Using the G Suite for Education in Language Teacher Education: Benefits and Challenges

Elis Kakoulli Constantinou(✉)

Cyprus University of Technology, 31 Archbishop Kyprianos, 3036 Limassol, Cyprus
elis.constantinou@cut.ac.cy

Abstract. Even though research in the use of cloud technologies in the delivery of online courses is expanding, online language Teacher Education remains an unexplored area. This paper reports on the results of a study conducted during spring 2018 and 2019, in which the G Suite for Education was utilised for the delivery of an online Teacher Education course in English for Specific Purposes (ESP) based on social constructivism and connectivism. It specifically focuses on the benefits and the challenges encountered while using some of the core services of the suite. A total of 24 English language educators from different countries participated in the study. Data were collected through questionnaires administered to the participants before the course, the facilitator's field notes, the participants' reflective journals, comments on Google Classroom and Facebook Messenger during the course, and focus groups/interviews after the completion of the course. The results of the study revealed that the G Suite for Education may potentially create the appropriate environment and conditions for learning and professional development. The study also revealed many positive aspects of these technologies as well as challenges encountered. At a time when schools, universities and other educational institutions are moving all of their operations online, this paper can prove useful for all educators, especially language teacher educators, who wish to consider using the G Suite for Education in their practices.

Keywords: Online language teacher education · Cloud computing · G suite for education · Social constructivism · Connectivism

1 Introduction

The development of technology and the constantly changing needs of the society today have led to the rise of online education. The disruption of education and the sudden shift away from on-site learning, because of COVID-19, have brought about dramatic changes resulting in remote learning through the use of various technology tools. The reliance on online education as the only viable solution during the pandemic, has established cloud computing technologies as "an unsung hero" [1, p.1]. According to the National Institute of Standards and Technology, cloud computing "enables ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be

P. Zaphiris and A. Ioannou (Eds.): HCII 2021, LNCS 12784, pp. 301–314, 2021.
https://doi.org/10.1007/978-3-030-77889-7_21

rapidly provisioned and released with minimal management effort or service provider interaction" [2, p.2]. These developments have affected all fields of education including language Teacher Education.

As research into the integration of cloud-based tools and Learning Management Systems (LMSs) in the learning and teaching process is growing, the use of tools such as the G Suite for Education in language learning and teaching is becoming more popular [3–5]. Nevertheless, despite the popularity that the G Suite for Education has been gaining the last years, the studies which report on the use of the suite for language TE are still limited.

This paper describes the experience of using the G Suite for Education for the delivery of an online English for Specific Purposes (ESP) Teacher Education course designed at the Cyprus University of Technology. More specifically, it focuses on the way some of the tools were used and elaborates on the benefits as well as some challenges encountered while using these tools.

2 Literature Review

2.1 Cloud Technologies and the G Suite for Education

Cloud computing has dominated many aspects of professional and personal life, while a decade ago, many people foresaw that cloud technologies were going to revolutionize the IT industry [6]. The potential of cloud technologies lies in their qualities, in other words their on-demand self-service, broad network access, resource pooling, and measured service [2, 6]. These affordances serve many different fields, including education.

The G Suite for Education constitutes the suite of cloud-based tools launched by Google that can be employed in education. The core services of the suite include Gmail, Calendar, Classroom, Contacts, Drive, Docs, Forms, Groups, Sheets, Sites, Slides, Chat, Meet, Vault, and Chrome Sync. Generally, the G Suite for Education has been regarded as cost effective, convenient, practical, flexible with high scalability [7]. As with every other cloud-based technology, minimal infrastructure is required; only an electronic device with access to the internet and reliable internet connection. Moreover, the G Suite applications are freely downloadable on devices such as tables or smartphones.

The benefits resulting from the use of G Suite for Education tools in the educational process reported in the literature are numerous. The ease with which these applications can be incorporated into mobile devices was one of the main reasons why the suite was selected as a LMS at Polotsk State University in Belarus, according to Barun, Dauhiala, Dauhiala, and Dziatlau [8]. The researchers investigated the perceptions of students towards the G Suite for Education, and stated that students were generally positively oriented towards the use of these Google tools in the teaching and learning processes. Some of the positive aspects of the suite they mentioned were permanent access to the materials, participation in online testing, submission of electronic assignments, possibility to pose questions, and synchronous communication. Korobeinikova et al. [9] also discussed the use of the G Suite for Education in tertiary education contexts. They

supported that using mobiles, smartphones or other electronic devices in higher education "is neither entertainment nor a tribute to fashion", but an integral part of the learning process (p. 108); in this sense, cloud technologies can only facilitate access to educational material and make course management easier. Praising the affordances of the suite, the researchers stated that it can fully support "the main factors of intensification of teaching" [9, p.110].

Similarly, Bhat, Raju, Bikramjit, and D'souza [10] talked about the effectiveness of Google Classroom regarding the submission of assignments; more specifically, they referred to the ability to keep track of late submissions without facing difficulties with understanding the handwriting of students. In their study, both teachers and students commented positively on the use of such tools and appeared to understand the need to shift from the use of traditional teaching methods to e-learning tools. They emphasised however, the need for being adequately prepared to deal with the technical aspect of these technologies by receiving appropriate training. Talking about the qualities of Google Classroom, Fenton [11] expressed the view that amongst the greatest virtues of Google Classroom are its simplicity and the fact that it is connected with all the other tools of the G Suite, providing thus the course designer and the instructors with a wide variety of affordances and immediate access to G Drive. He also made reference to the fact that it allows for collaboration. Apart from research in the field of education in general, research from the field of language education in particular also proves that G Suite for Education tools have been used in ESP contexts in tertiary education, and they have been positively perceived by the students and the course facilitator [4, 5].

Despite the benefits that have been reported in the literature, there have also been some challenges associated with the use of the G Suite for Education. Abid Azhar and Iqbal's [12] research study focused on the opinion of higher education teachers on the effectiveness of Google Classroom. According to their results, teachers expressed the view that the contribution of the tool to their teaching effectiveness or the learners' engagement was not important. They even added that other platforms can be more effective than Google Classroom. Other concerns reported in the study related to difficulties encountered by the students with the use of the tool and misuse of mobile technologies in the classroom. What is interesting to note is that the researchers supported that the reason for these challenges stemmed from their lack of training, and they stressed the need for appropriate training in the use of G Suite for Education tools by both teachers and students. Additionally, Bhat, Raju, Bikramjit, and D'souza [10] expressed a concern which relates to the originality of students' work, since it is easy to share their work with each other; nevertheless, they believed that this difficulty can be overcome when plagiarism check is applied on the assignments.

2.2 The G Suite for Education in Language Teacher Education

Even though the use of the G Suite for Education has become popular the last years, only a limited number of studies have investigated the use of these tools for Teacher Education. Heggart and Yoo's [13] study is among the few. Its purpose was to examine the effectiveness of using Google Classroom with a group of 33 final year pre-service primary TE students, and the results showed that Google Classroom was very positively perceived by both the students and the instructors and that the platform was

regarded as easy to access, and encouraged collaboration and the student voice. Furthermore, it provided students with the opportunity to learn autonomously and enabled the instructors to move on with a quicker pace in the class.

Basher [14] was another researcher who applied Google Classroom in a Teacher Education context. Following the experimental approach, Basher [14] divided a group of 60 students in Saudi Arabia into two groups of 30 students each, the control group and the experimental group. The researcher taught the control group in the traditional way, while the experimental group was introduced to Google Classroom, which was used to share course materials. The results of the study showed that there were significant statistical differences in the results between the experimental and controlled group when the Google classroom application was utilised, which related to teaching efficiency and academic achievement.

Another study that investigated the use of Google Classroom at Teacher Education level was that of Gupta and Pathania [15], who attempted to explore the web-based learning environments of Google Classroom and to assess its effectiveness. The sample consisted of 60 M.Ed. and M.A. Education students in a college of education in Jammu where Google Classroom was implemented. The findings of the study showed that students used Google Classroom to communicate with each other, and they felt autonomous and able to ask their instructor questions that they might have. Generally, they enjoyed learning and working collaboratively. The study also revealed that there were no gender differences between male and female students in their Google classroom learning environments. Moreover, it was found that there were no significant differences between the courses that students attended. In general, the majority of students preferred Google Classroom to more conventional methods, and they characterised Google classes as more interesting, livelier and more enjoyable. Students were also able to learn faster.

The research study described in this paper was conducted in spring 2018 and 2019 and focuses on the use of the G Suite for Education for the delivery of an online Teacher Education course in ESP. The section that follows sheds light on some of the aspects of the course in order to provide a background for the study.

2.3 The Online English for Specific Purposes Teacher Education Course

Even though ESP is an area which has been developing during the last decades, the need for ESP Teacher Education remains intense [16, 17]. An investigation of the existing ESP Teacher Education courses, shows that they are low in number, mostly offered at an MA level, on-site, demand the physical presence of the trainees, and cannot cater for the needs of ESP practitioners who cannot leave their teaching positions in order to receive Teacher Education. Sensing this need, the researcher developed an online ESP Teacher Education course, named the Reflective Teacher Education course in ESP, based on social constructivist and connectivist theories of learning. More details on the curriculum of this course can be found in Kakoulli Constantinou and Papadima-Sophocleous [18].

Having investigated various online platforms for the delivery of the course, it was decided that the G Suite for Education was the most appropriate one for this purpose. The suite was user-friendly, free of charge and there was support at no cost 24 h, seven

days a week. Through the G Suite for Education administrative account, the course facilitator (and researcher) could provide all the trainees with Google usernames and passwords, and both the trainees and the course facilitator were offered limitless storage space. Furthermore, the tools that they had access to allowed for organisation of the course material, easy collaboration, administration of students' work, easy grading and feedback, and also self and group reflection. Lastly, no advertisements appeared while using the suite.

The G Suite for Education tools that were used for the delivery of the course appear in Table 1.

Table 1. The tools used for the delivery of the course.

Tools	Purpose
Google Classroom	-The platform used for classroom management purposes, where all the instructions and material for the course were uploaded and tasks were submitted and discussed. Feedback was provided by both the facilitator and the participants in the course
G Drive	-The online space directly connected to Google Classroom, where the teachers and the facilitator saved and shared the material for the course and collaborated. Teachers could share documents and work both synchronously and asynchronously on them using features such as the "Chat" or "Comment"
Google Docs	-A tool used for the creation of documents, collaboration and cooperation
Google Slides	-A tool used for the creation of presentations
Google Forms	-The tool used for registering the participants in the course and for the creation of questionnaires and quizzes
Google Sites	-The Web page-creation tool used to create a website for the course (https://sites.google.com/site/reteesponline/home-1)

Apart from G Suite for Education tools, other tools were used for the delivery of the course such as, YouTube, which was used for sharing videos with interesting material during the course. According to Szeto and Cheng [19], YouTube is one of the most common Information and Communication Technology (ICT) tools used in education with many affordances. Because of the fact that it has become extremely popular among users, it covers a wide range of topics including teaching methodology issues. Moreover, YouTube videos can be embedded in Google Classroom. Apart from YouTube, Skype was used for teleconferencing, mainly to deliver webinars/tutorials, and also at the end of the course for the focus groups/interviews. Skype was regarded as suitable for this purpose, as it is free and has many capabilities for education, as Hashemi and Azizinezhad [20] argue. In the second stage of the study, Skype was replaced by Zoom.

Furthermore, a private group was created on Facebook for sharing ideas, news, events, articles and good practices, communicating and establishing a team spirit. The group aimed at providing more interesting learning experiences to the participants [21] and also support and strengthen the network, the learning community that was created

[22, 23]. Additionally, Facebook Messenger was used for communication purposes, in case the teachers faced difficulties and wished to contact the facilitator more directly. Communication via Messenger was easier and quicker, since the majority of teachers had Facebook accounts, and they used Messenger in their everyday life. Finally, the teachers personal email accounts were also used for communication purposes.

3 The Research Study

3.1 The Purpose and Methodology of the Study

The research study aimed at addressing the neglected need for ESP Teacher Education among a group of 24 language instructors from different parts of the world through the formulation of an online community.

The methodology followed was that of Technical Action Research [24], as the purpose was for the researcher to propose a possible answer to the problem of insufficient ESP Teacher Education amongst this community of language instructors through the design of an intervention, this online ESP Teacher Education programme. The study developed in two Stages, the two spiral cycles of Technical Action Research; in Stage 1 (February 26–April 8, 2018) the intervention was designed, implemented and reflection on its implementation followed; in Stage 2 (May 20–May 31, 2019) the intervention was refined, implemented again, and final reflections were drawn.

3.2 The Participants

The 24 language instructors that participated in the study were ESP educators representing different ESP fields or English as a Foreign Language (EFL) teachers who expressed interest in educating themselves on issues pertaining to ESP teaching methodology or updating their knowledge on the latest developments in ESP teaching practices. Table 2 gives an overview of the participants in the study.

The participants in Stage 2 were from the same group of participants in Stage 1. They were less in the second stage, due to the fact that some of them did not manage to complete Stage 1, and others because they faced personal, professional or technical problems and could not participate. The fact that they were given access to the material also drove some of them to make the decision to study this material at a later stage. In order to maintain their anonymity, the participants were assigned numbers (e.g. Teacher 1–Teacher 24).

It is worth mentioning that some of the teachers were not familiar with Google Drive (12.5%) or Google Classroom (16.7%) at all, even though the majority stated that they were extremely familiar with the use of Gmail (70.83%). The majority was also well-acquainted with Skype (58.33%) and Facebook (66.7%). This was expected since Google Drive and Google Classroom are not tools that are used widely in everyday life.

Table 2. The participants in the study.

Stage 1	Place of work	%	Age	%	Sex	%
(N = 24)	Greece	37.5	20–29	12.5	Male	12.5
	Cyprus	20.83	30–39	33.33	Female	87.5
	Saudi Arabia	16.66	40–49	33.33		
	Spain	8.33	50–59	12.5		
	Sudan	4.16	No response	8.33		
	United Kingdom	4.16				
	Egypt	4.16				
	Kosovo	4.16				
Stage 2						
(N = 14)	Greece	42.8	20–29	7.14	Male	14.3
	Cyprus	28.5	30–39	28.5	Female	85.7
	Sudan	7.14	40–49	57.1		
	United Kingdom	7.14	No response	7.14		
	Egypt	7.14				
	Kosovo	7.14				

3.3 Research Tools and Analysis of Data

Data were obtained through the use of an online questionnaire administered to the teachers at the beginning of the course, the aim of which was to extract information on their profiles, their needs in terms of ESP Teacher Education, and the reasons for which they wished to attend the course. Data were also elicited from the reflective journals that the teachers kept, the facilitator's field notes, discussions on Google Classroom and Facebook Messenger (introduced in Stage 2), and finally focus groups and interviews which took place after the course was completed. These tools were used in both Stages of the study, except for the questionnaire, which was only used at the beginning of the course.

The quantitative data obtained from the questionnaire were analysed using IBM's SPSS 22 software, while thematic analysis was conducted for the qualitive data collected from the other tools using NVivo 12 software. For purposes of reliability, an external researcher recoded the data, and Cohen's kappa test was run in both Stages (in Stage 1 $k = 0.67$ and in Stage 2 $k = 0.62$). The results of the test showed that there was substantial agreement between the coders [25].

4 Results and Discussion

The large amount of data obtained generated results pertaining to different characteristics of the participants, various positive aspects of the course, challenges encountered, as well as various suggestions for future improvements and additions. Some of these results appear in Kakoulli Constantinou [26]. As mentioned earlier, this paper focuses on the use of the G Suite for Education for the delivery of this course, and it aims at

delineating some benefits and challenges deriving from its use. The results are presented in two stages, the two cycles of the study.

4.1 Stage 1

Generally, the teachers and the facilitator spoke positively about the experience they had with the course in Stage 1. They enjoyed the course and characterised it as well-organised (n = 10, 41.66%), which implied that the choice of the researcher to use Google Classroom was appropriate.

Teachers were satisfied with the ways the material was presented (n = 15, 62.5%), and the fact that through Google Classroom, which was connected to the G Drive folder of the class, they would have access to the course material after the completion of the course. Generally, teachers were pleased with Google Classroom (n = 12, 50%) and Google Docs. One participant stressed the collaborative aspect of Google Docs and the practicality of cloud technology. These findings were compatible with previous research conducted on the use of the G Suite for Education [27, 28]. Through Google Docs teachers were able to send constructive feedback to each other and also receive constructive feedback by the facilitator, which they appreciated. The same tool allowed teachers to keep reflective journals in which their learning experiences and thoughts were noted. These journals, were stored in the G Drive folder of the course, and were shared with the facilitator. In general, the interactive and collaborative nature of G Suite for Education tools fostered the implementation of social constructivism, on which the course was built, a view also expressed by Denton [29].

Moreover, two of the teachers that did not have easy access to a computer found the Google Classroom mobile application very useful, as they were able to perform all the necessary tasks on their smartphone. This affordance of Google Classroom was also discussed by Barun, Dauhiala, Dauhiala, and Dziatlau [8]. Another positive aspect of the course was the fact that during the course, a sense of belonging to a CoP, as defined by Wenger and Trayner-Wenger [30], was developed, which proves that these tools can serve connectivist theories of learning.

Apart from all the benefits deriving from the use of the G Suite for Education, some challenges were encountered both with these tools as well as with some other tools used in the course. More specifically, Teacher 9, who had not used Skype for some time, did not know how to join the Webinar. For the teachers who could not attend Skype Webinars, the Webinars were scheduled on a new date and time. Skype connection difficulties were also faced by the facilitator. With regards to Google Classroom, six teachers (25%) mentioned that they came across some kind of difficulty, at least one time, with one of them stating that she did not like the interface (4.16%). Problems faced had to do with not being sure whether an assignment was submitted, figuring out how the platform worked and finding their way around the Google Classroom mobile application. As far as Google Drive was concerned, three participants had difficulties with finding the folders shared with them at the beginning (12.5%). Another problem encountered by Teacher 18 was the fact that she did not know how to access the document she worked on in Google Drive. Teacher 11 also expressed the view that moving from one folder to the other was challenging for her.

Moreover, another challenge faced was the difficulty of some of the teachers at the beginning of the course to understand where to post their first assignment.

These challenges were faced due to the fact that some of the participants were not familiar with Google Classroom or Google Drive, as the results of the questionnaire administered at the beginning showed. According to King [31], amongst the parameters for successful online teacher education and professional development is the ability of the technology to work smoothly enough so that learning is not disrupted; teachers need to feel comfortable with the technologies used. To minimize these challenges the facilitator provided constant support to the teachers and instructions were sent to them in various modes, audio-visual and written, via email, messages and Google Classroom posts.

Regarding their G Suite for Education accounts in general, only two teachers encountered some kind of difficulty (8.33%) at the beginning of the course. One of the teachers confused his personal Google account with the G Suite Google account provided to him by the facilitator and could not have access to the course material. Another teacher, on the other hand, faced problems with logging in her account, and the facilitator had to reset her password.

With regards to the Facebook closed group that was maintained for the course, this was generally well-accepted by the participants. Two of the participants however (8.33%) did not have a Facebook account, and did not wish to create one, because they considered Facebook as a tool purely for social networking that could not be used on a strict professional basis. The facilitator did not wish to impose the use of Facebook on the teachers. Nevertheless, recognising the value of social media in learning nowadays and in the creation of bonds between online community members [22, 23], the private Facebook group was maintained, despite the decision of the two teachers not to participate in it.

The teachers also faced challenges related to the communication and collaboration they had with each other, as synchronous communication was generally avoided by the teachers. As mentioned earlier, they contacted each other using tools such as Google Classroom or Google Drive or through commenting on the closed Facebook group, but this was done mostly asynchronously. This could be due to the fact that participants were not familiar with each other and hesitated to establish any form of relationship with each other outside the course boundaries, especially at the beginning of the course. However, the majority of the participants felt comfortable with sending the facilitator private messages via Messenger or emails for help, advice, clarifications or to comment on something (n = 14, 58%).

Upon completion of Stage 1 of the study, one of the most interesting suggestions expressed by the participants was the idea of organising more Webinars in the future. Teachers appeared to appreciate synchronous communication, and this was a parameter that was taken into account in the refinement of the course in Stage 2.

4.2 Stage 2

In the second cycle of the study, the course was renewed based on the feedback obtained from Stage 1. Therefore, two more weeks were added to the course, during which more Webinars were added, as suggested by the teachers. The new addition to

the course was named ReTEESP Online: The Sequel, and it aimed at complementing the initial course and improve it, and to provide teachers with the opportunity to study issues in the ESP field that they did not have the opportunity to study in the first version of the course. The tools that were used for the course were the same as in Stage 1, so that teachers understand that this sequel part was a continuation of the first version of the course, and also for purposes of consistency. The only changes made were the addition of Google Calendar for Scheduling Webinars, a Facebook Messenger group for more direct communication, and the replacement of Skype by Zoom, which was regarded as more appropriate for the delivery of Webinars than Skype.

In general, participants were positively oriented towards the course characterising it as interesting and useful with new ideas (n = 7, 50%). In all their comments teachers agreed that the combination of the two courses together was successful; in this sense, it could be claimed that the addition of the sequel course was beneficial and this way the ReTEESP Online had actually improved.

With regards to challenges faced in Stage 2 of the study, it is worth mentioning that they were less than in Stage 1, and they involved technical difficulties such as poor internet connection (n = 1, 7.14%) forgotten passwords (n = 3, 21.42%) and Zoom time restrictions (40 min with an audience of more than three people for the free Basic Plan used for the delivery of this course). Additionally, after the completion of the two stages of the study, in July 2019, a notification was posted on Google Classroom by Google that, as of September 2019, a new version of Classroom would be launched, which would include a Classwork page to help teachers organise classwork. Any classes using the previous version of Classwork would be automatically converted to the new version. Unfortunately, this was a challenge that was beyond the facilitator's control, which raised concerns regarding the extent to which users can control these technologies; such concerns are in line with Sultan's [32] and Dillon, Wu, and Chang's findings [6], who expressed certain worries over the use of cloud technologies in education. Additionally, after the completion of the course, Teacher 14 mentioned that he would have liked to see the material posted on Google Classroom at least one day before the Webinar so that there would be time to study them and be engaged in discussion beforehand.

To cope with the challenges of teachers not being able to participate in all the Webinars due to lack of time and other commitments, the facilitator recorded the Webinars with the participants' permission and uploaded the videos on the Google Classroom platform for everyone to watch in case they could not attend. Furthermore, the Facebook Messenger group that was created, which served as a Chat Room, allowed for the discussion to continue after the completion of the Webinars. To address the technical difficulties teachers faced, the facilitator was always available to provide them with help and the necessary instructions (i.e. sending them emails with instructions and resetting forgotten passwords). Moreover, the same Google class that was created for Stage 1 was used in Stage 2 to make it easier for the teachers to navigate and also to allow them to have all the material for the course gathered in one place. To face Zoom time restrictions, the Webinars were scheduled for 40 min to stay within the time limit of the free Basic Plan.

Upon completion of Stage 2, the only suggestion that was expressed regarding the technologies used for the course related to the addition of an open forum that would

allow the teachers to maintain the professional bonds that they had established in the context of the course. The tool that was suggested for this open forum was Facebook, as this was regarded as one of the most popular tools used by teachers in their everyday life. This is an interesting suggestion, which implies that for a day-to-day update and exchange of ideas, platforms which are used in daily life can be more easily employed than other platforms.

4.3 General Comments

In agreement with Heggart and Yoo [13], Basher [14], and Gupta and Pathania [15], the results of the study revealed that the G Suite for Education tools managed to create the appropriate environment and conditions to foster the acquisition of knowledge. The study also revealed many positive aspects of these technologies, such as the fact that the course was well-presented, well-organised and structured through the use of Google Classroom, the collaborative aspect of Google Docs, and the practicality of cloud technologies amongst others. The success of the course was not only due to the affordances of the technologies used, but also due to the pedagogies underlying the use of these technologies [33].

Furthermore, the study showed certain challenges that participants in this online TE course faced, such as difficulties in locating files and navigating through the G Drive, forgetting passwords, and generally challenges mostly of technical nature. Such challenges can exist, especially when the participants in the course are not adequately trained in the use of the technologies used for the delivery of the course. For this reason, constant monitoring of the situation by the facilitator is important, and provision of simple and effective instructions on how to cope with technicalities is necessary; this denotes that the facilitator should be comfortable with the use of these tools.

5 Limitations

Being a Technical Action Research study, the present study has certain limitations, which relate to the nature of Action Research, which operates at a local context, aiming at providing solutions to localised problems. Despite the fact that this study aims at providing a solution to the problem faced by this group of 24 language instructors, the fact that these instructors operate in different parts of the world and come from different educational contexts implies that the findings could apply in different online language Teacher Education contexts.

6 Conclusion

This paper describes the use of the G Suite for Education in the design and delivery of an online ESP Teacher Education course for language instructors that wished to receive training in teaching ESP outside the bounds of formal university education. The aim of the paper is to delineate the benefits and challenges that derive from the use of some of the tools of the suite.

The importance of the study lies in the fact that on the one hand, ESP Teacher Education is a field with very limited research, and on the other hand, the research conducted on the use of cloud technologies such as the G Suite for Education in language Teacher Education contexts is also limited. Therefore, this paper attempts to shed light on the affordances of G Suite for Education tools and the challenges that may potentially arise from its use in an attempt to contribute to the body of knowledge on the use of cloud technologies in the field of online Teacher Education in general and online language Teacher Education in particular. The results of the study may prove useful to designers of online Teacher Education courses, researchers in the field of online Teacher Education, stakeholders, decision-makers, institutions, language teachers, and generally anyone interested in this topic.

References

1. Alashhab, Z.R., Anbar, M., Singh, M.M., Leau, Y.-B., Al-Sai, Z.A., Abu Alhayja'a, S.: Impact of coronavirus pandemic crisis on technologies and cloud computing applications. J. Electron. Sci. Technol. 1–12 (2020). https://doi.org/10.1016/j.jnlest.2020.100059
2. Mell, P., Grance, T.: The NIST definition of cloud computing: recommendations of the national institute of standards and technology (2011). https://www.nist.gov/publications/nist-definition-cloud-computing
3. Esteban, D.S.G., Martínez, D.C.T.: Critical reflections on teaching ESP through constructivist, communicative and collaborative technological integrated procedures. Procedia. Soc. Behav. Sci. **141**, 342–346 (2014). https://doi.org/10.1016/j.sbspro.2014.05.059
4. Kakoulli Constantinou, E.: Teaching in clouds: using the G suite for education for the delivery of two English for academic purposes courses. J. Teaching English Specific Acad. Purposes **6**(2), 305–317 (2018). https://doi.org/10.22190/jtesap1802305c
5. Kakoulli Constantinou, E.: Revisiting the cloud: reintegrating the G Suite for Education in English for Specific Purposes teaching. In: Giannikas, C.N., Kakoulli Constantinou, E., Papadima-Sophocleous, S. (eds.) Professional Development in CALL: A Selection of Papers, pp. 55–69 (2019). https://doi.org/10.14705/rpnet.2019.28.870
6. Dillon, T., Wu, C., Chang, E.: Cloud computing: issues and challenges. In: 2010 24th IEEE International Conference on Advanced Information Networking and Applications, pp. 27–33 (2010). https://doi.org/10.1109/AINA.2010.187
7. González-Martínez, J.A., Bote-Lorenzo, M.L., Gómez-Sánchez, E., Cano-Parra, R.: Cloud computing and education: a state-of-the-art survey. Comput. Educ. **80**, 132–151 (2015). https://doi.org/10.1016/j.compedu.2014.08.017
8. Barun, A.N., Dauhiala, N.V., Dauhiala, D.A., Dziatlau, U.U.: Peculiarities of using G Suite for Education services in the educational process of Polotsk State University. J. Phys: Conf. Ser. **1691**, 1–6 (2020). https://doi.org/10.1088/1742-6596/1691/1/012161
9. Korobeinikova, T.I., et al.: Google cloud services as a way to enhance learning and teaching at university. CEUR Workshop Proc. **2643**, 106–118 (2020)
10. Bhat, S., Raju, R., Bikramjit, A., D'souza, R.: Leveraging e-learning through google classroom: a usability study. J. Eng. Educ. Trans. **31**(3), 129–135 (2018). https://doi.org/10.16920/jeet/2018/v31i3/120781
11. Fenton, W.: Google Classroom could bridge a gap in online learning. PC Mag. 27–32 (2017)
12. Abid Azhar, K., Iqbal, N.: Effectiveness of Google Classroom: teachers' perceptions. Prizren Soc. Sci. J. **2**(2), 52–66 (2018)

13. Heggart, K.R., Yoo, J.: Getting the most from google classroom: a pedagogical framework for tertiary educators. Aust. J. Teacher Educ. **43**(3), 140–153 (2018). https://doi.org/10.14221/ajte.2018v43n3.9
14. Basher, S.: The impact of google classroom application on the teaching efficiency of pre-teachers. Int. J. Soc. Sci. Educ. **2**(2), 33–48 (2017). https://doi.org/10.1016/j.compedu.2016.11.005
15. Gupta, A., Pathania, P.: To study the impact of Google Classroom as a platform of learning and collaboration at the teacher education level. Educ. Inf. Technol. **26**(1), 843–857 (2020). https://doi.org/10.1007/s10639-020-10294-1
16. Basturkmen, H.: ESP teacher education needs. Lang. Teach. **52**(3), 318–330 (2019). https://doi.org/10.1017/S0261444817000398
17. Gaye, A.: Implications of current research in ESP for ESL/ESP teacher training. In: Kenny, N., Işık-Taş, E.E., Jian, H. (eds.) English for Specific Purposes Instruction and Research: Current Practices, Challenges and Innovations, pp. 203–225. Springer, Cham (2020). https://doi.org/10.1007/978-3-030-32914-3_11
18. Kakoulli Constantinou, E., Papadima-Sophocleous, S.: Professional development in English for Specific Purposes: designing the curriculum of an online ESP teacher education course. In: Papadima-Sophocleous, S., Kakoulli Constantinou, E., Giannikas, C.N. (eds.) Tertiary Education Language Learning: A Collection of Research, pp. 89–109 (2021). https://doi.org/10.14705/rpnet.2021.51.1256
19. Szeto, E., Cheng, A.-N.: Exploring the usage of ICT and YouTube for teaching: a study of pre-service teachers in Hong Kong. Asia Pac. Educ. Res. **23**(1), 53–59 (2013). https://doi.org/10.1007/s40299-013-0084-y
20. Hashemi, M., Azizinezhad, M.: The capabilities of Oovoo and Skype for language education. Procedia. Soc. Behav. Sci. **28**, 50–53 (2011). https://doi.org/10.1016/j.sbspro.2011.11.010
21. Balcikanli, C.: Prospective English language teachers' experiences in Facebook: adoption, use and educational use in Turkish context. Int. J. Educ. Dev. Using Inf. Commun. Technol. (IJEDICT), **11**(3), 82–99 (2015). https://www.learntechlib.org/p/171323/. Accessed 26 Feb 2021
22. Dogoriti, E., Pange, J., Anderson, G.S.: The use of social networking and learning management systems in English language teaching in higher education. Campus-Wide Inf. Syst. **31**(4), 254–263 (2014). https://doi.org/10.1108/CWIS-11-2013-0062
23. Yildirim, I.: Using Facebook groups to support teachers' professional development. Technol. Pedagog. Educ. **28**(5), 589–609 (2019)
24. Grundy, S.: Three Modes of Action Research. Curriculum Perspectives **2**(3), 23–34 (1983)
25. Landis, J.R., Koch, G.G.: The measurement of observer agreement for categorical data. Biometrics **33**(1), 159–174 (1977). https://doi.org/10.2307/2529310
26. Kakoulli Constantinou, E.: Distance learning in teacher education: lessons learned from an online english for specific purposes teacher education course. In: 15th Annual International Technology, Education and Development Conference Proceedings (2021)
27. Brown, M.E., Hocutt, D.L.: Learning to use, useful for learning: a usability study of google apps for education. J. Usability Stud. **10**(4), 160–181 (2015)
28. Liu, S.H.J., Lan, Y.J.: Social constructivist approach to web-based EFL learning: collaboration, motivation, and perception on the use of google docs. Educ. Technol. Soc. **19**(1), 171–186 (2016)
29. Denton, D.W.: Enhancing instruction through constructivism, cooperative learning, and cloud computing. TechTrends **56**(4), 34–41 (2012). https://doi.org/10.1007/s11528-012-0585-1

30. Wenger, E., Trayner-Wenger, B.: Communities of practice: a brief introduction (2015). https://doi.org/10.2277/0521663636
31. King, K.P.: Identifying success in online teacher education and professional development. Internet Higher Educ. **5**(3), 231–246 (2002). https://doi.org/10.1016/S1096-7516(02)00104-5
32. Sultan, N.: Cloud computing for education: a new dawn? Int. J. Inf. Manage. **30**(2), 109–116 (2010). https://doi.org/10.1016/j.ijinfomgt.2009.09.004
33. Powell, C.G., Bodur, Y.: Teachers' perceptions of an online professional development experience: implications for a design and implementation framework. Teach. Teach. Educ. **77**, 19–30 (2019). https://doi.org/10.1016/j.tate.2018.09.004