

Google cloud services as a way to enhance learning and teaching at university

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Abstract. The article is devoted to the issue of a cloud-based learning system implementation as a powerful strategy for future specialists' training at higher educational establishments. Using cloud computing in self-work management of the university courses is essential to equip students with a workload of appropriate educational materials and variable activities for professional training. Theoretical and empirical research methods were applied to select the appropriate services and tools for organizing students' self-work at university. Critical analysis of scientific literature, synthesis of the data, didactic observation of the educational process, designing of the skeleton for university courses, questionnaires enabled to facilitate the study of the issue. G Suite has been chosen to enhance the quality of training of prospective specialists at a higher educational establishment. This paper introduces the outcomes of the project on applying Google Classroom in the management of students' self-work while studying university courses. The focus of the first stage of the project was on testing pilot versions of the courses with the aim to work out the requirements and recommendations for incorporation general blended learning model of university courses. Particular attention is drawn to the designed model of the university course based on the curriculum with the necessary components of blended learning in the G Suite virtual environment. Cloud-based higher education is considered as a prospective tool for design of university courses with the need for further research and implementation.

Keywords: cloud technologies, G Suite, Google Classroom, higher education, blended learning, students' self-work.

1 Introduction

1.1 The problem statement

The national policy of the preparation of specialists at higher educational establishments has undergone considerable positive changes in Ukraine due to supporting the line of European integration processes. The main legal aim is to implement innovations in the system of university courses learning and teaching. Current educational settings rely on a computer-based paradigm according to the strategy of the creation of the modern digital student-friendly environment. Notable achievements in making Ukrainian education competitive appear in developing blended learning courses for universities.

The discrepancy of the current situation in Ukraine is that it is a real challenge for a university to find the appropriate computer tools and ways to digitalize the process of preparation of future specialists. The urgent requirement of the modern educational process is based on the use of cloud-based technology and it should be recognized by a university through the strategy of the renovation of the curriculums. Such a strategy should address enhancing learning and teaching, improving outcomes of training of prospective specialists, and building congruent accessible e-learning environment.

1.2 Literature review

Bearing in mind the idea that the chosen cloud environment is to ensure both the general educational goals and digitalization of study we have analyzed the experience of educational establishments and scientific works and publications concerning the issue.

In order to select the appropriate services and tools for organizing students' self-work at university, a complex of theoretical and empirical research methods was applied. Critical analysis of scientific literature, synthesis of the data, didactic observation of the educational process, designing of the general didactic model of university courses, questionnaires enabled to facilitate the study of the issue.

In recent years a considerable amount of valuable works has been done in the field of implementation of cloud technologies into education. The benefits and limitations of cloud computing in education were introduced by Saju Mathew in 2012 [12]. Svitlana H. Lytvynova et al. have described the special features of the use of cloud services in non-formal education [9].

The issue of cloud-based learning was repeatedly raised by scholars around the world. The analysis of the current approaches to cloud-based learning systems interpretation has been done by Maiia V. Marienko and Mariya P. Shyshkina [20]. The profound analysis of the model of combined learning at higher education establishments is given by Serhiy O. Semerikov and Andrii M. Striuk [22]. Marinela Mircea [13], Veselina Nedeva [18], Oksana M. Markova [10], Serhiy O. Semerikov [15], Andrii M. Striuk [23], Hanna M. Shalatska [21], Pavlo P. Nechypurenko [14], Vitalii V. Tron [11] et al, devoted their works to the investigation of different aspects of cloud computing in higher education. At present much has been done in the field of implementing of information and communication technology (hereinafter ICT) for

teaching university courses in Ukraine. There is considerable experience in the creation and use of computer aid learning [3], [7], [8], [9], [11], [17], [19], [24].

Although there is a number of existing articles, books, monographs, concerning cloud-based e-learning this is one of the first paper to be devoted solely to Google cloud-based management of university courses.

2 Application of Google Classroom for managing university courses

Before proceeding to the subject of the discussion the question is bound to rise, whether Cloud technology can serve the educational process at university and whether it is able to replace successfully the existing schemes for students' self-work management.

However, the academic standards for university students are very high as well as the workload of courses, the urgent need to intensify students' self-work is vital. At the same time, the interrelation and interdependence of in and out class activities manage the system of higher education. According to the curriculum, during the study at university, students' professional competencies and sub-competencies are developed through their activities in general and professional-oriented theoretical and practical courses. The next point to be taken into account is that a large amount of a student's learning activity is his/her self-work and its share is about sixty per cents of academic hours of the university courses. We couldn't deny the fact that students' active involvement in studying enables the learning outcomes. What matters for a successful educational process in such a situation is the way by which the students are equipped with the materials for self-work. The students' performance as future specialists and efficiency of their learning tasks as well as the quality of learning outcomes depend greatly on effective management of information [9].

We are strongly convinced that a wide range of modern web technologies can be used for students' self-work management. The high-speed Internet and a gadget (laptop, tablet, etc.) are the two components that can be attributed to the special features of the organization of the mentioned training. Moreover, all educational materials should be selected and organized with the aim to ensure general educational needs, students' motivation for professional development and coincide with students' interests.

Being obsessed with consuming of modern gadgets, students drive the educational process as its active participants. We are at the point that using mobiles, smartphones, tabs, etc. in higher education is neither entertainment nor a tribute to fashion but an integral part and urgent requirement of European-oriented specialists' preparation. One may note that using smartphones provides students with resourceful access to learning materials and information on the Internet [1]. It would be mistaken however to suppose that educational establishment cannot make up a profit of it. The adoption of students' favourable gadgets for educational purposes solves a task to lessen the universities' budget spent on classroom equipment and software.

The use of smartphones and tablets or other devices improves students' availability to access course materials anytime and anywhere [4]. One more advantage of using

mobile devices in and out classrooms is that it is a solution to stressful situations as many people suffer anxiety if they are separated from their mobile devices [5].

It leads to the formulation of the new concepts of incorporating appropriate ICT into the curriculum. The modern shift towards combining the traditional in-class students' activities with their out-of-class autonomous self-work in a virtual environment enables tutors and lecturers to take benefits of the digitalization of education. One of the most important points is reducing the universities' and students' expenses on the educational process [13], [16]. The number of users, who are working today in the form of collaborative communities in clouds, has been increased, so this technology is becoming a new drawn to higher education as well [13].

It means that universities should develop their own policies in the sphere of the incorporation of special applications to promote and support modern educational services. In this connection, two questions are of a great interest for us as Ukrainian educators. The first one deals with the choice of the most efficient cloud services and applications to manage university courses and at the same time to support using smartphones. One more aspect under investigation is students' attitude and evaluation of a new cloud-based learning environment.

Due to the fact that cloud based G Suite provides the opportunity for free downloading its services and applications and enables users to take advantage of favourable gadgets or devices, especially smartphones. It means that G Suite can be considered as mobile cloud computing as it enables the use of services via mobile devices [5, p. 44].

All mentioned points justified the choice of G Suite for Education as a core set of services to ensure the blended learning at the university. It seems to us that the integration of Google apps, tools, services in preparation of the future specialists deserves attention as it is an appropriate way to manage university courses. Moreover, Google provides effective universities' infrastructure and at the same time supports to reduce cost, make quick and effective communication, collaboration with the range of security, privacy, flexibility, and accessibility [2].

It is important to note that the positive students' attitudes towards the incorporation of a new learning environment lead to a higher level of self-motivation for course study and education as a whole. Though, it couldn't be denied the fact that designing a virtual environment depends greatly on the university course, its aim, prospective outcomes, the students and the author's ideas. Moreover, it is necessary to point out that some requirements for managing the course with the use of G Suite are obligatory. Firstly, the chosen platform is a powerful tool to support the educators and it cannot be recognized as an educator. Secondly, all the applications provided by Google are to serve self-work management and need time limits according to the curriculum. The third but not the least point is based on university strategy, especially, on its part of the standardization of courses.

G Suite as a part of Google Cloud's robust set of solutions and technologies provide tutors and lecturers with the tools to create effective online courses. This platform is used worldwide by communities, schools, instructors, courses, teachers, and even in businesses. Although initially designed for higher education environment, G Suite has

quickly become used to conduct courses fully online or support face-to-face teaching and learning.

The choice of Google cloud implementation into the preparation of specialists at university should be analyzed both from the students' and lecturers' points of view. The heart of the discussion is the students' needs and their interests.

When a course is on its early way to digital transformation, it is the lecturer's choice of the design and set of technologies useful to ensure students' professional development as well as their motivation to study. To achieve success as the author of a special course the creator is to take into account the main factors of intensification of teaching by means of cloud computing at higher education. They are as follows:

- increasing the purposefulness of learning;
- increasing motivation for learning;
- increasing the informative capacity of educational content;
- increasing the pace of training actions;
- applying of active methods and forms of training;
- applying a wide range of electronic training tools, in particular, ICT;
- providing a student's individual educational path.

All above-mentioned means that using ICT the lecturer is the one who makes such psychological and pedagogical conditions that are aimed at creating a favourable environment for the student's successful development as a future specialist as well as a personality.

Here we need to consider these factors in detail from G Suite users' vision. The purposefulness of students' self-work can be supported by adding a syllabus to the contents of courses. One more idea is in providing Personal Journals of Learning Outcomes (hereinafter PJLO) for each university course taught by means of G Suite. Creating a chart that includes sequence, time limits, assessment scale, requirements for performing self-work, a lecturer directs a student to self-reflection and self-evaluation of his/her achievements in the course learning. Such journals are made as Google documents and shared in the Google Classroom (hereinafter GC) by copies for each student.

When a learner knows the ultimate goal and prospective outcomes of the course, it is not difficult to understand the purpose of the activities suggested.

In the vast majority of cases, to cope with the self-work assignments students grab a great deal of information from the sources of precarious accuracy and reliability. The explicit data and sources are valuable for each and every definite course, and they should be introduced as obligatory by the lecturers and tutors. It is easy to set the list of printed references but the accumulation of a wide range of open access sources materials has brought a need for a document management system at universities. Sharing the collections of papers and web links on a particular educational issue the lecturer is the driver and facilitator for appropriate knowledge consumption. Moreover, students' perception of their gargets shifts from the devices for entertainment towards the powerful source for education.

The system of posting assignments in GC supports a lot of active methods and forms of training. The lecturer can divide participants of the course into small groups, pairs,

and even appoint individual tasks. GC also provides students with the opportunity to interact and collaborate anytime and anywhere. When there is a question or misunderstanding of a self-work task, students have 'a teacher at hand in GC'. All charts between an educator and a learner in GC are personal as well as feedback.

The particular feature of theoretical courses is a huge amount of information to be studied and it calls for intensive reading. We suggest the materials for lectures to be organized according to the flipped class approach [18]. The idea is to give a portion of the material for studying in advance.

The templates of GC tasks make it possible to give students tests, questions for group discussions, assignments with the schemes, tables, open documents, presentation samples, etc. Educator chooses the way of the arrangement of course material, posting it in sets according to the topics or in free order. The distinguishing feature of GC is based on the opportunity to appoint the deadline for the performance of the self-work and grades of outcomes.

3 Google Classroom model of university course: stages of design and application

The question of how one and the same Google App or set of e-tools can serve different practical aims of university courses deserves special attention. As educators, we are interested in G Suite special component Google Classroom due to the fact that it is a free web application that can be used to organize seminars, lectures, tutorials, group, and individual self-work. One of its main advantages is an open-source allowing students even with basic programming knowledge to install it for their own needs or educational purpose. Having Google Classroom installed on any laptop, tablet, smartphone, etc., students are equipped with all the material of the chosen course.

We are strongly convinced that G Suite use for blended learning should be the prior focus of developing higher education in Ukraine. Our idea has been proved by the data analysis of the lecturers' and students' questionnaires.

To determine learner's preferences in the usage of gadgets and their experience in the e-learning environment a special online questionnaire has been prepared. It contains 7 questions: indication of age/gender, rating of gadgets according to the frequency of its usage in everyday life (smartphone, tablet, laptop, personal computer, other), their predominance in educational process and in self-work, e-learning tools familiar to the learners (Moodle, Google Classroom, iSpring, Habr, other) and the same list of e-learning platforms distinguishing the most favored ones in educational process. The results are presented in Table 1.

The majority of respondents are female students aged 18 – 23. Smart phones have been rated as the most frequently used gadgets – 67 %. The questionnaire proves that learners use their gadgets both in educational process and in self-work as well that contributes to the development of university courses with blended learning. As for e-learning tools, Google Classroom takes the leading position, which makes it possible to assume that Google Cloud services are learner's choice.

Nearly three-quarters of the respondents from Alfred Nobel University consider Google Apps to be a supportive tool in course management and at the same time, the lecturer is the driver of the cloud-based learning environment at university. But, face-to-face teaching in the class plays a major role in the professional development of students. Meanwhile, GC successfully assists this process under the wise supervision of a lecturer.

According to students' views, the learning outcomes greatly depend on the way of the educational material representation and the most important role plays the possibility to access the tasks and the theoretical issues for their performance.

Table 1. Results of the students' questionnaire

No	Items	Data
1	Gender of respondents	male – 15% female – 84%
2	Age of respondents	18-19 – 45% 20-23 – 46% 24-35 – 9%
3	Rating of the gadget's type	smart phone – 67% PC – 12% tablet – 10% laptop – 10% other – 1%
4	Usage of gadgets in educational process	very often – 69% often – 24% seldom – 4% rarely – 2 % never – 1%
5	Usage of gadgets in self-work	very often – 68% often – 25% seldom – 3% rarely – 2 % never – 2%
6	Usage of e-learning tools	GC – 95% Moodle – 2% Habr – 2% iSpring – 0% other – 1%
7	Preference in e-learning platforms	GC – 95% Moodle – 2% Habr – 2% iSpring – 0% other – 1%

We would like to give a brief description of our experience at Alfred Nobel University. The experimental teaching was carried out on the basis of GC management service in the G Suite learning environment.

The most important requirements are as follows: to embrace current trends of implementing cloud-based learning and to enable all students to be involved as active

participants in developing professional competences through blended learning of university courses.

Alfred Nobel University has gained the right to use services Gmail, Calendar, Classroom, Contacts, Drive, Docs, Forms, Groups, Sheets, Sites, Slides, Hangouts, and others under G Suite for Education agreement. To support the university policy of implementing these services the team of lecturers was engaged in the project of GC management of university courses.

Collecting all the discussed results the University staff approved the G Suite implementation to the curriculum and the pilot version of theoretical and practical courses self-work in GC were started in the 2017.

The first step of implementing G Suite at Alfred Nobel University included two stages. The objectives of the first stage were formalizing the idea of implementation, launching pilot versions of courses designed by means of G Suite, analyzing the first experience and suggesting recommendations for incorporation. The second stage is devoted to launching pure experimental practical study.

The first stage of the project has several theoretical and practical results that enable the preparation of specialists at higher educational establishments. Despite the lack of empirical data, there is a contribution to practical issues by providing the model and recommendations for GC management of students' self-work at university.

There is the practical study and its results conducted in the years from September 2017 until May 2019. It was only the first stage of implementation of G Suite into specialists' preparation at higher educational establishment in Ukraine. The main aim of the stage was to decide whether it would be possible to ensure the general goal of specialists' preparation at universities in the Google learning environment. Another task was in the setting recommendations for a university course design.

In the period of the first stage, several lecture and practical courses were suggested by the staff of the University. It was approved the following skeleton for a university course (Fig. 1).

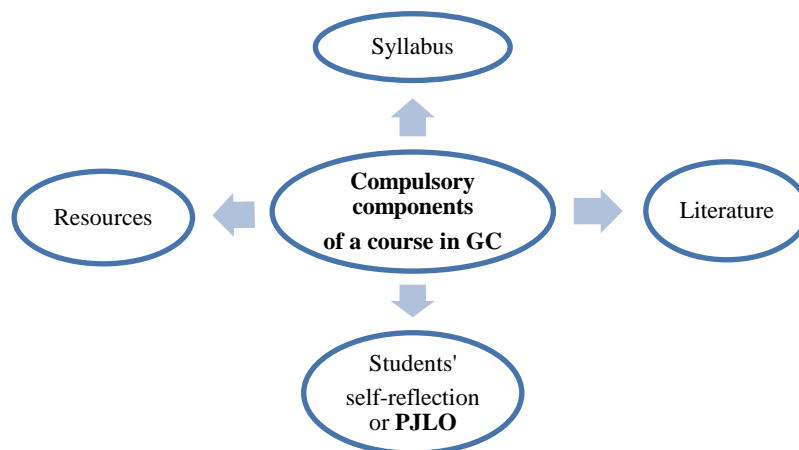


Fig. 1. Skeleton of a university course designed in Google Classroom

The next step to success in Google Classroom university management is the standardization of the design of the course. The following model has been introduced (Fig. 2): the syllabus of the course, literature, and resources of the course, a strict schedule of task performance and scoring, and assessment of the course (its types, criteria, scoring). Each pilot version of the courses must have a module arrangement that presupposes the diversity of the assignments and the possibility of their combining.

In this connection, it was designed and applied the model of the First Year of English for Translators Course [6]. As it is showed in Fig. 3, this practical course includes all compulsory elements and is supplied with the PJLO but special components have been added.

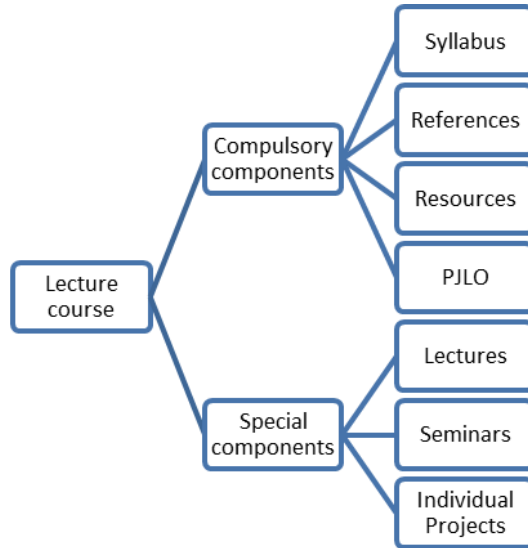


Fig. 2. Skeleton of a lecture course in GC

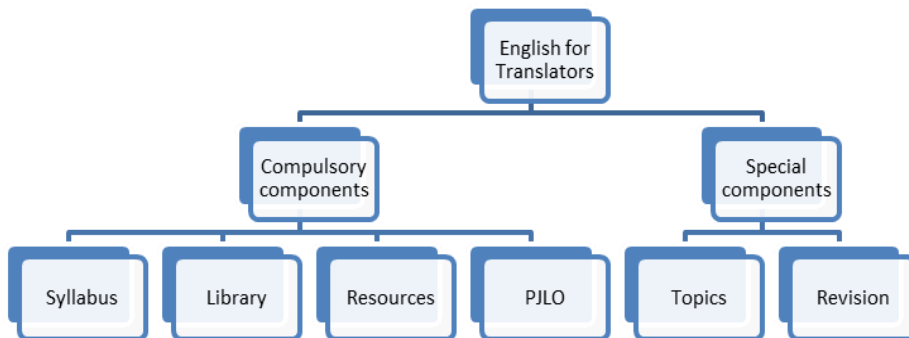
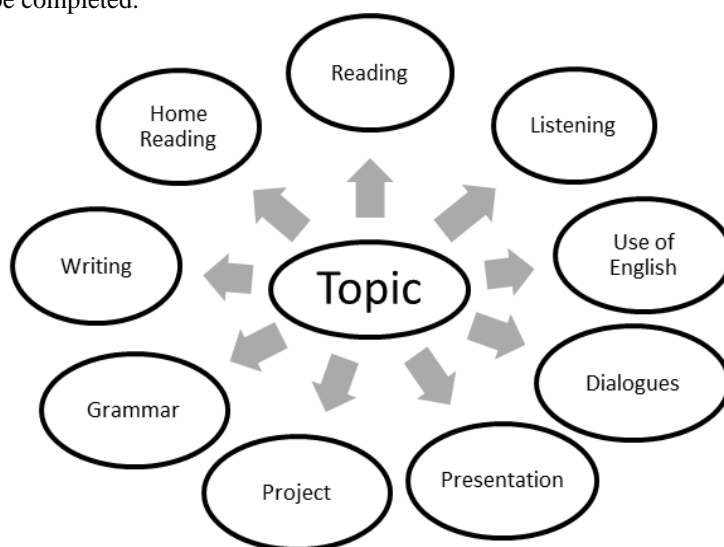


Fig. 3. Skeleton of English for Translators Course in Google Classroom

The GC architecture of this course includes eight topics according to the curriculum and extensive reading section posted as ‘material’. Each topic contains rubrics-tasks: Reading, Listening, Writing, Use of English, Grammar, Dialogues, Presentations, Home reading, Project (Fig. 4). As for the progress check, the model includes four Revision Sections after two topics. This section provides students with samples of Module Tests based on the studied topics and out of class self-work activities. Students choose the pace and the order of doing the tasks and decide what and how many times should be completed.

**Fig. 4.** Components of the topic of English for Translators Course in GC

On the basis of such outcomes, it is planned to launch the further stages of the research project to collect the data of efficiency of blended learning university courses implementation in specialists' preparation in the G Suite virtual environment.

The pure experimental part is scheduled to be organized from September 2019, with the results to be collected, analyzed, and published June-August 2020. At the beginning of the autumn semester, the first-year students of 14 departments of the University have been already engaged in the second stage of the experiment. Each course of the curriculum except Physical Education has been started in the Google Classroom.

The further stages of the practical part of our research will be held in other Ukrainian universities.

4 Conclusions

It is possible to make a conclusion that nowadays higher education with Google applications can support the renovation of methods, strategies, and technologies of

professional training of prospective specialists. The theoretical and practical background of G Suite for education enables us to design university courses for blended learning.

The Google Classroom has been chosen as the prior and dominant way to manage students' self-work. The selection of tasks and materials are based on the following general principles: circulation, progressive development in complexity, professional relevance. It means that the content of the materials, tasks, tests in terms of topics is selected according to the curriculum and range of standards of specialty. Moreover, self-work assignments on a course are supported by theoretical materials, sufficient examples, schemes, templates, additional resources, by links in a virtual learning environment that is accessible from any students' devices, especially smartphones. The great success in self-work management of a university course in Google Classroom depends greatly on an educational establishment policy.

The awareness of the importance of cloud-based higher education for the design of university courses is prospective both for further research in the methodology of teaching as well as for the programming.

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