USING THE OFFICE 365 CLOUD SOLUTION IN THE EDUCATION PROCESS

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Abstract

In generalizing the Moore's law (1965) in relation to digital technologies and the increase of information in the digital space, it can be agreed with its claim that performance (and amount of information) doubles about every 18 months. In the article, the author deals with issues (and possibilities) of the cohesion technologies of cloud computing and e-learning of students. In the last two academic years, the subject of Software Project Management at Bachelor Degree is taught at the Faculty of Economics and Management. The subject graduates get the theoretical basics of project management, in the practical level they get work in MS Project. MS Project application is available for students in two versions: in a local version on a PC and in an on-line version of the Office 365 SUA cloud solution. Learning materials for the subject (in the first year of the lesson) were not processed in electronic form nor yet in the form of an on-line course in the LMS Moodle environment. There was a challenge ahead of us - to work out the electronic form of the subject in a short space of time, using the Office 365 environment and its services for that purpose. Another objective was to familiarize students with the possibilities and functionality of Office 365 services as a future work environment during the transition into practice. It should be noted that none of the students did not work before using the Office 365 environment and did not use any of its services. After completing the subject, the students completed an anonymous online questionnaire evaluating the teaching method used. Its results are an important feedback for improving the teaching of the subject.

Keywords: *cloud computing, Office 365, online services, e-learning*

JEL Classification: *L86, M15, O33, I25*

1   Introduction

A key component of a modern e-learning system is the software solution for learning management. Cloud computing in this area can also bring new capabilities and features and make it better. For subject teaching Software Project Management (thereinafter SPM), we used the Office 365 environment for organizing teaching during the semester (lectures, exercises), providing electronic study materials, collaboration of a teacher and study group, and individual student work. After the end of the subject, we conducted a survey, the results of the survey confirmed the suitability of the chosen learning method in Office 365 and OneNote. At the same time, they suggested the possibilities of enhancing the online teaching of subjects. Because the survey results confirmed some students' negative attitudes towards LMS Moodle, our goal was to explore the possibilities of linking LMS Moodle and Office 365 and eliminating these attitudes.

1.1   Cloud Computing

Cloud Computing is currently undoubtedly one of the main trends in the provision of Internet services. Its popularity and penetration into almost all areas of social life is undeniable. Working in the cloud has become essential for businesses of all sizes and across all industries. The decision to switch to the cloud is no longer an optional: it is a requirement in today's business-driven business scene.. In literary sources, there are many definitions of cloud computing. A wider definition defines cloud computing as a way of providing IT services (software, hardware) via hosting over the Internet in a dynamically scalable virtual environment (Hallová, Cloud computing – definícia, výhody a nevýhody, 2013). For the different approaches to defining cloud computing, common features are:

- defining cloud properties,
- defining service models,
- defining deployment models.

From the end-user perspective is cloud computing the ability to use various IT services, software, data, and hardware base in an environment of broadband networks regardless of location, time, and device used.

One of the key elements of cloud computing is the deployment model. In general, the deployment model defines the relationship between the hardware base of cloud computing (its ownership and administration) and the way the software is made available and ready for use.

Cloud computing deployment models:
- Private cloud - services are provided for the authorized users only of specific organization, due to the need to ensure a high level of security.
- Community Cloud - services are provided for many organizations that have common interests and which create a specific community (e.g., banks).
- Public Cloud - services are publicly provided to all users free of charge, or fixed price per use/per user over broadband network
- Hybrid Cloud - is a combination of private and public cloud where part of the services or applications (especially for processing sensitive business data) is provided in a private cloud.
- Service models define which IT component is provided as an end-user service models:
- Software as a Service (SaaS) - the user is provided software accessible by means of web browser or program interface.
- Platform as a service (PaaS) - the user is provided as a service to various IT platforms (operating system, application development tools, database tools).
- Infrastructure as a service (IaaS) - the user is provided with a hardware infrastructure, network resources, storage, and computing performance.
- Communication as service (CaaS) - the user is provided services such as web conferencing, videoconferencing, social media tool, instant messaging.

In recent years, we have witnessed the growing number of businesses and organizations that have fully or partially implemented their IT environment in the form of cloud computing. Expanding the portfolio of services and areas where cloud computing services are offered. According to Kačmár , the release frequency of new cloud products for end users is considerably shorter - the new functionality is available to users during the month after creation and testing.

1.2   Cloud Computing in the Learning Process

The Internet changes traditional models of learning that transfer from the traditional forms of learning to classes, classrooms and lecture rooms to the virtual space. The use of Information and Communication Technologies (ICT) in education makes it possible to focus on the student and the individualisation of education . These technologies have changed the philosophy of teaching and learning, the role of a teacher (from an informant to a counselor and a guide), the role of a student (from a passive recipient to an active learner), a standard system of subjects and the organization and management of education .

In general, the benefits of ICT in the learning process can be summarized as follows :

- ICT can offer content in a compelling and interactive form.
- ICT helps teachers to record and track the progress of each student's study.
- ICT allows personalized learning of educational material.
- ICT can build virtual social communities between educational institutions, teams of students and teachers.
- ICT facilitates learning to learn.

In the educational institutions environment, Learning Management System (LMS) solutions represent an electronic management system and learning organization within e-learning. An on-line training course creates a global virtual knowledge space and supports personalized learning for students. E-learning is an accepted way of teaching and using the global network in every education process. Ubiquitous learning integrates wireless, mobile and context awareness technologies in order to detect the situation of the learners and provide more seamless adaptive support beyond formal learning process .

Cloud computing is gradually becoming part of the e-learning environment of educational institutions. According to the authors cloud computing is an infrastructure that can bring a new value to the e-learning system, as educational services can be delivered in a reliable and efficient way. It also provides an appropriate environment for ubiquitous learning activities.

Driving cloud computing into e-learning is a reality. According to , private and public cloud models are predominant in relation to the existing infrastructure of universities. From the point of view of providing specific software applications and services predominates the software model as a service (SaaS) with user access through a web browser.

The researchers dealing with cloud computing in education process are also (Thomas, 2012), (Arkhipova & Zaytseva, 2013), (Smith, Bhogal, & Sharma, 2014), (Alamri & Quershi, 2015), (Rudy & Cassandra, 2016), (Almajalid, 2017).

1.2.1 Office365 in education process

Office 365 cloud solution for Education of Microsoft works on a software-based principle as a service, and is a vast platform of tools for communication, collaboration, processing, and sharing electronic documents and user workspaces. The main advantage of Office 365 is authenticated user access from anywhere and anytime. For the user, that first time sign in to Office 365, there are some interesting options, such as online versions of Office applications, OneDrive 1TB of storage and 50GB of email storage, 5 personal licenses for free to install MS Office

to your PC/notebook. However, this is the minimum of the features that Office 365 includes.

From the point of view of the education process are its benefits even more pronounced. The wide functionality of the services available along with the unified access of teachers and students creates a common space for learning and collaboration. The justification for its use in the education process of Salcito is defined as the move and a "game changer" for teaching and learning.

The issues of implementation and use of Office 365 in the educational process are dealt with by authors (Babin & Halilovic, 2017), (Carutasu & Pirnau, 2017), (Dredge, 2017), (Georgieva, 2017), (Pugin , 2017).

2   Data and Methods

Cloud solution Office 365 is available for SUAs for employees, teachers and students since 2013. Its use by employees and students does not have the character of mass use. The switch to use is optional on the user's own choice . This is a significant difference compared to other Slovak universities, where its use is automatic and obligatory (even in coexistence with the academic information system and its services). Office 365's statistics show that it used 175 users in 2016, at the end of 2017 329 users. Of these, there are 253 employees (77%) and 76 students (23%)[5]. Situation according to individual faculties and type of user expresses Table 1. Statistics indicate that users do not know how many features Office 365 offers and uses only one, up to two services (typically mail and storage).

Table 1 **Using Office 365 on SUA by faculty and user type**

User	FAPZ	FBP	FEM	FESRR	FZKI	TF	Other departments
Staffs	28	21	34	32	13	24	101
Students	17	12	10	15	0	22	0

Source: Author's processing.

From 2015, a new, obligatory optional Software Project Management is included in the catalog of faculty subjects. The subject was not processed in electronic form (for a short time) and because part of the practical lesson was the work with the online version of Project Office 365, we decided to use Office 365, its environment and services for that purpose. Based on the above facts, we have defined the following requirements:

- Analyze the possibilities of using Office 365 in the learning process.

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[5]   These numbers apply to users of the e-mail service, they do not use other Office 365 services

- Analyze the available Office 365 services and develop the design components that a teacher can use to improve and streamline teaching.
- Apply the elaborated proposal for the subject of Software Project Management.
- Handle the background material of the subject in the form of a digital blank book.
- Explore the possibilities of linking the LMS Moodle University e-learning solution to Office 365.
- Expand and popularize the use of Office365 among FEM students.
- Realize a survey among the students who attended the subject with the support of the learning process in Office 365.

3 Results and Discussion

The starting point for the teaching of the subject was the decision on the appropriate form of processing of its electronic form. It was necessary to choose a solution that would provide students with an online learning environment without access to other learning platforms (such as LMS Moodle), providing them with the necessary information and opportunities for online communication. At the same time, study materials must be readily available, with a simple option of processing and updating . The electronic version of the subject was processed in the ClassNotebook application as a digital notebook. We used the basic structure of ClassNotebook:

- Content Library - contains background material for lectures and exercises.
- Collaboration Space - is used for user collaboration, document sharing and organization of study (semester assignment, publication of test results).
- Personal workspace for student - designed for communication between individual student and teacher, we used it for "hidden" communication (semester work assignment and its processing, consultation, short tests).

Other Office 365 applications
The current version of Office 365 for SUA users includes 26 apps in the base suite, of which 24 is common to teacher and student. Most applications are automatically assigned to the user (after publishing in Office 365), for some applications (in our case Project), permission is granted by the Office 365 administrator. During the semester, students learned about the functionality of multiple applications/ services that we distributed as follows:

- Office and Work Organization Applications

- Applications for online communication
- Applications for web and intranet
- Collaboration applications
- Applications for personal development and education
- Business applications

Office 365 and LMS Moodle

Electronic courses are available at LMS Moodle within the university. Our task was to explore the possibilities of integrating and linking Office 365 and LMS Moodle. This would make it possible to extend the room for learning and to eliminate students' negative attitudes towards some of the features of the LMS Moodle surveyed. The solution exists in the form of installing plugins in Moodle's LMS environment, which is the subject of further research in collaboration with the administrators of both platforms.,.

Survey and results

To obtain feedback from students and to evaluate the methodology used to teach the subject in Office365, we have developed a questionnaire. The questionnaire was spaced in the Forms application and sent to the students (a total of 32) after the end of the subject. The questionnaire was anonymous, filled in by 27 students, a return of 84.4%. It consisted of 16 questions which were structured into five thematic areas:

- Personal Respondent Surveys - own IT tools used, software used, language knowledge.
- Internet - usage reports for personal and educational purposes, service types used.
- The way of delivery and distribution electronic study materials.
- Learning with LMS support Moodle - its use, plus and minus.
- Training with Office365 support and OneNote application - evaluation of subject teaching with OneNote support, using other applications.

In the questionnaire we used basic descriptive characteristics and set several hypotheses. In the work, we present the OneNote and LMS Moodle teaching support hypothesis, *"It is for you to use and work in the OneNote/Moodle environment to benefit (in direct teaching on lectures and lectures for self-study,"* where we

studied whether students prefer one of tools. For student responses, we used the Likert Scale with the choice of 5 types of answers, the results displayed Figure 1.

Figure 1 **OneNote/Moodle as a benefit for teaching and self-study by students**
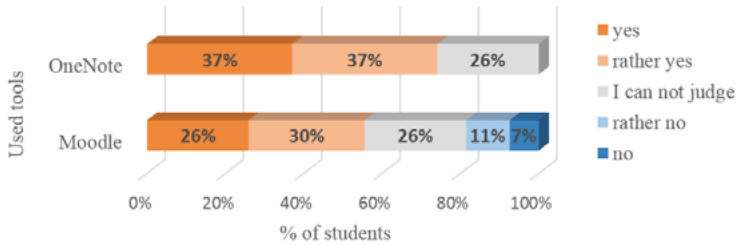
Source: Author's processing.

On the basis of the students' comments, we anticipated the OneNote preference and set the hypothesis H0 and H1.

On the basis of students' verbal expression we expected OneNote preference and we have determined the hypotheses H0 and H1. The aim of the paper is to retain or reject stated hypothesis:

Hypothesis H0: There are no differences in the evaluation of the lessons learned with the support of OneNote and LMS Moodle electronic tools. Students did not prefer any of these tools. From the point of view of the descriptive characteristics between OneNote and Moodle there are no differences in the medians.

Hypothesis H1: There are differences in the evaluation of subject-based learning with the support of OneNote and LMS Moodle electronic tools. Students in the evaluation preferred to use OneNote application. From the point of view of the descriptive characteristics between OneNote and Moodle there are differences in the medians.

Figure 1 shows that OneNote had better preferences in student ratings. Positive attitude in the OneNote assessment (yes, rather yes) was reported by 74% of students, for Moodle 56% of students. The negative rating (rather no, no) was only reported for Moodle - a total of 18%. Based on the basic descriptive characteristics (modus, median, mean) applied to that type of data it can be stated that students show division ambiguity. The modus shows a value of 3, so the most common answer was "I can not judge" (i.e. 26% of the students for both tools). The ambiguity of opinions is also confirmed by the median of 3 (50% of students reported positive responses and 50% negative responses). The results are shown in Table 2. A similar result is also indicated by data processing using the nonparametric Wilcoxon test in Table 3.

Table 2 **Evaluation of basic descriptive characteristics**

klasifikator	N Obs	Mean	Mode	N	Median
Moodle	26	2.6	3.0	26	3.0
OneNote	26	2.2	3.0	26	3.0

Source: Author's calculation.

Table 3 **From the results of the descriptive statistics by Wilcoxon Scores (Rank Sums)**

klasifikator	N	Sum of Scores	Expected Under H0	Std Dev Under H0	Mean Score
OneNote	26	626.0	689.0	46.752372	24.076923
Moodle	26	752.0	689.0	46.752372	28.923077

Source: Author's calculation.

We used the Wilcoxon Two-Sample Test to evaluate the hypothesis, the value of the test of 0.1813 confirmed the zero hypothesis - there is no significant difference between the OneNote and Moodle students' assessment (Table 4).

Table 4 **Results of Wilcoxon Two-Sample Test**

| Statistic	626.0000
Normal Approximation	
Z	-1.3368
One-Sided Pr < Z	0.0906
Two-Sided Pr > |Z|	0.1813
t Approximation	
One-Sided Pr < Z	0.0936
Two-Sided Pr > |Z|	0.1872
Z includes a continuity correction of 0.5.	

Source: Author's calculation.

The Office 365 cloud solution for the subject was only recognized by 19% of students. For the benefit of use for personal/study purposes, the students stated the following: availability of Office 365 apps/services anywhere, anytime (25%), possibility of free installation Office 2016 (30%), storage for files and 50GB mailbox (19%). Interestingly is fact, that 27% of students, as a personal benefit reported

acquiring knowledge for future employment. Cloud solutions are the future of IT technology, and the use of Office 365 during study is a way for students to expand their ICT skills for the future. The reality of ordinary life is that employers require a certain level of computer skills in almost any job position and generally all academic disciplines today require computer skills.

Teaching the subject using OneNote application, the students evaluated positively. Figure 2 shows the characteristics that the students most appreciated in this way of teaching and distributing the documents and consider them to be important.

Figure 2 **Rated characteristics of using OneNote in teaching**
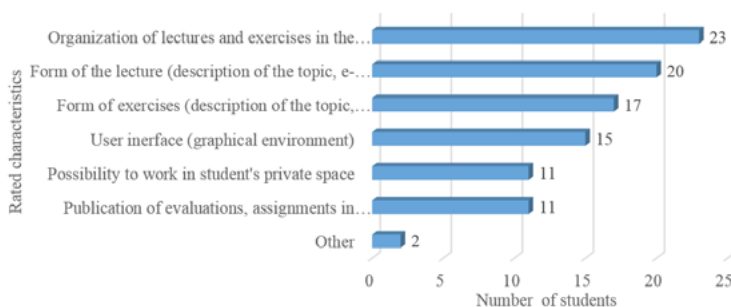
Source: Author's processing.

From the evaluation of other questions, we consider the following facts to be significant:

- The most used IT resource in the student's possession is a notebook, 79% of students use 2, respectively. 3 devices (notebook/tablet/smartphone). The reason for the survey is the ability to access OneNote applications and 15 other Office 365 applications using mobile apps on smartphone/tablet.
- There are significant differences in the use of the Internet (number of hours per week) for personal and study purposes. More than 30 hours a week, the Internet uses 56% of respondents for personal purposes and only 11% of respondents for study purposes.
- The use of LMS Moodle rated 63% of students as a benefit for their study, however, as deficiencies respectively missing elements: unattractive environment (29%), lack of online communication (25%), better orientation in courses (24%), quality of processed courses (16%).

The research has revealed several interesting conclusions that will make it easier to learn lesson not only in Office 365 but in LMS Moodle when it connects with Office 365 and LMS, which will enable the learning process to be improved for all existing courses and subjects in LMS Moodle. At the same time, they should be important in further research, addressing a larger number of students of different subjects, using other data acquisition techniques (interviews, teacher evaluation, etc.).

4   Conclusion

Office 365 with a wide application functionality is a powerful tool that can be used in the learning process. Experience has shown that the chosen form of teaching of the students' subject has been addressed, as reflected in their increased activity on lectures and exercises. Authors have said that education will be more personalized, collaborative, informal in the future, supported by flexible and dynamic virtual environments, and a range of tools to educate both within and outside schools. The solution used for the subject of the SRP meets the above attributes. Students have learned to work in a new way that integrates applications of a diverse nature into one unit and where information of a different nature is available. During teaching/self-study, they worked not only with OneNote, but also used communication, collaboration, and application processing applications. This form of cloud service and information is consistent with the authors' claims that understanding the work with information and its use as an activity represents an intellectual shift. An open question for solution is the integration of LMS Moodle and Office 365, which will provide SPU teachers and students with a modern learning platform to increase productivity.

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