Computer tools for data collection in the student-sociologist's workshop

Компьютерные инструменты сбора данных в практикуме студента-социолога

Written by:
Victor I. Nardyuzhev [91]
SPIN-код: 7378-7081
ORCID: https://orcid.org/0000-0001-9246-4432
Ivan V. Nardyuzhev [92]
SPIN-код: 4557-0467
Victoria E. Marfina [93]
SPIN-код: 1822-5213
Ivan N. Kurinin [94]
SPIN-код: 1638-2148

Abstract

The article is devoted to the collection and processing of sociological data using mobile and office computers in a workshop of sociological students. The relevance of these issues is due to the fact that new applied information competencies should be formed for the student in addition to his ability to work with questionnaires on paper, work on mobile and office personal computers in local and global computer networks with office programs and Internet technologies at present with mass the spread of computer and mobile technologies, the growth of the functionality of mobile personal computing devices, the increase in the number of developed services about online-survey, in the learning process, a sociologist student. These competencies are associated with the ability of sociological students to prepare and conduct case studies, use modern methods of collecting and preliminary processing of case data using mobile and office computers, apply statistical analysis programs for these data, and prepare final reports. The article shows how the authors solve this problem, relying on service programs for online questioning of Russian and foreign companies, as well as using their two developed programs. These programs run on Windows and provide a solution to the problems of data collection when filling out questionnaires on mobile and office

Аннотация

Статья посвящена вопросам сбора и обработки социологических данных с помощью мобильных и офисных компьютеров в практикуме студентов-социологов. Актуальность этих вопросов обусловлена тем, что в настоящее время при массовом распространении компьютерных и мобильных технологий, росте функциональных возможностей мобильных персональных вычислительных устройств, росте количества разработанных сервисов онлайн-анкетирования, в учебном процессе студента-социолога помимо его умения работать с анкетами на бумаге, работать на мобильных и офисных персональных компьютерах в локальных и глобальных компьютерных сетях с офисными программами и интернет-технологиями, должны быть сформированы новые прикладные информационные компетенции. Эти компетенции связаны с умением студентов-социологов готовить и проводить социологические исследования, использовать современные методы сбора и предварительной обработки социологических данных с помощью мобильных и офисных компьютеров, применять программы статистического

[91] Candidate of Engineering Sciences, Associate Professor, Department of Computer Technologies, Faculty of Philology, Peoples' Friendship University of Russia, RUDN University, Moscow, Russia
[92] Candidate of Engineering Sciences, Programmer of the Software Development Service, Avtomir Premier LLC, Moscow, Russia
[93] Master of Science in Higher Education Administration, Peoples' Friendship University of Russia, RUDN University, Moscow, Russia
[94] Candidate of Economic Sciences, Associate Professor, Head of the Department of Computer Technologies, Faculty of Philology, Peoples' Friendship University of Russia, RUDN University, Moscow, Russia

computers. They are registered by the Federal Service for Intellectual Property of the Russian Federation and for several years have been used in the workshop of sociological students on personal computers. The article describes an example of the use of these programs in the preparation and conduct of a large-scale case study on the topic "Self-assessment by students of their level of computer literacy."

The purpose of the study is to analyze the methods, technologies, tools and results of a large-scale questionnaire on the topic "Self-assessment by students of their level of computer literacy", on the example of which these competencies can be formed.

During the study, the method of interviewing students according to developed questionnaires and a correlation analysis of the collected data and the results of computer testing were used. When writing an article, a comparative analysis of modern online questionnaire service programs of Russian and foreign companies was performed. In addition, two authoring programs were used, running Windows and providing a solution to the problems of data collection when filling out questionnaires on mobile and office computers. These programs are registered by the Federal Service for Intellectual Property of the Russian Federation and for several years have been used in the workshop of sociological students on personal computers.

Keywords: Sociological student, online survey, questionnaire, data, statistical analysis, program, technology, mobile devices.

анализа этих данных, готовить итоговые отчёты.

Статья показывает, как авторы решают эту задачу, опираясь на сервисные программы онлайн-анкетирования российских и зарубежных компаний, а также используя две свои разработанные программы. Эти программы работают под управлением ОС Windows и обеспечивают решение задач сбора данных при заполнении анкет на мобильных и офисных компьютерах. Они зарегистрированы Федеральной службой по интеллектуальной собственности РФ и на протяжении нескольких лет использовались в практикуме студентов-социологов на персональных компьютерах. В статье описан пример использования этих программ в подготовке и проведении масштабного социологического исследования по теме "Самооценка учащимися уровня своей компьютерной грамотности".

Цель исследования - проанализировать методы, технологии, инструменты и результаты масштабного анкетирования по теме "Самооценка учащимися уровня своей компьютерной грамотности", на примере которого могут формироваться указанные компетенции.

При проведении исследования использовался метод опроса учащихся по разработанным анкетам и корреляционный анализ собранных данных и результатов компьютерного тестирования. При написании статьи выполнен сравнительный анализ современных сервисных программ онлайн-анкетирования российских и зарубежных компаний. Дополнительно применялись две авторские программы, работающие под управлением ОС Windows и обеспечивающие решение задач сбора данных при заполнении анкет на мобильных и офисных компьютерах. Они зарегистрированы Федеральной службой по интеллектуальной собственности РФ и на протяжении нескольких лет использовались в практикуме студентов-социологов на персональных компьютерах.

Keywords: студент-социолог, онлайн-опрос, анкета, данные, статистический анализ, программа, технология, мобильные устройства.

Introduction

The most important and often the most time-consuming task in the educational process of a student-sociologist is the development of technologies for collecting sociological data for their further processing. Among the modern methods are methods of data collection using

mobile and office computers, based on the technology of online surveys over the Internet and the use of specialized programs in local information systems.

As a" live "example for students-sociologists, below we consider a variant of the study in the dynamics (for two years) of working with a student's questionnaire on the topic "self-Assessment of the level of computer literacy". Approbation of the used programs and mass filling of questionnaires were provided at the stages of centralized computer testing in Russian universities. This example demonstrates in detail the technology of data collection before computer testing sessions, methods of statistical analysis of the collected data, the importance of the results obtained and, hopefully, further encourages students of sociology to master computer tools for data collection for solving applied problems.

Information materials (Predictive Solutions, 2019) note that mobile devices (tablet computers and smartphones) are now comparable in functionality to desktop computers and laptops. Online surveys using tablet computers have become a convenient, fast and inexpensive way to conduct sociological and marketing research. The advantages of the new technology include: 1) the quality of the collected data, ready for statistical processing (in the main file formats for processing, including .sav for processing in the IBM SPSS Statistics package); 2) the speed and convenience of the interviewer at all stages of his work (from the survey to upload data to the Central server); 3) savings in the cost of organizing and processing the survey data. Approaches to solving problems related to the analysis of big data, enhanced by data obtained in the course of online surveys, are reflected in the comparison of analytical services from Yandex and mail.ru, providing new platforms for conducting online surveys on their own (Demchenko, 2017). For the first time developed and presented an overview of the possibilities and limitations of the survey on tablets (research center "Discourse", 2017). In it, experts note that when filling out questionnaires on tablets and smartphones, errors associated with entering questionnaire data into the SPSS database for its processing and analysis are reduced. Important factors may be the new features of audio recording of interviews and geolocation when filling out questionnaires. Among the disadvantages of using mobile devices are: 1) the possible increase in the duration of the survey due to the need to print answers to open questions; 2) the relatively short operation time

of these devices without recharging the batteries. However, the rapid development of Internet technologies and mobile networks will provide new opportunities for rapid transfer of completed questionnaires and other information to the server. The result will be an increase in the quality of information collection, increasing the reliability of the results.

Two methods are defined for answering the questions of the online questionnaire, namely: a web survey, which the Respondent takes on a computer / laptop, and a web survey, the questions of which the Respondent answers using a smartphone (Mavletova, 2012). Noting the fact that the smartphone has already become the most common personal device among users in different countries and that the number of smartphones with Internet access is growing rapidly, the author presented the results of the study-an experiment in which attention was focused on studying the specifics of mobile web surveys and comparing the quality of online research conducted on a mobile phone with research conducted on a computer. Defining mobile web surveys as an additional method of data collection in online research, the author has evaluated the performance of mobile web surveys compared to web studies in which the Respondent participates by filling in the form on the computer and noted the need for further methodological work to assess the quality of data and analysis of opportunities to use mobile web surveys on smartphones and tablet computers.

Formed top services for creating surveys, form design and statistics collection. For the first time, a large number (over 45) of online survey services are presented on the Startpack website. Search and selection of services for business, for online surveys is provided. Developed top services for creating surveys, form design and statistics collection (Startpack-Recommendation system for cloud services, 2019). Services can be selected by filters and compared in detail. This system helps you make an informed decision about which online survey Builder or service to create online surveys, form design, and collect statistics really deserves attention. We will note below three systems, from the most often recommended for educational purposes to students-sociologists.

A modern, simple, effective tool for creating online surveys is Google Forms (Google Forms, 2019). With their help, you can solve a variety of tasks of development, editing, formatting and use on personal office and mobile devices via the Internet in the online mode of modern forms.

Questions in the forms may have a different format and additional control of the correctness of the entered data. You can customize the background color of the form using a preset or custom theme. Online survey statistics are available in the form, and respondents ' responses are available in an automatically created Google spreadsheet. The collected data in the basic xlsx and csv formats can be used for further processing and analysis. Additional service features include the ability to send notifications about filling out the form by email, confirmation of email addresses entered in the response field, and so on. the process of creating Google forms can be automated. To do this, you can use ready-made code examples in any text editor to develop and then use the appropriate scripts. Developed and presented a detailed analysis of the capabilities of Google Forms. It is shown what they are useful for and how to use them as effectively as possible (Solovyova, 2017).

Relatively recently, a new service Yandex.Forms (Yandex.Forms, 2019). It is a tool that allows you to create surveys, questionnaires, and various forms. You can create forms using templates. You can include a variety of questions in the form — with answer options, a field for entering text, a date selection. You can customize the display of questions based on previous answers. Respondents ' responses can be uploaded in xlsx and csv formats to any system for further analysis. The code of the finished form can be embedded on your website or in the application, give it a link in any way by email or through social networks. There are reports and Analytics, email notifications, templates of questionnaires and questions. There is a help system that helps you quickly create a form, edit it, change the appearance and format, connect a metric, publish a form, set up notifications (Yandex Help, 2019). Modern, well-known and free Webanketa service allows you to create and conduct private and public surveys, questionnaires and voting. Its main advantages are that the service is Russian-speaking and supports multilingual surveys. There is documentation available to create questions of different formats and types. Survey results files are available in xlsx and csv formats (Webanketa SIA, 2016). A brief description and list of the main features of Webanketa are given. This is a service for creating surveys, tests and votes that will suit both entrepreneurs and large firms, as well as students or friends (Startpack, 2019).

In addition to the above-listed online survey service programs, the authors of the article have developed and used two programs for collecting personal data in local computer networks of personal computers. These programs are registered by the Federal service for intellectual property of the Russian Federation (Rospatent).

The program "Invvod" works at the stages of developing templates for different questionnaires in a sociological study, selecting specific templates, filling out the questionnaire using lists to select answers to the questionnaire questions and a window for free input of answers. The program "Invvod" provides on a personal computer in the "off-line" mode data entry on the templates of any questionnaires in a sociological study. After selecting a template (file with the extension "htm"), you can start filling out the questionnaire. Available are lists for selecting answers to questionnaire questions and Windows for free input of answers. You can save the completed questionnaire in full or in part in a file with the "csv" extension. You can download the previously saved form and continue working with it (Nardyuzhev, Nardyuzhev, Marfina, Kurinin, 2018).

The "Intest" program provides collection of students ' details and results of their questionnaire. It is possible to fill out the questionnaires before starting a testing session on computers using linear or adaptive tests. The obtained data can be used both for the analysis of computer testing results and for the analysis of students ' answers to questionnaire questions (Nardyuzhev, Nardyuzhev, Marfina, Kurinin, 2018). Integration of the Intest program with the complex of auxiliary programs provided creation of two complex technologies "Tester" and "Trtester" for the organization of computer testing in Russian as a foreign language. Both options provide the entire cycle of work - from the preparation of computer tests, computer testing, collecting results in databases, performing operational statistical analysis of test results and statistical analysis of the quality of test tasks (Nardyuzhev V. I., Nardyuzhev I. V., Marfina V. E., Kurinin I. N., 2018).

Methods

The study is based on our extensive use of methods of interviewing testers on developed questionnaires, collection, storage and statistical analysis of information that would allow us to get in the dynamics (for two or more years) answers to the following questions:

- confirmation (refutation) hypotheses - all (part of) tested in the required volume (at a minimum) own a computer

(working with a mouse and a keyboard), there is no (there is) a significant difference in the level of computer proficiency between the tested children and girls (by gender), between urban and rural students who came to the centralized computer testing (CCT);

- the confirmation (denial) that the following methodological decisions - not to start before testing the simulator (for acquaintance with a mouse and keyboard) based on the automated training course, because there is a time limit on the day of testing and it is methodologically incompatible tasks - to master the computer and after a few minutes to work on test items on a particular subject, using the computer. Students should be given the opportunity to familiarize themselves with the testing procedure, the structure of computer tests and their examples at the stage of rehearsals in computer centers (classes) and via the Internet;

- scientific and methodological developments in methods of analysis of the level of computer skills among the tested in Russia (in the regions), development of the scale distribution on the test level of computer skills (scale of selection groups tested with low and high level of computer literacy), study of the effect of proficiency computer test results;

- the answer to the main question - there is no significant impact (with negative consequences) of insufficient computer proficiency on the results of CCT.

- assessment of changes: the number of students who came to the CCT; students ' experience with the computer; access to computers; the difference in the level of computer proficiency between the tested children and girls, between urban and rural students; the impact of developing rehearsal testing in computer classes; the ratio between the composition of groups of students with low and high levels of computer development, etc.

To assess the impact of the level of computer literacy of students on the results of their computer testing before testing in Russian and mathematics, participants filled out a questionnaire on the computer screen of the student "self-Assessment of the level of computer literacy". It consisted of 18 questions. Answers to questions were selected from the

suggested lists. The questionnaire was filled out on the computer screen before testing in Russian or mathematics. Among the questions and answers were the following: 1) Do you use a computer at home (at school, in other places)? Answers: no (less than 1 time a month, from 1 time a month, to 1 time a week, more often 1 time a week). 2) Do you use your computer for games and entertainment (for editing texts, for programming, for working with training courses, for searching information on the Internet, for working with e-mail)? Answers: no (less than 1 time a month, from 1 time a month, to 1 time a week, more often 1 time a week). 3) Do you control the mouse? Answers: very uncertain (uncertain, confident, very confident). 4) Do you enter text from the keyboard? Answers: very slow (slow, fast, very fast). 5) do You master working with a computer? Answers: no (at school, with parents, on courses). 6) Have you visited the test Center server? Answers: no (1 to 2 times, 3 to 5 times, more than 5 times). 7) Have you been tested on a computer? Answers: no (1 to 2 times, 3 to 5 times, more than 5 times). 8) Are you ready to use the computer in your studies and future work? Answers: low (medium, good, high) and others.

For work with questionnaires on local computers and in mass procedures of computer testing the program "Intest" is used. This program makes collecting details of students and the results of their survey. It is possible to fill out the questionnaires before starting a testing session on computers using linear or adaptive tests. The obtained data can be used both for statistical analysis of test results and for statistical analysis of students ' responses to questionnaire questions. The program features were used to solve the actual problem of assessing the impact of the level of computer literacy of students on the results of their computer testing.

Discussion

Studies of the impact of the level of computer literacy of students on the results of their computer testing have been conducted for a long time and in different countries. At the same time, students ' access to computers and their experience in using them were determined. The students ' level of computer proficiency was assessed, whether they had access to computers at home, at a friend's house, at school, at work, or anywhere else. Many of these studies included emotional variables such as attitudes toward and fear of computers. The impact of factors such as age, gender, work experience, native language, region and country where testing takes place, and

the availability of testing experience on forms was considered. Computer experience questionnaires were developed and attempts were made to create an interval-level scale of the level of computer development by students, a scale for selecting groups of test takers with low and high levels of computer development (Irwin Kirsch, Joan Jamieson, Carol Taylor, Daniel Eignor, 1998). Before the full transition from the blank to the computer version of TOEFL, ETS carried out detailed studies of the level of computer literacy of students taking the computer version of TOEFL, and the degree of influence of this level on test results (Daniel Eignor, Carol Taylor, Irwin Kirsch, Joan Jamieson, 1998); (Carol Taylor, Joan Jamieson, Daniel Eignor, Irwin Kirsch, 1998).

Similar studies were conducted at an early stage of the introduction of computer testing of applicants in the centralized testing of the Ministry of education of the Russian Federation. Models have been developed, and algorithms of computer information system computer-based testing (Nardyuzhev, Nardyuzhev, 2000), developed requirements for computer-based testing (Nardyuzhev, Nardyuzhev, 2002).

Given the interest in the introduction of artificial intelligence systems for the objective assessment of educational achievements and the translation of tests in individual subjects to computer versions in the coming years, we can talk about the relevance of such research today and in the future (Kolesnikova, 2019; Karabulatova, Vorontsov, 2019).

Results

The assessment of the impact of the level of computer literacy of students on the results of their computer testing is presented below. In total, 11,880 questionnaires were filled out (6078 questionnaires before testing in Russian and 5802 questionnaires before testing in mathematics). The following year, the composition of the questions and the design of this questionnaire did not change. In total, about 35 thousand questionnaires were filled out (12 thousand questionnaires-here and further in brackets data for the previous year are indicated). The data in the questionnaires completed before testing in both subjects were very close and, therefore, below, on the example of the analysis of data from 18591 (6078) questionnaires completed before testing in Russian, some of the results of our study are presented.

1. Paul. The children and girls who participated in the tskt in Russian were almost equally 52.5% and 47.5% (53% and 47%).
2. Type of settlement. The overwhelming number of test subjects was from large cities (with a population of 100 to 449 thousand people-26.9% (33.7%), from 450 to 680 thousand people-10.2% (9.3%), more than 680 thousand people-37.0% (36.6%)). From Moscow and St. Petersburg was 5.3% (2.3%). Of the small towns with a population of up to 99 thousand people was 11.7% (8.5%). Of the towns and villages were 7.8% (9.3%) tested.
3. Type of educational institution. More than half of those tested-69.0% (65.9%) were from regular schools. There were 11.1% (13.6%) of high schools. Secondary schools 16.3 per cent (16.9 per cent). Colleges and vocational schools of 2.0% (was 1.5%).
4. Special training of test subjects. Almost half of the test takers-43.5% (45.8%) did not have any additional training; 35.1% (33.8%) of the test takers were engaged in preparatory courses at universities; 6.9% (5.9%) were engaged with Tutors; 5.8% (5.4%)-on electives; 2.1% (3.4%) - in special classes on the subject.
5. Using a computer at home. 46.9% (56.9%) of those tested do not use it at home, and 39.9% (31.0%) use it more often than once a week.
6. Using a computer at school. 18.8% (20.6%) of those tested at school do not use it, and 31.1% (28.5%) use it more often than once a week.
7. Use your computer for games and entertainment. 27.5% (33.3%) of test subjects do not use a computer for games and entertainment, and 22.9% (19.7%) - use it for this purpose more than once a week.
8. Using a computer for programming. 53.1% (55.1%) of test subjects do not use a computer for programming, and 13.7% (12.9%) - use it for this purpose more than once a week.
9. Using a computer to search for information on the Internet. 49.5% (61.7%) of test subjects do not use a computer to search for information on the Internet, and 19.0% (12.5%) - use it for this purpose more than once a week.
10. Mouse control. 5.4% (7.4%) of test subjects are very insecure with the

11. Mastering working with a computer. 16.2% (17.5%) of test takers do not master working with a computer; 61.2% (62.1%) - do it at school; 11.4% (9.9%) - do it with their parents; 11.1% (10.4%) - do it on courses.

12. Experience testing on computers. 40.3% (44.6%) of students had never been tested on a computer before entering the centralized computer testing; 46.2% (42.1%) - from 1 to 2 times were tested on a computer; 8.7% (7.6%) - from 3 to 5 times were tested on a computer and 4.8% (5.7%) - more than 5 times were tested on a computer.

A more "subtle" analysis of the data obtained from the considered questionnaires allows you to find the answer to many important questions. For example, when the number of children and girls who participated in the Russian language testing was close-52.5% and 47.5% (53% and 47%), it turned out that at home for games and entertainment more often than once a week, 73.2% (75.4%) of children and 26.9% (24.6%) of girls use a computer, 74.8% (78.0%) of children and 25.2% (22.0%) of girls use a mouse very confidently, etc.

Depending on the answer to the questionnaire question, the tested person received from 0 to 3 points. The maximum number of points scored is 54 (with 18 questions in the questionnaire and a maximum weight of 3 points for each question). 0 points were received by" absolutely illiterate in terms of computer skills " participants of the survey. All participants were divided into three roughly equal groups with low, medium and high levels of computer development. Note that, for example, "in Russian " the difference in the value of the average test score for participants in groups with low and high level of computer development is only 1.22 (0.52) points with an average value for all tested 48.97 (49.25) and a maximum of 100. "In mathematics, " this difference in the value of the average test score for participants in groups with a low and high level of computer development is 4.15 (4.04) points with an average value for all tested 49.49 (49.82) and a maximum of 100.

As a result-for two years in a row it was received unambiguous confirmation of the answer to the main question of the performed research – there is no significant impact with negative consequences for students of insufficient level of computer proficiency on the results of their

mouse, and 79.5% (72.9%) - do it confidently or very confidently.

centralized computer testing. At the same time, there are trends of more active work of students who came to the CCT, with computers. So, in particular, in a year already 39,9% (was 31,0%) use the computer at home, 31,1% (was 28,5%) use the computer at school more often than once a week and 19,0% (was 12,5%) of pupils use the computer for search of information in the Internet and so on.

Conclusions

1) The Formation of new information competencies of the student-sociologist, related to the ability to use mobile and office computers, applied statistical programs for collecting, storing and analyzing sociological data, becomes more effective by using the service programs developed by the authors of the online survey "Invvod"and " Intest". These programs have been used for several years in the practice of social science students on personal computers. It is possible to fill out the questionnaires before starting a testing session on computers. The obtained data can be used both for the analysis of test results and for the analysis of students ' responses to questionnaire questions.

2) As an example for students-sociologists, this article shows a variant of the study in the dynamics (for two years) of working with a student's questionnaire on the topic "self-Assessment of the level of computer literacy". Testing of the Intest program and mass filling out of questionnaires were provided at the stages of large-scale centralized computer testing in Russian universities. The results obtained as a result of this study showed that there is no significant impact for students of insufficient computer proficiency on the results of their computer tests. This has become an important factor for the development of computer testing itself. And this example helps students-sociologists to realize the importance of this type of research, to interest them in the development of similar projects.

3) In Addition to the program "Invvod" developed as an example templates of questionnaires for entering data on groups of indicators that characterize the state of the education system (this is the details of students, teachers and

educational institutions): 1) Questionnaire student "self-Assessment of the level of computer literacy". 2) student Questionnaire. 3) student health Questionnaire. 4) teacher's Questionnaire. 5) the Questionnaire of the teacher "self-Assessment of the level of computer literacy". 6) the Questionnaire of health of the teacher. 7) Questionnaire of a General education institution. 8) Questionnaire "effective" in the world of information technology teacher.

4) The questionnaire of the "effective" teacher in the world of information technologies is a Constantly working example of the use of modern technologies and online survey services for students-sociologists. It includes the following questions developed by the authors of the article: 1) the material of the training course is relevant. 2) the Teacher can clearly organize the educational process in the credit system of training. 3) Uses modern it in the educational process (Internet, e-mail, presentations, office and application programs). 4) Actively uses the educational portal for the organization of the educational process. 5) at lectures uses computer and projection techniques. 6) Widely applies computer tests for an objective assessment of the student's knowledge of the course. 7) Presents the material clearly, clearly, accessible. 8) is Able to maintain discipline in the audience. 9) Tactful and friendly when communicating with students. 10) Punctual, not late for classes. This questionnaire provides an assessment on the following five-point scale: 5 points-always characteristic. 4 points-characteristically often enough. 3 points-typically at the level of 50%. 2 points-characteristically rare. 1 point-not at all characteristic (not noticed). It is actively used in the educational process and on the page of each training course of the authors in the Moodle learning environment.

Acknowledgements

References

data Collection using tablet computers. [Electronic resource]: http://www.predictivesolutions.ru/solutions/DataCollectionTablets.htm (circulation date 03.11.2019).

Demchenko P. (2017). Yandex. Look Research.Mail.ru and: what is more functional? 2017. [Electronic resource]: https://www.sostav.ru/publication/vzglyad-yandeks-i-research-mail-ru-chto-funktsionalnee-29141.html (accessed 03.11.2019).

Research Center "DISCOURSE". Tablet survey-overview of features and limitations, 2017 [Electronic resource]: https://c-discurs.ru/theme-of-day/ispolzovanie-planshetov-v-oprosah/ (circulation date 03.11.2019).

Karabulatova I.S., Vorontsov K.V. (2019). Digital linguistical migrationology: the possibilities of artificial intelligence in the study of migration processes// II World Congress in real and virtual mode "West-East: crossing cultures", 2-6 October 2019, Japan, Kyoto Sange University, Scientific and practical materials of the 2nd world Congress in Japan 2019, Kyoto: Kyoto Sange, 2019, volume 2, pp. 760-766.

Mavletova A. M., (2012). Mobile web surveys. In the book.: Online research in Russia 3.0. Moscow: OMI RUSSIA, 2012. Pp. 59-85. [Electronic resource]: https://publications.hse.ru/mirror/pubs/share/folder/csilvmoduq/direct/72776511 (circulation date 03.11.2019).

Startpack is a Recommendation system for cloud services (2019). Search and selection of services for business. Online survey. Top services for creating surveys, creating forms and collecting statistics. 2019 [Electronic resource]: https://startpack.ru/category/online-survey (circulation date 03.11.2019).

Google Forms, (2019). [Electronic resource]: https://www.google.com/forms/about/ (accessed 07.11.2019).

Solovyova E. All the possibilities of Google Forms, (2017). [Electronic resource]: https://netology.ru/blog/google-formy (accessed 07.11.2019).

Yandex forms, (2019). [Electronic resource]: https://yandex.ru/forms/ (accessed 07.12.2019).

Yandex help. What is Yandex.Forms? (2019). [Electronic resource]: https://yandex.ru/support/connect-forms/ (accessed 07.11.2019).

Webanketa SIA. Free creation of questionnaires, surveys, tests and voting, (2016). [Electronic

resource]: https://webanketa.com/ru/ (accessed 03.11.2019).

Webanketa from "webanketa" Sia, (2019). [Electronic resource]: https://startpack.ru/application/webanketa (accessed 03.11.2019).

Nardyuzhev V. I., Nardyuzhev I. V., Marfina V. E., Kurinin I. N. (2018). Certificate No. 2018615248 of may 03, on state registration of the computer program "Invvod". Issued by the Federal service for intellectual property (Rospatent).

Nardyuzhev V. I., Nardyuzhev I. V., Marfina V. E., Kurinin I. N. (2018). Certificate No. 2018614731 of April 17, on state registration of the computer program "Intest". Issued by the Federal service for intellectual property (Rospatent).

Nardyuzhev V. I., Nardyuzhev I. V., Marfina V. E., Kurinin I. N. (2018). Complex technology of computer testing in Russian as a foreign language. Bulletin Of the Russian peoples ' friendship University. Series: Informatization of education., issue 15(3), c. 319-332.

Irwin Kirsch, Joan Jamieson, Carol Taylor, Daniel Eignor. (1998). Computer Familiarity Among TOEFL Examinees. ETS, Research Reports, [Electronic resource]: https://www.ets.org/Media/Research/pdf/RR-98-06.pdf (circulation date 03.11.2019).

Daniel Eignor, Carol Taylor, Irwin Kirsch, Joan Jamieson. (1998). Development of a Scale for Assessing the Level of Computer Familiarity of TOEFL Examinees. ETS, Research Reports, [Electronic resource]: https://www.ets.org/Media/Research/pdf/RR-98-07.pdf (circulation date 03.11.2019).

Carol Taylor, Joan Jamieson, Daniel Eignor, Irwin Kirsch. (1998). The Relationship Between Computer Familiarity and Performance on Computer-based TOEFL Test Tasks. ETS, Research Reports, [Electronic resource]: https://www.ets.org/Media/Research/pdf/RR-98-08.pdf (circulation date 03.11.2019).

Nardyuzhev V. I., Nardyuzhev I. V. (2000). Models and algorithms of information-computing system of computer testing. Monograph. - Moscow: Prometheus,. - 148 p.