facial expressions: goodwill – neutrality	Smiles, absolute units
Paralinguistic	Intonation accents	Absolute units
	Verbal behavior	
Interaction with students	Tempo of speech	Words, absolute units per minute
	Self-presentation: name; position/status	Dichotomous score
	Involving students in communication: addressing the audience; jokes; using pronoun *I* and *We*)	Absolute units
Lecture content	Structuring: verbalizing the lecture purpose and plan; summing up the lecture	Dichotomous score
	Drafting: reading pre-prepared text; availability of text support (paper or gadget); links to authorities	Dichotomous score

2.2.2. Evaluating the effectiveness of online-lectures by students

To evaluate the effectiveness of the online-lecture, students were offered four 7-point scales. Two of these scales dealt with the content aspect of the lecture ("Quality of content", "Usefulness for future professional activities") and other ones concerned its emotional impression ("Interest", "Readiness to watch such lectures on their own"). Students' scores for each lecture were averaged.

2.3 Data Analysis

We used averaging the experts' descriptions of lecturers' verbal and nonverbal behavior as well as the students' evaluations of the content and emotional impression of online-lectures. Cluster analysis (Ward's method, option "by columns") was carried out for a comprehensive description of models of online-lecturers' verbal and nonverbal behavior. Criteria analysis (Mann-Whitney U-test, Fisher φ*-test) was applied to compare groups of teachers with different models of verbal and nonverbal behavior. The distribution of student lecture scores calculated using the Kolmogorov-Smirnov criterion d, which allowed us to use ANOVA-analysis F ($0.11 \leq d \leq 0.12$, $p > 0.20$) for their analysis. These statistical procedures were implemented by IBM SPSS Statistics.

3 Results

At the first stage of the study, we analyzed the features of verbal and nonverbal behavior of teachers (see Table 2). The comparison analysis revealed that the male and female behavior significantly differed in the parameters "availability of a text support", "using the pronoun We", "smile", which were higher in women as well as in the parameter "giving a lecture standing/moving", which was higher in men. The next stage was aimed to identify the most distinctive features of lecturers' verbal and nonverbal behavior by cluster analysis. Since our data had been presented by different types of scales, we converted numerical and percentage scales to rank scales by quartile selection. Clustering allowed us to distinguish two groups of lecturers, which differed in nonverbal behavior (L=6.2), and two groups – in verbal behavior (L=5.4). Pairwise comparison showed the parameters of verbal and nonverbal behavior with the greatest distinguishing power: "smiles", "open posture", "jokes" and "availability of text support" (see Table 3).

According to these results, we identified two types of lecturers' nonverbal behavior: open communication (group 1, n=20) and closed communication (group 2, n=10). In turn, the following types of verbal behavior were described: drafted verbal behavior (group 1, n=18) and spontaneous verbal behavior (group 1, n=12). Eventually, we obtained three models of lecturers' behavior: 1) the lecturers with open communicative position and spontaneous verbal behavior (M_1, n=12); 2) the lecturers with open communicative position and drafted verbal behavior (M_2, n=8); 3) the lecturers with closed communicative position and drafted verbal behavior (M_3, n=10). We did not find any lecturers with closed communicative position and spontaneous verbal behavior among the participants of our study.

Table 2. Verbal and nonverbal behavior of online-lecturers

Parameters	Total	Male	Female	*U* / *φ**
Nonverbal behavior				
Sitting	63.3%	60.0%	66.7%	-
Standing or moving	36.7%	66.7%	26.7%	*φ**=2.26, p<0.05
Gestures-illustrators	64.11	64.87	63.41	-
Gestures-adapters	24.57	39.27	9.87	-
Gestures of concern about appearance	2.12	1.26	2.93	-
Open posture	78.2%	72.7%	82.9%	-
Posture, facing the audience	97.3%	97.3%	97.4%	-
Smiles	8.97	6.80	11.13	*U*=64.50, p<0.05
Intonation accents	125.73	114.06	137.40	-
Eye contact with the camera	52.0%	45.3%	58.4%	-
Verbal behavior				
Speech tempo	108.35	109.32	107.37	-
Introducing himself/herself	40.0%	46.7%	33.3%	-
Presenting his/her position/status	43.3%	53.3%	33.3%	-
Links to authorities	76.7%	73.3%	80.0%	-
Addressing the audience	1.87	1.00	2.33	-
Verbalizing the lecture purpose and plan	100%	100%	100%	-
Summing up the lecture	76.7%	73.3%	80.0%	-
Jokes	0.70	0.80	0.60	-
Using the pronoun *I*	6.30	7.67	4.93	-
Using the pronoun *We*	8.67	5.66	12.07	*U*=69.00, p<0.05
Reading pre-prepared text	13.3%	6.7%	20.0%	-
Availability of text support	63.3%	40.0%	86.7%	*φ**=2.81, p<0.01

Table 3. Comparison of lecturers' groups identified by cluster analysis

Parameters	Group 1	Group 2	*U* / *φ**
Smiles (nonverbal behavior)	1.58	0.51	U=66,00 p<0.05
Open posture (nonverbal behavior)	89.4%	65.7%	U=68,00 p<0.05
Availability of text support (verbal behavior)	100%	8,3%	ϕ*=2.23, p<0.05
Jokes (verbal behavior)	0,30	1,10	U=66.5, p<0.05

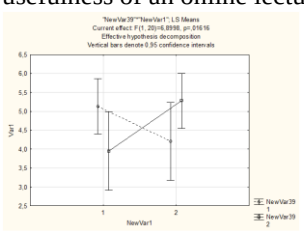
At the third stage of analysis, we compared the students' evaluations of the content and the emotional impression of the lectures in line to the lecturers' behavior models. The ANOVA analysis did not obtain significant difference; although there was

a trend to decreasing evaluations of lectures in the cases of lecturers' closed communicative position and drafted verbal behavior (see Table 4).

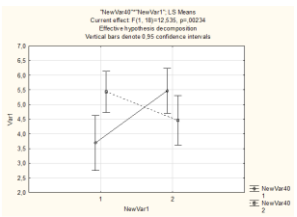
Table 4. Students' evaluations of online-lectures

Parameters	M_1	M_2	M_3	F	p
Interest	4,92	4,91	4,63	0,16	0,86
Readiness to watch such lectures on their own	4,76	4,71	4,26	0,45	0,64
Quality of content	5,07	5,07	4,60	0,64	0,54
Usefulness for future professional activities	4,71	4,53	4,36	0,60	0,56

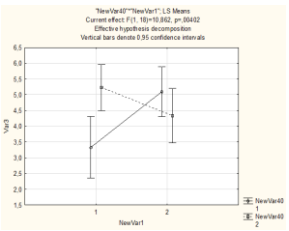
Finally, we conducted analysis of the relations between the students' evaluations of the lectures and the models of verbal and nonverbal communication among male and female lecturers. The lectures of female teachers were evaluated as more interesting in the cases of their open communicative position. Conversely, the lecturers of the male teachers seemed more interesting if the lecturer demonstrated a closed communicative position (see Fig. 1.1). The characteristics of verbal behavior showed another trend: a male teacher's lecture was perceived as more interesting when his speech looked spontaneous and natural, while an interesting lecture from a female teacher involved preliminary drafting (see Fig. 1.2). Similar results were obtained for evaluations the usefulness of an online lecture (see Fig. 1.3).



1.1



1.2



1.3

Fig. 1. Multifactor ANOVA results. Note: Var 1 – "Interest", Var 3 "Usefulness", NewVar 1 – sex (1 – male, 2 – female), NewVar 39 – nonverbal behavior (1 – group 1, 2 – group 2), NewVar 40 –verbal behavior (1 – group 1, 2 – group 2)

4 Discussion

According to the empirical results, we described different types of university teachers' verbal and non-verbal behavior in times of online-lectures. The signs "open pose – closed pose" and "smiles" demonstrated the most distinctive sense among the parameters of non-verbal behavior. These signs are usually considered as characteristics which express the readiness to communication [42]. Therefore we termed corresponding types of lecturers' non-verbal behavior "open communicative position" and "closed communicative position". An open communicative position is characterized by a predominance of open poses and smiles. Closed communicative position includes a tendency to increase the time of closed poses, as well as to reduce the num-

ber of smiles or their absence. Pre-prepared text sup-port (in paper form, smartphone or laptop) and jokes were identified as the distinctive parameters of verbal behavior. The lecturers who used the text support were less likely to joke during the lecture, while the lecturers who did not have any lecture notes, joked significantly more often. As a joke is a sign of spontaneous communication [41], these types of lectures' verbal behavior were called “drafted verbal behavior” and “spontaneous verbal behavior”. Combining these types of lecturers' verbal and non-verbal behavior suggested describing three models of teachers’ behavior throughout online-lectures: “open communicative position with spontaneous verbal behavior”, “open communicative position with drafted verbal behavior” and “closed communicative position with drafted verbal behavior”.

In contrast to our first hypothesis, we did not find the models of the online-lecturers’ behavior, which determined the highest evaluations of lectures by students. Despite the tendency to decrease the ratings of online-lectures of teachers with a closed communicative position and drafted verbal behavior, statistically significant difference was not found. Thus, we cannot conclude, that this model of the teacher’s behavior in terms of online-lecture determines the decrease in students’ evaluations of its content and emotional impression. Probably, the absence of statistically significant differences is determined by the gender heterogeneity of the groups of teachers with different behavior models. Using ANOVA analysis, we ascertained the difference between the models of verbal and non-verbal behavior of male and female lecturers, which associated with students’ high evaluations. The most sensitive to the gender context were estimates of the interest and usefulness of the lecture. Higher rating of interest in the case of online-lecture by a female teacher were associated with open communicative position and drafted verbal behavior. Conversely, the ratings of interest in a male teacher's lecture increased, when closed communicative position was combined with spontaneous verbal behavior. Similarly, the models of verbal behavior significantly determined students’ evaluations of the lecture usefulness: high ratings of the lecture usefulness were associated with the model of drafted verbal behavior in the cases of female teachers, but for male teachers spontaneous verbal communication was more highly rated by students. Thereby, our second hypothesis was confirmed.

Previously, studies of students’ evaluations of female and male university teachers in terms of communication “face-to-face” in the classroom presented similar results: female teachers are more often expected to warm and open communication, while male teachers – to some communicative detachment with high intellectual potential [10]. Moreover, violation of these expectations can lead to a decrease in their teaching performance ratings [2]. The results of our study confirm that in terms of online-lectures the same trends are reproduced. “Good online-lecture” of female teacher includes demonstration of the readiness to communication and thorough drafting the lecture, while “good online lecture” of a male teacher is determined by his ability to demonstrate fluency in the educational material due to low degree of communicative openness. Therefore, we can state that students’ evaluations of online-lectures are mediated by gender expectations just like in “face-to-face” learning.

Conclusion

The results of our study did not allow us to identify universal models of verbal and non-verbal behavior of the lecturers, which would provide high subjective evaluations of online-lectures by students. At the same time, it was found that these evaluations are determined by the degree of compliance of verbal and non-verbal behavior of female and male teachers with expected gender-specific behaviors. Despite the fact that our study has some limitations, such as the unusual for "face-to-face" learning 10-12-minute lecture format and a great age range of the lecturers, these results could be taken into account for development of training programs, which is aimed at improving the skills of online-lecturers.

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