

## ПСИХОЛОГИЯ ОБРАЗОВАНИЯ / PSYCHOLOGY OF EDUCATION

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УДК 316.614-057.875:654.173

doi: 10.15507/1991-9468.107.026.202202.229-246



Original article

### Video Conferencing Solutions for Students – Future Teachers’ Professional Socialization

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#### Abstract

**Introduction.** Despite the numerous publications on the implementation of distance technologies, there are practically no studies on the systematic analysis of various forms of video conferencing that support educational technologies and serve as a practical guide for teachers in teacher training. The purpose of the study is to analyze the experience of implementing video conferencing in various forms of interaction, to identify and experimentally test the effectiveness of their implementation in the process of professional socialization of student teachers.

**Materials and Methods.** The study was conducted on the basis of the method of reflexive-system analysis of the implementation of video conferencing in the professional training of student teachers. Based on the questionnaire and the method of expert assessments, testing of the level of social and psychological adaptability, professional and behavioral skills, social and emotional comfort of students was implemented. The experiment involved 209 students of the Glazov State Pedagogical Institute and Kazan Federal University.

**Results.** As a result of the study, it was revealed that the implementation of the group form of video conferencing significantly increases the involvement of almost all students in active communication activities in the classroom. Communication activity in the implementation of social and educational interaction between small and large groups made it possible to most effectively form professional socialization among students. Statistical analysis showed that it was classes in a remote format using video conferencing in subgroups of 4–5 students that had the greatest positive effect.

**Discussion and Conclusion.** The conclusions made by the authors contribute to the development of new forms of effective communication through social and educational interaction in the implementation of video conferencing. The materials of the article can be useful in the implementation of teacher education to increase the level of students’ involvement in professional training in the context of distance education.

*Keywords:* video conferencing, forms of interaction, professional socialization, student teachers, teacher education

*Acknowledgements:* The authors are grateful to the editors and reviewers for their attentive attitude to the article and for the indicated remarks, which improved its quality.

*Conflict of interests:* The authors declare no conflict of interest.

*For citation:* Nagovitsyn R.S., Valeeva R.A., Latypova L.A. Video Conferencing Solutions for Students – Future Teachers’ Professional Socialization. *Integration of Education*. 2022;26(2):229–246. doi: <https://doi.org/10.15507/1991-9468.107.026.202202.229-246>

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Оригинальная статья

## Профессиональная социализация студентов – будущих учителей при реализации видеоконференцсвязи

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### Аннотация

**Введение.** Несмотря на многочисленность публикаций по внедрению дистанционных технологий, практически отсутствуют исследования по систематическому анализу различных форм видеоконференцсвязи, которые поддерживают образовательные технологии и служат практическим ориентиром для преподавателей в профессиональной подготовке учителей. Цель исследования – проанализировать опыт реализации видеоконференцсвязи в различных формах взаимодействия, выявить и экспериментально проверить эффективность их внедрения в процессе профессиональной социализации студентов – будущих учителей.

**Материалы и методы.** Исследование проводилось на основе метода рефлексивно-системного анализа реализации видеоконференцсвязи в профессиональной подготовке будущих педагогов. На основе анкетирования и метода экспертных оценок реализовано тестирование уровня социальной и психологической адаптивности, профессиональных и поведенческих навыков, социального и эмоционального комфорта студентов. В эксперименте приняли участие 209 обучающихся Глазовского государственного педагогического института им. В. Г. Короленко и Казанского федерального университета.

**Результаты исследования.** В результате проведенного исследования было выявлено, что при реализации групповой формы видеоконференцсвязи достоверно повышается вовлеченность почти всех студентов в активную коммуникационную деятельность на занятии. Коммуникационная активность в реализации социального и учебного взаимодействия между малыми и большими группами позволила наиболее эффективно сформировать профессиональную социализацию у студентов. Статистический анализ показал, что именно занятия в удаленном формате с помощью видеоконференцсвязи в подгруппах по 4–5 человек оказали наибольший положительный эффект.

**Обсуждение и заключение.** Сделанные авторами выводы вносят вклад в развитие новых форм эффективной коммуникации через социальное и учебное взаимодействие при реализации видеоконференцсвязи. Материалы статьи могут быть полезны в педагогическом образовании для повышения уровня вовлеченности студентов в профессиональную подготовку в условиях дистанционного образования.

*Ключевые слова:* видеоконференцсвязь, формы взаимодействия, профессиональная социализация, будущий учитель, педагогическое образование

*Благодарности:* авторы выражают благодарность редакции и рецензентам за внимательное отношение к статье и указанные замечания, которые позволили повысить ее качество.

*Конфликт интересов:* авторы заявляют об отсутствии конфликта интересов.

*Для цитирования:* Наговицын Р. С., Валеева Р. А., Латыпова Л. А. Профессиональная социализация студентов – будущих учителей при реализации видеоконференцсвязи // Интеграция образования. 2022. Т. 26, № 2. С. 229–246. doi: <https://doi.org/10.15507/1991-9468.107.026.202202.229-246>

### Introduction

Modern approaches to teaching imply the implementation of a pedagogical paradigm, where the center is the student himself and the results of his/her learning [1] that directly depend on the process of student interaction with each other in the educational space [2].

When training student teachers, it is important to develop interpersonal communication skills [3; 4] that will allow them to successfully carry out professional activities in the future as part of a teaching team at school, effectively implementing interaction with students and their parents [5]. Numerous stu-

dies have revealed the effectiveness of various forms of student teachers' professional training [1; 2; 6]. Nevertheless, in the practice of teacher education, there are no experimental studies on how teachers can implement various forms of interaction in the context of distance learning for the effective formation of professional socialization of students. A hasty introduction of distance learning risks creating misconceptions on the part of students about the uselessness of such open and flexible learning, as well as distance learning education in general [7; 8]. In remote education without prior preparation, when communication problems among students are systematically manifested, users may mistakenly blame distance education for the failures in teaching [9; 10], rather than the poor-quality communication strategy [11]. This, in turn, significantly depreciates the achievements of science over the past decade in the implementation of distance education both from educational and technological point of view [12; 13]. In teacher education this issue becomes even more acute due to the fact that for student teachers some key competencies serving as indicators of their professional socialization are the ability to work in a team, to implement effective communication of pupils in individual and full-class learning and educational activities [14; 15]. From this perspective, it is necessary to search for distance learning technologies that will maximally correspond to modern teacher education and will be effective in the educational process to increase the professional socialization of student teachers [16].

### Literature Review

Video conferencing is a collaboration system that allows virtual training sessions to be organized remotely [17]. Recently, this technology has gained widespread use, especially during COVID-2019 lockdown [18; 19]. The competition between the teacher in the classroom with real interaction and the virtual teacher begins to significantly increase the level of teaching in both the first and second versions [20; 21]. In the educational field, video conferencing is a synchronous communication channel that facilitates the implementation of interactive

communication through communication, visual presence and data exchange between teachers and learners in the educational process, comparable to face-to-face communication [19; 22]. The synchronous learning model allows teachers and students to communicate in real time remotely from each other, increasing the level of cognitive remote interaction and professional socialization, in contrast to delayed feedback in asynchronous communication [12; 23]. Separate scientific works in the field of implementation of remote technologies have shown that video conferencing systems allow increasing instant real-time feedback to motivate and involve motivated students in an interactive educational process [9; 24]. Owing to the interactive possibilities of such interaction, teachers and learners can freely and naturally express their thoughts through easy online communication with each other in educational process [20; 25]. On the one hand, the use of video conferencing reduces the ambiguity and misunderstanding that arise in some cases during text communication, and on the other hand, it enhances psychological interaction, which leads to an increase in the level of professional socialization of students in the educational process, comparable to real communication [12]. However, the introduction of video conferencing to implement natural communication in real time does not always lead to a positive and effective result in an attempt to reproduce a real audience in virtual classes [19]. This situation is compounded by the lack of a systematic analysis of video conferencing systems that support educational technologies and serve as a practical guide for educators [12; 24]. Research work in this area bypasses questions devoted to the experimental analysis of the effectiveness of various forms of implementation of these technologies in the process of students' professional socialization [24; 26]. This issue is especially crucial in teacher education, where a systematic analysis of video conferencing implementation in professional training of future teachers has not been carried out to date [14; 27]. It is necessary to experimentally identify the learning and social interaction of participants in educational relations, their pedagogical com-



munication during training and upbringing in the context of distance education when implementing video conferencing [15; 16]. Thus, the purpose of the study is to analyze the practice of implementing video conferencing in individual, small and large groups (group and full-class interaction), to identify and experimentally test the effectiveness of its implementation in the process of professional socialization of student teachers.

### Materials and Methods

In the course of the study we used theoretical methods, namely, the analysis of the subject of research on the basis of special Russian and international literature; reflexive and systemic analysis of videoconferencing solutions in student teachers' professional training. The empirical method included testing students' professional socialization formation level by indicators. The experiment involved 209 first- and second-year students of the Faculty of Teacher and Art Education (Glazov State Pedagogical Institute) and the Institute of Psychology and Education (Kazan Federal University). All respondents were informed about the purpose of the study and expressed consent to cooperation. The experiment took 20 weeks (October 2020 – March 2021). All students participating in the experiment carried out blended learning: some subjects were taught in classroom in full-time format, and some subjects were taught only remotely in a remote format via video conferencing on the Zoom and Microsoft Teams platforms. At the ascertaining stage before the implementation of the study (October 2020) and at the control stage after the experimental work (March 2021), diagnostic procedures were carried out to identify the levels of students' professional socialization in academic groups. The number of the participants in these groups was not equal. To obtain more reliable results the amount was converted to percentage format (%). When diagnosed before the start of the author's study, these respondents showed low and medium levels of professional socialization, and in very exceptional cases – high ones. The study participants were divided into 5 experimental groups (EG), 2 academic groups in each:

EG1 (n = 42), EG2 (n = 39), EG3 (n = 47), EG4 (n = 36) and EG5 (n = 45). In each focus group, 35–40% of subjects were taught using video conferencing. Those not attending classes in a remote format for different reasons and not scoring 35% of video conferencing attendance during the experimental period were excluded from the experimental samples. The experiment on the analysis of professional socialization involved first-year students and second-year students, who were forced to transfer to a remote format for the whole semester due to the spread of the COVID-19 pandemic. Statistical analysis. The processing of the study results was carried out by means of the statistical software SPSS Statistics 20. The significance of differences in the results was determined by means of Pearson's chi-squared test ( $\chi^2$ ) at  $p < 0.01$  and  $p < 0.05$ . The choice of this statistical method was due to the fact that the results of focus groups on the state of the studied indicator were divided into more than two categories or, in particular, into three levels in particular: high, medium and low. Statistical comparative analysis was implemented between the data of each experimental sample (the arithmetic mean for three indicators of the number of study participants in the indicator for each level group: high, medium and low) with each other experimental group for a separate indicator of professional socialization before and after the experiment. For each comparison, a numerical value according to the chi-square ( $\chi^2$ ) of Pearson was identified, corresponding to the range of significance at  $p < 0.01$  or  $p < 0.05$ , as well as the range of insignificance at  $p > 0.05$ . Mathematical and statistical diagnostics of the results, which were revealed in all experimental samples before the study (October 2020), showed an insignificant significance of the results at  $p > 0.05$  between the groups. This confirms that the focus groups prior to the experiment were statistically equal. Prior to the experimental study, there were not a significant number of students in all experimental samples with high indicators. In turn, students with average and low indicators in terms of indicators were found to be a large number in each experimental group.



### Results

The first group (EG1) carried out distance learning during the experiment using video conferencing in the individual form, the most standard form of interaction. With this format of remote learning, all communication participants, the teacher and students had their own account and each studied remotely from their personal mobile device or personal computer. Here, the implementation of learning and social interaction was carried out mainly individually. In this form of communication, the teacher focused on students' active participation in intra-group communication, however, due to the lack of social presence face-to-face or to certain technical reasons, the students interacted extremely passively.

The second group (EG2) carried out the group form of distance learning. The training was carried out in small groups, where 7–9 accounts were created for 2–3 students in each while the teacher communicated from a separate account (Fig. 1).

With this training format, students were united into small groups at the institute, a dormitory, at the place of residence or in places convenient for communication outside educational facilities and carried out learning on a personal mobile device or laptop in any place convenient for training.

The third group (EG3), as well as EG2, carried out a group form of distance learning, but the training was carried out mainly in large groups. In this process of interaction, 4–5 accounts were created, each of which

had 4–5 students, and the teacher had a separate account (Fig. 2).

With this training format, students were united into subgroups in a dormitory or at the place of residence and carried out learning on a personal computer using a large TV screen or using a projector in order to see together all the other groups participating in the lesson and the teacher as well. This condition was mandatory for students in the large group form of interaction. For teaching students from EG2, this requirement was not mandatory, but it was an important recommendation for the implementation of more convenient and effective communication. The students had to feel a social presence at the lesson, not only of the students from their subgroup, but also of other students present online. The teacher's task was to create a space, the so-called "round table" in groups, in which each group could feel free in the educational environment and actively interact both in the subgroup and with other subgroups and the teacher. In this format, the teacher, just like the students, used only a projector with a large screen at the institute when interacting. The use of mobile devices in this format could only be possible for the activation of a video camera to transmit students' images to other participants at the lesson.

The fourth group (EG4) carried out remote interaction in the full-class form in a small group, where only 2 accounts were created, the first for the teacher, and the second for all students of the academic group (14–20 people).

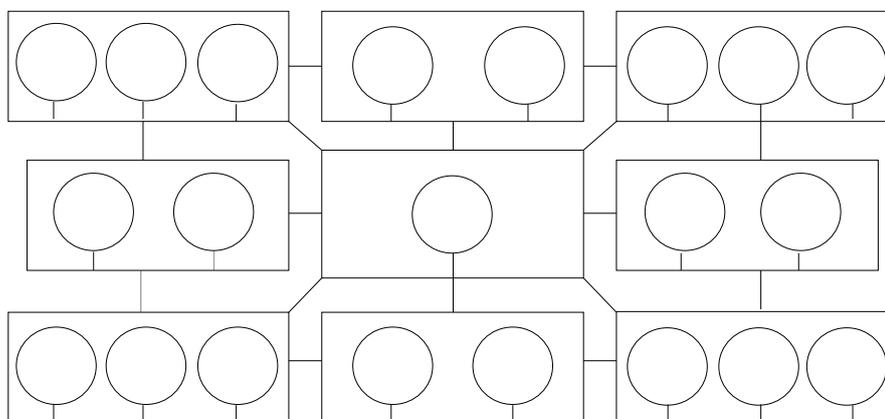


Fig. 1. Scheme of small group form in learning and social interaction

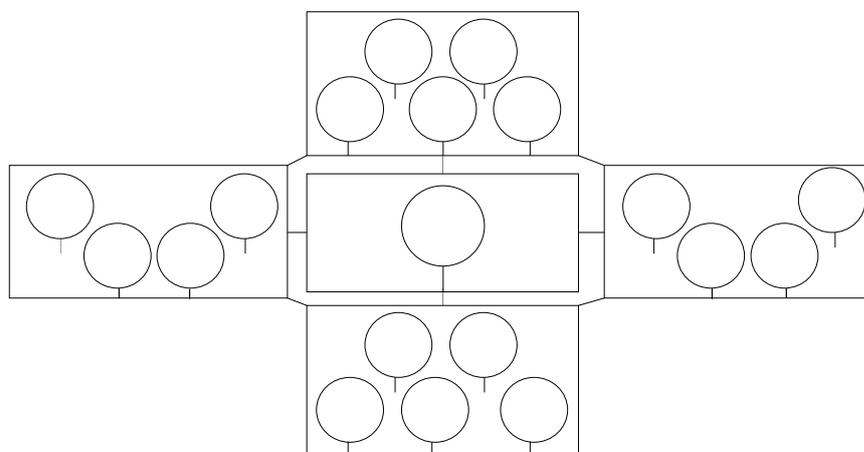


Fig. 2. Scheme of large group form in learning and social interaction

The fifth group (EG5) carried out distance learning in the full-class form of interaction in a large group, where 3 accounts were created, and only in exceptional cases 4 accounts, the first for the teacher, and the second and third – completely all students of academic groups.

When training in full-class forms of interaction, students and a teacher carried out communication in specialized classrooms of the institute or dormitories, projecting an image of each other using a projector on a large screen. This circumstance was dictated, on the one hand, by the inability of individual teachers of the older age group to carry out training sessions in person during this period. On the other hand, thanks to the implementation of these forms of interaction in the classroom, part-time teachers were able to carry out training without wasting time covering the distance from another university or basic school.

In these forms of communication, the teacher's task was to re-create a learning space for a seminar by implementing a synchronous unhindered communication, where students could freely have social and learning interaction with each other and together with the teacher, as they used to do in full-time interactive learning. During such lesson, the teacher, on the one hand, focused on the interaction of students within the academic group and made mutual communication easy, and on the other hand, he/she supported the discipline and consistency of interac-

tion, thereby gradually eliminating spatial boundaries in social interaction between the group and his/her virtual presence.

A prerequisite for conducting the experiment in all five forms was interaction with an open image of all study participants. To implement training in a large group and in both full-class forms of interaction, the teacher communicated with the students using a special headset. Thus, the teacher had the opportunity to move around the classroom and use a flip-chart, while creating the effect of social presence in the classroom where students carried out educational activities. In their turn, when implementing these forms of interaction, students used a special "portable" microphone or a mobile device with a high-sensitivity microphone. This technical condition was especially necessary for the implementation of unhindered interaction of each student with the teacher in the "question-answer" mode, thereby increasing the effect of educational and social presence in one room of all participants in the educational process.

As a basis for analyzing the effectiveness of different forms of video conferencing for improving the professional socialization of students in the implementation of vocational training, versatile indicators were studied [28–30], namely, the characteristics of social and learning interaction associated with social and psychological adaptability, professional and behavioral skills and social and emotional comfort in teaching students using video conferencing [31–34].

The study used the following diagnostic techniques, which systematically reflect the high, medium and low levels of professional socialization of future teachers:

- socio-psychological adaptation (indicators: communication, dominance and morality): questionnaire of socio-psychological adaptation by K. Rogers and R. Diamond [34], monitoring of personal value orientations [28], analysis of student mobility through monitoring the state of its adaptation and maladjustment [35; 36], diagnostic tools of moral and ethical norms [37];

- professional and behavioral qualities (indicators: self-acceptance, accepting others and challenge): testing neuropsychic stability [33; 34], monitoring the acceptance of professional and pedagogical values [38; 39];

- social and emotional comfort (indicators: internality, stamina and commitment): adaptive test of resilience according to the methods of S. Maddy and the California test for assessing goals in Khan's life [37], diagnostics of internality [30]; analysis of the confidence of emotional comfort and self-esteem in the implementation of joint activities [32].

We analyzed the features of various forms of teaching comparing their efficiency in increasing the level of students' professional socialization. On the basis of this diagnostics, the main levels of each indicator of the state of student teachers' professional socialization were identified (Table 1).

Diagnostic methods according to the criteria presented above, specially adapted for the implementation of experimental monitoring, were intended for first-year students, in exceptional cases for second-year students. The implementation of each diagnostic method, depending on the manifestation of the relevant features, ranked the respondents into high, medium or low levels. For each of the nine indicators for all indicators developed in the study, diagnostic procedures were carried out that revealed a specific level for each student according to this criterion in accordance with individual characteristics. The characteristics identified in the study, which include a system of indicators in their content, form an integral system for diagnosing professional

socialization by levels among students of pedagogical education.

Mathematical and statistical processing of the participants' data on the social and psychological adaptation after the implementation of the study (March 2021) between EG1 and EG2 (31.238), as well as in EG1 and EG3 (42.172), revealed the statistical significance of the difference in the obtained indicators at  $p < 0.01$ , and between EG1 and EG4 (7.399), EG1 and EG5 (8.787) – at  $p < 0.05$ . As for the difference between EG2 and EG3, it is not significant at  $p > 0.05$ , but between EG2 and EG4 (17.240), as well as EG2 and EG5 (14.411), the difference is significant at  $p < 0.01$ . Statistical analysis revealed a difference between EG3 and EG4 (22.744), and between EG3 and EG5 (19.461) at  $p < 0.01$ . Nevertheless, the comparative result between EG4 and EG5 did not reveal a statistical difference at  $p > 0.05$ . The data obtained show that the introduction of video conferencing with various forms of interaction has a different effect on students. To clearly demonstrate the comparative results in experimental samples on social and psychological adaptation, the arithmetic mean values for three indicators of the number of research participants for each level group were converted into percentages (Fig. 3).

The findings showed that the highest increase in the level of social and psychological adaptation was revealed among students from EG2 and EG3, who carried out video-conferencing in small and large group forms of interaction. To a lesser extent, the study had an impact on students from EG4 and EG5 in the implementation of the full-class form of interaction during video-conferencing. Monitoring of the "Communication" indicator in these four groups demonstrated an above average level of communication with each other, as well as the ability to form and improve interpersonal relationships at school and extracurricular activities [38; 40]. Performance for this indicator included the integration of personality traits on the one hand, such as proneness to conflict [30; 41] and, on the other hand, social traits, such as the presence of experience, motivation and the need for communication and mutual assistance [42; 43].



Table 1. Indicators of student – future teachers’ professional socialization

Student – future teachers’ professional socialization									
Criteria									
Social and psychological adaptability			Professional and behavioral skills				Social and emotional comfort		
Indicators									
Communi- cation	Domi- nance	Morality	Self-accept- tance	Accepting others	Challenge	Interna- lity	Stami- na	Commit- ment	
Levels									
High			Medium				Low		
High adaptability to existence in the educational space at the level of optimal communication and interaction between participants in professional training. The best degree of determination in the emotional need for cooperation, surrounding objects in the process of the educational and upbringing process. The optimal level of personal self-esteem and an indicator of satisfaction from their individual qualities and personal characteristics. High need for communication with classmates, for common teacher training and extracurricular activities. High motivation for the implementation of future teaching activity			Adaptability to the implementation of professional training in changing learning conditions corresponds to a low or medium level. In connection with the discrepancy between personal values and interests in the surrounding space of a pedagogical university, there is uncertainty in the manifestation of emotions in relation to social reality. There is an average or low level of self-affirmation in educational achievements and the degree of satisfaction with pedagogical personal characteristics. Low or medium need for interaction and communication and motivation for teaching. There is no active desire to implement educational and extracurricular activities in the group				High level of dissatisfaction with one’s personality traits and individual characteristics for active teaching. Alienation from communication with the academic community and joint educational and extracurricular activities is clearly expressed. The individual imperfection of the personality, signs of disharmony in the process of making responsible decisions are fixed, in some cases – academic failure. Uncertainty, depression and apathy towards the surrounding educational space, total inertia in the process of educational and extracurricular activities at the university. Alienation towards professional activity in the system of education and upbringing and absence of motivation to study in teachers’ training university		

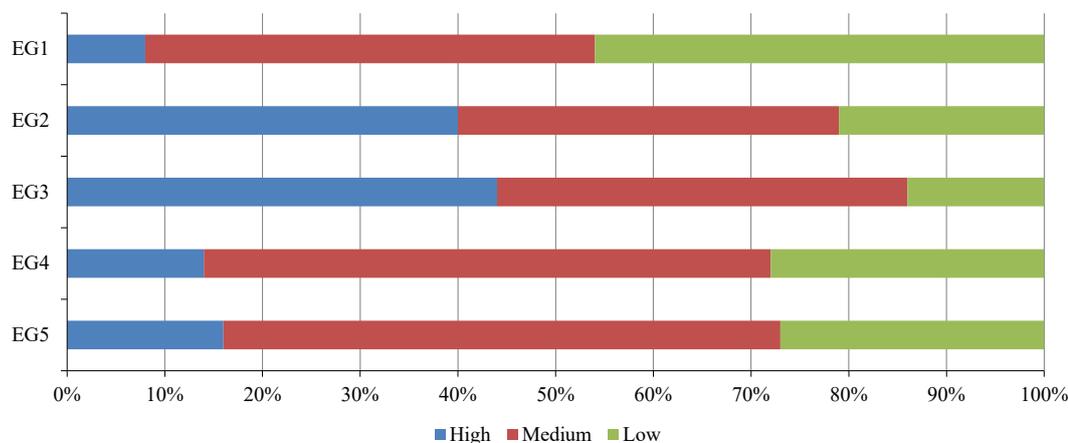


Fig. 3. Results of social and psychological adaptation of students in experimental groups



Students from EG2 and EG3 showed high results on the “Dominance” indicator, which determines the student’s orientation towards leading and managing in interpersonal communications with students having other value orientations [28; 37]. Analyzing the state of students’ adaptation and maladjustment to the pedagogical process at the university helped identify individually differentiating mobility in them [35; 36]. Students from EG1, according to the “Morale” indicator, showed a low ability to adequately perceive the specific social and pedagogical role offered to them in the process of professional training [44; 45]. In particular, in the readiness to accept the norms of the modern innovation space and meet the characteristics of the primary social environment in higher education and outside the educational organization [31; 35].

Mathematical and statistical processing of the participants’ data on the level of professional and behavioral qualities of students after the experiment (March 2021) revealed the following: between EG1 and EG2 (15.026), EG3 (34.520), EG4 (10.827) and EG5 (9.396) statistical significance of the difference at  $p < 0.01$ . Between EG3 on the one hand and EG2 (6.425), EG4 (7.651), EG5 (8.959), on the other hand, the difference was revealed significantly at  $p < 0.05$ , and between EG2, EG4, and EG5, statistical analysis revealed insignificant difference at  $p > 0.05$ . The final percentages in comparison

between focus groups in the average values for the indicators are presented in Figure 4.

As for “Self-acceptance” indicator, students from EG3 showed a high level of friendliness and an average level in relation to their own “Self” during pedagogical interaction [39]. Students of all groups, except for EG1, showed an average level of stress tolerance and the ability to regulate their behavior in their studies and in the afternoon during leisure activities [33; 46]. Diagnostic procedures on “Accepting others” indicator revealed the level of self-esteem and stability a student has on the one hand [39; 46], and the need for positive or negative approval by other students on the other hand. It is here that students from EG2 and EG3 showed higher results. Students from EG4 and EG5 showed the ability to create, non-standard solutions and active creative adaptation to the educational process in professional training [31; 35].

The results on the “Challenge” indicator, revealing the degree of students’ conviction that everything that is implemented in the environment makes it possible to systematically improve the professional individual level through the development of special pedagogical experience [39] varied considerably: students from EG2, EG3 and EG4 had a more positive attitude, while students from EG1 and EG5, on the other hand, related to it rather negatively [47].

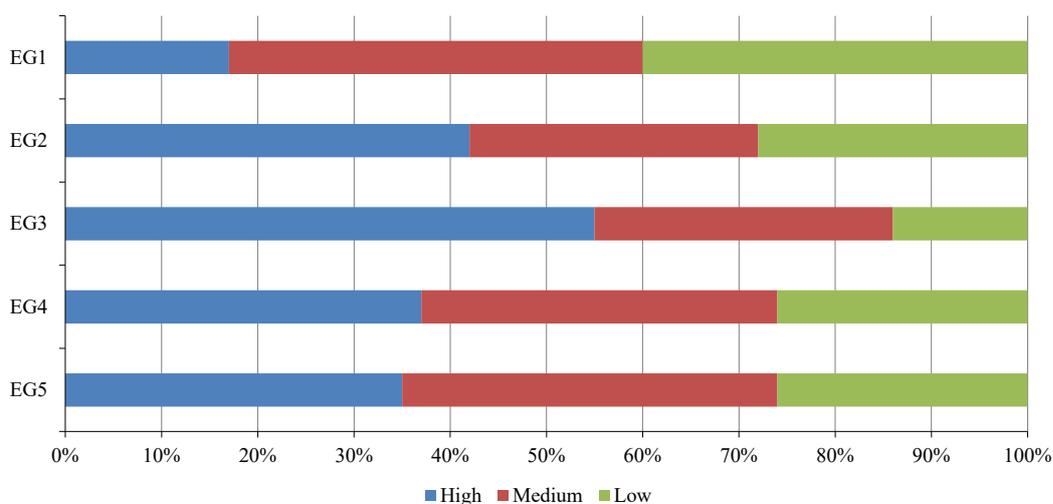


Fig. 4. Results of the level of students professional and behavioral qualities in experimental groups

Diagnostic procedures in this direction show students' acceptance of the surrounding educational space as the readiness for active teaching [30], despite the absence of reliable guarantees of success [37; 44].

The monitoring revealed a relatively similar degree of vigorous activity among all students, considering the pursuit of simple comfort and safety as a factor of decreasing pleasure [29] and harmony from the implementation of future teachers' professional training. However, the level of accepting the risk of not having professional self-realization in teaching of students' from EG2 and EG3 was rather high [36].

Analysis of the data obtained through mathematical and statistical processing to identify social and emotional comfort in students after the experiment (March 2021) revealed a significant difference between EG1 and EG2 (8.457), EG3 (6.851) and EG4 (6.166) at  $p < 0.05$ , as well as between EG5 and EG2 (13.612), EG3 (11.636) and EG4 (10.767) at  $p < 0.01$ . Then, between students from EG1 and EG5, there was a statistical insignificance of the difference at  $p > 0.05$ , as well as among students between groups EG2, EG3 and EG4 at  $p > 0.05$ . The final percentages in comparison between the experimental samples in the mean values for the indicators are presented in Figure 5.

As the results on the "Internality" indicator show, on average students perceive themselves as active performers of their own educational and extracurricular activities. In

most cases, positive emotions prevail in the educational and upbringing process. Diagnostic procedures reliably reflected the level at a high level of students in the belief that an active educational process significantly affects the result of activity [31], however, pedagogical success and an increase in the corresponding level may not be achievable [43]. In some cases, students from EG1 and EG5 showed a feeling of individual helplessness. Nevertheless, the majority of students feel that they themselves choose their own educational activities as the most effective and optimal path for the implementation of effective teaching activities. On the "Resilience" indicator, students most often have an average level of self-confidence, attitudes towards teaching [46], which contribute to professional endurance, increase intellectual burnout and prevent stress in the educational and educational process [40; 47]. Only an insignificant positive difference among students from EG2, EG3 and EG4 on the "Commitment" indicator revealed a high level of emotional satisfaction from professional training for teaching. It in some cases can create a positive atmosphere within a micro or macro academic group, as well as help to prevent the feeling of being a rejected person in the teaching staff [38].

Thus, the statistically confirmed difference in five experimental groups was based on the specificity in each experimental group of the teacher's social and educational interaction with students and students with each other.

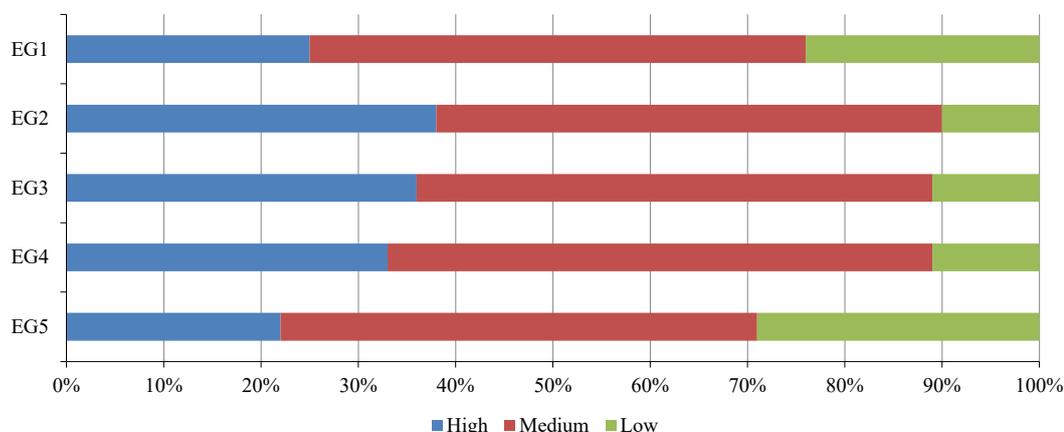


Fig. 5. Results of students' social and emotional comfort level in experimental groups

Here, the participants were not limited by the technical side of the process associated with various forms of participants' location in the educational process during communication. In the individual form, the main emphasis of educational interaction was placed on the communication of the teacher and each student individually. The educational communication and educational tasks were carried out mainly between teacher and student, and to a lesser extent between students themselves. This, in turn, as the study shows, did not allow to increase the professional socialization of students at a sufficient level.

In the group form of videoconferencing, the interaction was organized in two ways: the first – the teacher and each small group, and the second – the students themselves within each small or large group. During the implementation of this form, there was recorded a significant increase in the involvement of almost all students in active communication activities in the classroom, compared with the individual form of interaction. Communication activity in the implementation of social and educational interaction between small and large groups, as well as with a teacher in this form, made it possible to most effectively form professional socialization among students. Statistical analysis showed that the lessons in a remote format with video conferencing in subgroups of 4–5 students had the greatest positive effect on students. The implementation of this form of interaction allows you to reliably increase the level of social communication, stress resistance and the ability to regulate your behavior in the process of pedagogical interaction.

The full-class form of interaction during video conferencing turned out to be the most effective for providing the most relaxed and natural communication. Students actively interacted with the teacher and with each other. At some moments, with this form, the educational and social presence of the teacher in the classroom reached such a level that students did not notice the unreality of the teacher's presence in the classroom. However, it should be noted that like in the classroom with a real teacher, some students with the full-class form of interaction despite

the high level of teacher's social presence, stopped being involved in the learning process. It may not have allowed to achieve the high level of students' professional socialization, as in the group form of interaction. As the statistical analysis of full-class and large group forms of interaction with each other, it was the latter that had an insignificant effect on increasing the level of students' professional socialization.

### Discussion and Conclusion

One of the main aims of the research was to explain how the video conferencing system in various forms of interaction increases student teachers' professional socialization. As many teacher educators may not have the necessary professional experience in the field of video conferencing implementation [8], the experimental evaluation proposed in the study can provide practical guidance for each of the assessed forms of videoconferencing communication regarding its effectiveness in the training of future teachers [19]. The findings of the study will give teachers the variability of distance learning use and help them choose the one that better enhances the formation of student teachers' professional socialization, the necessary professional competencies of future teachers for communication and educational interaction [11; 26]. Nevertheless, as some authors experimentally confirm [22; 23], the use of video conferencing systems should not be the cure-all solution for distance learning continuity problem [10; 18]. It is recommended to use blended learning with multiple communication channels (synchronous and asynchronous) to increase access and opportunities for effective teacher training [20]. As the results of the study have shown, it is the implementation of the full-class small form of interaction during videoconferencing that makes it possible to create a natural pedagogical interaction between students and teachers. However, it is the large group form of interaction that is the most effective tool for increasing the level of future teachers' professional socialization.

The study has shown that participation in videoconferencing is not enough to organize students' socialization and make students feel



like they are in the real classroom [25; 48]. It is necessary to differentiate distance learning by various forms of communication, thereby increasing the level of social and cognitive intra-group interaction through the implementation of a virtual lesson for various groups [21]. Due to its synchronicity and superior ability to transmit verbal and non-verbal signals, compared to other media, video conferencing in group form, as well as in full-class small forms is perceived as the most favorable technology in educational interaction for increasing the professional socialization of student teachers [48; 49]. These forms of interaction during videoconferencing can become an innovative pedagogical technology to support full-time education in teacher training. It can help increase student teachers' professional socialization and form the necessary competencies to be able to work in a team, to implement effective communication and joint and individual educational activities. It is necessary to consider the interaction of students during videoconferencing not only as the implementation of a technical non-traditional tool for teacher education, but as a new form of social and educational interaction.

The study complements scientific developments in which it is experimentally proved that video conferencing made learning comparable, and in some aspects even better, than real or face-to-face interaction [22; 47]. Studies [12; 19] show that the use of video conferencing expands the boundaries of lecture and seminar formats, positively mixes these forms of learning, increasing student interaction, expanding their learning experience and increasing the level of professional socialization [8]. Experimentally proven to be the most effective, group form of interaction corresponds to the principles of lockdown regime, since training is carried out in subgroups during the implementation of

the interaction. The results of this study can serve as a guideline for the selection of effective forms of interaction in distance learning to support the professional training of teachers. They offer the authors' vision to improve the implementation of video conferencing as a pedagogical technology organized in the natural interactive cooperation of students with each other and with the teacher. They prove the possibility of increasing the level of students' involvement in pedagogical activities, thereby realizing effective communication and joint and individual educational activities aimed at increasing the level of students' professional socialization.

During COVID-19, it became clear that most participants in the educational process are not sufficiently prepared to perform many tasks of professional teacher training in a remote format. The lack of cognitive and social presence during the implementation of the educational process remotely is a complex phenomenon, more complex than it was previously thought. It is the implementation of the remote mode in the professional training of teachers through videoconferencing in the group and full-class forms of interaction that makes it possible to create a social presence, including the cognitive interaction of the learning group with each other in groups and with the teacher in the educational and social context. The results of the study show that the cognitive interaction of students during videoconferencing should be considered not as a technical non-traditional tool for pedagogical education, but as a new form of social and educational interaction to increase the level of future teachers' professional socialization. Modern technology forces us to think outside the standard framework in order to generate various possible solutions that will help meet the new needs of our students and the teaching and learning community.

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Submitted 14.10.2021; approved after reviewing 17.01.2022; accepted for publication 24.01.2022.

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R. A. Valeeva – scientific leadership; development of methodology; project administrator; critical analysis and revision of the text.

L. A. Latypova – literature review; data curation; provision of resources; text version of the paper; visualization/presentation of data in text.

*All authors have read and approved the final manuscript.*

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Поступила 14.10.2021; одобрена после рецензирования 17.01.2022; принята к публикации 24.01.2022.

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*Заявленный вклад авторов:*

Р. С. Наговицын – подготовка начального варианта текста; проведение экспериментов; развитие методологии; сбор данных и доказательств; формализованный анализ данных.

Р. А. Валеева – научное руководство; развитие методологии; администратор проекта; критический анализ и доработка текста.

Л. А. Латыпова – обзор литературы; курирование данных; обеспечение ресурсами; подготовка текстовой версии статьи; визуализация/представление данных в тексте.

*Все авторы прочитали и одобрили окончательный вариант рукописи.*