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LEVEL 2 DIGITAL DISCONTINUITIES AS A NEW TYPE OF FRUSTRATION

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Abstract
This study investigates the second level of digital inequality—digital discontinuities—that extend beyond access issues to include how digital opportunities are utilized. Conducted at the M. Akmulla Bashkir State Pedagogical University, the research surveyed over 3,000 students, revealing a spectrum of technical, social, physiological, and financial issues associated with distance education. Despite a majority expressing satisfaction with online learning, substantial concerns were raised regarding educational quality and the effective use of technical resources by educators. The paper argues that technical failures represent first-level digital divide problems, while educational issues signify a more complex second-level divide. This divide correlates with socioeconomic factors, such as human potential, and is further influenced by disparities in age, income, geography, and literacy. The study underscores the persistence of digital inequality due to social constraints and emphasizes the importance of enhancing both infrastructural access and digital competences to bridge this gap.
Keywords: *digital divide, frustration, human capital, digital inequality, professional deficits.*

Introduction

The informatisation of society naturally causes the growing interest of academic science in the problem of digital divide. Since the beginning of the 21st century, the problem of the digital divide has gained a natural development due to the significant growth of the digital industry and scientific research in this area. In particular, such aspects of digital inequality as territorial, gender and age, economic, related to the level of household income and a number of others have been highlighted [1, 2]. At the same time, discussions about digital inequality have been entirely based on infrastructural accessibility and, as a rule, have been reduced to the assessment of the degree of spread of personal computers and the Internet. The ideological basis of this approach is technological optimism, from the point of view of which it is enough to develop technology in its pure form without corresponding social changes. In this context, information and communication systems are seen as an important component of social infrastructure, along with such life-support systems as, for example, central electricity and water supply. Access to them is an important criterion of social inequality, and a distinctive feature is that information resources cannot be replaced by a temporary alternative. At the same time, especially in various kinds of reports, neither the qualitative characteristics of a computer nor the speed of the Internet are specified anywhere, but only their availability [3, 4].

Since the beginning of the 21st century, empirical information characterising the essential aspects of this phenomenon has been collected and summarised, which allowed to substantiate the limitations of the idea of technocratic optimism. At the World Summit of the Information Society, the idea of digital inequality only as physical access to relevant resources was recognised as limited [5]. Experiments [6] conducted as early as the turn of the century to measure practical skills in using the Internet have shown the paramount importance of such skills for the effective use of information technology (IT). These studies also revealed the dependence of the effectiveness of info-communication technology use on the social parameters of the participants - age, education level, experience with technology and a number of others.

The development of IT, namely the emergence and improvement of smartphones, contributes to the weakening of technical access problems [18]. Since 2014, the number of smartphones sold has surpassed the sales of personal computers. Moreover, the totality of technologies combined in a smartphone allows both to expand the use of existing stationary services (programmes), but at a convenient time and place, and at the same time to get previously unavailable unique services related to geolocation, health monitoring, contactless payments, identity verification and so on. However, despite the fact that mobile Internet access technologies have significantly increased the efficiency and volume of information absorption through access to it while travelling, it is still too early to talk about overcoming inequality in access to digital infrastructure. For example, the above-mentioned gap between urban agglomerations and small settlements in terms of the use of new generation networks providing high-speed Internet access persists.

Materials and Methods

Research design

The research was conducted in September-October 2020. It included a survey of students (more than 3 thousand respondents) of M. Akmulla Bashkir State Pedagogical University (BSPU named after M. Akmulla), Ufa, Russia.

Results

Within the framework of the survey of students of M. Akmulla BSPU one of the main disadvantages of forced distance self-isolation education was identified as problems of technical nature: old computer, technical problems, weak Internet, etc.

There were also points of social (lack of communication and lack of feedback), physiological (neck, head, back pain, etc.) and financial (disproportionate fees for commercial students).

It is worth noting that about a quarter of respondents have a negative attitude to online education, with 11% being extremely negative; another 13% of surveyed students believe that the educational process should combine elements of both face-to-face and distance learning; 57% of respondents stated that the distance learning format satisfies them. Despite the fact that more than 2/3 of the surveyed students are satisfied with distance education to some extent, along with the above-mentioned problems of technical nature, a significant proportion of respondents (about 40%) as

problematic issues related to the quality of education and the inability of the teacher to use the available technical resources.

Discussion

On the example of one university, we can see a situation where, on the one hand, when defining the negative aspects of online learning, digital content and its structure turned out to be the most problematic, while on the other hand, respondents noted the convenience and comfort of assignments as positive aspects in the organisation of the learning process. And if such reasons as technical failures can be attributed to the digital divide of the first level, then the issues related to educational problems are already moving into the category of problems of the digital divide of the second level, related to "the opportunities provided by access to the network and the way these opportunities are used" [7]. [7].

Since the beginning of the current century, the concept of digital divide of the second level has been firmly included in the scientific turnover, as well as becoming a number of criteria of socio-economic development of the society. Various international organisations began to include data on technological literacy to assess the level of information development of countries [8]. In general, the understanding of the dependence of the degree of citizens' involvement in the socio-economic life of the country on the level of access to IT services is developing: there is a close correlation with the human potential index [9], which indicates the objective interdependence of the level of mastering IR technologies and socio-economic development of society as a whole.

According to the results of the sociological study of the Institute for the Development of Information Society, the dynamics of information competence of the Russian population is generally positive, but not uniform [10]. Respondents of the middle age category are quite well versed in social networks and online courses. At the same time, representatives of the older age group lag behind in this respect. Thus, if the share of persons among young people who use a computer weekly was - 87.0%, then among respondents of the age group 55-74 years old only 18.0%. The presented survey data demonstrate the inequality in the level of information competences in different age groups, i.e. digital inequality of the 2nd level.

In terms of conceptualising the phenomenon of digital inequality, there is no universally accepted single model reflecting the interrelation of its levels. For example, Vernon Harper [11] in his works notes two types of digital inequality - access inequality and social inequality. The social type of digital inequality, in turn, includes a motivational barrier, a knowledge and skills barrier, a content barrier (lack of interest in the content of Internet resources) and a social network barrier. In turn, Van Dijk proposes 4 types of access [12]: motivation - physical access - IR skills and IR intensity. And, according to this model, the increase in the intensity of IR technology use increases the motivational level of access. It seems that from the point of view of digital inequality management, it is more important to improve physical access and competences in the use of information technologies. The problem of motivating the use of IR technologies and increasing the use of digital services among trained users will become more relevant when a high level of infrastructural accessibility is achieved.

Note that despite intensive technological development, digital inequality persists for social reasons, namely:

- low literacy levels, which reinforce the digital divide: those with tertiary education are 10 times more likely to utilise the potential of modern information technologies in their daily lives compared to those with secondary school education or lower;
- income gap: wealthy families are 10 times more likely to own computers with home high-speed Internet connections than low-income families who cannot afford the expensive monthly costs of such services.
- geographical limitations: the digital divide is exacerbated by geographical differences within a country: high-density urban areas are more likely to be connected to fourth- and fifth-generation mobile or fibre-optic connections than rural or mountainous areas;
- The gender gap is particularly pronounced in developing countries: according to an ITU report, 55 per cent of men and only 48 per cent of women have access to the World Wide Web;
- The age gap: there are more and more older people around the world, but their use of ICTs lags behind other age groups. The reason is that over the last decade, jobs have moved online and everyday life has become increasingly virtualised, making it difficult for the older generation to embrace new digital opportunities;
- lack of skills, which is an important barrier to the uptake and effective use of ICTs. In 40 of the 84 countries for which ITU has data, less than 40 per cent of the population has basic digital skills, such as copying a file or sending an email with an attachment [13].

The regional aspect of the digital divide is also important. The second-level digital divide between Russian regions is quite significant. According to the results of the joint report "Digital Life of Russian Regions 2020" by the Moscow School of Management "Skolkovo" and international audit leader EY, the value of the final Digital Life Index of the leading cities (Krasnodar, Yekaterinburg) is almost 5 times higher than that of the trailing cities (Nazran, Magas) (Figure 1). At the same time, the distribution of supply is significantly more even, the difference between the leading and trailing city is reduced to three times; the overall digital divide is more determined by differences in the level of digital demand, determined by digital skills and competences of the population .

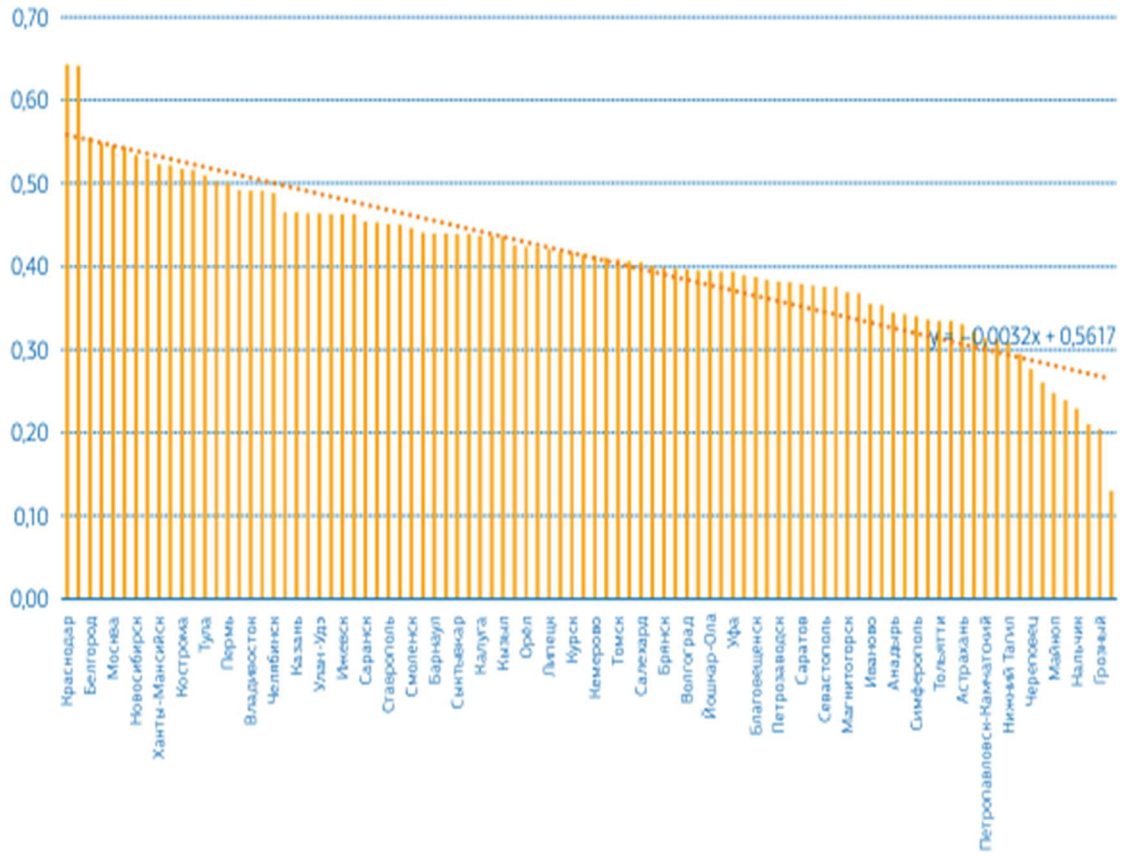

Figure 1: Overall level of digital divide between Russian cities

For example, the city of Ufa in this rating is in the third group of cities with a total (final) index value of 0.39. In the field of education in Ufa, the digital demand index is slightly higher than the overall digital life - 0.45. Meanwhile, the gap between digital demand and supply in Ufa in the field of education is significant (0.2) with demand prevailing. This indicates a great potential for educational activities in digital format. Excess of demand over supply is inherent in all million-strong cities, except for Moscow, Omsk and Kazan. At the same time, in Ufa, supply exceeds demand in transport, finance, trade, and healthcare.

It should be noted that Russia's digital population, which is defined as the total of all online and mobile users, spends more than 28 hours a month on a computer. And this figure is on par with users in countries such as France, Italy and Spain. However, it is noted that the digital divide between the users of modern digital devices and the population of the country as a whole is one of the highest and amounts to 21 percentage points, while in most European countries it is no more than 12% [14], which indicates the need to overcome it as soon as possible.

Bridging the digital divide in every aspect of human life is a real necessity today. Even at the beginning of the 21st century, the UNESCO Universal Declaration, which pays considerable attention to digitalisation in cultural, scientific and educational environments, pointed out the possible extension of inequalities already existing in the world to the digital sphere, i.e. the emergence of the digital divide, as a major problem [15].

There will be no socio-economic development of the society in the absence of a unified society united by common goals and objectives, including those related to digitalisation. Digital divides, especially of the second level, are a new type of frustration, because "going beyond the transformation and optimisation of business processes, digitalisation has begun to influence all spheres of modern society, including its educational and cultural components... Digitalisation has long ceased to be a distant future, its impact and consequences are observed and felt by ordinary people in all spheres of their lives - from modern school, workplace, forms and types of consumption to their own living environment, ways of pastime and interpersonal activities" [16]. [16].

Frustrators can be a variety of events and circumstances, which in classical science are usually divided into 4 types: physical, psychological, biological, social. Physical frustrators include financial constraints, deprivation of liberty. Among psychological - lack or lack of knowledge, fears, doubts. Biological causes of frustration are aging, external features, changes in appearance. And social causes are everything related to communication with others [17].

Digital frustration at the current stage of societal development can already be put on a par with physical, biological, psychological and socio-cultural frustration in its typology by the nature of barriers [19]. Digital technologies always make us treat them with caution - some people are more or less cautious when communicating with virtual space. Some people feel vulnerable and even defenceless in the Internet space and for this reason do not use, for example, the possibilities of bank cards, but prefer cash. Others are afraid to demonstrate their lack of IT competences in front of other people and therefore are not active participants in the digital movement. The third have an inexplicable fear, reinforced by film productions, of artificial intelligence. But then there are those who cannot learn new digital skills given the right needs. These are all variants of digital frustration, but while the first three examples are more psychological and can be addressed in this way, filling the digital gap at the second level is a managerial task. Of course, the state of frustration cannot be unequivocally attributed to negative phenomena, but prolonged frustration can lead to antisocial actions and move from the problems of one person to the category of social problems. In such a case, digital frustration, especially in the spiritual sphere, a state when, due to the digital divide of the second level, consumers are unable to satisfy their demands, can lead to a state of social anomie, substitution of notions and global social transformation. .

Modern realities and trends described in terms of "change of technological modes", "phase transition", "anthropological revolution", etc. convincingly prove that one of the leading historical factors in the development of society today is the increasing role of human capital: science, culture and education. It should be noted that human capital as a significant factor of social development in Russian society has been discussed relatively recently. Although in the world practice this concept has been used for more than half a century - it was formed in the early 60s of the twentieth century in the works of American economists T. Schultz and G. Becker. It was during this period of development that the theory of post-industrial society appeared, which is based not on the industrial sphere, but on theoretical knowledge and in which the main structural element is not firms and enterprises, but universities - the place of production and accumulation of knowledge.

All this came to Russia, unfortunately, several decades later. Therefore, the full realisation that education of a specialist, his professional qualification is as determining a factor in post-industrial society as material resources at the early stages of socio-economic development has not yet occurred. Despite the fact that these ideas are constantly discussed at round tables and conferences, reflected in scientific reports and concepts, the vestiges of "industrial consciousness" are firmly held in our society. The Russian society is still far from realising that "at present the world leaders are the countries that have learned better than others to form and use knowledge, skills, competences of people, their abilities for further learning and complexly organised joint activities" [20]. [20]. Training of a high-class specialist on the educational platform oriented to the industrial type of development in the current conditions is impossible a priori. Moreover, changes in the educational process should affect not only the professional side of the educational process in terms of content and technologies of the educational process, but also in the development of general cultural competences, because not only professional qualities, but also the general development of personality determine the level of development of a modern specialist. Competences and skills form the very human capital, without which productive production and innovation activities are impossible, ensuring the progress of society [21].

In the early 1990s, one of the progressive leaders of the Soviet higher school noted the crucial role of universities in the transition to post-industrial development of the country, for "society and the state cannot solve their urgent fundamental issues without higher school, for which there are no higher and more important than the fulfilment of the social order of society and the state" [22]. [22]. However, the global changes that have occurred over the past 30 years lead to the idea that already in the near future the availability of higher education will not be one of the determining factors due to its value erosion. The widespread increase in the control figures for admission to budgetary places in universities leads to the fact that university students are those who mastered the school programme and passed the minimum acceptable threshold of the USE for admission to universities. A "below average" schoolchild becomes a "below average" student, not receiving knowledge in universities, but listening to a course of lectures and becoming the owner of a "crust". And the problem of higher school, which becomes further the problem of the whole further development of the society, is the graduation of people with higher education, but only with its low quality.

It seems that in the near future it is necessary to return to the understanding of higher education as elite education, "opposed to mass and highly specialised education in the sense that it implies the primary value of such content and organisation of the educational process, which are focused on the search for truth and understanding of the subjects studied ... Elite education is necessary for society, because through it the genetic code of the nation is transmitted - its culture, intellect, higher spiritual and moral values. [23]. In addition, it is time to move away from the so-called "universal education" and move to the model of individual educational routes, which will allow improving competences by filling the professional deficits of each particular social actor and, as a result, will reduce the digital divide of the second level, hence, will contribute to the development of human capital.

With the direct participation of the author, the research team of the M. Akmulla State Pedagogical University has been working on a project since 2021 aimed at developing tools to overcome the digital divide of the second level - the development of a regional model of education quality management based on the identification of professional deficits, ensuring the continuous development of professional competencies of social actors. The developed methodology for identifying professional deficits of teaching staff with further improvement of professional competences, developed within the framework of this project, aims to ensure the continuous development of teachers' professional competences for the formation of human capital in the younger generation from school. This methodology has been developed on the basis of compliance of the content of assessment materials with the requirements of FSES of basic and secondary general education, model educational programmes and professional standard "Teacher (pedagogical activity in the field of preschool, primary general, basic general, secondary general education) (educator, teacher)", as well as practice-oriented assessment materials, homogeneity of the structure of diagnostic works for different subjects/subject areas and automated verification of the results.

In the course of the ongoing research, the methodology for identifying professional deficits and the developed toolkit were tested among more than 13,000 teachers and students . The results of the pilot study give grounds to conclude that the methodology allows assessing subject and methodological competences of teachers, determining the level of competences of teachers and students and identifying professional deficits in subject and methodological competences of teachers [24].

At the same time developed methodology allows to transfer the implementation of the model practically to any sphere of life activity of the society.

The development of human capital based on the general culture and level of education will make it possible to avoid "growth errors" in modern transformation processes and, if not completely protect society as a whole and each individual in particular from digital frustration, then at least reduce the time required to overcome it.

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