The Implementation of Cloud Services in Ukrainian Pre-School Educational Institution Management

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Abstract. Management of pre-school educational institution (PEI) is a comprehensive, multidimensional, resource-demanding process conditioned by the modern society that is developing dynamically and imposes new requirements to its subjects: readiness for more productive and creative work, cooperation in information-saturated environment, constant self-development, and competitiveness support, etc. Broad prospects thus are provided through using new technologies, including cloud services (CS).

The article represents the results of a survey that involved 227 PEI managers from eight regions of Ukraine and was aimed at identifying the state of CS use in their professional activity (awareness, readiness, experience, etc.). Advantages and possibilities of using Google CS, which are the most appropriate in modern Ukrainian PEI management realities, are defined. The technique of PEI managers training for using CS in their professional activity, as the essential condition for CS effective implementation in practice of PEI management, is developed and represented.

Keywords: cloud services, Google cloud services, pre-school educational institution, pre-school management, pre-school manager, survey, ICT-competence.

1 Introduction

The current stage of society development is characterized by dynamic spread of IT: network tools, cloud services (CS), virtual and mobile technologies et al., which has impact on all spheres of life, promotes qualitative renewal of ways to work with data, effective professional interaction. As noted by V. Bykov, the rapid spread of Information and Communication Technologies (ICT) creates the conditions for unlimited (full, fast, accurate, anytime and anywhere, with minimal effort, etc.) access to electronic resources for all stakeholders [1].

The implementation of modern ICT, including CS, in pre-school education is the newest topical scientific and educational problem in Ukraine. Using CS offers a number of possibilities in terms of pre-school educational institution (PEI) management: optimization of data exchange processes, e-document circulation, making effective

management decisions by establishing effective communication, files of any format remote storing, documents sharing and use of available high-quality applications regardless of the hardware features of the computer and need to install them, etc.

Different aspects of cloud technologies use at various levels of education in Ukraine are reflected in studies of V. Bykov [1], S. Lytvynova [3], Yu. Nosenko [4], Z. Seydametova, S. Semerikov, A. Stryuk, M. Shyshkina, et al. The studies of H. Yel'nykova, L. Karamushka, K. Krutiy, I. Plish, Ye. Khrykov [2] et al. are devoted to problems of education management, introduction of innovative technologies in the management processes. Actual issues of informatization of pre-school education in Ukraine are revealed in a study of Yu. Nosenko, V. Bogdan, Zh. Matyukh [5].

Ukrainian scientists examined some aspects of foreign experience in using CS in pre-school education, particularly in teaching children with special needs [4]. Possibilities of implementing virtual educational communities via Google Sites cloud service are disclosed by L. Rozhdestvens'ka [6]. Experience of using Office 365 cloud service in projecting electronic system of registration of children to Kyiv kindergartens (Ukraine) is reflected in S. Lytvynova's study [3].

However, the implementation of modern ICT, particularly CS, in PEI management remains among the newest scientific and educational problems in Ukraine, which is not reflected sufficiently in researches and requires comprehensive study. The problem is compounded due to a low level of ICT-competence of PEI managers, their poor preparedness for effective use of new technologies' potential.

The **purpose** of the article is to determine the current state, benefits and opportunities of using CS in PEI management in Ukraine. The purpose achievement involves solving ***objectives***: 1) to determine the current state of using CS by Ukrainian PEI managers; 2) to determine the benefits and possibilities of using Google CS in PEI management; 3) to develop a technique of PEI managers training for using CS in their professional activity.

2 The Presentation of Main Results

2.1 The Current State of Using Cloud Services by Ukrainian PEI Managers in Professional Activity

The main method that we chose to determine the current state of CS use by Ukrainian PEI managers in their professional activity was a survey, which lasted during 2015-2016. The survey involved 227 PEI managers from eight regions of Ukraine. Among them 48% work in cities, 52% – in rural areas.

The survey allowed clarifying a number of issues, including: a) The availability of computer and Internet in Ukrainian PEIs; b) PEI managers' level of skills in using computer technology and Internet; c) The frequency and purpose of using Internet in PEI; d) PEI managers' awareness of the term 'cloud services', and their usage in professional activity; e) PEI managers' readiness to deepen knowledge and skills in using CS in their professional activity.

It was found out that the vast majority of PEI (89%), managers of which participated in the survey, is equipped with computers (PC and/or laptop) and Internet connec-

tion (81%). The majority of PEI staff uses computer and Internet for professional purposes, including: *a)* Only a computer (without a network connection): managers (95%), pre-school teachers (72%), methodologists (56%), medical staff (40%), storekeepers (33%), bookkeepers (18%), psychologists and music educators (9%), catering staff (4%); *b)* Both computer and Internet: managers (82%), methodologists (57%), pre-school teachers (60%), medical staff (30%), storekeepers (21%), bookkeepers (20%), psychologists and music educators (10%), catering staff (5%). Thus, it was found that all subjects (managing and administrative staff, educators, and serving personnel) use computer and Internet as the tools to support professional activity. But the most active users are managers, methodologists and pre-school teachers.

As it turned out, the frequency of computer use in PEI managers' professional activity is as follows: every day (64%), several times a week (16%), several times a month (12%), do not use at all (8%). As for the frequency of Internet use, it is somewhat lower: it is used every day by 54% of respondents, several times a week – 21%, several times a month – 15%, is not used at all – 10%.

The PEI managers use Internet for professional communication, particularly with colleagues (64%), authorities (63%), subordinates (41%) and parents (37%). Yet, the potential of communication via Internet tools and CS is insufficiently involved in PEI managers' professional interaction. The reason for this we consider in their non-acquaintance with potential opportunities and advantages of such interaction.

The respondents identified that the main problems that arise when using Internet are: lack of skills (40%), poor quality of Internet connection (43%), high cost of Internet services along with low funding of PEI (22%), lack of Internet access (14%), especially in rural areas, lack of desire or need in networking (2%).

As for the term "cloud services", our study showed that the majority of respondents (64%) have never heard it before. Among the remaining respondents (36%) who have heard this term before, only 30% could choose the correct definition. Despite that most PEI managers are not acquainted with "cloud services", the survey showed that they, however, use various CS in practice. Specifically, 76% of respondents use e-mail in professional activity, 56% – search services, 51% – social networks, 47% – communication services, 30% – electronic data storages. Herewith, 9% of respondents do not use any of these services.

Respondents were asked to indicate the service (-s) that they use in professional activity (to choose from the list of proposed or to add one's own version). Thus, the variety of services used by PEI managers was distributed as it is shown in Table 1.

As we can see, the most prevalent tools applicable by Ukrainian PEI managers are e-mail services and social networks, and the least popular are electronic data storages. In our opinion, the reason for such distribution lies in managers' non-acquaintance with potential opportunities and advantages of various services use in professional activity. The survey showed that the purpose of CS use by Ukrainian PEI managers distributed as follows: information search (74%), communication (63%), data storage (34%), data sharing (34%), and files collaborative usage (20%). Herewith, 10% of respondents do not use any CS.

We consider being positive that the majority of PEI managers expressed a desire to improve their ICT-competence. Thus, 100% answered that they would like to learn

about how to use CS in professional activity and to raise CS awareness for further implementation in managerial work.

Table 1. Services used by Ukrainian PEI managers in professional activity

E-mail services	Search services	Social networks	Synchronous communication services	E-data storages
Ukr.net – 16% Gmail.com – 14% Mail.ru – 11% Yandex.ru – 11% Meta.ua – 4% Rambler.ua – 2% Bigmir.net – 0,4%	Google – 22% Yandex – 3% Yahoo – 1% Meta – 1% Rambler – 0,8%	Google+ - 18% OK – 10% Facebook – 9% Vkontakte – 9% Twitter – 2%	Viber – 14% Skype – 9% ICQ – 2% MSN Messenger – 1%	Яндекс.Диск – 12% Google Drive – 6% E-Disk (ukr.net) – 2%

2.2 The Possibilities of Using Google Cloud Services as a Tool of PEI Management Support

In Ukraine, the introduction of CS in education began rather recently and particularly in pre-school education is still at an early stage. After a preliminary analysis of various CS, we have chosen Google services which have a number of advantages significant in conditions of Ukrainian PEI: free of charge; ease of use; availability of multipurpose account that provides access to all services; usability on different platforms (Windows, Android, iOS); availability of functionality required in PEI management; availability from any digital device connected to the Internet; no need to deploy "cloud" (Ukrainian PEI don't have technical staff to execute this), etc.

According to Ye. Khrykov's study, the main functions of educational management are: planning, organization, control and regulation [2]. These functions are basic, fundamental components of management that contribute to all its stages and content. They promote the improvement of management decisions, identification of shortcomings in staff activity and their timely removal, motivation of personnel to professional development, establishment of psychologically favorable atmosphere, improving quality of pre-school educational process and PEI practices in general.

In modern conditions of spreading ICT, democratization of education and governance, implementation of the principles of openness and transparency, development of competitive relationship there is a need to upgrade management functions and approaches to Ukrainian PEI management that consists in follows: a) Qualitative upgrade of the communication process, introducing tools for synchronous and asynchronous communication (anywhere, anytime); b) Optimization of e-document circulation; acceleration of e-document search and processing; cost savings (reducing the cost of paper, ink for office equipment, etc.), collaborative work with documents; c) Optimization of methodical activity, creation of banks of didactical resources, creation of educators' e-portfolios as a tool for summarizing and sharing their professional experience, constant self-development; d) Ensuring feedback and communication with stakeholders (parents, authorities, local public organizations, etc.); e) Creation of PEI positive image, which indicates the public confidence, competitiveness in the

educational market, openness to dialogue with the target audience.

Taking into account named functions and the opportunities given by Google services, we worked out a scheme for using these services in PEI management (Fig. 1).

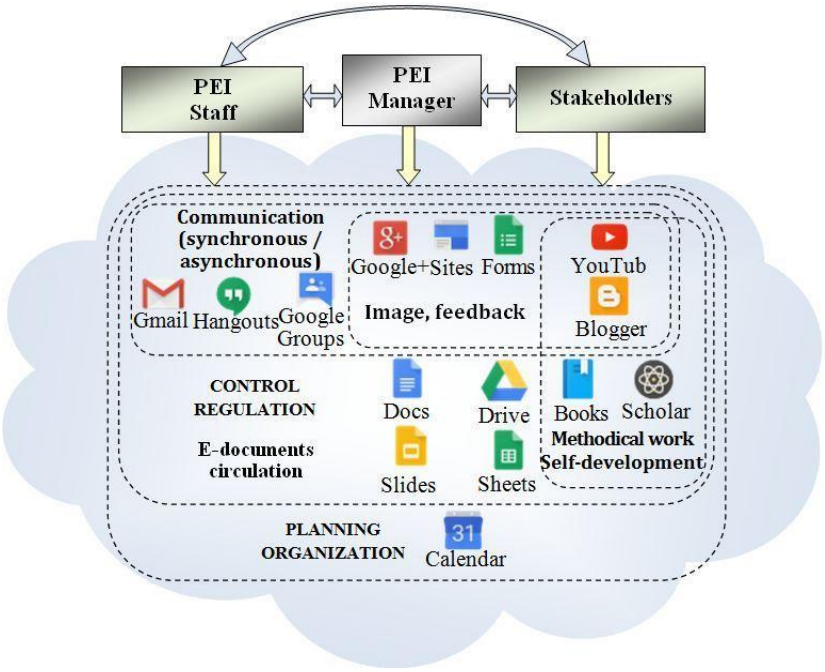

Fig. 1. Use of Google cloud services in PEI management

Integrated use of these services will allow optimize the planning, organization, control and regulation of processes in PEI, providing feedback from stakeholders, e-document circulation, methodical work and staff professional self-development, creation of a positive image of PEI.

2.3 The Technique of ICT-Competence Development of PEI Managers in Terms of Using Google Cloud Services in Their Professional Activity

The essential condition for CS effective implementation in practice of PEI management is the development of PEI managers' ICT-competence, their skills to use these technologies as a tool for professional activity support. It is worth to mention that in Ukraine the training of PEI managers is carried out in several ways: 1) For future professionals – in higher education institutions of Ukraine that have a license for conducting training in appropriate direction; 2) For practicing managers – through training courses at the regional institutions of postgraduate education. Each Ukrainian preschool manager must pass these courses every 5 years. However, analysis of the curricula of Ukrainian pedagogical universities and postgraduate institutes has shown that they have no courses aimed at developing managers' skills in using CS in profes-

sional activity. In this regard it became necessary to develop appropriate technique that could be recommended for training future and practicing PEI managers.

According to our technique, the ***purpose*** of training PEI managers in terms of using Google CS is the achievement of a high level of ICT-competence, namely their ability to use these services as a tool for supporting management activity in the following areas: planning and organization, communication, assuring feedback and dialog with stakeholders, e-document circulation, methodical work and constant professional self-development, creation of PEI positive image, et al.

The purpose achievement involves performing a number of ***tasks***: 1) to provide PEI managers with theoretical knowledge about the sense, advantages and disadvantages, functional features and possibilities, purposes, ways to use Google services in PEI management; 2) to form practical skills and abilities to use these services, and to choose them according to the exact professional situation; 3) to develop positive attitudes towards CS; the ability to self-assessment of their own level of mastery of CS; values aimed at deepen their knowledge and skills on the use of CS.

The authors' technique is based on andragogical, competency-based, activity, differentiated, humanistic, and acmeological ***approaches***.

Among the ***principles*** of PEI managers training we define the next ones: principle of visualization, availability principle, practical-oriented principle, the principle of systematic and consistency training and self-development, principle of combining different training forms, principle of individualization, principle of consciousness, principle of independence and activity, principle of strength of knowledge and skills.

For the development of PEI managers' ICT-competence it is advisable to use ***forms*** and ***methods*** that take into account psychological and didactical features of adult training: lectures (traditional and online), workshops, training sessions, discussions, consultations (full-time and distance), demonstrations of using CS on specific examples, practical tasks, individual and group project work, diagnostic measures (pedagogical and psychological tests, questionnaires, interviews, observation).

The ***tools*** necessary for implementing technique are: demonstration tools (multimedia board), computer-oriented tools connected to the Internet (PC, laptop, tablet, et al.), Google CS, and training materials.

Realizing the importance of providing high-quality methodological support of the development of PEI managers' ICT-competence, we have developed guidelines "*Google cloud services in PEI managers' professional activity*", consisting of the following modules: 1) Basic concepts. 2) Possibilities of using CS in PEI management. 3) Google search service. 4) Communication services (Gmail service. Hangouts messaging and video conferencing service). 5) Office suite (Google Docs. Google Sheets. Google Slides). 6) Service for planning and organizing (Google Calendar). 7) E-data storage (Google Drive). 8) Services for supporting methodical work and professional self-development (Google Books, Google Scholar). 9) Services for creating positive image of PEI and supporting feedback and dialog with public (Google Forms, Google Sites, Blogger, Google+, YouTube).

The description of each service includes consideration of the following categories: a) recommendations for the use of this service in managers' professional activity; b) usage instructions (interface description, usage algorithms, etc.); c) questions for

self-control; d) practical exercises and tasks for project work.

The structure and content of the authors' guidelines were developed so as to: 1) Take into account the PEI managers' main activities, which are expedient to be supported with using CS; 2) Be used in pedagogical universities and postgraduate institutes while training future and practicing PEI managers; 3) Be used by PEI managers within informal education and self-development.

The content of the authors' guidelines was used as the basic framework for the development of PEI managers' training sessions towards using Google CS in professional activity. Since 2016 we have conducted a series of training sessions (within the regional training courses, free). Currently, more than 80 PEI managers have been successfully trained and our work in this direction continues.

The level of PEI managers' ICT-competence in terms of using Google CS is indicated by levels of its ***components***: a) *Motivational* (conviction of the benefits of CS; awareness that their usage has a positive impact on the quality of professional activity; expression of readiness to use Google CS in professional activity); b) *Cognitive* (knowledge of essence, advantages and disadvantages, functional features and possibilities, ways to use Google services in PEI management); c) *Operational* (the ability to choose service (-s) adequately to professional situation, perform administrative functions and solve professional tasks using CS); d) *Reflexive* (positive attitude to CS; the capacity for self-assessment; expression of willingness to deepen knowledge and skills in using CS, and share this experience with colleagues / subordinates).

Among the ***levels of PEI managers' ICT-competence*** in terms of using Google CS we determine: a) *High level* (know the essence, advantages and disadvantages, functional features and possibilities, purpose of using Google CS in PEI management; are able to use CS effectively for a wide range of professional tasks; demonstrate a high level of readiness to use Google services in professional activity, and to further ICT-competence improvement); b) *Middle level* (know some characteristics, features and possibilities, purpose of using some Google services in PEI management; are able to use some services to solve specific professional problems; show interest in using Google services in a professional activity); c) *Low level* (poorly aware or not aware of the characteristics, features and possibilities, purpose of using Google services in PEI management; are not able to use CS effectively in solving professional problems; show weak interest or lack of interest in using CS in professional activity).

For the ***diagnostics*** of PEI managers' ICT-competence in terms of using Google CS we consider expedient to use the following methods: a) pedagogical testing to determine the level of cognitive component; b) observation, surveys, practical tasks to determine the level of operational component; 3) surveys, psychological testing to determine the level of motivational and reflexive components.

The ***result*** of the author's technique should be the improvement of PEI managers' ICT-competence in terms of using of Google CS in professional activity.

3 Conclusions

PEI management is a comprehensive, multidimensional process conditioned by the

modern society that is developing dynamically and imposes new requirements to its subjects: readiness for more productive and creative work, cooperation in information-saturated environment, constant self-development, and competitiveness support. Broad prospects thus are provided through using new technologies, including cloud services. CS offer broad functionality for effective support of various administrative processes in PEI. Comparative analysis of CS of various IT companies revealed that Google services have a number of advantages that are significant in conditions of Ukrainian pre-school reality. Using these services in complex will contribute to creation of a united information environment for effective cooperation and communication between staff and managers of PEI, promote transparency of administrative decisions, establishing relationships with stakeholders, creating and maintaining a positive image of the institution and its competitiveness in the education market.

For effective implementation of Google CS the prerequisite is to develop PEI managers' ICT-competence. Our survey, which involved 227 PEI managers from different regions of Ukraine, has shown the lack of their knowledge and skills in using advantages of CS. Thus, since 2016 we have conducted a series of trainings using the authors' technique. Currently, more than 80 PEI managers have been successfully trained. Implementation of the author's technique of PEI managers' ICT-competence development allows forming and improving their knowledge, abilities, skills, attitudes, motivation to use CS as a tool to support professional activity, improving the quality of IT support of management processes in Ukrainian PEI.

References

1. Bykov, V.Yu. (2013) Cloud computer-technology platform of open education and appropriate development of organizational and technological structure of IT-departments of educational establishments. In: Teoriya i praktyka upravlinnya sotsial'nymy systemamy: filosofiya, psykholohiya, pedahohika, sotsiolohiya, vol. 1, pp. 81–98 (in Ukrainian)
2. Khrykov, Ye. M.: Management of educational institution. Znannya, Kyiv (2006) (in Ukrainian)
3. Lytvynova, S.H. (2013) Cloud technologies in preschool educational institutions management. http://www.ruo-obolon.kiev.ua/index.php?option=com_content&view=article&id=979:2013-06-12-18-44-53&catid =69:obolon-365&Itemid=91 (in Ukrainian)
4. Nosenko, Yu. Some aspects of foreign experience of using cloud technologies in teaching children with special needs. In: Collection of papers of the Report Conference of the Institute of Information Technologies and Learning Tools of NAES of Ukraine, pp. 126–129. IITLT NAES Ukraine, Kyiv (2015). http://lib.iitta.gov.ua/165919/ (in Ukrainian)
5. Nosenko, Yu., Bogdan, V., Matyukh, Zh. Urgent Directions in scientific research of informatization of preschool education in Ukraine. In: Science and Education a New Dimension. Pedagogy and Psychology, vol. IV (39), Issue 79. SCASPEE, Budapest, pp. 52–55 (2016). http://scaspee.com/all-materials/urgent-directions-in-scientific-research-of-informatization-of-preschool-education-in-ukraine-nosenko-yu-bogdan-v-matyukh-zh
6. Rozhdestvens'ka, L. V. (2012) Conference Diary. 10 Informatization Steps: Ghost of Virtual Teachers' Room. http://edugalaxy.intel.ru/index.php?automodule=blog&blogid=8&showentry=3664 (in Russian)