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## Digital education in the coronavirus era

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**Abstract:** following work outlines a study of the transformation of the educational process during the coronavirus pandemic. The object of the study is the Moscow region, which in the study is represented by seven universities. The subject of the research is the reports of students of these universities, which contain an opinion about the quality of distance education and the degree of satisfaction with it. Messages were collected and classified using machine learning methods - they were grouped according to various topics, from organizational issues to questions of personal well-being. Based on the results of the research carried out, a general assessment of the digital educational process by students is given.

### 1. Introduction

The recent outbreak of the coronavirus pandemic has led to major changes in all areas of human life. In particular, the entire world community had to rebuild the education system, since it was decided, almost everywhere, to switch to remote work and distance education. The authors of this article conducted a large-scale study based on the analysis of big data of social networks, to study several parameters:

- the effectiveness of digital education;
- reaction and assessment of the quality of distance education by students.

### 2. Exploration of the region

The city of Moscow was chosen as a key region for assessing the above parameters. Moscow is a city of federal significance, the capital of Russia. The population of the region as of January 1, 2020 is 12 678 079. Moscow is also one of the ten regions with the largest share of students in the total population. At the same time, in 2018, the region ranked only fifth in this rating with a share of students of 4% in the total population, losing behind the Tomsk region, St. Petersburg and the Leningrad region, the Oryol region and the Omsk region.

In terms of the indicators of university and postgraduate migration, Moscow, together with the Moscow region, can be characterized as a magnet region. This means that Moscow universities, on the one hand, are attractive for graduates of local educational institutions and, on the other hand, are also attractive for school graduates located in other regions of Russia. That is, higher educational institutions in this region attract school graduates from other regions and work mainly for the local labor market [1].

The higher education system in Moscow and the Moscow region is the leading link in the socio-economic development of the region. This assessment is characterized by indicators above average in



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terms of the contribution of universities in Moscow and the Moscow region to the economic and innovative development of the region, as well as the level of contribution above average to the development of human capital. The contribution of universities to the development of human capital was calculated by assessing the excess of the level of wages of workers with higher education over workers who do not have one, as well as the share of employed students in the region.

### 3. Information clusters

According to the monitoring of the effectiveness of the activities of educational institutions of higher education in 2019, 147 higher education institutions function in Moscow. There are 706,037 undergraduate, specialist and graduate students in the region. Of these, 462,990 study full-time, 304,422 - at the expense of the budgetary funds of the Russian Federation.

Since a large number of higher education institutions are located on the territory of Moscow, the communities of which have been identified in social networks, for the convenience of analysis, the results of the study for this region were divided into separate blocks. This part of the report presents the results obtained for universities, the number of student contingent of which does not exceed 5,000 people. In further analysis, we will talk about seven Moscow universities, subordinate to the Ministry of Science and Higher Education of the Russian Federation, whose communities were identified in social networks:

- Moscow Architectural Institute (MARHI);
- Moscow State Psychological and Pedagogical University (MGPPU);
- Russian State Geological Prospecting University named after Sergo Ordzhonikidze (RGGRU named after S. Ordzhonikidze);
- National Research University "Moscow Institute of Electronic Technology" (MIET);
- Moscow State Technological University "STANKIN" (MSTU "Stankin");
- Moscow State University of Geodesy and Cartography (MIIGAiK);
- Moscow State University of Food Production (MGUPP).

The total number of the student contingent of the presented universities is 27 654 people, which is about 4% of the entire student contingent of the region. This block has been allocated in order to provide an equally effective assessment for both large universities and universities with a low number of students [2].

### 4. Methods of collecting information

Data collection was carried out using the Vkontakte API and using the Python programming language.

To work with the VK API, it was decided to use libraries: vk\_api and a library containing mathematical functions and models - pandas. Further, requests were already formed to certain user pages (users of the Moscow region were selected):

```
t={}
for j in range(0, len(data)): #запускаем поиск по массиву
    t[j]=vk.users.search(q = data['N'][j] + ' ' + data['F'][j],
        birth_day = data['D'][j], \ birth_month = data['M'][j],
        birth_year = data['Y'][j], count = 1000, fields='bdate, city'):
        for h in (t[j]['items']):
            with open('users.txt','a') as f1:
                f1.write((str(data['id'][j]) + ';'
                    + str(t[j]['count']) + ';'
                    + str(h['id']) + ';'
                    + h['last_name'] + ';'
                    + h['first_name'] + ';'
                    + h.get('bdate','') + ';'
                    + h.get('city',{}).get('title','')
                    + ';\n').encode('cp1251', 'replace').decode('cp1251'))
```

**Figure 1.** An example of a request to the VK API.

Then, keeping the hierarchical structure of requests, the necessary information about the sought communities was processed, to which the selected users were subscribed [3]:

```
try:
    m=vk.community.get(user_id = str(h['id']), count = 50000)
    for q in m['items']:
        with open('community.txt','a') as f2:
            f2.write(str(data['id'][j]) + ';' + str(h['id']) + ';' + str(q) + '\n')
except:
    with open('community.txt','a') as f2:
        f2.write(str(data['id'][j]) + ';' + str(h['id']) + ';0;\n')
```

**Figure 2.** Request to read community id.

## 5. Analysis of social media data

The analyzed universities differ in the number of communities in social networks. In general, universities can be divided into two groups on this basis. The first group includes the Moscow Architectural Institute, MGPPU, S. Ordzhonikidze, which are characterized by values above the average in terms of the number of communities in social networks (3, 4, 3 communities, respectively), as well as MIET, which is the leader in this indicator among the studied universities (8 communities, which corresponds to a high value relative to federal statistics). Another group includes MIIGAiK and MGUPP, which each have 2 communities in social networks, which corresponds to the average value of this indicator, as well as MGTU "Stankin", in which only 1 community in social networks was identified (the value is lower than the average relative to general federal statistics).

In general, students on social networks do not discuss issues directly related to education. Until March 16, 2020, when the majority of Russian universities switched to distance learning, educational topics were presented in a small number in the communities of the Russian State University for the Humanities. S. Ordzhonikidze (about 3% of all posts), MSTU "Stankin" (about 5% of all posts), MIIGAiK (1% of all posts) and MGUPP (less than 1% of all posts). After 03/16/2020, educational topics also appear in the communities of MSUPE (2% of all posts) and MIET (about 1% of all posts). In turn, the share of messages related to educational topics in other studied universities increased 3-4 times (up to 9% in the S. Ordzhonikidze Russian State University of Humanities, up to 20% in MSTU "Stankin", almost 5% in MIIGAiK). The smallest increase in the share of relevant posts is characteristic of the MGUPP communities (from 9% to 12% of all posts) [4].

## 6. Subject and tone of messages

The most popular topic is organizational and methodological. About 60% of all relevant posts belong to it. About three quarters of messages on organizational and methodological topics are neutral in tone, the rest are characterized by negative tone. The second most popular topic was the technical support of the educational process. It owns 16% of all relevant posts. In terms of tone, most of the messages related to this topic are negative (about 77%), the rest are neutral in tone. Household and social and financial topics were approximately equal in terms of the number of relevant messages (10% and 9%, respectively). Most of the messages on the social and financial topic are characterized by a neutral topic (about 78%), the rest are negative in terms of topics. In turn, within the framework of everyday topics, negative messages prevail with a slight preponderance (about 57% versus 43% of messages that are neutral in tone).

The smallest number of messages relates to the topic of personal qualities and well-being (about 5% of all relevant messages). All messages related to this topic are characterized by a negative tone. Note that among the relevant statements, not a single message was found that had a positive tone [5].

## 7. Dynamics of publication activity

In the communities of the Moscow Architectural Institute, no relevant messages were found, therefore, the dynamics of publication activity is considered further without taking this university into account. There were no relevant messages in the communities of MGPPU and MIET until March 16, 2020. After being transferred to distance learning at these universities, there is an increase in the number of relevant messages. In MGPPU, the activity increases from week 17 (20-26.04), in MIET communities the only relevant message was published on week 23 (1-7.06). In other universities, a similar situation is observed: the number of relevant messages published after March 16, 2020 exceeds the number of messages published before 12 weeks (March 16-22).

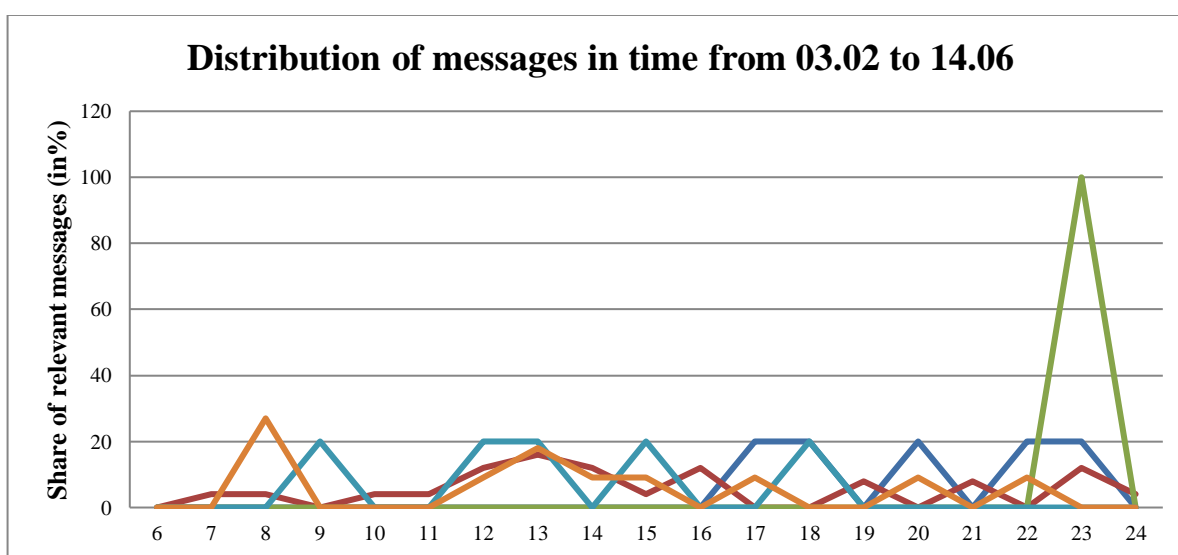


Figure 3. Research of university activity.

In the communities of MIIGAiK (blue line) and MGUPP (orange line), until March 16, 2020, relevant messages were published only in one week (on 9 and 8, respectively). After the transition to distance learning, relevant messages in these communities are published almost every week. In the communities of MIIGAiK, relevant messages have not been published since 4.05, in the communities of MGUPP, a decline in publication activity has been observed since 17 weeks (from 20.04), although relevant messages are found in the communities of this university also at 20 and 22 weeks (11-17.05 and 25-31.05) [6].

The highest publication activity is typical for the communities of the Russian State University for the Humanities named after S. Ordzhonikidze (brown line) and MSTU "Stankin" (violet line). Moreover, this is true both for the period before 03/16/2020, and for the period after the transition to distance learning. Relevant posts were published in the communities of these universities almost every week throughout the observation period. The highest frequency of publications of relevant messages in the communities of these universities is observed in the period from 12 to 14 weeks (from 16.03 to 5.04).

In general, the peak of publication activity in the universities under consideration falls on 12-15 weeks (03.16-12.04). Probably, this is due to the fact that during this period there was an approbation of distance learning systems by students, which raised questions from teachers. It can also be noted that in the period from 22 to 23 weeks there is also a fairly high publication activity, which may be associated with the approaching session [7].

## 8. Conclusion

Based on the results of the analysis of relevant messages published in the communities of the studied universities, it was found that the most resonant topic among students is organizational and

methodological topics. Within the framework of this topic, students ask questions about the format of the session, the timing of the quarantine introduced at the university, the procedure for debt collection in terms of distance learning. It also touches upon the problems of communication with the dean's office, accounting, individual teachers. No less significant for students is the problem of obtaining various types of documents in quarantine. In general, it can be noted that students experience a lack of official information, as well as certain difficulties in establishing contact with the administration of universities.

Also popular are the topics related to the technical support of the educational process. Many students express dissatisfaction with the quality of the electronic educational environment that exists in their university.

Among the relevant messages there are also statements on social, financial and household topics. Within the framework of the social and financial topics, students are mainly interested in the timing of receiving a scholarship, and also express their concern that their payments may not come due to the transition to distance learning. The smallest number of relevant posts relates to the topic of personal qualities and well-being. Moreover, all messages related to this topic are characterized by a negative tone. Students in their statements talk about the difficulties they faced in the transition to distance learning. First of all, these difficulties are associated with an increase in the number of assignments, as well as with a state of uncertainty caused by the lack of reliable information from representatives of universities [8].

## References

- [1] Michael F D 2009 *Young Bringing Knowledge Back in: From Social Constructivism to Social Realism in the Sociology of Education* (London: Routledge) p 247
- [2] Wolf A 2002 *Does Education Matter? Myths about Education and Economic Growth* (London: Penguin books) p 352
- [3] Ramalho L 2018 *Fluent Python: Clear, Concise and Effective Programming* (California: O'Reilly Media) 1 p 751
- [4] Furedi F 2009 *Wasted: Why Education Isn't Educating* (London: Continuum) p 246
- [5] Marshall S 1963 *An Experiment in Education* (London: Central Advisory Council For Education) p 222
- [6] Guldberg H 2009 *Reclaiming Childhood* (London: Routledge) p 206
- [7] Bowles S and Gintis H 1976 *Schooling in Capitalist America: Educational Reform and the Contradictions of Economic Life* (New York: Basic Books) p 340
- [8] Hunter J D 2000 *The Death of Character: Moral Education in an Age without Good or Evil* (New York: Basic Books) p 336