

Learners Preferences in Higher Mobile-Assisted Education. Case Study of Faculty of Informatics and Management, University of Hradec Kralove

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Abstract. This paper presents the case study of the Faculty of Informatics and Management, University of Hradec Kralove, Czech Republic. The study reflects results of the research conducted at the institution to discover learners' preferences in higher mobile-assisted education. Particularly, it focuses on two didactic questions: (1) whether all students, not only of those enrolled in IT study programmes, are sufficiently equipped with mobile devices so that they were not limited in their exploration for educational purposes, and (2) how mobile devices are exploited within the teaching/learning process there. More than two hundred students administered the questionnaire of 12 multiple-choice questions. The results proved students owned various types of mobile devices with different operation systems, which brought some limitations, and exploited them for both the educational and non-educational purposes.

Keywords: ICT-enhanced learning, ICT, mobile-assisted learning, MAL, e-learning, m-learning, tertiary education

1 Introduction

The university education has changed substantially within last decade but various problems still exist. In developed societies efforts towards increasing the amounts of educated people is emphasized. Making the education open to everyone and developing the system of further, lifelong education are the topical issues. In many cases, the part-time and/or distance education are the only ways to meeting employers' requirements and increasing the qualifications. With adult students a high level of motivation and mature personality make pre-conditions for applying autonomous learning enhanced by information and communication technologies (ICT) implemented into the process of instruction. Lately, reflecting the latest technological and technical development, the mobile-assisted learning (MAL) has been widely applied in the higher education. Material and technical problems been solved, the time came we dealt with didactic

aspects of MAL. The main questions solved at the Faculty of Informatics and Management (FIM), University of Hradec Kralove (UHK), are as follows:

- Are all students sufficiently equipped with mobile devices so that they were not limited in their exploration for educational purposes?
- How are the mobile devices exploited within the teaching/learning process?

2 From the History of ICT-enhanced Education at FIM

According to the Education Law No. 111/98 Sb., §21, par. b) since 1999 Further Development Plans of all Czech universities have had to be introduced on their web pages. The Centre for Higher Education Studies, Prague, made the analysis which shows that:

- most universities emphasize the ICT implementation in the instructional process – currently the ICT also include mobile devices ;
- technical universities, which are in a close relation to technical development results, express a more keen interest in this field compared to non-technical institutions;
- technical and non-technical universities differ in their approach to the ICT/MAL problem – technical universities focus on material and technical issues of the process, i.e. they put emphasis on equipment and its technical characteristics, faculties of education pay more attention to didactic aspects.

The MAL process has been mainly developed and researched at two Czech educational institutions – the Faculty of Education, University of Ostrava and Faculty of Informatics and Management, University of Hradec Kralove [1]. The process of ICT implementation at FIM was conducted in following steps:

- At the beginning of 1990s FIM teachers started to exploit shared directories and present study materials there. Step by step the importance of e-mail increased for conducting communication student/student and student/teachers communication, e-administration of credits and examinations started, timetables, syllabi, entrance exams results were displayed on FIM websites, e-journal Telegraph published and first teachers' websites supporting their subjects appeared – in 1997 nearly 25% of FIM teachers their personal websites. The professional virtual learning environment Learning Space was bought in 1999, however, it was replaced by WebCT in 2001.
- In 1998 the first distance online course was designed within the Tempus Project MUDILT (Multimedia and Distance Learning for Teachers). In 2000 the ECDL (European Computer Driving License) course was prepared in the distance form within the Tempus Project PATTERN (Public Administrators' Training Towards EU). These courses helped substantially to teachers' computer literacy development. Other courses followed. In 2001 the Institute of Further Education was established at FIM and started to organize all commercial activities. Experience gained in designing and running commercial online courses for public resulted in the OLIVA Project (On-Line VyučA, on-line learning). This online course targeted at FIM teachers and students. Its main objective was to train both parties in

designing, running and learning from online courses. More courses for university students appeared; first in the field of Informatics, Economy and Management, then in foreign languages, Psychology, Ethics etc., either for the distance education, to support face-to-face lessons.

- Later on, FIM conducted several important projects in co-operation with other Czech and international universities, e.g. the RIUS Project: Run-up of InterUniversity Study in selected universities in the Czech Republic [2] which was devoted to interuniversity study based on virtual mobilities, the EVENE Project - Erasmus Virtual Economics & Management Studies [3], or the REKAP Project - Development of e-learning competences of academic staff [4]).
- In January 2016 more than 250 courses were available LMS Blackboard (in 2008 WebCT merged with Blackboard) and 2,500 students of FIM use nearly 12,000 seats. Thus the exploitation of LMS has become a common standard, for both students and teachers. Continuous training was provided to the newly interested staff to develop this competence. Training courses for teachers, future course tutors, were conducted in the distance form, i.e. the participants were in students' roles, which enabled them important experience [5].
- Moreover, another topic should be mentioned – learning and teaching styles. They exploit advantages of the ICT/MAL environments, as course designers have a wide range of tools available to choose from, which accommodate all learning/teaching styles and students can choose/teachers can apply appropriate activities which suit best the purpose. In 2010 – 12 FIM solved the GACR project funded by the Czech Science Foundation 'A flexible model of the ICT supported educational process reflecting individual learning styles' which was based on C. A Johnston's approach [6].
- Since the 2012/13 academic year virtual desktops have been available to students and teachers, particularly to work with software not providing free/open access (e.g. MS SQL Server, Enterprise Architect). Two main approaches can be applied on how MAL can be used: (1) if we aim at supporting the face-to-face process of instruction, we can exploit the currently used learning contents and methods on mobile devices listed above; (2) if we understand how new devices work, what their strengths and weaknesses are, we apply such new teaching/learning methods which are able to profit from features of mobile devices.
- In 2013/14 academic year the application Blackboard Mobile Learn™ version 4.0 was piloted for Apple and Android devices (Blackboard Mobile Learn™ version 4.0 supports iOS6+, i.e. iPhone 3GS, iPad 2+, iPad mini, iPod Touch 4+ and Android OS 2.3+). This process required special didactic preparation and the developing/training new skills of teachers and learners. However, within this process our experience from e-learning implementation was exploited – if teachers' experience in online instruction is exploited, it is less demanding for the designers, tutors and learners to develop new skills required for running the MAL process [7].
- At FIM following activities were implemented in the MAL process:
- face-to-face teaching/learning, i.e. learners attended present lessons where discussions and immediate feedback-required activities were preferred;

- before/after-lesson independent work in online courses in LMS Blackboard (i.e. activity running after instruction in learners' leisure time);
- after-lesson independent learning through mobile devices, particularly practicing the new knowledge and skills, is conducted mainly on tablets and smartphones, which were recommended for Blackboard Mobile Learn™ version 4.0.

So as the MAL was applied appropriately, the model by Herrington et al. was accepted and worked out by Lorenz [8], which is based on eleven didactics rules for mobile education design:

1. Real world relevance: Use mobile learning in authentic contexts.
2. Mobile contexts: Use mobile learning in contexts where learners are mobile.
3. Explore: Provide time for exploration of mobile technologies.
4. Blended: Blend mobile and non-mobile technologies.
5. Whenever: Use mobile learning spontaneously.
6. Wherever: Use mobile learning in non-traditional learning spaces.
7. Whomsoever: Use mobile learning both individually and collaboratively.
8. Affordances: Exploit the affordances of mobile technologies.
9. Personalize: Employ the learners' own mobile devices.
10. Mediation: Use mobile learning to mediate knowledge construction.
11. *Produce*: Use mobile learning to produce and consume knowledge. [9; 134]

Reflecting the latest development, the use of immobile, i.e. traditional, information and communication technologies moved to mobile devices, e.g. in e-shopping, e-banking, and finally in education [10]. The state changed substantially within a few years; currently, various types of mobile devices are available on the market. Therefore, mobile devices are becoming standard didactic means on all levels of education. Moreover, foreign languages could be called pioneers in MAL. At the beginning (except for others) mobile devices were often used for listening to music with lyrics in English. This kind of entertainment, which has been widely spread among young people, including university students, was a way which opened doors to mobile devices exploited for educational purposes [11].

3 Research Design

3.1 Research Sample

Totally, 203 FIM students participated in the research. The research sample had following characteristics: 60 % of male and 40 % of female respondents, 41 % studying Applied Informatics and 21 % Information Management bachelor study programmes, 2 % Applied Informatics and Information Management follow-up two-year master programmes, 10 % were students of Financial Management and 27 % of Tourism Management study programmes. The age structure was as follows: 70 % of respondents were 20 – 24 years old, 13 % were 25 – 29 years old, 11 % were 30 – 39 years old, 2 % were younger than 20 years and 4 % were above 40 years.

3.2 Methodology

The method of questionnaire was applied for data collecting. The questionnaire was available in online courses in the LMS Blackboard for three weeks. It included 12 items focusing on the use of mobile devices and social networks. All questions were of multiple-choice type: items 1 and 2 provided four choices, all choices could be marked in items 2 – 8, one choice in items 9 – 12. The data were processed by the NCSS2007 statistic software by the method of frequency analysis, and analyzed.

4 Results

The results are displayed in the form of figures and described.

The data reflecting the possession of mobile devices are presented in figure 1. To provide a more complex view, data collected from the research group of FIM students were compared to the group of 324 students of Faculty of Education (FaEd) UHK (176 primary level pre-service teachers and 148 lower secondary pre-service teachers). The results show that more FIM students own PCs (52 %, FaEd 40 %); however, slightly more FaEd students possess notebooks (91 %, FIM 88 %). The situation is very similar with smartphones and mobile phones – under both criteria the difference is 3 % in favor of FIM students; 61 % of them own smartphones and/or 57 % are mobile phones owners. Results of both groups are rather similar with tablets (24 % FIM, 25 % FaEd). Netbooks are not frequently owned (10 % of FIM students, 3 % FaEd). From other data the TV possession was mentioned by 67 % of FIM students (compared to 42 % of FaEd); whereas 49 % of FaEd students declared the ownership of radios (compared to 30 % of FIM). To sum up: as all choices could be marked in item 8 of the questionnaire (Devices the respondent owns), further analysis of collected data was made. It proved that each respondent owned at least one of the listed mobile devices (notebook, tablet, netbook, smartphone). As for question 1, it can be concluded that both the FIM and FaEd students have been sufficiently equipped with mobile devices and the MAL process can be applied.

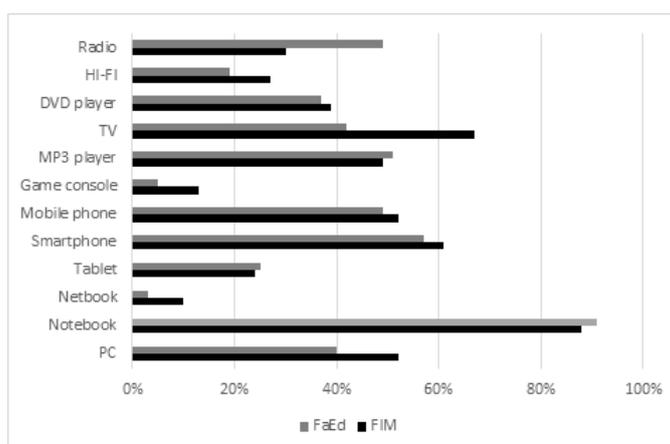


Fig. 1. Mobile and other devices the respondents possess

Findings to question 2 were collected from FIM respondents from items 1 – 7 of the questionnaire. The results are presented in figures 2 – 4. As clearly displayed in figure 2, mobile devices are rather frequently exploited for both purposes – private communication (i.e. with family and/or friends) and professional communication (i.e. on topics relating to school/study and work affairs). The highest frequency was detected with notebooks (79 %, for both purposes), followed by smartphones (professional 56 %, private 59 %) and mobile phones (professional 46 %, private 55 %). What was very surprising in the times of e-society was the fact that nearly all respondents declared personal contact to be very important for professional purposes (92 %) and private communication (96 %). This finding proved respondents did not use mobile devices for all purposes; despite their fast development and wide spread, the human interpersonal communication is still alive in today’s e-world.

However, mobile devices provide more than communication services. Therefore, further on, other fields the mobile devices are exploited were researched: entertainment and education, particularly the higher and further education. As displayed in figure 3, notebook is the most frequently used device for higher (university) education (HE) and further education (FE) – both criteria reached 87 %).

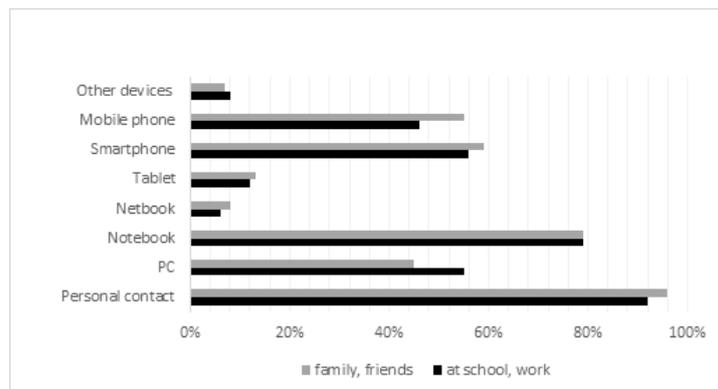


Fig. 2. Purposes the respondents exploit the mobile devices for: Communication with family and/or friends

Moreover, 81 % of respondents declared the use of notebook for Entertainment. Similarly to previous results, the smartphone took the second ‘place’ (HE 43 %, FE 45 % and entertainment 49 %). The PC reached the third position (HE 42 %, FE 46 %, Entertainment 36 %). Unlikely to previous results, mobile phones were detected as less frequently exploited (both HE and FE 17 %, Entertainment 28 %). Surprisingly, more than 50 % of respondents declared the use of TV for entertainment. Unfortunately, the data do not show more details, i.e. whether the respondents watch the TV programmes, play video-games or conduct other activities.

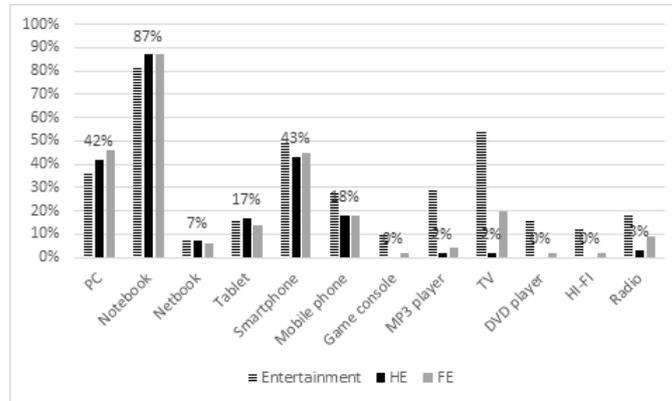


Fig. 3. Purposes the respondents exploit the mobile devices for: entertainment, higher education (i.e. university education) and further education (interests, profession)

As displayed in figure 4, not only information and study materials available through mobile devices are exploited by the respondents for the higher education and further education. As described above, at FIM all subjects taught in all study programmes have appropriate online courses in the LMS Blackboard – these courses were used as a source of information for the higher education by 92 % of respondents compared to only 38 % for further education. Moreover, 85 % of respondents personally attended lectures within HE, which was rather surprising with students of IT study programmes where selected lectures were video-recorded and later available on FIM web page; three quarters of respondents (HE 77 %, FE 76 %) used materials from the Internet which were available free of charge; study materials of the FIM web page were exploited by 72 % of respondents for HE (compared to 26 % for FE); and discussion groups within online courses in LMS were attended by 72 % of respondents to discuss topics relating to HE (compared to 33 % of discussions on FE).

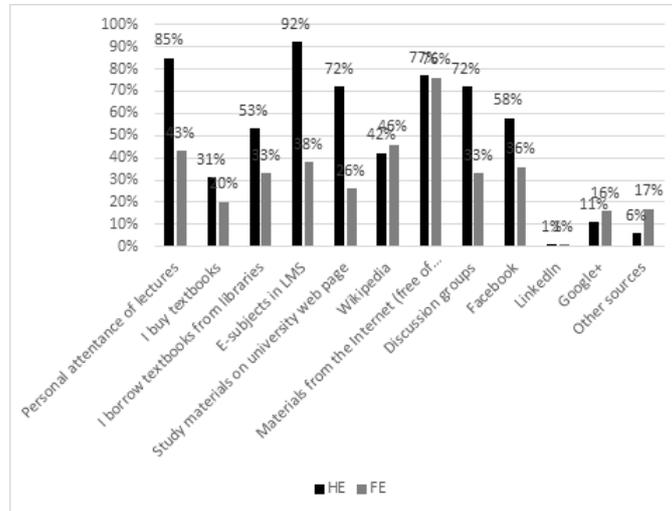


Fig. 4. Sources the respondents exploit for: higher education, further education

Generally, discussions (private and education-related) and availability of study materials are the main reasons why respondents access social networks. This area was monitored by items 9 – 12. Totally 19 social networks were mentioned by the respondents. The collected data showed that Facebook (originally designed by Harvard university students for data sharing, general communication and entertainment), Google+ (serving the same purposes) and LinkedIn (connecting the world's professionals to make them more productive and successful) were the most frequently accessed social networks (followed by Twitter and Skype). The access rate to those significantly exploited is displayed in figure 5.

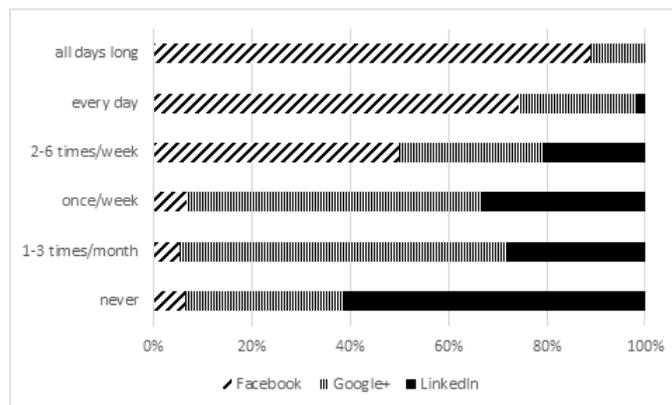


Fig. 5. Frequency of selected social networks exploitation

As expected, the most frequently used social network was Facebook. It was exploited by the 36% of FIM students logged in all days long, 42% accessed Facebook

every day. It means Facebook was daily used by 78 % of respondents. Google+ was in different position – 42 % of respondents expressed they never accessed Google+; 25 % declared their access 1 – 3 times per month and 9 % used it once per week; 24 % of respondents declared their access more frequently than once per week.

LinkedIn was the least frequently accessed among the three social networks. Despite the fact this is the social network of administrative staff, personnel managers or IT professionals, it was 'ignored' by IT students. Totally 79 % of respondents did not use LinkedIn at all; another 10 % accessed this social network exceptionally (i.e. 1 – 3 times per month as maximum); 5 % of FIM students stated rare visits, i.e. once per week; and only 6 % of students declared they used LinkedIn more frequently. These data clearly show the position of LinkedIn for education was not strong, i.e. the network will not be implemented into the designed system of instruction until the students'/respondents' approach changes, i.e. the access frequency arises.

But, despite the access frequency was very low in Google+ and LinkedIn, FIM students had their accounts there. The reason might be that as IT professionals they were interested in new 'items', so they created accounts, but in practice they neither or rarely used them. Probably the Facebook environment satisfies their social and professional needs and they did not feel like accessing other networks frequently and regularly.

5 Discussions and Conclusions

In the current globalized world, differences in technical and technological development are quickly fading. However, the methodology of designing and conducting the mobile-assisted process of instruction is still missing. Generally, social networks were primarily exploited for communication with family and friends, sharing photos and materials of interest. This support to social networks from the public should be exploited for educational purposes and learners' motivation. In practice, despite their disadvantages (small screen) to present the (learning) content and thanks their advantages (low weight, small size), the mobile devices have become the most frequently used means of access to social networks. Education must benefit from this fact. Similarly to e-learning a decade ago, the 'MAL didactics' is strongly required in the current process. For this purpose, the FRAME model is widely applied. It provides answers to basic questions on learners' taking full advantage of the mobile exploitation, on designing materials and activities appropriate for mobile access, on the effective implementation of MAL into formal and informal learning etc. [12, p. 27]. The FRAME model describes how learners are moving from real to virtual environments and situations, they interact there with other people, information or systems, all doing anywhere, anytime. The mediator of the process is the technology. Been displayed in the form of the Venn diagram, three aspects (circles) which represent the learner, device and social aspects intersect in the centre. The intersection of usability of the device and social technology describes the availability of mobile technology (which is called the possession in our research). All the aspects overlap in the center of the Venn diagram

and define an ideal mobile learning situation. Moreover, technical characteristics of mobile devices and social and personal aspects of learning are also considered within the FRAME, which refers to psychological theories e.g. by Vygotsky [13]. The mobile device works as an active component of learning and social processes in the FRAME model and the word 'rational' refers to the "belief that reason is the primary source of knowledge and that reality is constructed rather than discovered" [12, p. 15].

The above presented results collected at FIM reflect those of MAL implementation in the world. However, in the Czech Republic significant items have not been published. In 2010, i.e. under the starting MAL conditions, Lorenz [8] conducted a study focusing on mobile education within the changing university environment focusing on services which libraries can provide. Compared to our research, he asked two identical and two different questions. Particularly he paid attention to the problem, whether the students and teachers have sufficient learning/teaching skills for MAL and what their equipment was. He discovered that 32 % of students and 23 % of teachers regularly accessed social networks, they used podcasts and audio-books (by 18 % of students and 12 % of teachers), e-readers (23 % of teachers and 21 % of students). However, both the students and teachers felt they had insufficient skills for the exploitation of MAL potential (65 % of teachers and 42 % students). On the other side, 46 % of teachers and 57 % of students were willing to pay for mobile-relating services for education and they would appreciate and implement mobile devices into learning and teaching processes. In general, their attitudes to MAL were positive.

In the survey conducted by Chen [14] the research topic closely relates to our study. Chen detected tablets were an ideal tool for ubiquitous, collaborative and interactive environment for autonomous informal foreign language learning. This approach was supported by students' positive attitudes towards tablets' efficiency and usability for the MAL process. Other studies, e.g. by Demouy and Kukulska-Hulme [15], have demonstrated mobile technologies work as helpful and appropriate means for foreign language learning and teaching. These findings will help develop the MAL didactics when new, still unknown, mobile devices are implemented in this process.

Since 2010, when the Lorenz's was carried, the data and situation in the Czech Republic have changed. Our study was of great importance, as it reflected the state-of-art in the field and discovered future research topics.

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References

1. Kostolányová K.: Teorie adaptivního e-learningu [The theory of adaptive e-learning]. Ostrava, Ostravská univerzita (2012)
2. RIUS Project: Run-up of InterUniversity Study in selected universities in the Czech Republic, CZ.04.1.03/3.2.15.1/0067, <https://www.uhk.cz/fim/projekty/1360>
3. EVENE Project (Erasmus Virtual Economics&Management Studies), 2005-3857/001-001, <https://www.uhk.cz/fim/projekty/1740>

4. REKAP Project (Rozvoj e-learningových kompetencí akademických pracovníků) [Development of e-learning competences of academic staff] CZ.04.1.03/3.2.15.3/0406, <https://www.uhk.cz/fim/projekty/2080>
5. Zervas, P., Sampson, D. G.: Facilitating teachers reuse of mobile assisted language learning resources using educational metadata. *IEEE Transaction on learning technologies*, 7(1), pp. 6--16 (2014)
6. Johnston, C. A.: *Unlocking the will to learn*. Corwin Press Inc. (1996)
7. Kaptelinin, V., Nardi, B.: *Acting with technology: Activity theory and interaction design*. Cambridge: MIT Press, (2006)
8. Lorenz, M.: Kde nechala škola díru: m-learning aneb Vzdělání pro záškoláky [Where school let a hole yawn: m-learning or education for truants]. *ProInflow: <http://pro.inflow.cz/kde-nechala-skola-diru-m-learning-aneb-vzdelani-pro-zaskolaky>* (2011)
9. Herrington, J. et al.: *New Technologies, New Pedagogies: Mobile Learning in Higher Education*. Research Online: <http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1092&context=edupapers>, p. 134 (2009)
10. Pieri, M., Diamantini, D.: From e-learning to mobile learning: New opportunities. In M. Ally, *Mobile Learning. Transforming the delivery of education and training*, pp. 183--194, Athabasca: AU Press (2009)
11. Traxler, J.: Current State of Mobile Learning. M. Ally, *Mobile Learning. Transforming the Delivery of Education and Training* (pp. 9--24). Athabasca: AU Press (2009)
12. Simonova, I., Poulouva, P.: *Learning Style Reflection within Tertiary e-education*. Hradec, Kralove, WAMAK (2012)
13. Vygotsky, L. *Mind in society: The development of higher psychological processes*. In M. Cole, V. John-Steiner, S. Scribner, & E. Superman (Eds.), Cambridge: Harvard University Press (1978)
14. Chen, X. B.: Tablets for informal language learning: student usage and attitudes. *Language learning & technology*, 17(1), pp. 20—37 (2013)
15. Demouy, V., Kukulka-Hulme, A.: On the spot: Using mobile devices for listening and speaking practice on a French language programme. *Open Learning: The Journal of Open, Distance and e-Learning*, 25(3), pp. 217--232 (2010)