

# Digital Platform for Educational Research Coordination



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**Abstract** It is obvious that cooperation and information sharing among researchers are now crucial for the successful completion of significant research initiatives. Because of this, we are presently witnessing a sharp rise in the number of digital platforms that cater to these two fundamental demands. Through the cooperation and exchange of ideas, these platforms make it easier to carry out scientific endeavors. In addition, they help make universities and scientific institutions more well-known. The article outlines the outcomes of the creation of the “International Community of Researchers in Teacher Education” (ICRTE, <https://te.kpfu.ru>), a digital platform intended to coordinate pedagogical research in the field of education. Its goal is to evolve into a multipurpose platform for unrestricted contact among scientists working in many sectors on collaborative initiatives to advance education. The digital platform is intended to provide a dynamic information environment with capabilities for scientists to collaborate on specific research areas. The features of this tool enable the user to start new research teams and scientific initiatives, support their continued execution, and recruit other collaborators including those outside the educational area. The chapter lists the primary functions and responsibilities of its functioning.

**Keywords** Educational research · Digital platform · Teacher education · Researchers’ interaction

## 1 Introduction

A new paradigm for scientific research is being adopted by the international scientific community, according to which experts from many areas must collaborate in order to produce meaningful findings. This calls for the most diverse set of research skills, which cannot be confined to just one field of study. Scientific cooperation is becoming a crucial component of contemporary research. Today’s modern research infrastructure is crucial to the introduction of fresh ideas for structuring an efficient

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scientific process. It is becoming more transparent, open, and conducive to maximizing participant engagement across a range of scientific disciplines as well as within the larger national scientific community.

Digital platforms in the field of research and education have influenced the approaches and mechanisms for conducting scientific research and disseminating the knowledge gained. It was digital platforms for research that made possible the emergence of the “open science” paradigm.

According to Ershova and Khokhlov, digital platforms with their own sets of services and data that permit addressing unique challenges are required for each of the research and development-related fields (fundamental research, applied research, research and development) [1]. We believe that this is a reasonable suggestion, as it is currently impossible to envision a digital platform that is equally successful for resolving certain issues across a range of study fields.

In the field of research, materials have just started to surface that provide instances of solutions for digital platforms. Zatsarinnyy [6], for instance, presents a descriptive model for generating data on automated functions that can be used to design new automated processes that combine functions that are already reproducible on the basis of a digital platform and functions developed based on the findings of scientific research and patent research. The authors claim that using this methodology will shorten the time needed for creative tasks, including performing scientific research and incorporating the findings into the workplace.

According to Veredinsky, the use of digital platforms for the creation and dissemination of creative projects will enable the emergence of a digital community, or partner network, made up of specialized digital platforms [5].

Kruglikov considers digital platforms as a tool for the evolution of information communications and makes an attempt to describe the future of the digital platform market in education [3].

Kostina in her article raises the issue of the degree of continuity or revolutionary nature of digital platforms in relation to earlier, more conventional forms of storing knowledge sources after highlighting the continuity of the processes of accumulation and cataloguing of knowledge throughout the history of science [2]. In response, she comes to the conclusion that attaining scientific outcomes is increasingly dependent on having an understanding of the peculiarities of the digital platforms utilized by researchers.

As a result, it seems that if we view the digital platform as a tool for the advancement of scientific knowledge and scientific communication, then the way in which technical problems relating to knowledge organization, storage, and quality of the digital tools used are resolved will have a significant impact on how research fields communicate.

Education is a major study topic that merits the attention of experts from a variety of disciplines, including pedagogy, psychology, sociology, physiology, computer science, etc. Additionally, there is a requirement to forge a strong link between pedagogical science and practice. The construction of a single digital platform for coordinating research can serve as the foundation for the building of an efficient system of scientific communication.

The platform creation project was divided into many stages, including an investigation of comparable platforms, platform development and deployment, and a reflective stage to evaluate the platform’s efficacy and the need for platform improvement.

A review of the existing situation has revealed that there are several cases of digital infrastructure that has been successfully organized for the global collaboration of researchers. The reality that many of these tools are field-specific is an essential factor. Such solutions may be divided into two categories: tools for cooperation and tools for sharing information and resources.

Here are some examples of collaboration platforms: <https://vi-seem.eu>, <https://www.vre4eic.eu>, <https://www.foldercase.com>, <https://www.academia.edu>, <https://www.mysciencework.com>, <https://www.researchgate.net>, <http://wesharescience.com>, <https://www.dotmatics.com>, <https://osf.io>, <https://loop.frontiersin.org>.

Digital platforms that focus on facilitating the sharing of information and assets among experts in a field exist as well. You can utilize the information and assets of other researchers in place of creating a protocol from new, conducting their own tests, or investing in new equipment. Here are a few cases of such platforms: <https://orcid.org>, <https://www.lens.org>, <https://galaxyproject.org>, <https://www.myexperiment.org>, <https://www.benchfly.com>, <https://publons.com>.

Here is an analysis of the most famous of them (Table 1).

Among informational platforms, ORCID (<https://orcid.org>) is a well-known example. The identification, gathering, and preservation of the author’s works on the basis of a single platform is the major objective. According to the author ID, automated collecting occurs in the Scopus and Web of Science databases. Additionally, you have the option of individually adding your articles to the platform’s database. ORCID stands apart from other systems in that it offers a Russian-language user interface.

The Web of Science database may be searched on Publons.com to find, gather, and save author articles. There has also just been an introduction of synchronization with the Scopus database. Unlike ORCID, the platform enables the implementation of scientometric techniques for evaluating the scientific activities of researchers. It’s important to mention further projects that have been using this platform. For

**Table 1** Platforms for supporting scientific activities

Platforms	Basic unit	Main idea	Interface language
ORCID	Research/publication	“Connecting research and researchers”, automated database of publications	English, Russian
Publons.com/Web of Science	Research/publication	A repository for publications and reviewers’ work	English
ResearchGate	Researcher	Presentation of research findings in publications	English
ICRTE	Research project	Coordination of educational research, support of current research, and creation of scientific communities	Russian

instance, the Publons Reviewers Academy initiative was set up using Publons.com as a foundation. The writers were given the chance to undergo training based on the platform and certification as article reviewers.

For scientists and academics, the ResearchGate platform (<https://www.researchgate.net>) is seen more as a specialized social network (teachers, research managers). The portal has comparable features for gathering and preserving papers as well as a block of open academic positions worldwide.

The “Basic Unit”, or core elements of the platform, was discovered throughout the analysis. It is feasible to conclude from the fundamental unit that some aspects of scientific inquiry should receive more emphasis than others. Here, we may emphasize the key components like research, publications, or the researcher’s individuality, similar to ResearchGate. The Research Project, or the research concept, was designated as the primary unit throughout the creation of the ICRTE platform.

The major purpose of building such a platform at Kazan Federal University is to promote international collaboration, coordinate, and carry out cooperative research via remote access.

The platform is a collection of digitally-based products and services that adhere to the following standards in order to accomplish its objectives:

- Facilitating productive scientific dialogue among research project team members;

- Support for participants’ work in the remote access mode;

- Setting up circumstances for online teams and collaboration while carrying out complex research projects;

- Supplying controlled access to the platform for researchers to plan and carry out collaborative research as well as global expertise;

- Assistance with the efficient sharing of scientific, technical, and scientometric data among project participants;

- Availability of integrated tools for tracking the progress of projects;

- Granting access to external systems for storing and processing scientific and scientometric data for members conducting cooperative research;

- Facilitating communication with prospective users of innovative technology and research clients;

- Standardization of educational research techniques;

- Giving researchers the opportunity to create their own techniques for gathering and evaluating data;

- Protecting personal information in conformity with the law and moral principles;

- Usability for both researchers and professionals.

Kazan Federal University handles all aspects of platform activity coordination.

The International Forum on Teacher Education (IFTE, <https://ifte.kpfu.ru>), which takes place at Kazan Federal University in May each year and attracts up to 12,000 participants from thirty different countries of the world, is one of the significant venues for in-person communication between members of the project teams and the research groups. The Forum’s structure and subjects are entirely congruent with the shared scientific interests of the scientists that make up the ICRTE platform.

The primary functionality and technology aspects of the platform’s software implementation will be covered in order.

## 2 The Platform's Functional Description

Users have the option of using a browser or mobile clients that have been installed at their workplaces to access this system online and interact with it. The platform's whole user interface is presently only available in Russian. With the integrated automatic translation features included in all contemporary browsers, this is not a major issue.

The Platform's development makes use of cutting-edge information and computing technologies that were chosen after conducting test runs and forecasting future technological advancements. Python was selected as the programming language, which is the most widely used programming language [4]. With the help of the Django web framework, you can easily modify the Platform's code. PostgreSQL, Docker, HTML, CSS, JavaScript, Cypress, and Gulp were furthermore utilized in the construction. The system was created in line with the requirements of the Russian Federation's legislation on the processing and storage of data.

After registration, anyone can use the platform. The user enters their full name, email address, password, and password confirmation during registration. They also choose their position, place of employment, academic degree, and areas of interest in science from the provided lists, specify their area of specialization, and list the languages they have studied and their proficiency in them. A confirmation email is delivered to your inbox upon registration. Only once the user confirms the email may they access the website. The password is stored in the database in encrypted form.

The platform's home page is customized for each individual user. It displays to the viewer a brief list of fresh initiatives, fresh research teams, and fresh publications that are selected at random. One may access own personal account as well as all the major areas from the home page. The user can view the platform administrator's feed of news and announcements. The ability to view pop-up alerts on other users' actions relating to the entities of this user that are visible on the platform is a key element of the main page. For instance, by accessing them, he can approve or reject the notices of applications received for joining a project or research group.

The sections "Researchers", "Projects," "Research Groups," and "Papers" are the Platform's core parts.

Researchers section. All users who have registered and been verified are shown on this list. This list appears on the related page in a random order. Searches may be done using keywords, names, specializations, and areas of scientific interest. You may view a scientist's profile and a list of the groups and projects in which they are involved by clicking on their name. By selecting the option next to a scientist's profile, you may store information about him for later reference. When you do, updates about that scientist will then show up on your main personalized user page.

The "Projects" component, which serves as the foundation of the entire platform, is one of the most fundamental. With the use of this digital resource, users are able to start new scientific initiatives, follow their development, and enlist the help of other collaborators—not just those in the educational field. Any registered user can join an ongoing project by submitting an entrance form, where he specifies his

role and discusses how he could further the cause. Each project's page is crammed with connections to pertinent research findings, including published articles, books, patents, databases, media resources, and other items. You can discover the research group the project is affiliated with on the website of all projects. The project's authors are split between registered and unregistered groups. User comments are displayed on the project page.

According to the platform's co-executor number, the following projects are the largest: "Expert and analytical support for the implementation of primary education in the context of the introduction of new GEF IEO" (19 people), "Comprehensive support for children with ASD" (18 people), "Psychological and pedagogical prevention cyber risks in children and youth in the VUCA world" (17 people), and "Professional career motivation for students—future teachers" (16 people) (16 people). Publications, including 17 papers in highly referenced journals included in the Scopus and WoS indexes in 2022, are a striking example of the initial outcomes of initiatives implemented on the ICRTE platform.

Research groups, on the other hand, are alliances of researchers bound by a particular scientific topic, as opposed to projects, which have definite objectives and goals, deadlines, and actual outcomes. Research-based teacher preparation (44), early childhood education (39), inclusive education and special needs (36), a secure learning environment (30), and digital solutions in education were the largest groupings by number of participation (24).

All of the publications that users deem important to connect to their projects in the platform as a representation of the findings of their study are listed in the "Papers" section. By title, author, keyword, and scientific subject, academics identify common article data that may be looked up using the built-in search engine.

Users may preserve information on projects and publications that are related to them as well as write comments on them using the platform's features. Members of study groups and project teams have the option of communicating with one another.

Users' emails are used to notify them of the following events: the acceptance of a user's application to join the research group and the project; forming a project or research team with other users.

The admin has access to all the data on the website and has the ability to change, add, and delete it. There are listings of each site entity in the administration panel. You may see, modify, add, and delete the appropriate entities from each list, as well as perform a field-specific entity search. A research group may be linked to a number of different research projects as well as a particular research project.

The online interface has been tested on a variety of hardware, software, and browsers (including Windows, MacOS, Linux, iOS, and Android) (Google Chrome, Safari, Microsoft Edge, Mozilla Firefox). Linux and containerization technologies are used to operate the server portion of the system.

### 3 Conclusion

The following outcomes were attained as a result of the development of a single ICRTE platform:

The possibility of forming various international teams, including virtual;

The possibility of effective identification of the results of intellectual activity has been obtained;

Professionals were given access to research initiatives in the field of education;

Shortened research cycles and lower expenses;

Scientific and scientometric information interchange concerning endeavors, groups, teams, and researchers has qualitatively risen in both degree and intensity;

Decreased administrative load for researchers as a result of integrated tools for tracking the projects' execution and automated report preparation in accordance with standards;

The transition to modern forms of organization and the use of new hardware, software and social research tools has been ensured.

To date (December, 2022), 790 users from over a hundred universities have registered on the platform, participating in 72 projects and united in 22 research groups. This information is displayed at the footer of all pages of the platform.

The site's primary users are researchers, who gained access to a platform for cross-disciplinary and international collaboration, a database, and tools for educational research. For managers and practitioners alike, the advantage is clear: they may start relevant research to address the issues surrounding their professional endeavors. Universities and scientific institutions will be able to expand their research potential as a result of using the platform.

Digital platform for the coordination of pedagogical research "The International Community of Researchers in Teacher Education" is designed as a constantly evolving information environment with tools for the researchers' interaction from different science fields. The architecture has been formed and the functional requirements for software implementation and system requirements for the infrastructure have been determined. The choice of technological solutions is based on the method of experimental evaluation of the quality criteria for the functioning of software systems and the interaction of software components. The digital platform's pilot operation is evidence that the technologies were chosen to solve the tasks in an efficient manner. The ICRTE is the first specialized platform in Russia that facilitates interaction on a variety of topics in the field of education. It is intended to serve as a multipurpose platform for open discussion amongst researchers working on related subjects and ideas.

**Acknowledgements** This chapter has been supported by the Kazan Federal University Strategic Academic Leadership Program (PRIORITY-2030).

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