Formation of Digital Literacy of First-Year Bachelors Studying Humanitarian Courses: a Practice-Oriented Approach

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Abstract. We carried out a systematic analysis of the problem of developing digital literacy among bachelors who studying humanitarian courses. It is proved that the solution to this problem contributes to the development of education digitalization f as achieving the national goals of the Russian Federation. Adequate changes in the structure and content of education represent a system of information education that has an advanced nature, in connection with we analyzed the essence of digital literacy. We propose a practice-oriented approach to the formation of bachelor's digital literacy. The potential of the course "Modern Information Technologies" was proved, this course can be used to solve the strategically important problem of developing students' digital literacy

Keywords: Information society · Information education · Digital literacy · Bachelor's · Digitalization of education

1   Introduction

The infiltration of digital technologies into all spheres of social life has a significant impact on education management, learning models, teaching and educational activities, and students' leisure activities. The widespread application of digital technologies contributes to the digital development of education. The digital transformation program in the field of education involves achieving digital competence in key sectors of economic and sociocultural spheres; large-scale increasing of educational services in electronic form; and providing broadband access to the Internet [3, 6, 8, 11]. The aim of the study: identifying the effectiveness of pedagogical conditions for the formation of digital literacy of bachelors who study in humanities courses. The concept of "second literacy" as a prototype of digital literacy was introduced by A.P. Ershov [4] in 1981. Currently, the development of procedural, algorithmic, or computer thinking, and mastery of 21st-century competencies, which undoubtedly include competencies in the field of digital technologies, are recognized as significant, providing access to digital tools: network social services, augmented reality technologies, cloud document storage, interactive worksheets, Qr-codes, webinars, electronic textbooks, virtual notebooks, web quests, interactive videos and games, electronic testing. P. Gilster [16] interprets digital literacy as a life skill that ensures survival since it is associated with the ability not only to extract information provided by a multifunctional computer, but also to understand, correctly apply, interpret, correctly evaluate, and systematize it in various formats. The structure of digital literacy for bachelors in the humanities courses includes various aspects, including cognitive, informational and cultural, technical and technological, creative, assertive, reflective, communicative, ethical, etc. [1, 2, 5, 7, 9, 10, 12, 13, 14, 15, 16, 17].

Hence, digital literacy is a multi-level construct that promotes multimodality during designing educational programs, the work of project teams, and the subjectivity of students and teachers as creators of knowledge. A practice-oriented approach to training specialists involves taking into account, first of all, the requirements of employers for digital literacy, formulated based on a systematic analysis of metadata in economics, the Federal State Educational Standard. Digital development of education means, in particular, the design of technologies for monitoring the level of readiness of students for digitalization, and the development and application of end-to-end digital technologies, for example, virtual reality (VR) technologies and artificial intelligence (IT). In this connection, it is necessary to develop educational practices, and methodological solutions for a new class focused on the personalized organization of the educational process. Digital transformation in education is aimed at radically improving students' educational outcomes in the developing digital environment.

2   Methodology and research methods

The methodological basis of the research includes conceptual approaches to the formation of computer literacy, ICT competence, and information culture of teachers (A. P. Ershov, I. V. Robert, M. P. Lapchik, E. S. Polat, V. V. Grinshkun, L. S. Galkina, A.V. Sharikov, etc.). The research work was carried out at the Far Eastern Federal University during the process of studying the course "Modern Information Technologies" and participating 1st-year students. 460 students were involved in the experiment, conducted over three years from 2021 to 2023.

3   The research results

The results of the analysis of 1st-year students training who studied in the humanitarian courses of FEFU indicate that an insufficient understanding of the technical principles of work, a low level of readiness to systematize and summarize information, a lack of skills to carry out commands according to a flow chart and use variables in computer science. In addition, humanists have expressed psychological resistance to mastering digital skills. Applying a modular approach to teaching is methodologically justified since theoretical tasks and laboratory work are differentiated by the number of tasks, the sequence of their presentation, and the degree of complexity. At the same time, the indicated parameters are being transformed depending on the capabilities of specific groups of students. During the experiment, digital literacy was diagnosed in the process of classroom laboratory work and solving creative tasks. The following activities were included in the content of the first module: working with a text editor, creating an author's text product, including formatting, creating multi-level lists, building complex tables, and columns, automatic table of contents, and merging of documents.

The results of the entry test demonstrate that at the beginning of the academic year, even for such an operation as text formatting only 45.7% of bachelors had an average level of preparation, while 25.7% of students had a low level, and a very low level was recorded for 17.1% of students. Only 11.4% of students confirmed their readiness to master the course.
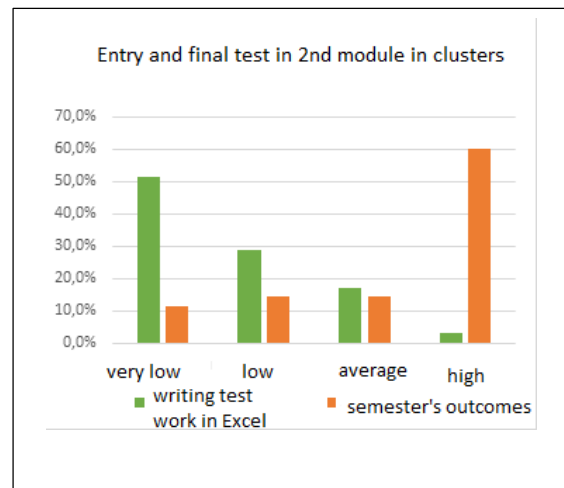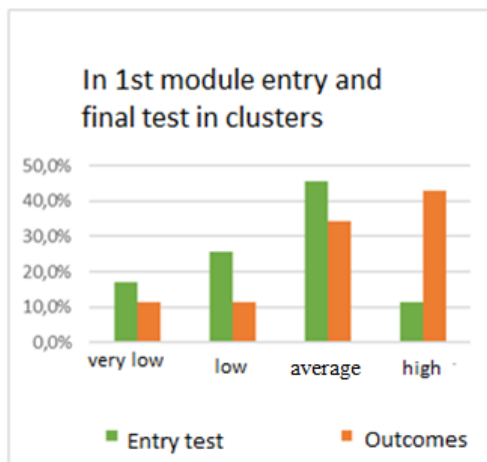

According to the results of the entry test of the next module, we revealed that no more than 3% of the group was able to work using Excel. 17.1% of students showed an understanding of basic functions and the ability to use them. 51.4% of students had a very low level of Excel proficiency. 28.6% of bachelors were characterized by a low level of proficiency in working with documents using Excel programming. The usage of creative tasks in the learning process allowed to halve the number of bachelors with low and very low levels of training. At the same time, 60% of first-year bachelors demonstrated a high level of digital literacy according to the 2nd module indicators. As a creative homework assignment "Let's get to know each other," bachelors talk about their small homeland with interest, remember school time, and create links to their websites and photo collages using school photos. Students are interested in creating a family tree, describing their hobbies, creating charts based on the Unified State Exam results, and posting videos of their performances, photos of their certificates, and other awards. 7–10% of bachelors can perform self-presentation in the form of a computer game or a unique microfilm that reflects their style. In this way, we can obscure how digital literacy is formed and new functions are mastered. The retrospective function of reflection is realized in the ability of bachelors to critically analyze, logically justify their actions, and generalize the systematization of knowledge reflecting their digital literacy.
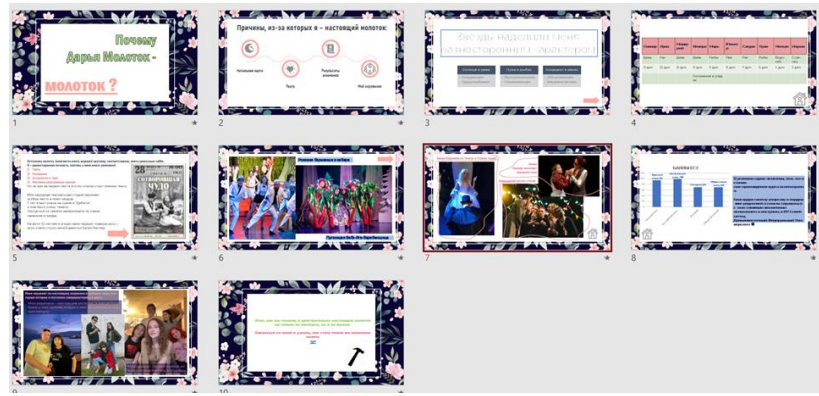
The constructive function of reflection takes place due to setting new goals, designing new programs, and the means of educational activities, in which digital literacy is formed.

Test results reflect positive dynamics according to achievement clusters (pic. 1).
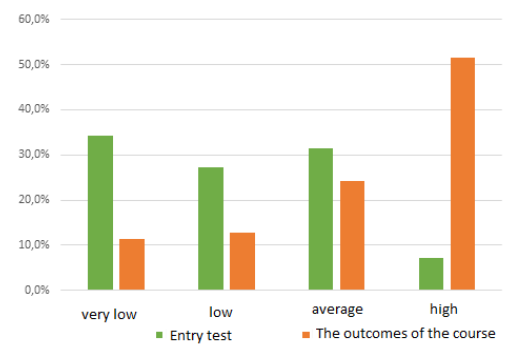
Picture 1. Test results by academic performance clusters

While mastering the «Modern Information Technologies» course, it was important to consider the gender aspects of digital literacy formation. When comparing the digital literacy skills of 1st-year bachelors according to gender the following picture emerged. The entry test revealed that 19.2% of female students were prepared to operate in a text editor, while 18% of females were unable to work appropriately with spreadsheets. 77.8 young males could not deal with spreadsheets; 11.1% of male students had poor and medium proficiency in using a text editor (pic. 2).
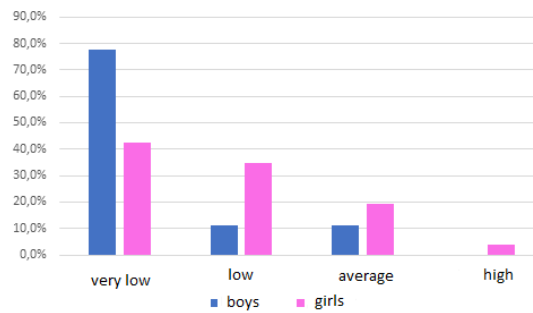

Picture 2. The entrance test for students in group B5122-58.0301 (Japanese)
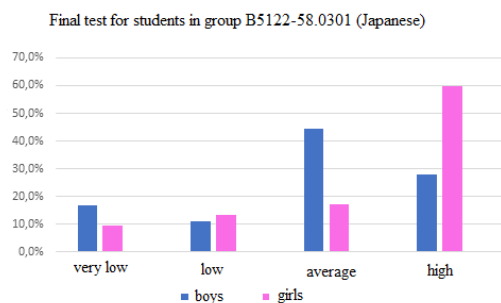
Picture 3. The final test for students in group B5122-58.0301 (Japanese)

At the end of the course (pic.3), 59.6% of the girls and 27.8% of the boys in the «Japanese Studies» group had mastered Word and Excel apps at an advanced level. The apps were mastered at an average level by 17.3% of females and 44.4% of males. The responsible approach toward mastering the course may be the deciding element in growing undergraduate females' digital literacy.
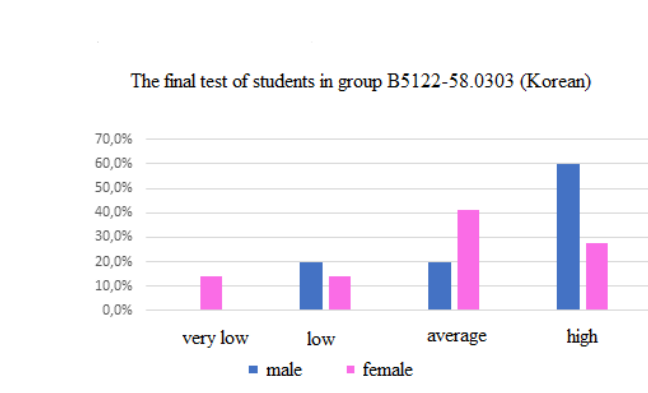

**Picture 4.** The final test of students in group B5122-58.0301 (Korean)

However, in the «Korean Studies» group, boys outperformed girls by 60% to 27.6% (pic. 4). As a result, the growth of digital literacy is not dependent on gender differences but rather on the amount of preparation at school and ambition to study.

Table 1. The dynamics of academic performance based on task complexity

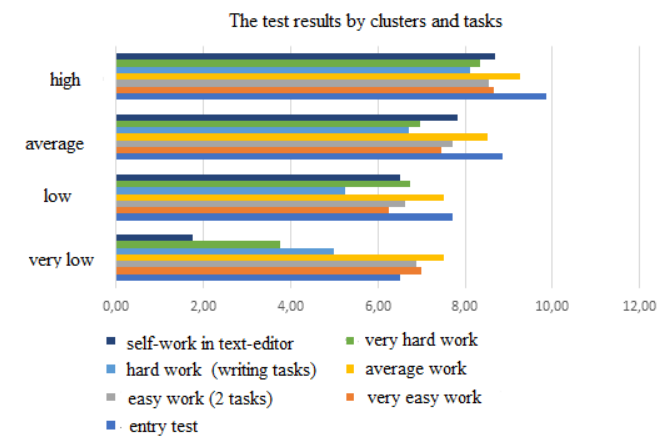| Sex	The entry test	Very easy 2 tasks	Easy 2 tasks	Average 3 tasks	Hard 4 tasks	Very hard 5 tasks	The final test
M	7.85	10.04	11.48	13.76	14.96	15.90	14.70
F	7.50	9.45	10.43	12.41	12.65	13.22	13.98
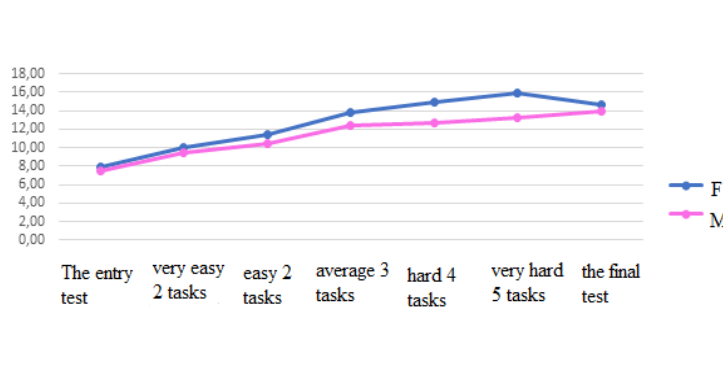
Picture 5. The learning curve of students in the B5122-58.03.01 group (Korean). 1st module
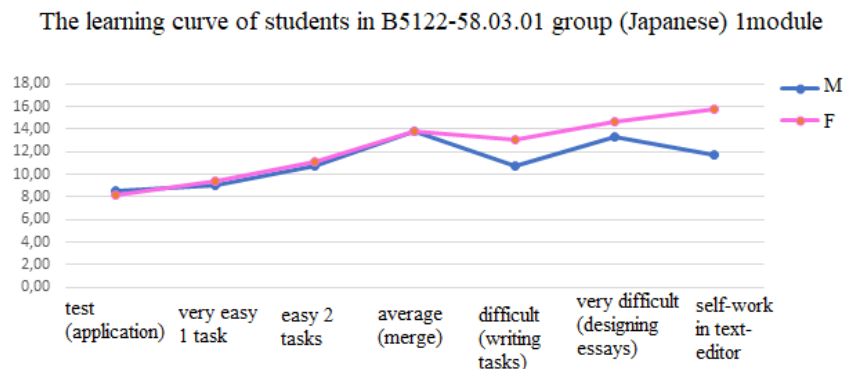
Picture 6. The learning curve of students in the B5122-58.03.01 group (Japanese). 1st module

The analysis of the academic performance dynamics based on task complexity (Tables 1, 2; Pictures 5, 6) reveals a consistent learning process among females, due to a responsible attitude to courses and regular completion of tasks. If compared to boys to girls they require more supervision and attention from the teacher than female pupils because the process of establishing digital literacy for guys is dependent on individual psychological qualities and motivation.

The lack of groups with a uniform level of digital literacy development was revealed by monitoring the test results by clusters and tasks (Picture 7, Table 2).

Picture 7. The test results by clusters and tasks

Table 2. The dynamics of academic performance based on task complexity

Clusters	The entrance test	Very easy 1 task	Easy 2 tasks	Average	Hard	Very hard (an abstract preparation)	Individual work in a text editor	The final test
Very low	6.50	7.00	6.88	7.50	5.00	3.75	1.75	3.50
Low	7.72	6.25	6.63	7.50	5.25	6.75	6.50	13.00
Average	8.86	7.46	7.71	8.50	6.71	6.96	7.83	15.67
High	9.85	8.67	8.53	9.26	8.10	8.33	8.70	17.40

4 Conclusions

As a result, we may assume that for students with low or very low preparation levels, it is necessary to organize individual consultations and design additional creative projects that form basic abilities but take less time to complete. Securing the covered topic was accompanied by doing additional homework assignments, which do not have one correct solution, but require correct formatting in applications. For example, writing complex calculations in Word, designing graphs with shapes, and so on. As a result of such inventive effort, first-year bachelors gained practice-oriented knowledge that they may apply in their future professional activities. Thus, the study has proved the effectiveness of laboratory work applying and creative tasks within the discipline of «Modern Information Technologies» for establishing digital literacy of bachelors of humanitarian courses and their enthusiasm to learning and using digital technologies in future professional activities.

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