Training future language teachers to educate the digital generation

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Abstract

For the students in today's secondary education, digital technology is part of their everyday life, which is why their generation has been named by researchers digital natives, Net-generation, Millennials, etc. These students access online information, generally based on visuals, play, communicate and collaborate in various virtual communities, they are involved in and expect immediate feedback / rewards. All these features could be valued in school as well. Thus, in the school environment, the infusion of technology should be sustained with adequate training of teachers / future teachers, especially for its effective integration into the teaching activity. In this respect, in the last years, various pedagogical models have been developed in the world, the two most well-known being the Technological Pedagogical and Content Knowledge Model (TPACK) and the Substitution-Augmentation-Modification-Redefinition Model (SAMR) to highlight and explain how technology supports and / or transforms teaching-learning-evaluation activities in the increasingly complex ecosystem of the class. In this paper, we present some of the trends in the integration of ICT in language learning, exemplifying learning activities based on ICT collaborative applications, proposed, realized and evaluated by the Faculty of Letters students, the field of Philology from UVT, within the offered teacher training program by the above-mentioned institution. Activities are analysed within TPACK and SAMR, identifying types of applications that are useful in language classes and concrete ways of integrating online and / or collaborative applications, especially using mobile technology.

Keywords: Preservice teacher training, ICT integration, Mobile assisted language learning (MALL), web 2.0 and 3.0 applications

1. Introduction

Technology development over the past half century has led to a transformation of language learning, both in formal and informal environments. This has resulted in a new domain, named ***Computer Assisted Language Learning*** (***CALL***), an umbrella term for a multitude of processes and activities that use ICT for teaching and learning languages.

Historically, there are three periods of technology integration (Warschauer, 2004). In the first period (1960-1970), also known as structural / behavioural CALL, technology, especially audio, involves repetitive exercises, drills and practices, mainly designed to learn grammar rules or develop a vocabulary. The

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second period, termed communicative CALL (1970-2000), was characterized by the fact that students could effectively learn the language with the help of technology, using the language in various situations, watching videos with native speakers, being a period in which communication and interaction have become important aspects in learning (Farghaly, 1989).

The current approach, integrative CALL, is based on the development of Internet and hypermedia, in which one can develop speaking, listening, reading and writing skills, through video and audio streaming, interactive graphical content, virtual reality (VR) and augmented reality (AR) technologies (Hasan& Hoon, 2013). CALL resources, commonly used in the literature are specific, specialized programs, individual and / or collaborative online applications, videos, dictionaries, digital books, many in virtual libraries, online courses, etc. (Garrett, 2009).

Over the past two decades, collaborative Web 2.0 applications have changed the interaction and communication between teacher, information and student, and have transformed the student from a user into a content creator, giving him an active role in learning, which also led to a new conceptualization of teaching, learning and evaluation act. We are talking about 2.0 education, open access and socially constructed or 3.0 education, based on the omnipotent technology, generally mobile, with students being co-creators of learning experiences, online learning communities, etc.

There are various applications that can be used by students in class, from simple applications such as online dictionaries, bilingual applications or general web 2.0 collaborative applications to complex ones such as ***FluentU*** (https://www.fluentu.com/) based on subtitled videos in various languages, ***Duolingo*** (https://ro.duolingo.com/) based on gamification for language learning, ***Memrise*** (https://www.memrise.com/) or ***Quizlet*** (https://quizlet.com/latest) for vocabulary, ***BBC Languages*** (http://www.bbc.co.uk/languages/), etc. In order to integrate them into teaching activities, future language teachers need to have digital skills at least at an average level, and also to know the major groups of useful applications.

The ICT skills and the existence of the technology itself, do not guarantee the success of its use in learning activities. Hence, for an effective integration of mobile technology in language classes, preservice teachers should apply various models and frameworks, developed by researchers in order to also explain the pedagogical foundation of ICT-based activities. In this sense we note ***TPACK*** (Mishra & Koehler, 2006), ***SAMR*** (Puentedura, 2009), ***Systematic ICT Integration Model*** (Wang & Woo, 2007) and the new and practical ***BUNZ model*** (Bunz, 2017). In language classes, a blended learning environment (Graham, 2006) is increasingly used, especially in the flipped class approach, and informal and non-formal learning is valued, leading to new roles and pedagogical skills for language teachers.

Taking into account this infusion of technology in language learning and the various pedagogical approaches to technology-based learning, the question is how well prepared future language teachers are, i.e. the students at the West

University of Timisoara (WUT), to integrate ICT and manage effectively based on technology-based activities.

This study investigates how preservice language teachers, students in the academic year 2018-2019, of the Faculty of Letters from WUT, understood, used in pedagogical context and valorised the potential of various web 2.0 and 3.0.

In this context, we present trends in technology-enhanced language learning based on collaborative applications, as well as various pedagogical ICT integration models that can be used to implement and assess the pedagogical and technological competencies of language teachers.

2. Learning theories and mobile assisted language learning

In the past decade, due to the unprecedented development of mobile devices, ICT-based language learning has migrated to this technology and, thus, a new ***Mobile Assisted Language Learning*** (***MALL***) domain emerged (Chinnery, 2006).

The analysis of Kukulska-Hulme and Viberg (2018) shows that the use of mobile technology in language learning promotes social constructivism through various learning approaches (e.g. game-based learning, problem-solving, situated and contextual learning etc.). The authors assert that people can create new knowledge and meaning by combining things, ideas and activities they already know and believe in a manner of mutual interaction.

A mobile-based constructivist education can be achieved through the Mobile Assisted Language Learning apps, Mobile Response System apps, Web 2.0 tools, mobile portals, games and collaborative sites. Thus, students are connected online, being encouraged to create and distribute content, to openly express their ideas, to organize and to support their point of view, to communicate and to collaborate with others, and, as a result, they become aware of the coherent or inconsistent information from their own learning and can fill in the missing parts. From the point of view of social constructivism, it is important for students to benefit from feedback during the process of constructing their own knowledge.

The connectivist theory of learning emerged as a direct consequence of online collaboration. This theory describes learning as having a place distributed within a network, technologically enhanced, recognizing and interpreting patterns (Siemens, 2004, Downes 2007). As Downes (2007) points out, "connectivism is the thesis that knowledge is distributed across a network of connections, and therefore that learning consists of the ability to construct and traverse those networks". As examples of applications used in MALL we can remember Social networks (Blogs, Wikipedia, Twitter, Youtube), Podcast, E-mail, Mobile Forums, Learning and Discussions Platforms (Edmodo) etc. Also, as a consequence of the connectivist theory, we can identify the development and evolution of Massive Open Online Courses (MOOC). We can list MOOC platforms that contain various language courses for language acquisitions, such as edX (http://www.edx.org/), FutureLearn (https://www.futurelearn.com/), Coursera (https://www.coursera.org/) or Udemy (https://www.udemy.com/).

In a broader synthesis, Keskin and Metcalf (2011) present also other learning theories in mobile learning (behaviorist, cognitivist, constructivist, lifelong learning, heutagogy, informal learning, etc.), emphasizing the link between these and information and content delivery mobile learning, context (social, location) dependent mobile learning, diversity of information sources in mobile learning, etc. The theories of learning previously described draw on what McLouglin and Lee (2011) have called 'Pedagogy 2.0', a set of approaches and strategies that support learning patterns in which students are able to participate, collaborate and communicate knowledge, also having a strong control over the learning precept, being mainly based on Web 2.0 collaborative tools. Recently, Web 2.0 has evolved to Semantic web or Web 3.0, which differs from Web 2.0 by being better at defining and describing relationships between data. Web 3.0 also extends the social aspects of Web 2.0 by using mobile devices, cloud computing, and cloud-based collaborative working tools, such as Google apps (Halupa, 2015). Hence, MALL is portable, ubiquitous, persuasive, personal, contextual and many times informal.

In this environment based on mobile technology, education focuses on the learning process, the lifelong learning approach, the self-directed learning model - the heutagogical model (Gerstein, 2013).

Noteworthy as an important aspect of learning in the digital era is peer learning, connecting people to other people based on the desire to share information in a community, thus creating a mentoring situation on various levels of expertise, and a complex learning environment (Rose et al., 2002). The network, i.e. the community, decides what is important for learning, according to the priorities it identifies. Due to the multi-layered and multi-directional capability of hypermedia links, knowledge building becomes chaotic, non-hierarchical; knowledge can be negotiated being oriented towards mutable goals (Cormier, 2008). An example of such a rhizomatic learning structure is Wikipedia, with its advantages and disadvantages, often used as a resource in language classes.

Understanding the complexity of the learning environment and applying these learning theories created to explain ICT-mediated learning are useful for language teachers in designing and delivering the curriculum adapted to the digital age. In this sense, we can identify ICT integration trends and pedagogical models to enhance learning experience in language classes.

3. ICT integration trends and pedagogical models in language classes.

Because most students possess mobile devices, a ***Bring Your Own Device*** (***BOYD***) approach to MALL can also be implemented in pre-university education. Even for primary education, a level at which not all students have a mobile device, the investment in such devices is much more advantageous for schools, in terms of costs, space and mobility than in the investment in computers, as mobile technology expands learning activities outside class and it can practically be deployed anywhere and anytime. In education, BYOD refers to the fact that students can bring their own mobile device (smartphones or tablets) into the

classroom to conduct learning-assessment activities. According to the NMC / CoSN Horizon Report (2017 K-12 Edition), schools worldwide have begun to implement BYOD in 2014-2015 (Freeman et al., 2017). Nevertheless, the presence of technology must be accompanied by the knowledge and implementation of pedagogical models of its integration into the teaching activities, so that technology can lead to the actual support and / or transformation of the learning activities created for pupils. We recall some of the most known and used such models.

The ***Technology-Pedagogical and Content Knowledge*** (***TPACK***) model is based on the idea that effective integration of technology in class depends on how teachers understand and use different applications and facilities combined with their knowledge of pedagogical and scientific content to design, manage and evaluate teaching activities.

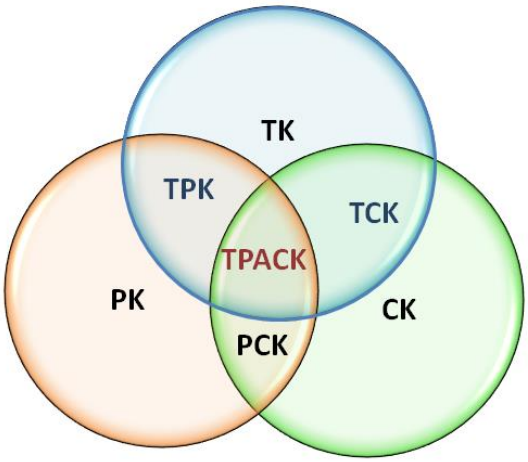


Figure 1. TPACK framework (adapted after http://tpack.org)

The model targets pedagogical knowledge (PK), content knowledge (CK) and technological knowledge (TK), and all intersections between Technological Pedagogical Knowledge (TPK), Technological Content Knowledge (TCK), Pedagogical Content Knowledge (PCK), respectively Technological Pedagogical Content Knowledge (Mishara & Koehler, 2006), a term later modified in TPACK.

The strategies proposed for TPACK development are diverse, based on instructional design, technology or discipline content, being integrative or transformational (TPCK is regarded as a unitary domain) (DeRossi, 2018).

Recently, various variants of the original TPACK framework have been developed based on digital tools, pedagogical approach or content such as e-TPACK (Angeli & Valanides, 2009), TPCK-Web (Lee & Tsai, 2010), TPACKing - constructivist perspective of TPACK (Olofson et al., 2016), TPACK in action (Tai, 2015), etc.

In teacher education, TPACK can be developed in various ways such as collaborative instructional design, pedagogical content knowledge (PCK) - focused learning, technological pedagogical knowledge (TPK) -focused learning,

reflective / reflexive learning, problem-based learning, computer-adaptive learning, instructional planning, and workplace learning (Harris, 2016). Competence development within the TPACK framework can be assessed through strategies of the type of performance observation, assessment and self-assessment (DeRossi, 2018).

In the case of CALL and/or MALL, TPACK facilitates language teachers to understand how linguistic and cultural concepts can be represented using technology, but also how current and emerging technologies and modern pedagogies can be used to develop new knowledge (van Olphen 2008).

A second model is the Substitution-Augmentation-Modification-Redefinition (SAMR) model, developed by Puentedura (2009), which defines the various stages of technology integration in e-learning and m-learning, especially useful when converting content or resources from a traditionally delivered course to a blended / mixed course.

The model targets four levels of technology integration, as follows:

- Substitution (technology replaces another tool, with no functional change),
- Augmentation (technology replaces another tool, with functional improvements),
- Modification (the resource / learning activity has to be redesigned)
- Redefinition (the technology enables the creation of new tasks, new learning activities inconceivable without technology).

In this model, Substitution and Augmentation are regarded as ways to enhance learning tasks, while Modification and Redefining allow for transformation of these tasks.

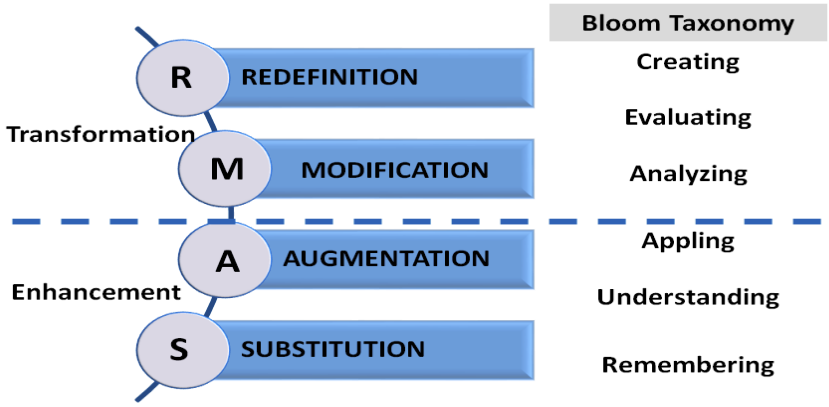


Figure 2. SAMR model and BLOOM's modified taxonomy (adapted after Puentedura 2014)

Note that the SAMR model may be linked to Bloom's digital taxonomy (Fig. 2) and to various ICT tools through The Pedagogy Wheel (Carrington, 2015). In the new version of Bloom's taxonomy, thought by Krathwohl (2002), the levels starting from the lowest one are Remembering, Understanding, Appling,

Analyzing, Evaluating and Creating. The new taxonomy is tailored for technology-based learning that helps the student to be a co-creator of knowledge.

4. Methodology

The study aims to investigate how preservice language teachers use and integrate fixed and/or mobile technology in designing teaching-learning-assessment activities in their domain, based on various pedagogical approaches. Students from the third year of the Faculty of Letters from the West University of Timisoara (WUT) were involved in this study. These students are also enrolled in the Teacher Training Program, offered by the same university.

We analyze the activities performed within the Computer Assisted Instruction (CAI) course and, in particular, the way in which preservice language teachers enrolled in this course subsequently applied the acquired knowledge in their didactic activities within the teaching practice.

Technology based pedagogical activities proposed by preservice language teachers aimed at content creation, knowledge transmission / presentation, formative and summative assessment (general activities), as well as activities specific to the philological field such as reading, writing, speaking, listening and vocabulary tasks. The model generally used for structuring learning activities by pre-service language teachers involved 4 steps, adapted after Bunz (2017):

- identify pedagogy (desired result, skills, activities) and content
- find the purpose (conceptual understanding, demonstrate knowledge, develop various skills, increase engagement and motivation, etc.)
- identify the functionality, select and evaluate the application
- plan the ICT integration (to enhance the language learning activity within a language class, BOYD - in language class activities, etc.)

The integration of technology in learning activities has been discussed based on the SAMR model, which demonstrates the level at which technology supports or transforms the learning task.

Regarding the TPACK development of preservice language teachers, we used a "TPK to TPACK" approach that starts from the analysis and application of certain technologies in the educational environment, and then passes on to the content of the subject taught. We chose this approach because the course was a common one offered to the various specialties of UVT.

The research questions underlying our study were the following:

Q1. *How can Web 2.0 and mobile technology enhance language classes?*

Q2. *How do preservice language teachers develop CALL and/or MALL competences and assess technology integration?*

Participants

The study was attended by 28 students from the third year of the Faculty of Letter from the West University of Timisoara (WUT) that are also enrolled in the psycho-pedagogical training program offered by Teacher Training Department (DPPD) offered by the same university, out of a total of 54 enrolled students, in the academic year 2018-2019. Participants were between 21 and 26 years old

(an average of 21.4 years old), 92% female and 8% male. Specializations studied by these students are Romanian 31%, English 29%, French 16%, Spanish 5%, Italian 3%, German, 5% and other languages 1%.

Instruments

Preservice language teachers used the SAMR model and / or steps in the BUNZ model to develop CALL and/or MALL competencies that were assessed through the TPACK framework. For the assessment, we adopted a reflexive strategy for teachers' TPACK development (Foulger, 2015), which aimed at pre- and post-activity TPACK self-assessment, applying the Sahin (2011) TPACK survey. This is one of the tools recognized in the specialized literature for TPACK teacher assessment, centered on the content areas they teach in the classroom. The survey consists of 47 items focusing on seven subscales of teacher knowledge (TK, PK, CK, TPK, TCK, PCK and TPCK). These items use a 5 point Likert scale response; from strongly disagree to strongly agree. We evaluated the reliability of our sample, and the results obtained revealed that all seven subscales achieved Cronbach alpha levels over 0.70 (the survey was reliable). On the subscales we have TK (15 items), PK (7 items), CK (6 items), TPK (4 items), PCK (7 items), TCK (4 items) and TPCK (5 items). We exemplify the items in the TPCK subscales, taking into account that we are particularly interested in how future teachers have evaluated their progress on this segment.

Table 1. Technological Pedagogical and Content Knowledge (TPACK) subscale items (Sahin, 2011)

TPCK_1.Integrating didactic methods and educational technologies relevant to didactic activity in my specialization.
TPCK_2. Selecting teaching strategies and modern technologies that help me teach effectively.
TPCK_3. Teaching successfully by combining my content, pedagogy, and technology knowledge.
TPCK_4. Taking a leadership role among my colleagues in the integration of content, pedagogy, and technology knowledge.
TPCK_5. Teaching a specific theme using various teaching strategies and applications.

Activity description

For seven weeks, preservice language teachers have studied various online application groups, specialized software and digital resources, taking into account their effective use in the educational environment, from various teaching-learning activities, pedagogical methods and organizational forms of a supposed CALL or MALL activity. These activities focused on the creation of content, the transmission / presentation of knowledge, formative and summative assessment, activities that can be carried out regardless of preservice teachers' specialization, being described in detail in Craciun (2019). A second set of activities, designed for the philological field, focused on reading, writing, speaking, listening and vocabulary. Finally, each preservice teacher has

created an e-Portfolio with the Google Sites application, presenting various technology-based learning activities, describing the technology used, how to integrate it, and reflecting on the work being done with that application. The portfolios were posted on a Padlet panel (https://ro.padlet.com/) created to present and evaluate the course activity.

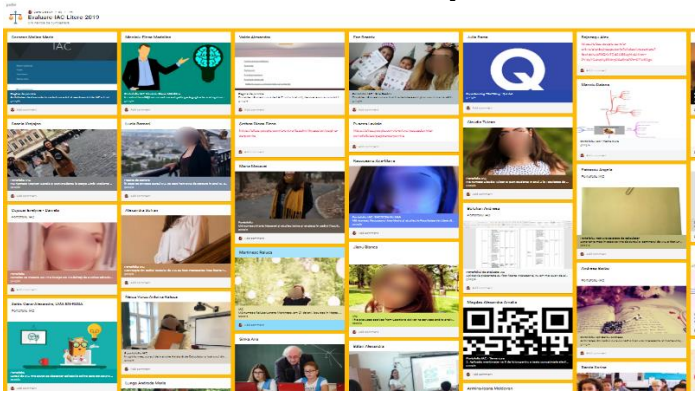


Figure 3. Padlet- evaluation CAI 2018 Faculty of Letters – All specializations

Activities designed by preservice language teachers were presented to classmates through the Edmodo class platform, and they could view and comment on the posts. However, some activities were evaluated as individual assignments uploaded to the platform.

Following the feedback received, the proposed activities were redesigned, and collaborative preservice language teachers grouped activities in tasks, depending on the SAMR levels, discussing how activities can be folded on the TPACK framework.

5. Results and discussions

Learning activities designed by future language teachers

Without going into too many details, we briefly describe an example of a general activity that targets formative demonstration for knowledge / reflection. Starting from the initial activity without the involvement of ICT, there were discussions on the ways in which technology can support this task by replacing instrumental evaluation material (test, rebus, activity sheet, etc.) with a quiz (Google Form, Mentimeterhttps://www.mentimeter.com/) to ways the technology completely redefines the task, using the Mobile app (Kahoot https://kahoot.com/, Socrative https://socrative.com/, Mentimeter) to gamify the assessment or writing through online applications (Google Sites e-Portfolios shared to a global audience).

Below are some of the activities / tasks proposed by preservice language teachers for philology-related learning and assessment activities (see Tables 2 and 3). Even though the activities were designed based on a subject studied in the curriculum, the activities are presented only in the way that the applications / technology themselves are valued according to the SAMR model, considering that students chose themes folded onto the studied languages which sometimes have targeted specific competencies.

Noteworthy for foreign languages, preservice language teachers have highlighted the multiple possibilities of integrating various digital content and collaborative online applications to understand the content taught, the use of background knowledge, conversation interpretation, understanding native speakers and identifying specific information, and of the main ideas, especially for listening activities.

Table 2. Simple learning activities (designed for pupils)

Activity1	***Substitution***	***Augmentation***	***Modification***	***Redefinition***
Reading A text (high school)	Students read a pdf / doc sent by mail, posted on an e-learning platform etc.	Students read using the dictionary and text search facilities	Students add text using specific applications (Google Docs, Notability)	Students browse the contents of an interactive book / use classic augmented textured textures with multimedia elements Aurasma https://www.aurasma.com/
BLOOM taxonomy	Remembering	Understanding	Analyzing	Analyzing
Activity2	***Substitution***	***Augmentation***	***Modification***	***Redefinition***
Vocabulary building to demonstrate knowledge (high school)	Students take notes in a Google Doc about (a place for holiday, itinerary, etc.)	Students create a postcard using images and text / a map with text and photos- Google maps	Students create a digital brochure/ infographic https://piktochart.com /	Students write via online applications (Google sites) to share and comment information about their trip
BLOOM taxonomy	Remembering	Applying	Creating	Evaluating and Creating
Activity3	***Substitution***	***Augmentation***	***Modification***	***Redefinition***
Listening activity (middle school)	Students listen dialogues/texts available on the learning platform and complete a fill-in exercise in a Google docs	Students listen (with pause/replay in their own pace) dialogues/texts available on Podcasts and complete online exercises	Students in pairs listen to a dialogue, read transcription and voice dialogue using Vocaroo https://vocaroo.com/ complete with matching replies	Students (in pairs) watch a video on YouTube and make an animated movie around the main idea / theme of the movie using PowToon https://www.powtoon.com posting it for the entire school community on a Padlet panel
BLOOM taxonomy	Understanding	Understanding and Applying	Analyzing and Evaluating	Creating

Table 3. Formative/summative assessment activities (designed for pupils)

Activity1	*Substitution*	*Augmentation*	*Modification*	*Redefinition*
Asses vocabulary (middle school)	Use Google Sheets/ docs to create a vocabulary table with the definitions (and images) for every word	Organize the vocabulary using concept map with Coggle https://coggle.it/	Record a short video Animoto, Tellegami https://tellagami.com/with words, definitions, suggestive images	Use Quizlet https://quizlet.com/ to create flashcards with the selected words and definitions
BLOOM taxonomy	Understanding	Applying and Analyzing	Creating	Creating
Activity2	*Substitution*	*Augmentation*	*Modification*	*Redefinition*
Speaking assessment (high school)	Students conceive a text (requirement for evaluation) and record it individually with an audio editor, e.g. Vocaroo	Students create a text and register it using an expressive avatar created with Voki https://www.voki.com/	Students write, record individually and post on the eLearning platform (Edmodo, Google Classroom, etc.) to give and get feedback	Students use the Flippgrid https://flipgrid.com/ platform to post audio / video with assessment requirement
BLOOM taxonomy	Applying	Analyzing	Evaluating and Creating	Evaluating and Creating
Activity3	*Substitution*	*Augmentation*	*Modification*	*Redefinition*
Writing assessment text descriptive /letter (middle school)	Students write the text with a text editor (MS Word, Google Docs)	Students write the text with a collaborative text editor (Google Docs) correcting each other	Students write a text that includes multimedia elements etc. and attaches a QR code for fast mobile access	Students write the text and share it on a site, blog, in a public post, asking for and giving feedback
BLOOM taxonomy	Appling	Applying and Evaluating	Analyzing and Creating	Creating and Evaluating

Q1. Examples of applications used and received feedback

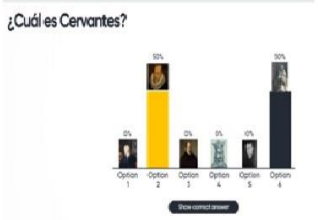
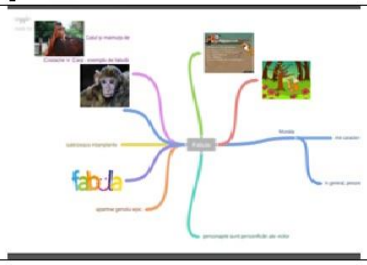
The applications used in the design of learning activities are presented in Fig. 4.

Figure 4. Word cloud applications used by preservice language teachers

The most widely used applications, expressed in the training-learning portfolios were Padlet (88%), Mentimeter (93%), Edmodo (100%), Quizlet 93%), Coogle (93%) and Google Suite (100%).

We present some examples and select from the feedback provided by future language teachers on how these applications, especially the collaborative ones, can be effectively used by teachers and students (Table 4).

Table 4. Applications, activity examples and feedback

Application	*Example*	*Characteristics/ How it sustains language learning*
Padlet		"can be a multiple resource of differentiated learning activities", "facilitates communication and collaboration", "easy to use", etc. *Ex – Resources in German, middle school*
Mentimeter		▪ "offers real time results", "motivate students", "time efficient", "makes my presentation interactive" ▪ *Ex: Miguel de Cervantes/ Don Quijote de la Mancha*
Coogle – Fable characteristics, middle school		"facilitates organization/synthesis of information", "helpful for brainstorming and exchanging ideas", "makes recap more efficient", "offers team work possibilities" etc. *Ex – Fable characteristics, middle school*

Analysing the planned activities, the way of integrating the chosen applications, the feedback offered to colleagues, and the reflections on the activities of future

language teachers, we can conclude that from their perspectives, MALL implementation aims at least 6 important aspects: providing flexibility of learning in time and space, motivating learners in learning languages, mobile learning tasks are interactive and can be easily folded to the students' learning needs, mobile technology facilitates independent learning, easy updating of information in the digital environment and access to up-to-date resources, and it helps integrating language learning into real world context.

Q2. Developing preservice language teachers' TPACK through mobile collaborative applications

Determining how future language teachers have developed their technological and pedagogical skills through their training activities has been done by analyzing data from pre- and post-activity TPACK self-assessment.

The obtained values for the seven subscales, calculated with the SPPS statistical software, respectively with https://memory.psych.mun.ca/models/stats/effect_size.shtmlare shown in Table 5.(with m= mean; SD = standard deviation; dif. = difference between post-test mean and pre-test mean; t = indicator for the applied statistic; p = statistical significance threshold – p < .05 = significant and d = effect size)

Tabel 5. T-test values for paired pre and post activity assessment

Subscale	Moment for testing				dif.	t	P sig (2tailed)	Effect size d
	Pre-test (n=28)		Post-test (n=28)					
	m	AS	M	AS				
TK	3.97	.68	4.24	.51	.27	6.06	.000	1.16
PK	3.82	.82	4.39	.46	.57	3.54	.001	.667
CK	3.88	.79	4.45	.50	.57	3.68	.001	.696
TPK	3.86	.41	4.68	.64	.82	4.12	.000	1.148
PCK	4.21	.64	4.57	.50	.35	2.51	.018	.488
TCK	4.03	.96	4.73	.41	.71	4.01	.000	.752
TPCK	3.79	.92	4.49	.51	.70	4.04	.000	.763

Analysing the self-reported data, there was a significant increase in competencies in all TPACK domains. Also a significant increase for all five items for the TPCK subscale has been observed.

The greatest progress has been identified for technological skills/knowledge, due to the specificity of the course and the initial digital competencies level of the preservice language teachers. The second greatest effect size was observed for pedagogical and technological skills/knowledge, the TPK subscale, which also related to the specifics of the course, focusing on the pedagogical knowledge and skills.

The obtained values for the TPCK subscale items are shown in Table 6.

Table 6. T-test values for paired TPCK subset

Item	Moment for testing				df.	t	P sig (2tailed)	Effect size d
	Pre-test (n=28)		Post-test (n=28)					
	m	AS	M	AS				
TPCK_1	3.75	.97	4.54	.58	.79	3.67	.001	.64
TPCK_2	3.96	.99	4.54	.69	.57	2.74	.011	.53
TPCK_3	3.68	.98	4.54	.69	.86	4.50	.000	.86
TPCK_4	3.43	1.2	4.14	.93	.71	2.63	.014	.49
TPCK_5	4.14	1.01	4.71	.46	.57	3.44	.002	.65

There was a significant gain (P<0.05) for al TPCK items. In a decreasing order of the effect size, the first highest increases were observed in items 3, 5 and 1. This demonstrates the progress of the participants in making the proper choice of technology, folded on pedagogical needs specific to teaching language topics, increasing the ability to select the technology and the teaching strategy. The biggest progress has been identified for TPCK_3, in which, in the post-activity reflections, preservice language teachers have pointed out that they are more confident in using fixed, but especially mobile technology, in the design and development of teaching activities, folded on specific language learning teaching methods and on the content/competencies concerned.

The significant increase for TPCK_1 reflects the fact that future language teachers believe that through their activities they have developed / improved their skills in the selection and integration of technologies and teaching methods.

On the other hand, the lower results obtained for items TPCK_2 and TPCK_4 may be explained through the fact that the majority of future language teachers involved in the study did not actually have teaching experience except for a few lessons (4 in this semester) in pedagogical practice and did not yet have the opportunity integrate into a teaching community, practice classes being scattered and often individual.

6. Conclusions

This study identified the future language teachers' perceptions about the potential of ICT for an effective learning, assessing the progress they have made in identifying and understanding the integration of technology in the classroom through the TPACK framework and the SAMR model, folded on the succession of steps, adapted after the BUNZ model.

Various types of resources and online tools with potential for language learning have been presented, analyzed and applied, building learning sequences based on the SAMR model. Preservice teachers' reflections on these activities have highlighted a better understanding of how well-chosen, applied technologies can transform tasks to enhance student learning.

The results obtained by preservice teachers reveals the need for a technology-based, integrated approach to language learning, understanding how digital technology, the knowledge and correct application of learning models based on fixed or mobile technology can transform learning tasks, the latter facilitating formal and/or non-formal learning. The results also highlight the fact that such technology-based learning activities, lead to developing CALL and/or MALL skills in future language teachers enrolled in the teacher training program, increased their confidence in the use of technology in their present and/or future teaching activities, and especially to awareness of the importance of a correct, conscious and effective integration based on appropriate pedagogical principles and technology.

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