



Improving students' research activities through digital resources: A case study of Kazakhstan

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Abstract

The present study examines students' research activities and how digital resources influence the improvement of students' research activities. This is a quantitative study in which numerical data are collected and analyzed to establish relationships, test hypotheses, and generalize findings. To collect primary data, a questionnaire survey was used. The study was conducted at Almaty University of Humanities and Economics (Almaty, Kazakhstan). The experiment included 100 participants. This study discovered that digital resources play an important role in fostering participants' research skills and encouraging active participation in research activities. Results showed that elements such as software skills, information skills, digital equipment setup skills, specialized software skills, and the ability to master certain types of specialized software are important components of students' overall research activities. Research in this area allows us to explore not only the research characteristics of digital environment users but also, in the future, outline strategies for realizing students' research potential through the productive use of digital tools.

Keywords: Development, Digital resources, Impact, Improving, Research skills, Students.

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Contribution of this paper to the literature

This study adds to the existing literature by examining the effect of digital resources on improving students' research activities and determining how digital resources develop functional research skills.

1. Introduction

The organization and participation of students in research activities are of particular importance in Kazakhstan's higher education system. However, long-term socioeconomic transformations in the country have resulted in problems with staffing the higher education sector, including its scientific sector. Insufficient material and technical support for scientific activities has led to significant age disparities in the composition of scientific and pedagogical personnel, a decline in young people's interest in research activities, and a lack of participation in research work (Yespolova, Irodakhon, Bekzod, Rabiga, & Zhupat, 2023). Individual state-level decisions have yet to reverse the downward trend in scientists' social status. To maintain competitiveness in the global market for educational services, higher education institutions must improve the efficiency of decisions made in the field of scientific personnel reproduction (Zhakupova, Mankesh, Kyakbaeva, Karimova, & Omarova, 2022).

The evolution of this problem in modern theory has revealed that it is gaining significant attention. For example, researchers have developed a broad concept of how a student forms a research culture (Chelly Dagdia, Avdeyev, & Bayzid, 2021; Dewey, Roehrig, & Schuchardt, 2021). Technological approaches, methods, and techniques have been identified, and their integration into a university's educational process creates the best conditions for motivation for creative self-realization (Bereczki & Kárpáti, 2021; David & Weinstein, 2024; Li, Kim, & Palkar, 2022). Numerous studies and a long history of the issue's development demonstrate the problem's relevance. Researchers believe that the problem of developing research skills, which serve as the foundation for research activity, is especially important for students in higher education institutions (Frankowski, 2021; Killion, Page, & Yu, 2019). During the student years, active mastery of scientific knowledge and methods emerges, contributing to the development of intellectual activity and the manifestation of research initiatives (Egana-delSol, 2023; Hernandez-Matias et al., 2020). Today, the importance of students' functional skills for successful research activities is widely acknowledged, as is the need for research literacy to develop alongside critical thinking, self-learnability, and creativity. The concept of developing students' functional skills is actively permeating the national strategy at all levels of education. Students' functional skills develop throughout their university studies (Alodat, Muhaidat, Algotaylat, & Alzboun, 2020).

A researcher's approach to learning is based not only on educational information but also on a variety of difficult tasks that students must complete in order to develop creative skills. Researchers in developed countries have devised a variety of strategies to help students develop their research skills (Kwangmuang, Jarutkamolpong, Sangboonraung, & Daungtod, 2021). The task is for teachers to master these methods and apply them in their classrooms. Be able to coordinate and collaborate on research projects. Students' critical attitudes toward research procedures should be encouraged and developed in any way possible (Dekker, 2020; Díez-Palomar, García-Carrión, Hargreaves, & Vieites, 2020). Thus, the professionalism and business experience of university teaching staff motivate students to participate in research activities (Fernandes, Araújo, Miguel, & Abelha, 2023; Veles, Graham, & Ovaska, 2023). The quality of a teacher's developed and published teaching aids, scientific reports, articles, and monographs determines their scientific capital. This is an important topic because a review of Kazakh researchers' works from 2018 to 2023 reveals that there are almost no major studies on the subject, and the few publications are primarily utilitarian and applied.

Many researchers believe that higher education can only provide certain levels of knowledge if the student actively participates. In this case, self-education plays an important role for the student (Berti, Grazia, & Molinari, 2023; Kocagül, 2024). However, a preliminary survey of students at the country's universities revealed that, in practice, only about 3.4% of junior students systematically and consciously use research skills, while 15.9% either use these skills in their studies or do so very rarely. The vast majority, 80.7% of junior year students, use research skills in their educational activities infrequently and unsystematically, without clearly understanding the motivations for the research activity, and they limit themselves to a small number of abilities. As a result, students' inability to participate in research and scientific work in higher education is evident.

It is difficult to imagine a modern university without laboratories for natural sciences, general professionals, and specialized disciplines. Researchers emphasize that organizing students' research activities is highly effective when conducted in an environment that fosters development, where students are motivated for self-learning and growth (Gora, Ştefan, Popa, & Albu, 2019). The absence of such laboratories, along with the lack of a dedicated developmental environment, leads to significant challenges. These include over-reliance on students' own experience, a focus on teaching through action, encouraging observation and experimentation, and alternating between individual and group work to address educational issues. Access to international academic databases remains a luxury at some universities, which undermines both the legitimacy of the institutions and the academic capabilities of their students. These issues contribute to the low international rankings of universities in Kazakhstan.

Finally, the most important aspect of improving research activities (RAs) is digital resources (DRs) and their impact on developing students' research skills (RSs). However, the main question is whether using digital resources helps to develop functional research skills and improve research activities. If that is the case, how does it occur? Unfortunately, despite the undeniable influence of digital resources on students' engagement in research, the existing literature has not adequately addressed the issue of fostering students' research abilities using digital tools. The methodology for organizing students' research activities in the university's digital educational space, particularly in Kazakhstan, is still in its early stages. This study attempted to address the following research question:

Q1: Does the use of digital resources have a significant effect on improving students' research activities?

1.1. Objectives

The present study examines students' research activities and how digital resources influence the improvement of students' research activities.

The hypothesis is that digital resources will improve students' research activities as well as their functional research skills (FRSs).

1.2. Significance of the Study

This study is significant because it addresses the pressing problem of improving students' research activities through digital resources. The research issue represents the conflict between the need for scientific continuity and the exodus of highly qualified young personnel, and the lack of valid and statistically significant research tools for analyzing factors in students' research activities when using digital resources. Therefore, the significance of this study is that it may contribute to a deeper understanding of improving student research performance. This study contributes to the existing literature by examining the impact of digital resources on improving student research performance. The study's findings could be used to develop strategies for using digital resources as a unique educational tool to improve students' research activities in Kazakhstan.

2. Literature Review

Digital resources diversify students' research activities and increase their motivation to conduct research. According to Okoye et al. (2023) digital resources not only improve the learning process at school but also broaden research opportunities. Schmid, Pauli, and Petko (2023) emphasize the importance of using digital educational materials, tools, and services that allow for individualizing research and learning, but they do not take into account the possibility and necessity of their influence on student personalities. According to research by Stehle and Peters-Burton (2019) developing students' functional research skills is a difficult but necessary aspect of teaching that educators must address. Van Schoors, Elen, Raes, Vanbecelaere, and Depaepe (2023) believe that digital resources are an unconventional way of organizing the research process, employing active methods of action to implement a person-centered approach.

It is important to remember that modern digital resources are hypermedia systems in which static elements (text, images) interact with dynamic information blocks (video, audio). The digital form of presenting information is also gaining popularity: digital photography, digital video, etc. The use of digital resources opens up new avenues for an operational method of visualization in teaching, aids in developing students' research skills, organizes and conducts surveys and student control, and works with non-text forms of content (diagrams, tables, graphs, video, and flash animation, etc.). Digital resources can help demonstrate the dynamics of a phenomenon, convey research information in specific portions, serve as a source and measure, stimulate students' cognitive interests, and enable the operational and self-monitoring of research results (Maddens, Depaepe, Raes, & Elen, 2023). Consequently, using digital resources to organize students' research work affects the improvement of research activities. Polat and Kutlu (2022) state that research activities are necessary to develop functional research skills as a universal method of comprehending reality. According to Qureshi, Khan, Raza, Imran, and Ismail (2021) actively incorporating digital resources into education changes research activity, content, and organizational and methodological foundations. Yan and Sana (2021) also stated that mastering research skills helps graduates develop professional, soft, and behavioral competencies, increasing their social capital. Research activities lead to the acquisition of new branches of scientific knowledge while transforming reality, as well as the ability to navigate independently when solving new, non-standard problems and tasks posed by circumstances in unknown conditions. However, when considering the concept of research skills among students, researchers do not provide a clear definition. For example, Algolaylat, Alnjadat, and Alzboun (2022) suggested that this definition's components, like the comprehensive definition of research skills, are multifaceted and functional, with no single point of view. Baysal, Yörük, and Ocak (2022) define research skills as the abilities acquired, based on methodology, techniques, and technology, to perform various types of scientific and research activities. Hart (2019) investigated the impact of general research skills such as problem identification, research hypothesis formulation, concept definition, classification, observation and experimentation, summarization, textual work, note-taking, and argumentation and defense of ideas. Lachance, Heustis, Loparo, and Venkatesh (2020) investigated the concept that research skills are methods of carrying out individual activities. Guandalini (2022) classifies the following groups of research skills of students: information management, information exchange and digital interaction, creation and transformation of digital content, problem-solving in a digital context, and security of digital technologies. Similarly, Hayes and Cejnar (2020) argue that these skills are essential for students because they allow them to solve the many and varied problems that arise during their schoolwork and research.

However, Lavi, Tal, and Dori (2021) believe the primary challenges confronting modern education systems are the ability of these systems, particularly educational institutions and teachers, to use new technologies and change their roles in response to emerging opportunities. Similarly, Reichert-Schlax et al. (2023) and Amhag, Hellström, and Stigmar (2019) argued that teachers are increasingly concerned with developing digital educational resources using readily available hardware and software. Nagel, Guðmundsdóttir, and Afdal (2023) and Pongsakdi, Kortelainen, and Veermans (2021) also point out the following shortcomings: teachers' lack of experience with digital resources, as well as tools for collaboration in a digital environment; insufficient supply of interactive educational resources; and, most importantly, simulators, sets of interactive tasks with feedback and analytics. Mei, Aas, and Medgard (2019) and Lindfors, Pettersson, and Olofsson (2021) observe that the main problems are the lack of digital competence among teachers and their lack of readiness. On the other hand, Haleem, Javaid, Qadri, and Suman (2022) argue that digital resource development practices in developing countries fall far short of meeting current needs.

All of the above is relevant for future research, including problem analysis, data collection and systematization, data interpretation, and formulating specific research conclusions.

3. Method

3.1. Research Design

This is a quantitative study in which numerical data are collected and analyzed to establish relationships, test hypotheses, and generalize. The quantitative approach enabled the researchers to perform precise measurements and statistical data analysis, resulting in objective and reliable findings. This approach generalizes the findings to larger populations, increasing the study's external validity. It offers opportunities to test hypotheses and establish cause-and-effect relationships. As a result, using a quantitative approach is appropriate and in line with the study's purpose.

3.2. Research Sample Formation

The study was conducted at Almaty University of Humanities and Economics (Almaty, Kazakhstan). The experiment included 100 participants. This city was chosen as one of Kazakhstan's main economic and financial centers. The study included participants of various genders and ages. There were 46 male and 54 female respondents. The objects of the study are participants in the second year of the "Digital Resources and Research Activities" training in LMS Moodle.

3.3. Measures

General sociometric indicators were collected from study participants (see Table 1).

Table 1. Descriptive information provided by respondents.

Descriptive information about a respondent's		Quantity	Sample
Gender	Female	54	52.31%
	Male	46	47.69%
Age	20-25	65	57.12%
	25-30	24	22.32%
	30-35	11	10.56%
Study fields	"6B01303: Primary education with information and communication technologies"	50	50%
	"6B01101 - pedagogy and psychology."	50	50%
The University's name	Almaty University of humanities and economics	100	100%

3.4. Research Design and Hypothesis

The study shows that effective use of digital resources (DRs) stimulates student research activities (RAs). The study examines students' RAs, confidence in using digital resources, learning tactics, and reflective abilities. The learning outcomes of the course "Digital Resources and Research" in LMS Moodle (Learning Management System Moodle) were examined. A well-designed training program includes tasks arranged from easiest to most difficult; supporting information, support, and materials are provided at the appropriate times; and tasks designed to practice repetitive skills are given at the exact right time. Two 50-minute sessions were scheduled each week. The course's implementation took nine weeks. At the end of the course, participants must complete a research project and provide a report. As a result, the study found that using digital resources improves functional research skills and leads to successful research activities.

Figure 1 shows the proposed relationships among the study variables, while the hypotheses are summarized below.

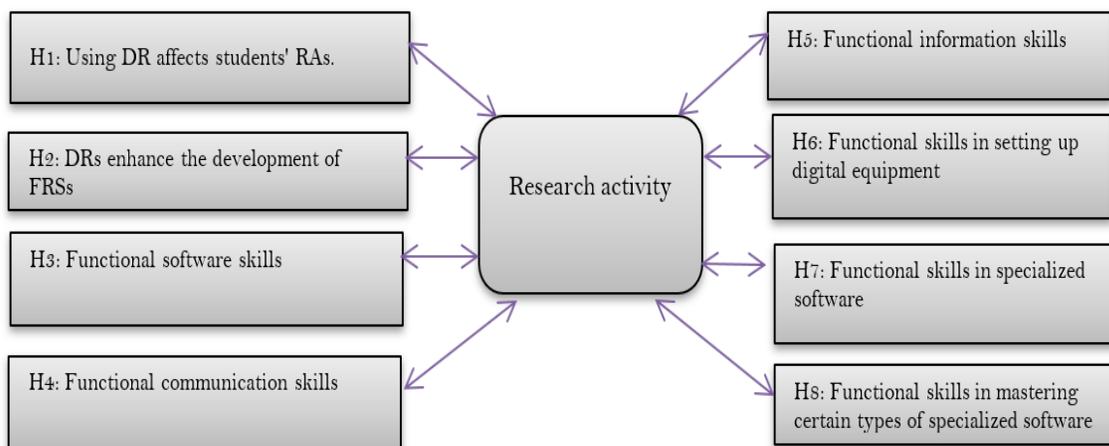


Figure 1. The proposed relationships among the study variables.

The following hypotheses were formulated and tested for reliability:

H1: Using DR affects students' RAs.

H2: DRs enhance the growth of FRSs.

H3: Functional skills in working with software are an element of students' RAs.

H4: Functional communication skills are an element of students' RAs.

H5: Functional information skills are an element of students' RAs.

H6: Functional skills in setting up digital equipment are an element of students' RAs.

H7: Functional skills in working with specialized software are an element of students' RAs.

H8: Functional skills in mastering certain types of specialized software are an element of students' RAs.

After developing hypotheses about the key drivers of RAs and constructing a preliminary model, we can begin confirmatory factor analyses.

3.5. Data Collection Tools

The data was collected through a questionnaire for this study, which was conducted at Kazakhstani universities.

3.5.1. A Survey to Determine the Effectiveness of DRs on Students' FRSs

A survey was conducted to determine the effectiveness of digital resources in improving students' functional research skills. The questionnaire contained 26 questions. It was created using an ordinal rating scale (or Likert scale). Respondents were asked to indicate whether they agreed or disagreed with a given statement. The questionnaire with questions is shown in Table 2.

Table 2. A questionnaire content.

Variables	Questions
Using digital resources	Using digital resources has a positive impact on research activity improvement
Digital resources	Digital resources enhance the development of functional research skills
Functional software skills	Confident user of text editors (Word, Pages, etc.)
	Confident user of spreadsheets (Excel, etc.)
	Confident user of photo, video, and audio editing programs
	I create electronic presentations using special programs (For example, PowerPoint)
	I use programming languages (SQL, R, C++, etc.)
	I deal with big data
Functional communication skills	I upload personal files (Articles/magazines, videos, programs, etc.) to websites and social networks for public access
	Active user of instant messengers and social networks
	I use special software applications to receive and send research tasks (For example, Slack, Microsoft Teams, LMS, etc.)
	I create and conduct online events using various services (Zoom, Webinar, Skype, etc.)
Functional information skills	I use spaces on the internet to store documents, images, and other files (Yandex.Disk, Google Drive, Dropbox, OneDrive, etc.).
	I maintain a blog (regularly updating it with posts, images, or multimedia) and create other internet content.
	I obtain additional information through the internet (official websites, portals, and email).
Functional skills in setting up digital equipment	I can connect and install new devices
	I can search for, download, install, and configure software.
	I can install a new system or reinstall an existing system
Functional skills in specialized software	I can use programs
	I know one type of software
	I know two or three types of programs
Functional skills in mastering certain types of specialized software	I can use statistical packages
	I can use the mathematical programming package
	I can use multimedia software to work with sound and video.
	I know design programs
	I know programming languages (C++, Python, R, etc.)

Note: DRs (Digital resources), FRSs (Functional research skills), SQL (Structured query language), and Effect (Effectiveness).

3.6. Validity and Reliability of the Instruments

The instruments' validity was confirmed by experts, including non-participating primary school teachers, school psychologists, and school administration representatives. Experts recommended eliminating some open-ended tasks. A pilot test was also conducted with 20 students who had the same characteristics as the target sample. Cronbach's α for pretest and posttest was 0.83 and 0.70, respectively.

3.7. Data Analysis

The study results have been compiled and analyzed using partial least squares SmartPLS to determine the correlation and the level of influence of the factors in the proposed model. Cronbach's alpha, composite reliability, and average variance extracted were used to assess the validity and reliability of the obtained variables. The results were analyzed using SPSS software version 26.

4. Results

The use of Cronbach's alpha coefficient determined the internal consistency of the questionnaire items (individual indicators) and their reliability. The scale reliability obtained by Cronbach's alpha coefficient in our study is presented in Table 3.

Table 3. Reliability and validity of survey items.

Latent constructs	Cronbach's alpha	rho_a	CR	AVE
Using digital resources	0.884	0.911	0.924	0.754
Digital resources	0.862	0.901	0.907	0.757
Functional software skills	0.778	0.856	0.848	0.606
Functional communication skills	0.784	0.776	0.788	0.604
Functional information skills	0.786	0.796	0.862	0.684
Functional skills in setting up digital equipment	0.714	0.721	0.734	0.646
Functional skills in specialized software	0.716	0.719	0.729	0.663
Functional skills in mastering certain types of specialized software	0.718	0.712	0.746	0.676

Note: CR (Composite reliability), AVE (Average variance extracted).

Referring to Table 3, functional software skills have an AC of 0.778 and a CR of 0.848, whereas functional communication skills have an AC of 0.784 and a CR of 0.788. Functional information skills had an AC of 0.786 and

a correlation coefficient of 0.862. Functional skills in configuring digital equipment had an AC of 0.714 and a CR of 0.734. Functional skills in specialized software have an AC of 0.716 and a CR of 0.729. Functional skills in mastering specific types of specialized software had an alpha of 0.718 and a CR of 0.746. The AC of digital resources was 0.862, and the CR was 0.907, whereas using digital resources had an alpha of 0.884 and a CR of 0.924.

The coefficient of determination was used to assess the model's quality. The value of the coefficient of determination for variables is based on the following inequality: $0 \leq R^2_{yx} \leq 1$.

Table 4 shows the definition of independent variables, taking into account the coefficients. All indicators are high and close to 1; as is known, if the coefficient is close to 1, then the model describes the data well. To double-check the coefficient of determination, we used adjusted R^2_{yx} . All data obtained meet the criterion of a good sample.

Table 4. Coefficient of determination of dependent variables in the model.

Latent constructs	R square	R-squared adjusted
Research activity	0.748	0.732
Functional research skills	0.736	0.732

Referring to Table 4, the functional research skills in our model are 0.736, and the research activity is 0.742. By changing any independent variable, in our case, digital resources, our dependent variables will change by 73.6% and 74.8%, due to the high impact on our variables.

Table 5 displays the findings of the Fornell-Larcker criteria.

Table 5. Fornell-Larcker criteria.

Latent constructs	1	2	3	4	5	6	7	8
Using DRs (1)	0.936	-	-	-	-	-	-	-
Digital resources (2)	0.724	0.907	-	-	-	-	-	-
Functional software skills (3)	0.756	0.816	0.856	-	-	-	-	-
Functional communication skills (4)	0.744	0.811	0.834	0.840	-	-	-	-
Functional information skills (5)	0.764	0.791	0.847	0.857	0.864	-	-	-
Functional skills in setting up digital equipment (6)	0.773	0.786	0.840	0.854	0.859	0.872	-	-
Functional skills in specialized software (7)	0.626	0.708	0.729	0.712	0.732	0.864	0.890	-
Functional skills in mastering certain types of specialized software (8)	0.618	0.714	0.736	0.726	0.746	0.739	0.876	0.887

Referring to Table 5, in this model, the square root must exceed the correlation values of the other latent constructs. The maximum correlation of the latent constructs in the model with any other latent constructs reveals that each construct that employs digital resources exceeds the square root of the AVE. The relationships between discriminant constructs were evaluated for accuracy, and all required indicators were found to meet the criteria.

The next step in our research is to test all hypotheses using a standard beta calculation (see Table 6).

Table 6. Hypothesis testing.

Latent constructs		β	t	P	Conclusion
UDR -> RA	H1	0.732	13.246	0.000	Accepted
DR -> RA	H2	0.720	13.124	0.000	Accepted
FSS -> RA	H3	0.718	12.078	0.000	Accepted
FCS -> RA	H4	0.286	3.567	0.000	Accepted
FIS -> RA	H5	0.405	8.112	0.000	Accepted
FSSDE -> RA	H6	0.29	6.418	0.000	Accepted
FSSS -> RA	H7	0.018	0.542	0.068	Not- accepted
FSMTSS -> RA	H8	0.027	0.534	0.124	Not- accepted

Note: UDR, using digital resources; DR, Digital resources; RA, Research activities; FSS, Functional software skills; FCS, Functional communication skills; FIS, Functional information skills; FSSDE, Functional skills in setting up digital equipment; FSSS, Functional skills in specialized software; FSMTSS, Functional skills in mastering certain types of specialized software.

Referring to Table 6, the highest T value was obtained because using digital resources has a positive impact on research activity improvement ($t = 13.246$), and the lowest values were the relationships between functional skills in specific types of specialized software and the development of research skills ($t = 0.534$) and functional skills in working in specialized software provision and the development of research skills ($t = 0.542$). All of the hypotheses proposed in this study were proven. Hypotheses 7 and 8 are rejected.

5. Discussion

The study investigated improving students' research activities and how digital resources influenced the development of their functional research skills. An important scientific problem at the moment is identifying tools, methods, and technologies that contribute to the development of FRSS in the changing conditions associated with education's digitalization. Kaur et al. (2023) and Jovanović, Saqr, Joksimović, and Gašević (2021) provide relevant data about the importance of using digital educational materials and tools to personalize teaching research.

To analyze the method used to organize students' research activities, it was necessary to examine the structure of the research activities to specify each element. As in the case of digital learning, we assumed that elements such as software skills, information skills, digital equipment setup skills, specialized software skills, and the ability to master certain types of specialized software were important components of students' overall research activities. The examination of the data obtained led to the following conclusion: The hypothesis (H1) that using digital resources has a positive impact on research activity improvement has been confirmed; (H2) that digital resources enhance the development of functional research skills has also been confirmed; (H3) suggests that functional software skills are

of critical importance in the growth of research activities. H4 discovered that functional communication abilities significantly predicted research activity. Functional information skills (H5) were discovered to play an important role in developing research projects. Digital equipment setup skills (H6) are a strong predictor of RA development. These results proved that there was a significant connection between all skills and the research activities of students, which formed the basis of this activity. The results of this study are similar to those of the studies by Vieno, Rogers, and Campbell (2022) and Tahya, Dahoklory, and Dahoklory (2022).

However, this study was unable to demonstrate that specialized software skills are a component of research activity. There could be several reasons why there is not enough evidence to support the hypothesis. One possible explanation is that study participants did not use specialized software skills very frequently. In line with these findings, Molnár and Kocsis (2024) reported that these skills are better suited for students studying information technology or engineering, but this is not unique to this group of participants.

The possession of certain types of specialized software has no direct connection to research activities and is not an important component of this type of activity. Possible explanations for this result should be considered. First, this skill may not be as widespread among students as other skills. As a result, the study participants likely lacked sufficient experience with specialized software to assess its impact on their research activity. Second, Nicolaides et al. (2020) and Cui, Chen, Shiri, and Fan (2019) explain that specialized software may not be as intuitive and easy to use as other resources, making it difficult for participants to use it in research processes because it necessitates higher-order knowledge and extensive specialized training.

Results showed that elements such as software skills, information skills, digital equipment setup skills, specialized software skills, and the ability to master certain types of specialized software are important components of students' overall research activities.

6. Conclusion

The study investigated the improvement of students' research activities and how digital resources influence the development of their functional research skills. The stated objectives are to (1) evaluate students' research activities and (2) examine the impact of digital resources on developing their functional research skills and enhancing students' research activities.

The application of various digital applications at higher education institutions and students' low motivation for research activities have raised questions about how to form the most important components of the structure of students' research activities (RAs) and improve their research engagement. To determine the methods used to enhance students' RAs, it was essential to examine the structure of the RAs and specify each element. Results showed that elements such as software skills, information skills, digital equipment setup skills, specialized software skills, and the ability to master certain types of specialized software are critical components of students' overall RAs. Digital resources (DRs) were also found to impact the development of functional research skills (FRSs) among study participants.

The study's findings are vital for developing digital resources that meet students' research needs and actively support student RAs in higher education. Research in this area will enable the identification of the research characteristics of modern digital users and, in the future, help outline strategies for realizing students' research potential through the productive use of digital research tools (DRTs). This research allows us to explore not only the research characteristics of digital environment users but also to develop strategies for maximizing students' research potential through effective utilization of digital tools.

7. Limitations and Additional Future Directions

This study examines students' research activities and how digital resources influence the improvement of students' research activities. Research in this area makes it possible to study not only the research characteristics of users of the digital environment but also, in the future, to outline strategies for realizing the research potential of students.

However, many of its aspects warrant further investigation.

1. Further research can be conducted to investigate the problem of managing university students' research activities in both theoretical and practical digital activities at universities.
2. To identify and justify organizational and pedagogical conditions that promote increased efficiency in managing university students' research activities in modern sociocultural contexts.
3. Create criteria for assessing students' competence in research activities.

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