

The cover features a futuristic cityscape with a prominent glass capsule in the foreground. The capsule has a white top with a red stripe and a black panel with the word 'Ursula' and a star symbol. The background is a dense urban landscape with a river. The top half of the cover is overlaid with a geometric pattern of overlapping triangles in shades of blue, purple, and teal. The title 'REVISTA INCLUSIONES' is centered in large, white, bold, sans-serif capital letters.

REVISTA INCLUSIONES

HACIA UN FUTURO PROMETEDOR

Revista de Humanidades y Ciencias Sociales

Volumen 7 . Número Especial

Octubre / Diciembre

2020

ISSN 0719-4706

CUERPO DIRECTIVO

Director

Dr. Juan Guillermo Mansilla Sepúlveda
Universidad Católica de Temuco, Chile

Editor

OBU - CHILE

Editor Científico

Dr. Luiz Alberto David Araujo
Pontificia Universidade Católica de Sao Paulo, Brasil

Editor Europa del Este

Dr. Aleksandar Ivanov Katrandzhiev
Universidad Suroeste "Neofit Rilski", Bulgaria

Cuerpo Asistente

Traductora: Inglés

Lic. Pauline Corthorn Escudero
Editorial Cuadernos de Sofía, Chile

Portada

Lic. Graciela Pantigoso de Los Santos
Editorial Cuadernos de Sofía, Chile

COMITÉ EDITORIAL

Dra. Carolina Aroca Toloza
Universidad de Chile, Chile

Dr. Jaime Bassa Mercado
Universidad de Valparaíso, Chile

Dra. Heloísa Bellotto
Universidad de Sao Paulo, Brasil

Dra. Nidia Burgos
Universidad Nacional del Sur, Argentina

Mg. María Eugenia Campos
Universidad Nacional Autónoma de México, México

Dr. Francisco José Francisco Carrera
Universidad de Valladolid, España

Mg. Keri González
Universidad Autónoma de la Ciudad de México, México

Dr. Pablo Guadarrama González
Universidad Central de Las Villas, Cuba

Mg. Amelia Herrera Lavanchy
Universidad de La Serena, Chile

Mg. Cecilia Jofré Muñoz
Universidad San Sebastián, Chile

Mg. Mario Lagomarsino Montoya
Universidad Adventista de Chile, Chile

Dr. Claudio Llanos Reyes
Pontificia Universidad Católica de Valparaíso, Chile

Dr. Werner Mackenbach
Universidad de Potsdam, Alemania
Universidad de Costa Rica, Costa Rica

Mg. Rocío del Pilar Martínez Marín
Universidad de Santander, Colombia

Ph. D. Natalia Milanesio
Universidad de Houston, Estados Unidos

Dra. Patricia Virginia Moggia Münchmeyer
Pontificia Universidad Católica de Valparaíso, Chile

Ph. D. Maritza Montero
Universidad Central de Venezuela, Venezuela

Dra. Eleonora Pencheva
Universidad Suroeste Neofit Rilski, Bulgaria

Dra. Rosa María Regueiro Ferreira
Universidad de La Coruña, España

Mg. David Ruede Zúñiga
Universidad Nacional Andrés Bello, Chile

Dr. Andrés Saavedra Barahona
Universidad San Clemente de Ojrid de Sofía, Bulgaria

Dr. Efraín Sánchez Cabra
Academia Colombiana de Historia, Colombia

Dra. Mirka Seitz
Universidad del Salvador, Argentina

Ph. D. Stefan Todorov Kapralov
South West University, Bulgaria

COMITÉ CIENTÍFICO INTERNACIONAL

Comité Científico Internacional de Honor

Dr. Adolfo A. Abadía

Universidad ICESI, Colombia

Dr. Carlos Antonio Aguirre Rojas

Universidad Nacional Autónoma de México, México

Dr. Martino Contu

Universidad de Sassari, Italia

Dr. Luiz Alberto David Araujo

Pontificia Universidad Católica de Sao Paulo, Brasil

Dra. Patricia Brogna

Universidad Nacional Autónoma de México, México

Dr. Horacio Capel Sáez

Universidad de Barcelona, España

Dr. Javier Carreón Guillén

Universidad Nacional Autónoma de México, México

Dr. Lancelot Cowie

Universidad West Indies, Trinidad y Tobago

Dra. Isabel Cruz Ovalle de Amenabar

Universidad de Los Andes, Chile

Dr. Rodolfo Cruz Vadillo

Universidad Popular Autónoma del Estado de Puebla, México

Dr. Adolfo Omar Cueto

Universidad Nacional de Cuyo, Argentina

Dr. Miguel Ángel de Marco

Universidad de Buenos Aires, Argentina

Dra. Emma de Ramón Acevedo

Universidad de Chile, Chile

Dr. Gerardo Echeita Sarrionandia

Universidad Autónoma de Madrid, España

Dr. Antonio Hermosa Andújar

Universidad de Sevilla, España

Dra. Patricia Galeana

Universidad Nacional Autónoma de México, México

Dra. Manuela Garau

Centro Studi Sea, Italia

Dr. Carlo Ginzburg Ginzburg

Scuola Normale Superiore de Pisa, Italia

Universidad de California Los Ángeles, Estados Unidos

Dr. Francisco Luis Girardo Gutiérrez

Instituto Tecnológico Metropolitano, Colombia

José Manuel González Freire

Universidad de Colima, México

Dra. Antonia Heredia Herrera

Universidad Internacional de Andalucía, España

Dr. Eduardo Gomes Onofre

Universidade Estadual da Paraíba, Brasil

Dr. Miguel León-Portilla

Universidad Nacional Autónoma de México, México

Dr. Miguel Ángel Mateo Saura

Instituto de Estudios Albacetenses "Don Juan Manuel", España

Dr. Carlos Tulio da Silva Medeiros

Diálogos em MERCOSUR, Brasil

+ Dr. Álvaro Márquez-Fernández

Universidad del Zulia, Venezuela

Dr. Oscar Ortega Arango

Universidad Autónoma de Yucatán, México

Dr. Antonio-Carlos Pereira Menaut

Universidad Santiago de Compostela, España

Dr. José Sergio Puig Espinosa

Dilemas Contemporáneos, México

Dra. Francesca Randazzo

Universidad Nacional Autónoma de Honduras, Honduras

Dra. Yolando Ricardo

Universidad de La Habana, Cuba

Dr. Manuel Alves da Rocha

Universidade Católica de Angola Angola

Mg. Arnaldo Rodríguez Espinoza

Universidad Estatal a Distancia, Costa Rica

REVISTA INCLUSIONES M.R.

REVISTA DE HUMANIDADES
Y CIENCIAS SOCIALES

Dr. Miguel Rojas Mix

*Coordinador la Cumbre de Rectores Universidades
Estatales América Latina y el Caribe*

Dr. Luis Alberto Romero

CONICET / Universidad de Buenos Aires, Argentina

Dra. Maura de la Caridad Salabarría Roig

Dilemas Contemporáneos, México

Dr. Adalberto Santana Hernández

Universidad Nacional Autónoma de México, México

Dr. Juan Antonio Seda

Universidad de Buenos Aires, Argentina

Dr. Saulo Cesar Paulino e Silva

Universidad de Sao Paulo, Brasil

Dr. Miguel Ángel Verdugo Alonso

Universidad de Salamanca, España

Dr. Josep Vives Rego

Universidad de Barcelona, España

Dr. Eugenio Raúl Zaffaroni

Universidad de Buenos Aires, Argentina

Dra. Blanca Estela Zardel Jacobo

Universidad Nacional Autónoma de México, México

Comité Científico Internacional

Mg. Paola Aceituno

Universidad Tecnológica Metropolitana, Chile

Ph. D. María José Aguilar Idañez

Universidad Castilla-La Mancha, España

Dra. Elian Araujo

Universidad de Mackenzie, Brasil

Mg. Romyana Atanasova Popova

Universidad Suroeste Neofit Rilski, Bulgaria

Dra. Ana Bénard da Costa

*Instituto Universitario de Lisboa, Portugal
Centro de Estudios Africanos, Portugal*

Dra. Alina Bestard Revilla

*Universidad de Ciencias de la Cultura Física y el
Deporte, Cuba*

CUADERNOS DE SOFÍA EDITORIAL

Dra. Noemí Brenta

Universidad de Buenos Aires, Argentina

Ph. D. Juan R. Coca

Universidad de Valladolid, España

Dr. Antonio Colomer Vialdel

Universidad Politécnica de Valencia, España

Dr. Christian Daniel Cwik

Universidad de Colonia, Alemania

Dr. Eric de Léséulec

INS HEA, Francia

Dr. Andrés Di Masso Tarditti

Universidad de Barcelona, España

Ph. D. Mauricio Dimant

Universidad Hebrea de Jerusalén, Israel

Dr. Jorge Enrique Elías Caro

Universidad de Magdalena, Colombia

Dra. Cláudia Lorena Fonseca

Universidad Federal de Pelotas, Brasil

Dra. Ada Gallegos Ruiz Conejo

Universidad Nacional Mayor de San Marcos, Perú

Dra. Carmen González y González de Mesa

Universidad de Oviedo, España

Ph. D. Valentin Kitanov

Universidad Suroeste Neofit Rilski, Bulgaria

Mg. Luis Oporto Ordóñez

Universidad Mayor San Andrés, Bolivia

Dr. Patricio Quiroga

Universidad de Valparaíso, Chile

Dr. Gino Ríos Patio

Universidad de San Martín de Porres, Perú

Dr. Carlos Manuel Rodríguez Arrechavaleta

Universidad Iberoamericana Ciudad de México, México

Dra. Vivian Romeu

Universidad Iberoamericana Ciudad de México, México

**REVISTA
INCLUSIONES** M.R.
REVISTA DE HUMANIDADES
Y CIENCIAS SOCIALES

Dra. María Laura Salinas
Universidad Nacional del Nordeste, Argentina

Dr. Stefano Santasilia
Universidad della Calabria, Italia

Mg. Silvia Laura Vargas López
Universidad Autónoma del Estado de Morelos, México

**CUADERNOS DE SOFÍA
EDITORIAL**

Dra. Jaqueline Vassallo
Universidad Nacional de Córdoba, Argentina

Dr. Evandro Viera Ouriques
Universidad Federal de Río de Janeiro, Brasil

Dra. María Luisa Zagalaz Sánchez
Universidad de Jaén, España

Dra. Maja Zawierzeniec
Universidad Wszechnica Polska, Polonia

Editorial Cuadernos de Sofía
Santiago – Chile
OBU – C HILE

Indización, Repositorios y Bases de Datos Académicas

Revista Inclusiones, se encuentra indizada en:





REX



UNIVERSITY OF
SASKATCHEWAN



Universidad
de Concepción



BIBLIOTECA UNIVERSIDAD DE CONCEPCIÓN

**DESIGNING A DISTANCE LEARNING PROCESS:
THE USE OF CLOUD SERVICES FOR PEER-TO-PEER INTERACTION**

Ph. D. (c) Anna Alexandrovna Silaeva

Russian State University of Tourism and Service, Russia
ORCID: 0000-0003-4334-6581
silaeva.a.a@mail.ru

Ph. D. (c) Alexandra Georgievna Panova

Russian State University of Tourism and Service, Russia
ORCID: 0000-0003-3127-4277
alexandra.g.panova@mail.ru

Ph. D. (c) O. A. Evreeva

Russian State Social University, Russia
ORCID: 0000-0002-9073-271X
evreeva@yandex.ru

Dr. O. F. Lobazova

Russian State Social University, Russia
ORCID: 0000-0002-8601-6665
lobazovaof@gmail.com

Ph. D. (c) Rezeda Azmetova

K.G. Razumovsky Moscow State University of Technologies and Management, Russia
ORCID: 0000-0001-9206-4607
rezeda-azmetova@mail.ru

Fecha de Recepción: 11 de mayo de 2020 – **Fecha Revisión:** 01 de junio de 2020
Fecha de Aceptación: 10 de septiembre 2020 – **Fecha de Publicación:** 01 de octubre de 2020

Abstract

One of the modern approaches to improving the quality of education in universities and organizing more effective interaction between all the participants of the educational process can be the use of distance learning support systems and electronic courses developed based on them, as well as on Internet and cloud services. The latter is a promising area that is rapidly developing and widespread; it opens up new opportunities and means for the development of distance learning. The article justifies the relevance of using cloud services for peer-to-peer interaction and discusses the features of using cloud technologies in education. A comparison of distance learning technologies and cloud technologies has been carried out, based on an expert survey. Cloud services, as well as the ways of spreading peer-to-peer interaction, have been identified and analysed, with the help of which peer learning can be implemented.

Keywords

Distance learning – Cloud services – Peer learning – Peer-to-peer interaction – Peer assessment

Designing a distance learning process: the use of cloud services for peer-to-peer interaction pág. 514

Para Citar este Artículo:

Silaeva, Anna Alexandrovna; Panova, Alexandra Georgievna; Evreeva, O. A.; Lobazova, O. F. y Azmetova, Rezeda. Designing a distance learning process: the use of cloud services for peer-to-peer interaction. Revista Inclusiones Vol: 7 num Especial (2020): 513-525.

Licencia Creative Commons Attribution Non-Comercial 3.0 Unported
(CC BY-NC 3.0)
Licencia Internacional



Introduction

In the 21st century, it is impossible to modernize the educational process without taking into account the changes in tendencies that are focused on global standards. The emphasis is shifted towards personality development and the latest technologies are introduced, which inevitably leads to the need to rethink and improve pedagogical methods¹.

More often, to ensure a high-quality educational process, it is necessary to search for different tools, the use of which provides independent, scientific and self-organizing activities of students. With the introduction of mixed and distance learning² and the emergence of a large number of massive open online courses (MOOC), the technology of peer learning is becoming more popular³. One of the components of peer learning is peer assessment, which allows the teacher to go beyond the standard forms of detection the academic achievements. It provides students with the opportunity to evaluate the work of his peers, to identify standard errors and to rethink tasks⁴.

The term "peer-to-peer" was first used in 1984 by Parbawell Yohnuhuitsman. This term was used to explain the functioning of a computer network. It is based on the equality of the participants and is characterized by the fact that its elements can be interconnected, in comparison with the traditional system, when only a certain category of participants can provide certain services to others⁵. Therefore, when the term "peer-to-peer" began to be used in education, its main idea remained. The idea is that students become equal participants of the educational process, they can cooperate in educational content creation, discuss problematic issues in groups, evaluate other participants and use feedback for improving their knowledge and skills⁶. During peer learning, teachers do not abandon their obligations in the learning and assessment process, but they work together with students to help them develop learning and assessment strategies, provide comprehensive support and act as mentors and tutors⁷.

¹ G. M. Gogiberidze, V. A. Isakov, T. V. Ershova, O. V. Shulgina, "Development of innovations in the educational environment: inclusive education and digital technologies", *Revista Inclusiones* Vol: 7 num sp (2020): 147-158; A. S. Kagosyan; N. D. Kotovchikhina; I. V. Poshentseva; T. L. Kashchenko y E. V. Aralova, "Technologies and tools to improve the quality of university education", *Revista Inclusiones* Vol: 7 num sp (2020): 566-578 y S. M. Duisenova; B. N. Kylyshbaeva; K. A. Avsydykova y Ye. Kh. Ishanov, "Sociological Analysis of Educational Strategies in the System of Higher Education in Kazakhstan", *Space and Culture, India* Vol: 7 num 4 (2020): 181-193.

² I. A. Skripak; S. N. Aynazarova; E. V. Ukhanova; A. E. Tkachenko y L. S. Erina, "Digital Virtualization Technologies in Distance Learning", *International Journal of Advanced Trends in Computer Science and Engineering* Vol: 9 num 2 (2020): 1808-1813 y S. V. Matveeva; N. S. Akatova; Yu. I. Shcherbakov y N. V. Filinova, "Digitalization of Higher Education and Professional Development of Educators: Technologies and New Opportunities", *Amazonia Investiga* Vol: 9 num 29 (2020): 77-86.

³ A. Wessel, "Peer learning strategies in the classroom", *Journal of Best Teaching practices* Vol: 2 num 1 (2015): 14-16.

⁴ Z. Zhang y J. G. Bayley, "Peer learning for university students' learning enrichment: Perspectives of undergraduate students", *Journal of Peer Learning* num 12 (2019): 61-74.

⁵ K. J. Topping, "Trends in peer learning", *Educational Psychology* Vol: 25 num 6 (2005): 631-645.

⁶ A. Kodabux y B. K. A. Hoolash, "Peer learning strategies: Acknowledging lecturers' concerns of the Student Learning Assistant scheme on a new higher education campus", *Journal of Peer Learning* num 8 (2015): 59-84.

⁷ P. Ashwin, "Peer support: Relations between the context, process and outcomes for the students who are supported", *Instructional Science* Vol: 31 num 3 (2003): 159-173.

The specificity of peer learning and peer-to-peer interaction using information and communication technologies is the Internet, Web 3.0 technologies, mass digitization of various materials and a large number of open educational resources (OER)⁸.

An example of a successfully functioning peer-to-peer interaction system is Peer 2 Peer University (P2PU)⁹, which is supported by the Chicago Public Library and aims at optimizing interaction in the professional-pedagogical industry.

Another example is MOOC, the main idea of which is to provide students with unlimited access to a variety of educational resources¹⁰. Peer-to-peer interaction in the MOOC is usually implemented through the possibility of using forums for users, which help to create and maintain communities of students, teachers and assistants, involving the leading international experience¹¹. The most popular MOOC include: Coursera (Stanford University); MIT Open CourseWare (Massachusetts Institute of Technology); EdX (Massachusetts Institute of Technology and Harvard University).

Blogs can also serve as a tool for establishing peer-to-peer interaction. In the article¹², the author points out the effectiveness of blogging in the field of vocational education for the systematic improvement of the staff's qualification.

Studies¹³ recorded an increase in interest in educational material in the process of peer learning because students could freely submit materials or create forums for discussion. Support for projects and the interest in publications among the colleagues were also recorded. A friendly and professional atmosphere, convenient access to resources and mutual assistance contribute to the development of professional qualities, as well as to the development of the ability to cooperate, tolerate different opinions and quickly respond to educational challenges¹⁴.

⁸ M. Stigmar, "Peer to peer teaching in higher education: a critical literature review", *Mentoring and tutoring: Partnership in learning* Vol: 24 num 2 (2016): 124-136.

⁹ U. Karma y R. Sangay, "Peer-learning: An Alternative Teaching Pedagogy for Highly Teacher Centered Classes. *International Journal of English*", *Literature and Social Science* Vol: 4 num 5 (2019): 1520-1529.

¹⁰ A. V. Novikov; U. U. Abdulkadirov; S. Pivneva; A. V. Polkovnikov y V. V. Pertsev, "Software educational resources as a means of studying economic and mathematical disciplines at university", *Revista Inclusiones* Vol: 7 num sp (2020): 395-408 y A. I. Nikiforov; A. M. Avdonina; T. V. Dikova; A. S. Bagdasarian y I. Yu. Ilina, "Formation of a Continuing Education System in Modern Conditions", *Universal Journal of Educational Research* Vol: 8 num 5 (2020): 1772-1777.

¹¹ M. D. B. Ibrahim y N. Aaijaz, "Dynamics of peer-assisted learning and teaching at an entrepreneurial university: An experience to share", *International Journal of Humanities and Social Science* Vol: 1 num 12 (2011): 93-99.

¹² A. Havnes, "Peer-mediated learning beyond the curriculum", *Studies in Higher Education* Vol: 33 num 2 (2008): 193-204.

¹³ J. A. Hammond; C. P. Bitchell; L. Jones y P. Bidgood, "A first year experience of student-directed peer assisted learning", *Active Learning in Higher Education* Vol: 11 num 3 (2010): 201-212; H. Huijser; L. Kimmins y P. Evans, "Peer Assisted Learning in Fleximode: Developing an Online Learning Community", *Journal of Peer Learning* num 1 (2008): 51-60 y J. Van der Meer y C. Scott, "Shifting the Balance in First-Year Learning Support: from Staff Instruction to Peer- Learning Primacy", *Journal of Peer Learning* num 1 (2008): 70-79.

¹⁴ V. N. Dolzhenkov; I. D. Maltzagov; A. I. Makarova; N. S. Kamarova y P. V. Kukhtin, "Software Tools for Ontology Development", *International Journal of Advanced Trends in Computer Science and Engineering* Vol: 9 num 2 (2020): 935-941 y V. A. Slepov; T. N. Rodenkova; M. E. Kosov y A. I. Grishin, "Human Capital Development as an Element of Financial Management in National

PH. D. (C) ANNA ALEXANDROVNA SILAEVA / PH. D. (C) ALEXANDRA GEORGIEVNA PANOVA / PH. D. (C) O. A. EVREEVA

DR. O. F. LOBAZOVA / PH. D. (C) REZEDA AZMETOVA

Since young people in Russia, as well as in the world, spend the vast majority of their time using various computer devices with 24-hour access to the Internet, it becomes possible to implement peer learning using modern cloud services.

The term “cloud” itself comes from telephony, because telecommunications companies that in general offered point-to-point connection until the 1990s, began to offer virtual private networks (VPN), with comparable quality of service, but at much lower costs. By switching traffic for optimal channel utilization, an opportunity appeared to use the network more efficiently. The cloud symbol was used to denote the distinction between user and supplier¹⁵.

The term “Cloud computing” was first used in 1993 by Eric Schmidt to name services that remotely support various data and applications hosted on remote servers¹⁶. Today this term is widespread in the information space.

According to M.A. Vouk¹⁷, the cloud is a server that stores programs and data that the consumer can use without installation and access to personal files from any computer with Internet access. M. Cusumano¹⁸ interprets this concept as “a complex infrastructure with a large number of technical details hidden in the “clouds”.

Amazon has played a key role in the development of cloud computing by modernizing its data centres, which, like most computer networks, use only 10% of their capacity at one point in time to ensure reliability during a load jump. Today, Blackboard, Moodle, Microsoft Live@edu and Google Apps for Education and Google Groups are some of the most common cloud services and systems. Cloud technologies became widespread after Google introduced the Google Apps platform for web applications. In general, now, the main providers of cloud technologies are Amazon, Google and Salesforce. Microsoft is considered the front-runner among commercial cloud services. It offers appropriate solutions to customers through Microsoft Online Services and the Windows Azure platform¹⁹.

According to researchers²⁰, the use of cloud services in education has several advantages:

Education Systems”, *Journal of Advanced Research in Law and Economics* Vol: 10 num 4 (2019): 1303-1308.

¹⁵ S. Bhardwaj; L. Jain y S. Jain, “Cloud computing: A study of infrastructure as a service”, *International Journal of engineering and information Technology* Vol: 2 num 1 (2010): 60-63.

¹⁶ J. Kerr y K. Teng, “Cloud computing: legal and privacy issues”, *Journal of Legal Issues and Cases in Business* Vol: 1 num 1 (2012): 1-11.

¹⁷ M. A. Vouk, “Cloud computing—issues, research and implementations”, *Journal of Computing and Information Technology* num 16 (2008): 235-246.

¹⁸ M. Cusumano, “Cloud computing and SaaS as new computing platforms”, *Communications of the ACM* num 53 (2010): 27-29.

¹⁹ J. Qayyum; F. Khan; M. Lal; F. Gul; M. Sohaib y F. Masood, “Implementing and Managing framework for PaaS in Cloud Computing”, *International Journal of Computer Science Issues* num 8 (2011): 474-479.

²⁰ K. Yadav, “Role of Cloud Computing in Education”, *International Journal of Innovative Research in Computer and Communication Engineering* Vol: 2 num 2 (2014): 3108-3112 y N. Sultan, “Cloud computing for education: A new dawn?”, *International Journal of Information Management* Vol: 30 num 2 (2010): 109–116.

- Significant savings on software purchases. Cloud services account for these costs and users only pay for network usage.
- Reducing the need for special premises. The use of services is available to everyone and anywhere. Only the access to the Internet is needed.
- All cloud-based backups are saved. The user does not need to worry about data deletion, virus infection or data loss due to hard disk damage.
- Performing a large number of educational work types, monitoring and assessing students' knowledge online.
- Ad-free environment, anti-virus and anti-hacker security, openness and accessibility of the educational environment for teachers and students.

Nowadays, cloud services are also gaining popularity, with the help of which the teacher gets the opportunity to develop tests or use existing ones. Open Test is one of the examples of such services for fast and high-quality development of tests²¹.

Sharing the experience of integrating Google Apps cloud technologies into the information and educational space, V.H. Pardeshi indicates the directions of the use of cloud software. Among them, he highlights the Google Apps services as the promising one, the result of the integration of which with the educational institution's web services will be a hybrid information and educational space of the university²².

Cloud technologies, according to I.V. Ananchenko, allow one to improve the quality of education of university students and improve the interaction between the teachers and students. To build a learning system based on cloud technologies, the author suggests placing an electronic textbook in the university's private cloud, which consists of theoretical material and applied problems. He claims that the Moodle computer system should be used for this purpose²³.

According to the results of the study, conducted by C. Bulla and others, it was concluded that the most common use of cloud technologies is the application of the cloud model "software as a service". Among other such technologies, Google Docs service is worth mentioning. It gives students the opportunity to carry out collaborative projects, discuss them, publish results on the Internet for further analysis, create summary tables and diagrams and conduct test control and self-control of educational achievements. In addition to this service, the tools of this technology are Gmail, Google Calendar, Google Drive (a service for storing personal files) and Google Sites (a tool that allows creating sites using standard templates)²⁴.

²¹ T. Ercan, "Effective use of cloud computing in educational institutions", *Procedia Social and Behavioral Sciences* num 2 (2010): 938-942.

²² V. H. Pardeshi, "Cloud Computing for Higher Education Institutes: Architecture, Strategy and Recommendations for Effective Adaptation", *Procedia Economics and Finance* num 11 (2014): 589-599.

²³ I. V. Ananchenko, "Oblachnye tekhnologii v vysshem obrazovanii", *Sovremennye naukoemkie tekhnologii* num 5 (2015): 48-52.

²⁴ C. Bulla; B. Hunshal y S. Mehta, "Adoption of Cloud Computing in Education System: A Survey", *International Journal of Engineering Science and Computing* Vol: 6 num 6 (2016): 63-75.

A. Mansuri and colleagues reveal the functionality of cloud technologies in organizing distance learning as learning in the cloud (using the Google Groups service), monitoring the quality of education (using Google Doc) and implementing an analytical system (Google Analytics). It is advisable to introduce these capabilities of cloud technologies at a university. This is especially true for distance learning. The use of such technologies during the student's absence provides them with free access to educational materials and creates the effect of being present at classes and consultations²⁵.

The article is aimed at determining the features of using cloud services for the introduction of peer-to-peer interaction in the educational process of higher education institutions.

Research hypothesis: the implementation of peer learning in distance education is possible through the use of cloud technologies.

According to the results of the study, it can be concluded that the aim was achieved.

Methods

To achieve the aims set in the work, general scientific methods were used:

a) theoretical: analysis of reviewed scientific sources on the research problem to clarify the level of the development of the problem of designing a distance learning process using cloud services to implement peer-to-peer interaction; generalization of Russian and foreign experience in the use of cloud services and technologies in higher educational institutions;

b) empirical: an online expert survey of participants of the educational and scientific environment of higher education institutions to carry out a comparative analysis of distance learning technologies and cloud technologies, to identify cloud services with the help of which peer learning can be implemented and to determine ways to introduce peer-to-peer interaction.

The survey involved 40 experts, scientific and pedagogical workers, whose work is related to the introduction of cloud services in the educational process of higher education. Thus, it can be assumed that these are people who know quite well the latest trends in technological development and who work mainly in educational institutions well equipped and focused on the use of modern information and communication technologies.

Results

According to the results of the expert survey, a comparison of distance learning technologies and cloud technologies was carried out (Table 1).

²⁵ A. Mansuri; M. Verma, P. Laxkar, "Benefit of Cloud Computing for Educational Institutions and Online Marketing", Information Security and Computer Fraud Vol: 2 num 1 (2014): 5-9.

Parameter	Distance learning technologies	Cloud technologies
Data security	High	Low or medium
Software security	Depends on the institution	Depends on cloud services provider
Hardware and software cost	High or medium	Low
Disaster recovery	Manual	Automatic
System availability in case of failure of one of the servers	No	Yes
System availability regardless of time or space constraints	Yes	Yes
Saving data and performing calculations on the user's computer	Mandatory	Optional
Scalability of educational courses	Limited	Unlimited
Software mobility	Yes	Yes
The ability to integrate various platforms	Low	High
The need for system maintenance in case of hardware or software changes	Yes	No
Rational use of resources	Not always	Always
Learning content management	Requires certain effort	Requires little effort
Physical location of educational materials	Known clearly	Hidden

Note: compiled based on the expert survey; * – percentage of expert references

Table 1

Comparison of distance learning technologies and cloud technologies

Furthermore, following the main aim of the study, the experts identified and analysed cloud services, with the help of which peer learning could be implemented (Table 2).

No.		%*
1	The use of forums, chats, in particular in LMS Moodle	80%
2	Automating peer grading with the Workshop resource in LMS Moodle	75%
3	The use of peer assessment applications in Inquiry Learning Spaces (ILS) developed in Graasp	70%
4	The use of Google Apps	65%
5	Group interaction using virtual boards	62.5%
6	Collaborative blogging	62.5%

Note: compiled based on the expert survey; * – percentage of expert references

Table 2

Cloud services, with the help of which peer learning can be implemented

Discussion

In the research results discussion, we will define the ways of implementing peer-to-peer interaction and the use of them.

Thus, according to the expert survey, 80% of the respondents consider LMS Moodle to be one of the most popular learning management systems in Russia. Several tools available in this system (namely Forum, Chat and Workshop) make it possible to

implement peer-to-peer interaction. Forum and Chat can be used to provide an exchange of views, advice and useful information. Students can communicate both synchronously and asynchronously using this tool.

Workshop is used to automate peer assessment. During the stages prescribed by this tool, students get different assignments with the deadlines at each stage. Students can present the results of completed assignments in the form of any digital content (document, spreadsheet, presentation, etc.). Also, they add text in the special form on the site using the embedded text editor (link to a blog, document, wiki resource, etc.). After submitting the work, the system moves to the next stage and each student needs to evaluate his classmates' materials using the assessment criteria developed by the teacher. For a better understanding of how work should be graded, the teacher can provide students with an example of work and an example of its grading. Students are allowed to evaluate one or several works. To ensure unbiased assessment, both the works and students can be anonymous. At the final stage, students receive two marks for the workshop: a grade for their work and one for their colleagues' work assessment. In the case of biased assessment, if the grade given by the student differs significantly from the grades of other students for this work, the grade for the assessment is automatically reduced.

According to one of the respondents, "it is important to take into account that in peer-to-peer interaction a student has access to the necessary resources, can work both individually and in a group, and to understand the features of assessment". According to the experts, the features of peer assessment include: the presence of clear formulations of assessment criteria (75% of the respondents); the organization of students' work in pairs or groups to assess each other (65% of the respondents); the application of the double anonymity principle: students do not know who they have evaluated, and do not know who has evaluated them (60% of the respondents). The experts underlined that in the process of developing the assessment criteria, the following factors are taken into account:

- the criteria are aimed at assessing students' work (at an intermediate or final stage);
- students' work is evaluated according to the criteria or is compared to the sample given by the teacher, but not to the work of other students;
- the criteria must be presented to students in advance;
- it is necessary to use a clear algorithm for deriving the grade, according to which students can assess themselves and evaluate their level of achievements;
- an assessment criterion is a concrete expression of the measure of achievement of educational goals. As one of the respondents noted, "it is possible to evaluate only what is being taught".

According to 70% of the surveyed experts, some Inquiry Learning Space (ILS) applications that can be created using the Graasp platform toolkit, also include peer assessment. One can also use the Question Scratchpad, Table Tool and Peer Assessment Tool for peer assessment. Using the Table Tool application provides students with the ability to add tables in which they can fill in empty cells according to the assignment. The Question Scratchpad application can be used to teach students to

formulate questions of various types on a specified topic, which makes it possible to either use the proposed set of words when creating a question or type questions with the help of the keyboard. When configuring these applications, it is possible to switch on peer assessment mode and to specify the criteria for grading. While working in ILS apps, students select the tool to ask for feedback on their work after completing an assignment.

The experts mentioned that the teacher must also use Peer Assessment Tool, which is usually added to the teachers-only section of the Teacher Dashboard, to take full advantage of the peer assessment mode of Table Tool and Question Scratchpad. This application allows the teacher to determine which student should grade other students' works after receiving grading requests. One student can grade several students' works. It is also possible to specify that several students graded the same work. Moreover, students do not know whom they have evaluated and do not know who has evaluated them. After grading, another tool appears, which allows viewing how the work was graded.

According to 65% of the surveyed experts, peer assessment can also be implemented with the help of Google apps. Google Sheets can be used to display the assessment criteria; they allow students to give points. In this case, the reason for the grading can be provided in the comments. If, in addition to the grade, a descriptive comment is also added during the assessment, one can use Google Forms or Google Docs.

Besides, 62.5% of the respondents believed that virtual boards can be used for creative works, in particular padlet.com and blogs. For example, Blogger is one of the Google services, where blogs can be either personal or collective, created by several co-authors, and all of them can post messages. In this case, students have the opportunity to publish their work and to reflect on it, after reading the comments of other users.

Conclusion

Peer learning sets new challenges for the teacher: they should be ready to select high-quality technologies for implementing peer-to-peer interaction. Students, in their turn, must learn to be responsible for the provided content, possess communication and collaboration skills, think critically and overcome conflict situations skilfully. After studying any academic discipline, students need to understand clearly what skills and competencies they have received, and peer-to-peer interaction is one of the means that makes it possible to track all the strengths and weaknesses, as well as to identify gaps in knowledge and to reflect on it.

The introduction of cloud services is a new direction in the field of computer technologies, and their introduction in the field of education makes it possible to create continuous learning process with the support of mobile information and communication technologies and Internet services. The educational process itself becomes accessible, since the student has the opportunity to receive educational material at any time and anywhere, only the Internet connection is needed.

Cloud services provide researchers and scientists with the ability to instantly process huge amounts of information with low computational resources and to instantly share analysis results with other researchers around the world.

The use of cloud technologies allows continuous communication and interaction between teachers and students. Thus, the results of the study confirmed the hypothesis that the implementation of peer learning in distance education is possible through the use of cloud technologies.

References

Ananchenko, I. V. “Oblachnye tekhnologii v vysshem obrazovanii”. *Sovremennye naukoemkie tekhnologii* num 5 (2015): 48–52.

Ashwin, P. “Peer support: Relations between the context, process and outcomes for the students who are supported”. *Instructional Science* Vol: 31 num 3 (2003): 159–173.

Bhardwaj, S.; Jain, L. y Jain, S. “Cloud computing: A study of infrastructure as a service”. *International Journal of engineering and information Technology* Vol: 2 num 1 (2010): 60-63.

Bulla, C.; Hunshal, B. y Mehta, S. “Adoption of Cloud Computing in Education System: A Survey”. *International Journal of Engineering Science and Computing* Vol: 6 num 6 (2016): 63-75.

Cusumano, M. “Cloud computing and SaaS as new computing platforms”. *Communications of the ACM* num 53 (2010): 27-29.

Duisenova, S. M.; Kylyshbaeva, B. N.; Avsydykova, K. A. y Ishanov. Ye. Kh. “Sociological Analysis of Educational Strategies in the System of Higher Education in Kazakhstan”. *Space and Culture, India* Vol: 7 num 4 (2020): 181-193.

Dolzhenkov, V. N.; Maltzagov, I. D.; Makarova, A. I.; Kamarova, N. S. y Kukhtin, P. V. “Software Tools for Ontology Development”. *International Journal of Advanced Trends in Computer Science and Engineering* Vol: 9 num 2 (2020): 935-941.

Ercan, T. “Effective use of cloud computing in educational institutions”. *Procedia Social and Behavioral Sciences* num 2 (2010): 938-942.

Gogiberidze, G. M.; Isakov, V. A.; Ershova, T. V. y Shulgina, O. V. “Development of innovations in the educational environment: inclusive education and digital technologies”. *Revista Inclusiones* Vol: 7 num sp (2020): 147-158.

Hammond, J. A.; Bitchell, C. P.; Jones, L. y Bidgood, P. “A first year experience of student-directed peer assisted learning”. *Active Learning in Higher Education* Vol: 11 num 3 (2010): 201–212.

Havnes, A. “Peer-mediated learning beyond the curriculum”. *Studies in Higher Education* Vol: 33 num 2 (2008): 193–204.

Huijser, H.; Kimmins, L.; Evans y P. Peer. “Assisted Learning in Fleximode: Developing an Online Learning Community”. *Journal of Peer Learning* num 1 (2008): 51-60.

Ibrahim, M. D. B. y Aaijaz, N. Dynamics of peer-assisted learning and teaching at an entrepreneurial university: An experience to share. *International Journal of Humanities and Social Science* Vol: 1 num 12 (2011): 93–99.

Kagosyan, A. S.; Kotovchikhina, N. D.; Poshentseva, I. V.; Kashchenko, T. L. y Aralova, E. V. “Technologies and tools to improve the quality of university education”. *Revista Inclusiones* Vol: 7 num sp (2020): 566-578.

Karma, U. y Sangay, R. “Peer-learning: An Alternative Teaching Pedagogy for Highly Teacher Centered Classes”. *International Journal of English, Literature and Social Science* Vol: 4 num 5 (2019): 1520-1529.

Kerr, J. y Teng, K. “Cloud computing: legal and privacy issues”. *Journal of Legal Issues and Cases in Business* Vol: 1 num 1 (2012): 1-11.

Kodabux, A. y Hoolash, B. K. A. “Peer learning strategies: Acknowledging lecturers’ concerns of the Student Learning Assistant scheme on a new higher education campus”. *Journal of Peer Learning* num 8 (2015): 59-84.

Mansuri, A.; Verma, M. y Laxkar, P. “Benefit of Cloud Computing for Educational Institutions and Online Marketing”. *Information Security and Computer Fraud* Vol: 2 num 1 (2014): 5-9.

Matveeva, S. V.; Akatova, N. S.; Shcherbakov, Yu. I. y Filinova, N. V. “Digitalization of Higher Education and Professional Development of Educators: Technologies and New Opportunities”. *Amazonia Investiga* Vol: 9 num 29 (2020): 77-86.

Nikiforov, A. I.; Avdonina, A. M.; Dikova, T. V.; Bagdasarian, A. S. y Ilina, I. Yu. “Formation of a Continuing Education System in Modern Conditions”. *Universal Journal of Educational Research* Vol: 8 num 5 (2020): 1772-1777.

Novikov, A. V.; Abdulkadirov, U. U.; Pivneva, S.; Polkovnikov, A. V. y Pertsev, V. V. “Software educational resources as a means of studying economic and mathematical disciplines at university”. *Revista Inclusiones* Vol: 7 num sp (2020): 395-408.

Pardeshi, V. H “Cloud Computing for Higher Education Institutes: Architecture, Strategy and Recommendations for Effective Adaptation”. *Procedia Economics and Finance* num 11 (2014): 589-599.

Qayyum, J.; Khan, F.; Lal, M.; Gul, F.; Sohaib, M. y Masood, F. “Implementing and Managing framework for PaaS in Cloud Computing”. *International Journal of Computer Science Issues* num 8 (2011): 474-479.

Skripak, I. A.; Aynazarova, S. N.; Ukhanova, E. V.; Tkachenko, A. E. y Erina, L. S. “Digital Virtualization Technologies in Distance Learning”. *International Journal of Advanced Trends in Computer Science and Engineering* Vol: 9 num 2 (2020): 1808-1813.

Slepov, V. A.; Rodenkova, T. N.; Kosov, M. E. y Grishin, A. I. “Human Capital Development as an Element of Financial Management in National Education Systems”. *Journal of Advanced Research in Law and Economics* Vol: 10 num 4 (2019): 1303-1308.

Stigmar, M. "Peer to peer teaching in higher education: a critical literature review". Mentoring and tutoring: Partnership in learning Vol: 24 num 2 (2016): 124-136.

Sultan, N. "Cloud computing for education: A new dawn?". International Journal of Information Management Vol: 30 num 2 (2010): 109–116.

Topping, K. J. "Trends in peer learning". Educational Psychology Vol: 25 num 6 (2005): 631–645.

Van der Meer y J., Scott, C. "Shifting the Balance in First-Year Learning Support: from Staff Instruction to Peer- Learning Primacy". Journal of Peer Learning num 1 (2008): 70-79.

Vouk, M. A. "Cloud computing—issues, research and implementations". Journal of Computing and Information Technology num 16 (2008): 235-246.

Yadav, K. "Role of Cloud Computing in Education". International Journal of Innovative Research in Computer and Communication Engineering Vol: 2 num 2 (2014): 3108-3112.

Wessel, A. "Peer learning strategies in the classroom". Journal of Best Teaching practices Vol: 2 num 1 (2015): 14-16.

Zhang, Z. y Bayley, J. G. "Peer learning for university students' learning enrichment: Perspectives of undergraduate students". Journal of Peer Learning num 12 (2019): 61-74.