

EMERGING TECHNOLOGIES: DOES IT FEEL LIKE LEARNING?

Ljiljana Vukićević-Đorđević

Faculty of Science, University of Kragujevac
Phone: +38163638595, E-Mail: ljvukicevic@yahoo.co.uk

Abstract. *Are textbooks in a new learning environment still predominant authority and do English language instructors have to allow ICT through the front door or through the kitchen door? How to achieve an acceptable compromise between the necessity of using modern technologies in teaching/learning and the need for teacher education and learner training in the area of computer assisted language learning? Does the revolution in technology automatically and unavoidably trigger the revolution in pedagogy as well? We prepared a questionnaire for the students of the Faculty of Science in Kragujevac to gather information as to how modern technologies and electronic devices affect the students' (English language) learning and to what extent such novelties change their method of learning. Also, we tried to learn how much progress the students have experienced while using communication devices and particular software programs. We were also interested in students' opinion on further progress in gaining knowledge that resulted from greater availability of modern electronic technologies, as well as their motives and attitudes toward mastering English language. Increased engagement of both learners and instructors necessarily results in better-quality educational experiences, and it seems that blended learning when technology is not used haphazardly but is integrated into a course is the most effective one.*

Key words: *language learning technologies, Internet, e-learning, CALL, pedagogy*

1. INTRODUCTION

The apparent acceleration of time has been producing a profound impact on us. Not only have we become older, or have been enjoying the things we do, which may give the impression of accelerated life, but also we have to consider the overall impact speeding up the time from the outside. The greatest acceleration of time comes as an outcome of the rapid pace of technological innovation. All spheres of life are being affected by new information and communication technologies and education has not been spared from dramatic changes. Language learning and new technologies have always kept abreast. To begin with the traditional tape recorder, going through CD players, pre-recorded listening materials, DVD players and palmtop devices, no one can assume the future development of learners' environment and state-of-the-art technologies yet to come.

Globalisation is, without any doubt, reshaping our lives. Intercultural competence has become an imperative in both international business and foreign language learning. The Internet has transformed into a source of information and is not conceived as a mere means of communication. Are textbooks in such environment still predominant authority and do English language instructors have to allow ICT through the front door or through

the kitchen door? How to achieve an acceptable compromise between the necessity of using modern technologies in teaching/learning and the need for teacher education and learner training in the area of computer assisted language learning? Does the revolution in technology automatically and unavoidably trigger the revolution in pedagogy as well?

Endeavoring to search for the suitable answers to the above questions, we prepared the questionnaire for the students of the Faculty of Science in view of further more thorough and extensive investigations. The questionnaire was designed to give us information as to how modern technologies and electronic devices affect the students' (English language) learning and to what extent such novelties change their method of learning. Since the era of the Internet has unavoidably juxtaposed real and virtual world, even interchanging them, we tried to learn how much progress the students have experienced while using communication devices and particular software programs.

We were also interested in students' opinion on further progress in gaining knowledge resulted from the greater availability of modern electronic technologies, as well as their motives and attitudes toward mastering English language.

2. WHAT IS LANGUAGE ABOUT

First of all, language is about words. Learning and remembering new words has always been of paramount importance, irrespective of the language learning approach and methods used. Over time, individual differences in second language acquisition have come into the focus of cognitive psychology and sociolinguistics. With modern technologies, a large number of English words have become easily available by the simple 'click' of the mouse. Nowadays, mobile phones, due to their ubiquity, enable their users to learn across multiple contexts at their time convenience.

Secondly, language is about (con)texts. Cognitive processes and the focus of attention explain how learners sift what is relevant and important. When using the modern devices of communication, users may be offered annotations or highlighted dictionary definitions along with the text they read. If compared to traditional textbooks and paper dictionaries, the information that is needed is obtainable instantly. Unfortunately, it seems that publishers have their hands full on one side while at the same time fewer people immerse themselves in reading for pleasure. In learning foreign languages, reading is the *sine qua non* of acquisition.

Also, language is about structures. In student-computer interactions in language (grammar) learning it is very important to provide feedback, assessment and remediation (Levy, 2009). Generally and in so far as such impression exists, grammar programs are very basic in their processing input, diagnosing errors and providing feedback to learners. The vast majority of software providers offer automatic translation and spell checker, but in spite of high ratings (e.g. Babylon, Power Translator, Prompt, Systran, etc.), it seems that human translation will not be superseded soon, since, for the time being, large amount of memory makes computers mere productivity tools for human translators' (Melby, 2002) and 'despite some impressive applications, no AI systems today can learn, understand and use language as quickly and accurately as a 3-year old child' (Sowa, 2014). Although inconsistent and not very reliable, human judgment is not expected to be replaced with its automatic counterpart even in machine translation evaluation (Turian et al, 2003), especially with computer systems being still far away from processing complex

information if compared with the human brain (Kaiser, 2007). Regardless of the aforesaid, a variety of benefits are attributable to emerging technologies in language learning.

Since foreign language is also about the music and melody of others, learners must be aware of its intonation, rhythm, and stress, because they all shape the production of meaning. From the first recording of sound and speech to modern times, there has been a vast array of sound carriers. Some of them have soon become obsolete, and today, besides CDs, podcasts and other downloadable materials, there are also programs for assessing and teaching spoken language skills (www.carnegiespeech.com), pinpointing speaking errors. Of course, computer-aided pronunciation training is still a matter of attainable potential rather than reality.

Revolutionary technologies in information and communication have established new patterns of both teaching and learning, modifying long-established principles in the classroom. However, despite positive changes and numerous ways of implementing innovations in teaching/learning process, of utmost importance is to be critical and cautious of what we choose from a colourful throng as mobile devices proliferate.

From experience so far, students are more motivated to learn if the learning situation resembles the real-life situation and this is why language instructors tirelessly search for 'authentic' material. It is not difficult to find suitable course books for the professional development of English language in business, banking, tourism, IT, etc., but English language instructors dealing with students of science usually face a much bigger problem – only a few ESL textbooks have been published for students of Ecology and almost nothing for students of Chemistry, Biology, and Physics, except the adaptable series of Cambridge IGCSE, IB diploma, and OCR AS/A2 level textbooks. Thus, 'the availability of online material is invaluable' (Kern, 2013), especially when the lack of textbooks is an impediment. A lot of relevant and up-to-date materials may be found on websites, to mention just a couple of examples: www.howstuffworks.com, www.onestopenglish.com, www.English360.com, etc., and students may enhance their knowledge and capabilities using a 3D-based virtual platform of *Second Life*, or popular apps *Rosetta Stone*, *Babbel*, *Livemocha*, *Byki* or *Duolingo*.

With the advent of MALL technology (Mobile Assisted Language Learning), it was soon integrated into the foreign language curricula and both pedagogically sound applications and important benefits to students have been reported so far (Abdous, 2009; Golonka, 2014), although significantly greater progress in the short run made by the learners NOT using technology was also reported (Barr, 2005). Comparing the students' pre-test and post-test scores, it was noticed that science students considerably developed their scientific English listening skills through podcasts (Hawke, 2010). The ones designed for English language learning may include grammar tips, vocabulary, pronunciation, and idioms, and it is clear per se that using podcasts is more beneficial and helpful than using the traditional chalk and talk method (Hasan & Hoon, 2013). It is possible to design podcasts including 'audio, video, music, and ancillary materials' (Rosell-Aguilar, 2007), e.g. to combine video and subtitles, or still pictures with audio track comments, or stereotype images with snippets of traditional folk music and everyday storytelling. Students may also learn how to prepare podcasts on their own, and the students of science, in this sense, can produce a trailer/commercial for an episode on Animal Planet or Discovery Channel.

In addition, learners can use computer systems to examine English language as it is actually written and spoken in a range of contexts using concordances – special software programs allowing users to search millions of words and their in-context occurrences (British Council, 2013). Concordancing can be beneficial for both learners and language instructors – giving opportunities for error analysis for the first, and offering input for materials development for the latter.

But, when talking about language learning technologies we might recall that ‘the most profound technologies are those that disappear’ (Weiser, 1991). Not literally, of course, but in a way they become entwined with people’s everyday lives until they get the point where they become indistinguishable on casual observation. Nowadays, people have access to a variety of digital devices and services. However, engineering refinements and technological breakthroughs have already made our good old desktop PCs obsolete, leaving us – both instructors and learners – with lots of lessons yet to be learned. Laptops, tablets, palmtops, personal media players, cell phones, smartphones and other devices have brought an abrupt (if so!) revolution of learning. Web 2.0 tools, interactive whiteboards, and 3D virtual environment facilitate communication, discussion and collaborative learning activities. Furthermore, highly-intelligent wearable technologies which provide users with audio-visual information (Google Glass, Oculus Rift), the Internet of Things, artificial intelligence and machine learning speculated about in SF films (*A Space Odyssey*, *Her*, *The Machine*) all suggest that human intellectual capacity and control may be exceeded soon.

But, is the grass always greener on the other side of the fence?! A lot of gadgets being more dynamic and pervasive have been designed and put on the market. They all promise more educational potential. So-called ‘Digital Natives’ – the members of millennial generation for whom the Internet is second nature – have already been put in contrast to the older ‘Digital Immigrants’ who do not have the same familiarity, commitment, or comfort level (Godwin-Jones, 2005). Communicative skills and computer literacy obtained through using new technologies and devices can justify spending much time on instant messaging, videogames, and social networks. And no matter how ‘disruptive’ technology Skype may be, it has become a commonplace in job interviews whenever and wherever time equals money. And it always does!

The pace of innovation is likely to be even more rapid. Instead of other computing devices, mobile devices, becoming even more powerful and versatile, are abruptly made users’ primary and ‘this is not trend language educators can ignore’ (Godwin-Jones, 2011). So, the ‘computer-mediated colonization’ as a cosmopolitan vision of electronic democracy (Ess, 2002) is not something that can be ignored in the classroom any longer.

What is the situation really like?!

3. MODERN TECHNOLOGIES IN USE FOR LEARNING

When talking about language learning technologies, it seems that their potential is only beginning to be explored. Both instructors’ and learners’ preconceived beliefs are likely to affect the way they adopt new technologies and learning strategies. We might emphasize a lot of advantages of novel gadgets providing the Internet access paired with high mobility. However, it would be more fruitful if such devices were not associated with social prestige and the principles of fashion design in the first place, especially

because 'learners are increasingly in a position to take the lead and engage in activities motivated by their personal needs and circumstances of use' (Kukulka-Hulme, 2008).

Besides their convenience and attractiveness, they also may be motivating for both students and their teachers, especially for those with learning preferences. In addition, dependence on physical printed materials is considerably reduced. However, since most software programs are drill-practice based, it is often difficult to find substantial differences between traditional and electronic textbooks, especially at the beginning of computer assisted language learning.

3.1. The Sample: Structure and Properties

In an attempt to gather information from our students learning English, we prepared a questionnaire consisting of questions on modern technologies in language learning and based on their practical experiences. Thus, the students of the Faculty of Science of the University of Kragujevac were asked to answer the questions dealing with up-to-date technologies and their use for learning. As presented in Table 1, the participants were 194 students (179 freshmen and 15 sophomores) studying Biology (41), Chemistry (67), Ecology (26), Informatics (17), Mathematics (29), and Physics (14). They were recruited and took part in the survey on a voluntary basis in a formal classroom setting. Each respondent was well acquainted with the aims of the survey and was assured of complete anonymity in their responses. The results were obtained over 2014/15 academic year.

Table 1. The student sample structure

Major	Freshmen		Sophomores	
	Male	Female	Male	Female
Biology	6	35	/	/
Chemistry	19	48	/	/
Ecology	7	19	/	/
Informatics	/	2	15	/
Mathematics	7	22	/	/
Physics	2	12	/	/
TOTAL: 194	41	138	15	

The students of the Faculty of Science attend the English language classes over two semesters – both in the first year or in one semester in the first two academic years. Their previous experiences with the English language and the length of study vary, as may be seen in Table 2. A downward trend in the number of students who have had no experience in learning English before their enrolment in the Faculty has been observed in recent years. We have designed special courses for them and are currently very satisfied with their learning and performance outcomes.

Table 2: Number of years spent learning English

Years	0	1	4	5	6	7	8	9	10	11	12	13
Students	6	2	13	2	4	11	107	11	22	5	9	2

We have designed and run tailor-made English language courses based on English for specific purposes to help the students further their career positions. It would be much

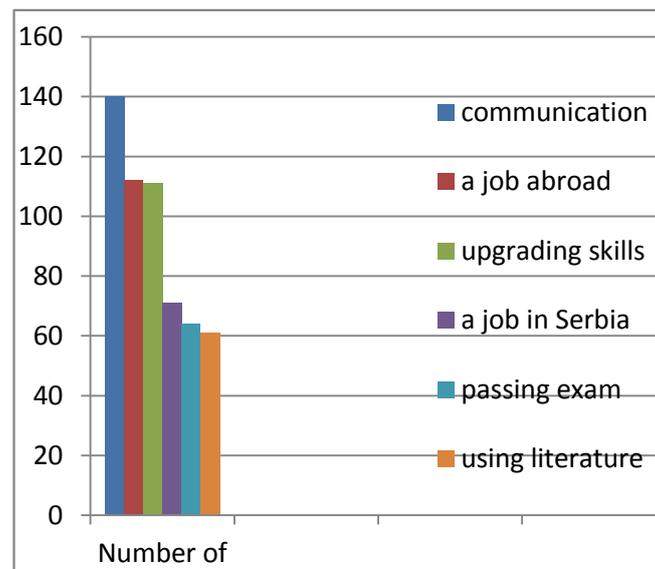
more beneficial to students if greater attention was paid to English for academic purposes with English language as the medium of instruction, at least in specific courses. Improving their English skills would then be an inevitable requirement, since they would fail their courses otherwise.

3.2. Results and Discussion

In comparison to other courses they were taking in the same academic year, the students responding to the survey generally spent *similar time* on the course of English language, including assignments, presentations, etc. (61 or 31%), *somewhat less time* (68 or 35%), or even *much less time* (42 or 22%). On the other hand, not so many students spent *somewhat more time* (17 or 9%) or *much more time* (6 or 3%) on the course of English Language, making approximately 12% of the total number of the respondents in the survey.

Interestingly enough, *communication with people with common interests* was the highest-rated reason (140) why the respondents would like to master the English language. They are also well aware that virtual communities, both professional and entertaining (*LinkedIn, Friendzy, Facebook, Edmodo, Twitter*), and blog projects allow users' 'adherence' to up-to-date language which is permanently evolving. The second highest-rated reason was, as expected, *getting a job abroad* (112) and a surprisingly high number of students emphasized *upgrading their skills* (111) as the third highest-rated reason. Considerably lower number of respondents would like to master English skills in order to *make their job-searching process in their homeland a lot easier* (71), to *pass the English exam* (64) or to *use literature in English* (61) as presented in Chart 1. This denotes a motivation of a particular type and suggests that self-confidence and self-esteem play important roles as personality traits.

Chart 1: Reasons why learning English is important and useful



As aforesaid, language is about words and context. Apart from incidental vocabulary acquisition in a second language, learners often cannot infer word meanings themselves and for a long time have been expected to look for the translation equivalents in bilingual dictionaries. However, only about one quarter of respondents consult *traditional printed dictionaries* (48), and somewhat fewer students use *on-line/CD-ROM dictionaries* (37) for help. Thanks to the explosive growth of the Internet, students can search for word meanings in both isolation and context. There has never been such abundance of opportunities for exploring the endless world of words, but at the same time it seems that superficial inspection and the lack of thoroughness take their toll. As many as 84% of respondents (163) turn to *the Internet* while searching for unknown word meanings. This is in accordance with the results of a particular survey where the Internet, because of a faster access to information, is more frequently used for information input than as a channel of output and communication (Wang, 2009). *Teachers and friends' support* is needed by only 43 participants out of 194. And here we come!

Almost all the respondents in the survey stated that they have a *PC/laptop* (190) and *mobile phone* (183). Only 39 students have *tablet PCs*, 44 have *iPod/MP3*, and 42 have a *PDA/smartphone*. Unfortunately, the students responding to the survey are not so eager to learn about information technologies and their application in study. The Internet was specified as most commonly used technology with all participants (100%). It seems that PCs were replaced by other devices since only 95 students have used PC so far, 42 have used iPod/MP3, and 12 – PDA. Strangely enough, more students have used the Excel/Database software (74) in comparison to Word processing software (63).

When it comes to the frequency of use of the technologies (Table 3), we expected the Internet to be highly rated – as it actually is – but were disappointed to find that 120 students (62%) never used their gadgets for learning and statistical data analysis software was never (61%) or rarely used (24%) by even 166 students.

Table 3. Frequency of use of the technologies

	Never	Rarely	Sometimes	Often	Always
Internet for assignments/presentations	9	29	47	78	31
iPod/MP3 for learning	120	37	29	4	4
Word processing software for learning	78	30	49	24	13
Statistical data analysis software	119	47	15	8	5

All respondents in the survey would like to improve their English skills. We were surprised with *vocabulary* as the highest-rated skill they are interested to expand (111), which suggests that a lot of hard work has to be done on their own even without technologies to be relied on, since ‘research has shown that both intentional learning through explicit instructions and incidental learning through reading can lead to vocabulary acquisition’ (Thornton, 2004). To ease out their meagre vocabulary with new ‘entries’, they may start with a well-defined goals-and-method matrix. The second- and third-rated were *conversation* (104) and *grammar* (85), and then *listening and understanding* (75), *writing* (35) and *reading* (26), respectively.

We were also interested to find out to what extent the respondents take the advantages of available technologies. Understanding of the workload that the students can expect to experience while studying, includes among others, a topic presentation based on their professional interests. Besides traditional printed literature available in the library, they are also encouraged to gather the necessary information on the Internet, bearing in mind the information dependability and liability for copyright infringement (Shin, 2015). The following data in Table 4 are English course-related.

Table 4. Extent of use for English Language course

	Slightly ←-----→Considerably				
Internet and e-libraries	12	14	55	58	55
PC for assignments	55	45	36	30	28
Wireless-based interactive learning	85	54	28	19	8
Downloading material (PC/iPod/MP3)	115	31	11	13	24

The respondents generally use familiar software packages – *Microsoft Word* (162) and *Power Point* (169). Only a small group of respondents uses *Windows Movie Maker* (30) and *Microsoft's Photo Story* (8). Three participants in the survey stated that they have also used an innovative alternative to presentation software called *Prezi*, which was officially launched in 2009.

Over the academic year 2014/15 the respondents have used materials downloaded from the Internet to study for the English Language course *several times in a semester* (103), *several times a month* (33), or *several times a week* (27), but there is also a group of 31 students who have never downloaded any materials for this course. On the other side, there are also enthusiasts willing to learn, read or assess their knowledge online. They were all asked to weigh up what electronic devices offer for English language learning, as may be seen in Table 5.

Table 5. Extent of usefulness in learning English

	Slightly ←-----→Considerably				
online major field tests	58	39	38	37	22
e-books (literature)	77	48	24	26	19
computer/video games	61	39	28	38	28
making videos/presentations	33	37	48	47	29

Since universities are perceived to be moving with the times (Rosell-Aguilar, 2007), we endeavor to provide additional material for classroom-based instruction and have found the greatest opportunities on the web. First of all – podcasts!

Given that the fields of professional interests of the students of a Faculty of Science cover the areas of biology, chemistry, ecology, physics and adjacent sciences, we have discovered the Naked Scientists – one of the first podcasts launched in 2001 and based at Cambridge University's Institute of Continuing Education. In the last five years they achieved over 40 million programme downloads with audiences exceeding a million people worldwide each week. We have already downloaded their interviews with subject

matter experts in chemistry, medicine, space & earth, etc., and podcasts related to astronomy, genetics, neuroscience, etc. The impact of podcasting on learning may be valued through the fact that it is mostly free of charge and, furthermore, it is easy to publicise, easy to subscribe, and easy to use. Once upon a time, there was the cassette recorder which is still believed to have affected language learning most (Davies, 2005), and podcasts seem to be worthy successors to their predecessor.

Since podcasts are very useful and language learning has been identified as one of the disciplines likely to benefit from development in podcasting (Kukulska-Hulme, 2006), we were interested in their use in the English language course both inside and outside the classroom. One third of respondents *have used podcasts only at lectures/exercises* (61 or 31%), additional 33 students (17%) have used them *at home too*, and, unfortunately, the majority of students in the survey (100 or 52%) *have never used podcasts at home*.

Providentially, what gives us hope and keeps us going further is in the participants' response to the question related to their willingness to enroll in an additional English language course taken from outside the Faculty if the course materials were new technology based (computer interaction, podcasts, online chat, online tests, etc.). The great majority of the respondents circled **YES** (119 or 61%), far exceeding the number of those who said **NO** (38 or 20%) or **DO NOT KNOW** (37 or 19%).

The last question in the questionnaire was related to respondents' personal impression on how the greater availability of modern electronic technologies would affect gaining knowledge. The answers vary. Some of the respondents believe *it would be much easier* (97), some think that *it would bring about no considerable change* (35), and some simply admit that they *do not know* (22). There is also a group of students who tend to hesitate since they believe that state-of-the-art *technologies would also require greater knowledge to use them* (40).

In the end, we should emphasize the importance of both intentional and incidental learning, the latter of which being learner-centred and without much scholarly attention attracted so far. Learning on the move, learning while walking, mobile learning – all of these encourage students to become more nomadic in their learning routine. A text may be decomposed into chunks while reading and displayed on the screen of a mobile device while commuting, waiting at a bus stop, or similar, and thus the process of learning never stops and there is no 'slack' time.

Talking about the screen, we may notice that new technologies in foreign language learning have also brought some problems, such as reduced screen size, short battery life, network speed, possible radiation exposure, limited audiovisual quality, etc. Also, overreliance on new technologies can have unintended adverse consequences such as overdependence, regardless of the purpose of use – from checking on the Facebook status updates to cheating on exams! And, of course, there was a comment of a respondent in the survey that attracted our attention most: the question was 'In your opinion, how would greater availability of modern electronic technologies affect gaining knowledge?' and the comment was added to the answers provided – plain and simple: 'It would make us (even more!) stupid!'

4. CONCLUSION

First of all, we should state that language instructors are more than ever technically challenged with the latest innovative technologies in language learning. Their lack of experience with using technology can often present 'the most serious barrier to its successful integration into the language curriculum' (Blake, 2007), but, on the other hand, technology affords new types of language-learning tasks expanding the teachers' options as well (Chapelle, 2007). Of course, from the very beginning mere contrivances have to be clearly separated from smart and effective pedagogical tools. The Internet itself offers an unprecedentedly richer learning environment which is highly suitable for both slower and eager learners. Many opportunities to enhance language learning are 'at learners' fingertips' uplifting the language learning to a new level along with learning about history, politics, culture, customs, etc. With the advent and development of social networks and chat boxes communicative competence has already been and will further be promoted.

Some important distinctions may be drawn between face-to-face learning and learning supported by new technologies. Although social context may be very important for language learners, they could be even more successful in the solitary learning modality. For some learners it may be very stressful to act in the classroom and they feel shy and embarrassed that they might make a mistake. In such context, are modern technologies facilitative while helping learners' swimming or debilitating while hindering them due to their insufficient knowledge and skills? There is also the issue of humanity since there is a difference between the type of feedback provided by human tutors and machine tutors (Salaberry, 2001). On the other hand, when using a language learning software package, students are free to make choices based on their personal inclinations, to repeat input, to adjust the difficulty levels, and to get help if needed which all may contribute to increased motivation and reduced anxiety. Positive experiences of language learners should be a cornerstone for successful integration of new technologies into the curriculum and the dilemma between technology-driven and principle-oriented pedagogy would be solved.

But, besides the aforesaid pedagogical and technical constraints, for a successful application of new technologies in language learning there are also certain financial and legal hindrances that have to be dealt with. When it comes to financial matters, benevolent attitudes towards the implementation of new technologies may change, especially if their pedagogical benefits cannot be properly measured in terms of money. Since digital works are entitled to copyright protection, great attention must be paid to copyright in education, and all participants in the teaching/learning process have to think about these issues from an ethical viewpoint.

Anyway, novelties generally bring important benefits, especially with regard to motivation. An increased interest coming from the inner self of the learner must be more 'profitable' than teachers' delivery in the classroom, regardless of their proficiency imagination, and creativity. In addition, many teachers whose education was based on the grammar-translation and other traditional methods might find themselves not properly trained to teach in the 21st century, especially when it comes to modern technologies and introducing state-of-the-art devices into teaching and learning activities. The problem can be solved through a successful combination of life-long learning and self-development,

since substantial additional workload for teachers is simply the matter of their responsibility.

But, it is ‘the activity and not the technology per se that makes the difference’ (Lund, 2008), since effective teaching remains effective under all conditions – supported by technological means or not. Hands-free mode (and fashion!) appear to be a great way to enable multitasking, and technology is seen as an amplifier of cognition, but possible reorganizing of mental functioning should be beneficial and not detrimental to human learning and it is not supposed to allow mind-free operation. Increased engagement of both learners and instructors necessarily results in better-quality educational experiences, and it seems that blended learning when technology is not used haphazardly but is integrated into a course is the most effective one. Then, it does not feel like learning, but learning is actually happening.

REFERENCES

- Abdous, M., Camarena, M. & Facer, B.R. (2009). MALL Technology: Use of Academic Podcasting in the Foreign Language Classroom. *ReCALL* 21(1): 76-95
- Barr, D., Leakey, J. & Ranchoux, A. (2005). Told like it is! An evaluation of an integrated oral development pilot project. *Language Learning & Technology* 9(3): 55-78
- Blake, R. (2007). New Trends in Using Technology in the Language Curriculum. *Annual Review of Applied Linguistics* 27: 76-97
- British Council (2013). *Innovations in learning technologies for English language teaching*. ed. By Gary Motteram
- Chapelle, C. (2007). Technology and Second Language Acquisition. *Annual Review of Applied Linguistics* 27: 98-114
- Davies, G. (2005). Computer Assisted Language Learning: Where are we now and where are we going? Keynote speech at the University of Ulster Centre for Research in Applied Languages UCALL conference: “Developing a pedagogy for CALL”, 13-15 June 2005, University of Ulster at Coleraine
- Ess, C. (2002). Computer-mediated colonization, the renaissance, and educational imperatives for the intercultural global village. *Ethics and Information Technology* 4(1):11-22
- Godwin-Jones, R. (2005). Emerging Technologies – Messaging, Gaming, Peer-to-peer Sharing: Language Learning Strategies & Tools for the Millennial Generation. *Language Learning & Technology* 9(1): 17-22
- Godwin-Jones, R. (2011). Emerging Technologies – Mobile Apps for Language Learning. *Language Learning & Technology* 15(2): 2-11
- Golonka, E.M., Bowles, A.R., Frank, V.M. & Richardson, D.L. (2014). Technologies for foreign language learning: a review of technology types and their effectiveness. *Computer Assisted Language Learning* 27(1): 70-105
- Hasan, M. & Hoon, T.B. (2013). Podcast Applications in Language Learning: A Review of Recent Studies. *English Language Teaching* 6(2): 128-135
- Hawke, P. (2010). Using internet-sourced podcasts in independent listening courses: Legal and pedagogical implications. *Jalt CALL Journal* 6(3), 219-234

- Kaiser, M. (2007). Brain architecture: a design for natural computation. *Philosophical Transactions of the Royal Society* 365: 3033-3045
- Kern, N. (2013). Technology-integrated English for Specific Purposes lessons: real-life language, tasks, and tools for professionals. *Innovations in learning technologies for English language teaching*. ed. by Gary Motteram. pp 89-115
- Kukulska-Hulme, A. & Shield, L. (2006). Researching new and emerging technologies in language education. Paper presented at the Intellect Research Forum, The Open University, 21 February 2006
- Kukulska-Hulme, A. & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL* 20(3): 271-289
- Levy, M. (2009). Technologies in Use for second Language Learning. *The Modern Language Journal* 93: 769-782
- Lund, A. (2008). Wikis: a collective approach to language production. *ReCALL* 20(1): 35-54
- Melby, A.K. (2002). Memory and Translation. *Across Languages and Cultures* 3(1): 45-57
- Rosell-Aguilar, F. (2007). Top of the Pods – In Search of a Podcasting ‘Podagogy’ for Language Learning. *Computer Assisted Language Learning* 20(5): 471-492
- Salaberry, M.R. (2001). The Use of Technology for Second Language Learning and Teaching: A Retrospective. *The Modern English Journal* 85: 39-56
- Shin, S. (2015). Teaching Critical, Ethical and Safe Use of ICT in Pre-service teacher Education. *Language Learning & Technology* 19(1): 181-197
- Sowa, J.F. (2014). Why Has Artificial Intelligence Failed? And How Can It Succeed? *Computación y Systemas* 18(3): 433-437
- Thornton, P. & Houser, C. (2004). Using Mobile Phones in Education. *Proceedings of the 2nd IEEE International Workshop on Wireless and Mobile Technologies in Education*
- Turian, J., Shen, L. and Melamed, I. D. (2003). Evaluation of Machine Translation and its Evaluation. *Proceedings of the MT Summit IX, New Orleans, USA*: 386–393
- Wang, L. & Coleman, J.A. (2009). A survey of Internet-mediated intercultural foreign language education in China. *ReCALL* 21(1): 113-129
- Weiser, M. (1991). The computer for the 21st century. *Scientific American* 265(3): 94-104

**Appendix 1: University of Kragujevac, Faculty of Science,
Chair of General Education Courses**

Survey of CALL/MALL Technology Use, 2014/2015 academic year

The respondents of the survey are students of the Faculty of Science of the University in Kragujevac, majoring Chemistry, Biology, Ecology, Physics, IT, and Mathematics – freshmen and sophomores. Each respondent was well acquainted with the aims of the survey. The questionnaire used a five-point scale for respondents to indicate the extent to which they agreed with the statements in it. The respondents were assured of complete anonymity in their responses.

Your responses will remain anonymous and confidential. The aggregated information will be used to provide further feedback regarding technology-enhanced language learning. Please provide as accurate answers as you can.

1. Your major of study (*Chemistry, Biology, Ecology, Physics, IT, Mathematics*)

2. Your academic year (*Freshman / Sophomore*) _____
3. Sex (*male / female*) _____
4. How long have you been studying English Language? (*in years*) _____
5. I would like to master the English language in order to (*Check all that apply*):
 - use literature in English
 - make my job-searching process here a lot easier
 - pass the English Language exam
 - get a job abroad
 - communicate with strangers with common interests
 - upgrade my skills
6. Compared to other courses you are taking this year, how much time do you spend on this course, including assignments, presentations, etc.?
 - much less time
 - somewhat less time
 - similar to other courses
 - somewhat more time
 - much more time

7. Which of the following do you own? (*Check all that apply*)

- PC /laptop
- iPod/MP3
- tablet
- mobile phone
- PDA/smartphone
- other (specify: _____)

8. When trying to find the meaning of an unknown word, I use: (*Check all that apply*)

- traditional printed dictionary
- on-line dictionary / dictionary CD-ROM
- Internet
- teachers and friends' support

9. How often have you downloaded material from the Internet to study for this course since the beginning of the academic year?

- never
- several times in this semester
- several times a month
- several times a week

10. Have you used the podcasts for this course?

- Yes, but only at lectures / exercises.
- Yes, I have used them at home, too.
- No, I have never used them at home.

11. Would you be more likely to enrol in an additional English language course (taken from outside the Faculty) if the course materials were new technology based (computer interaction, podcasts, online chat, on-line test, etc.)? Yes

- No
- I don't know

12. Which of the following technologies have you used so far? (*Check all that apply*)

- PC
- PDA
- iPod/MP3
- Internet
- Word processing software
- Excel/Database software
- Other (specify: _____)

13. How often do you use the following:

	Never	Rarely	Sometimes	Often	Always
Internet for assignments/presentations	<input type="checkbox"/>				
iPod/MP3 for learning	<input type="checkbox"/>				
Word processing software for learning	<input type="checkbox"/>				
Statistical data analysis software	<input type="checkbox"/>				

14. I would like to improve in the following English language skills (*Check all that apply*)

- Reading
- Listening and understanding
- Writing
- Conversation
- Vocabulary
- Grammar
- Other (specify: _____)

15. To what extent do you use:

	Slightly				Considerably
	1	2	3	4	5
<input type="checkbox"/> Internet and electronic libraries					
<input type="checkbox"/> PC for assignments					
<input type="checkbox"/> wireless-based interactive learning					
<input type="checkbox"/> downloading material (PC/iPod/MP3)					

16. Which of the following have you used in the English language and to what extent do you find them useful in learning?

	Slightly					
Considerably						
	1	2	3	4	5	
<input type="checkbox"/> online major field tests						
<input type="checkbox"/> e-books (literature)						
<input type="checkbox"/> computer/video games						
<input type="checkbox"/> making videos/presentations						

17. Which of the following programs have you used for learning so far?

- Microsoft Word
- Power Point
- Microsoft's Photo Story
- Windows Movie Maker
- Other (specify: _____)

18. In your opinion, how would greater availability of modern electronic technologies affect gaining knowledge?

- It would be much easier.
- It would bring about no considerable change.
- It would require greater knowledge to use them.
- I don't know.