Mobile technology in a strategy to enhance entrepreneurial learning: a dreamy m-learning Erasmus+ project case study

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ABSTRACT: Contemporary mobile technologies offer many exciting and distinct features in educational settings. The way the technology is implemented in formal and informal education can make a big difference. The main goal of this study was to explore how mobile learning can enter into inclusive educational settings, especially with learners who have cognitive and psychomotor disabilities, and socioeconomic disadvantages. The study outlines experience in the use of mobile device educational potential to enhance entrepreneurial learning of lower-educated women who want to start businesses from their homes. A sample of 167 participants from five European countries was chosen for quantitative research of their perceptions and experiences. The study revealed that 1) mobile learning is a proper strategy to support the needs of learners with some disabilities; 2) entrepreneurial skills might be built by spaced and deliberate practice, as well as perceptual exposure; and 3) technical pedagogical content knowledge might be a useful basis for design of an effective mobile learning course.

INTRODUCTION

European Union strategy 2020 aims to improve Europe's competitiveness and productivity with action on employment, climate change and energy sustainability, education, fighting poverty and social exclusion [1]. Eurostat reported that over the past five years more than one-third of adults with at most lower secondary education were at risk from poverty or social exclusion [1]. Lower-educated women are more likely to live in poverty and suffer social exclusion than men because the barriers that women face lead to their exclusion from full participation in many areas of life. Many of these lower-educated women, whether employed or not, deal in handicrafts. Although handicraft products are becoming more valuable in the eyes of the customer, most of these women are not aware of the real value of their products or how to take commercial advantage of them [2].

In 2017, the Erasmus+ Dreamy m-learning project was launched to mitigate this poverty and social exclusion, especially among women in underprivileged regions. The project consortium consists of partners from five countries; namely, Turkey (promoter Afikad from Afyonkarahisar, Orkon Engineering and Haci Bayram Veli Universty, Ankara and Afaspim from Afyonkarahisar); one partner from Greece (IDEC S.A., Athens); Slovenia (University of Ljubljana, Faculty of Education, Ljubljana); Poland (Danmar Computers, Rzeszów); and France (Guimel, Arcachon). The main aim of the project was to enhance modern entrepreneurship and competencies through mobile learning, which offers many benefits and opportunities to reach learners in different ways and in a timely way. It provides a personalised learning environment for formal, informal and non-formal learning. Eight project members from countries across Europe and Turkey committed to providing learning multipliers with a new understanding of how to support entrepreneurship – using a module-based mobile learning.

At the core of mobile learning is a modern idea of entrepreneurship in an open learning environment. Entrepreneurs around the world are well-regarded and enjoy high status within societies. More than two-thirds of the adult population worldwide consider starting a business a good career choice [3]. However, in the world, little more than half the adults believe they have the required skills to start a business, while a third indicate the fear of failure would inhibit them from pursuing entrepreneurial opportunities [3]. Early-stage entrepreneurial activity is viewed as a business opportunity rather than a necessity for work. Among such entrepreneurs a portion seek to improve their situation, either through increased independence or through increased income. These entrepreneurs very often do not anticipate creating any jobs in the first five years [3]. Learning innovation skills by entrepreneurs is crucial to surviving in the market.

The project described in this study aims to overcome disadvantages mentioned at the start of this article, both in the training and in the business case. The main objective was to help in developing a mobile learning habitus for lower-educated women, especially those who work from home. The habitus is essentially the way in which a culture is *embedded* in an individual and how this internalisation becomes the basis for a person's behaviour. It is the belief or

orientation of the learner towards how entrepreneurship should be learned and this ultimately influences their decision-making regarding particular activities or approaches.

MOBILE LEARNING FOR ENTREPRENEURSHIP EDUCATION

In the past decade, there has been a significant shift from stationary information and communication technology (ICT) to mobile technology. Mobile learning technology refers to the adoption of mobile devices to support mobile learning [4]. Oyelere et al defined mobile learning as:

> *…the application of portable mobile computing devices, such as mobile phones, tablets, smartphones, and e-readers, to access learning resources, collaborate, communicate, and share learning experiences* [5].

Mobile learning provides a new way to motivate learners through high levels of engagement and novelty, personalisation, and autonomy. Mobile devices offer unlimited mobility, flexibility and small size [5]. Mobile devices offer a range of new opportunities for designing and improving physical and virtual learning environments, interactions, skills acquisition and developing knowledge in formal and informal settings [5][6]. Mobile learning:

- stimulates creativity and curiosity [7];
- informs attitudes towards contemporary technology [8];
- provides blended and distance learning [9];
- develops design thinking as an approach for innovation learning both intra- and trans-disciplinary [10];
- promotes collaborative, co-operative and social learning;
- supports inquiry-, project- and problem-based learning [11];
- supports active and hands-on learning [5][12].

Mobile devices offer course designers a possibility to tailor learning and its context to students with diverse learning needs [4], especially in inclusive settings. Learners can interact within a context as collaborators or individual learners [4] where interactions between learners and mobile devices require feedback, negotiation, consultation, support and trust between key learners [4]. Mobile learning also should be matched with learners' needs and learning objectives should be considered when designing the learning environment. An effective, modern, mobile learning design should comprise the following steps regarding entrepreneurship learning [13]:

- mapping educational objectives with Bloom's taxonomy, especially on the cognitive dimension;
- acquiring skills by spaced practice, deliberate practice and perceptual exposure;
- learning from feedback and educational interactions;
- learning by thinking as reflection and retrieval practice [13].

Moreover, a design for optimal learning outcomes of entrepreneurial skills suggests helping learners practise skills divided into three categories: A - cannot do, B - can do with effort and C - mastered [13]. A case of entrepreneurial learning might be to teach marketing literacy. Concepts and factual knowledge of marketing strategy might require moving from A to B to C, whereas entrepreneurship higher decision-making skills might require a move from A to C, if it becomes intuitive for the learner, while they have been practising trial and error examples on an app.

Before learners use applications, they must be properly acquainted with mobile devices to provide successful ICT integration. This hinges on a combination of teachers' technology, pedagogy and content knowledge, as defined by the technological pedagogical content knowledge (TPACK) model. The TPACK model offers teacher and learner several ways to integrate and refine ICT as:

> *…the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies, pedagogical techniques that use technologies in constructive ways to teach content, knowledge of what makes concepts difficult or easy to learn, and how technology can help redress some of the problems that students face, knowledge of students' prior knowledge and theories of epistemology, and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones* [14].

Considering learners' TPACK, courses designer might provide mobile learning where both entrepreneurial learning and TPACK development can occur. The following approaches should be adopted for developing successful learning outcomes:

- ICT must be aligned with specific learning objectives;
- learners' ICT expertise in the learning context might allow developing specific content knowledge using specific technologies;
- learners gain experience and knowledge through real-world cases that require them to define and design solutions;
- learners then refine solutions for problems and scenarios [14].

The theme of mobile learning of entrepreneurship is both current and relevant globally. Existing studies advocate how mobile learning can facilitate learners' motivation and interest. Potentially, the strongest contribution in this current work is through accounts of how mobile learning of lower-educated people can be manifested.

This study will answer the following two research questions:

1. What are the pedagogical and marketing experiences of women who are potential entrepreneurs?
2. What is the level of TPACK in lower-educated women who want to start a business from home?

METHOD

The sample for the Dreamy m-learning Erasmus+ project comprised 167 women as a target group from different countries; namely, 40 from Poland, 77 from Turkey, 15 from France, 20 from Slovenia and 15 from Greece. They were opportunistically sampled. The participants were aged between 18 and 68. To survey participants' perception and experience with education and training, two questionnaires were used.

First questionnaire, self-developed, aimed to capture participants' perception and experience with:

- educational technology (12 items) and learning resources (9 items) subscales with a 4-point Likert scale: 1- never, 2 - sometimes, 3 - often, 4 - always;
- the model for receiving instruction (7 items), learning process (12 items), assessment methods (10 items), sales preferences (8 items) subscales with a 5 point Likert scale: 1 - not at all to 5 - very much.

A modified TPACK questionnaire was used to measure participants' technological and pedagogical knowledge [15]. Fourteen items were selected and modified using a 5-point Likert scale, from 1 - strongly disagree to 5 - strongly agree. The internal consistency of the self-developed questionnaire, as measured with Cronbach's alpha coefficient, was very high at 0.89 (58 items), while Cronbach's alpha coefficient of the modified TPACK questionnaire also was very high at 0.93 (14 items).

The study was conducted in accordance with general data protection regulations and research ethics, in the northern spring of 2018. Participants were recruited by an on-line Web portal and briefed about the study and ethical considerations, before they completed the questionnaires. Voluntary informed consent was a prerequisite for a subject's participation in research. Participants completed both questionnaires. There were no time limits imposed on participants.

Data analysis was conducted using SPSS software. Descriptive analyses were conducted to present the students' basic information and the mean score of dependent variables.

RESULTS AND DISCUSSION

One hundred and sixty-seven participants were involved in this study, with an average age of 37.79 years. The participants were all female. There were seven participants who had not finished elementary school; 61 had only finished elementary school; 61 had vocational education; and 38 had a university degree.

Figure 1 shows how often participants were looking for information from learning resources. It was found that *other people* and the *Internet* were the two most frequent sources, while foreign magazines/journals and e-readers seem to be the least used. Respondents under the age of 25 were more dependent on the Internet and peers to gather information.

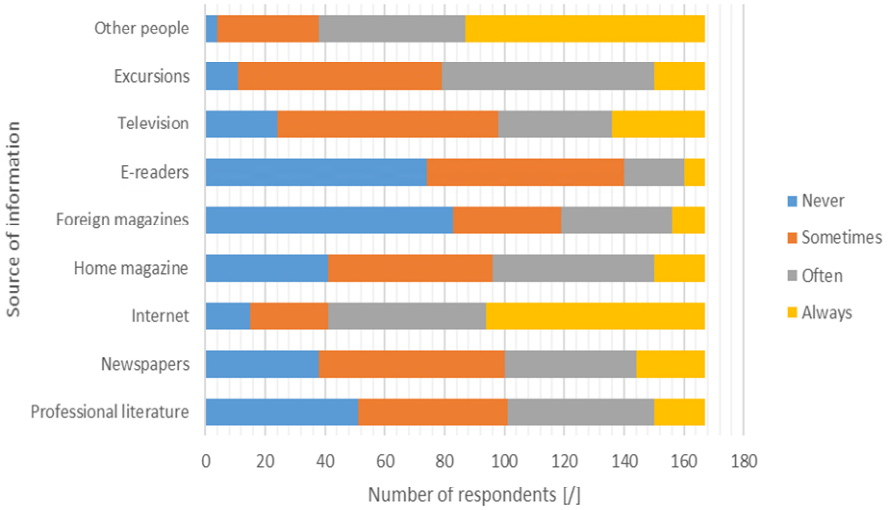

Figure 1: Learning resources.

Smartphones and desk computers were in daily use among participants, especially those with vocational education (see Figure 2). Surprisingly, navigation devices and smartwatches seem to be not so used. Thus, there was little educational use of these devices.

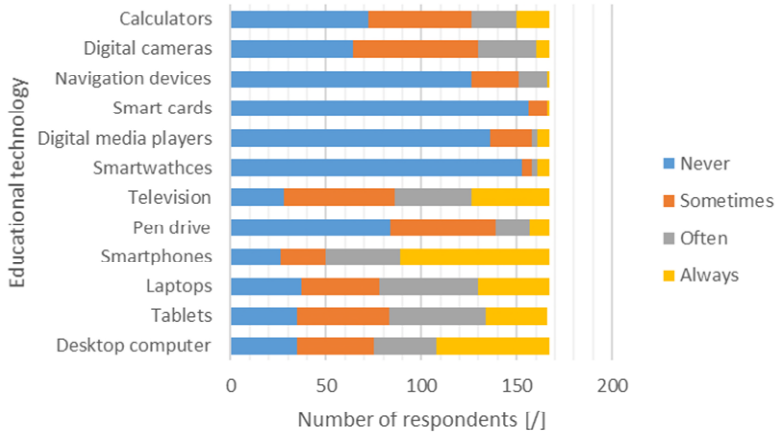

Figure 2: Use of different educational technology.

Table 1 shows different perceived experiences with the learning and training process. Participants with lower education prefer combined text and visual instruction with self-paced learning, while voice instruction was found not so effective, especially for older participants. Participants prefer a learning environment with their own pace of learning using different real-world cases. To complete a task, assistance from a mentor/tutor or peer was needed, with feedback. A frequent assessment method was preferred with an elaborated review of the product, especially among younger learners or trainees. Tranquil mobile learning is preferred, without pressure and boredom. Metaphors and humour increase mutual trust between a learner and the physical or virtual learning environment. This might lead to establishing a more socially inclusive learning environment, especially for learners with several disabilities [16].

Table 1: Respondents' perceived experience with learning.

Instructional form	M [/]	SD [/]
Voice instruction, step by step	2.98	1.48
Text instruction, step by step	3.26	1.2
Visual (photo) instruction, step by step	4.00	0.97
Combined text and visual instruction	4.31	0.87
Combined voice and visual instruction	4.02	0.96
Combined text and voice instruction	3.09	1.03
Combined text, visual, and voice instruction (YouTube video)	4.08	1.12
Learning preferences		
Environment with own pace	4.21	0.87
Well-structured process of learning	4.01	0.94
To have feedback from device/Internet	3.93	1.22
To have feedback from other learners	4.05	1.05
To have feedback from mentor/tutor	4.01	1.23
To have feedback from book/handbook	3.69	1.23
Construct new ideas based on previous and current knowledge through active learning/work	3.99	1.11
To learn within real context, situation or surrounding	4.23	0.99
Interact and communicate with mentors and other learners to complete tasks	4.21	0.87
Learning beyond organised courses, at own time in not-so-structured an environment	4.05	1.06
Good administration and co-ordination of resources	4.07	1.04
When meaning exists within unpredictable situation, to be uncovered by self	3.96	0.99
Assessment		
Written assessment/verification	3.74	1.13
Oral assessment/verification	3.56	1.22
Assessment of performance on various sections of the criteria	3.75	1.17

Instructional form	M [/]	SD [/]
Review of the product: product, report, technical documentation	4.01	0.98
Peer assessment	3.69	1.24
Assessment of the portfolio	3.81	1.11
Self-assessment	3.32	1.16
Computer evaluation/test	3.37	1.17
Assessment by other people	3.34	1.18
No assessment	2.26	1.43

Figure 3 shows participants' preferences about selling the products which can be made in their homes. They prefer visual communication followed by voice communication. It seems that chambers of commerce and governmental business points are not much used for the niche production offered by handcraft producers.

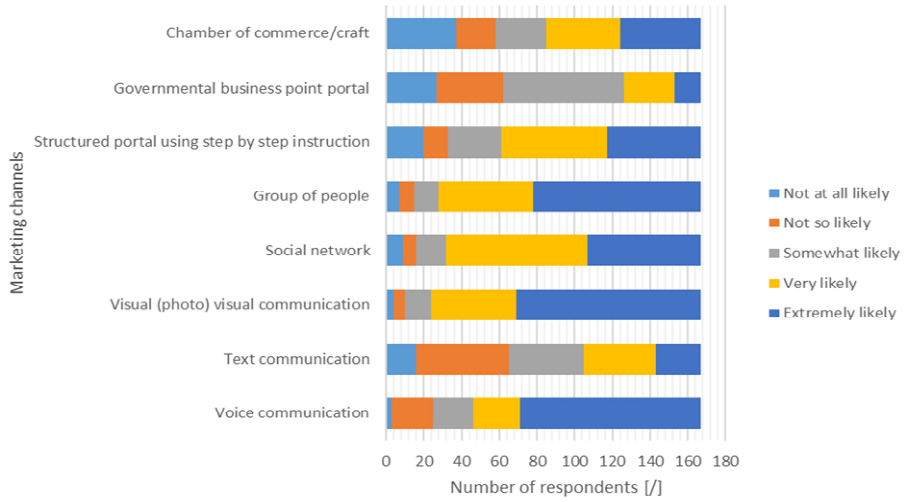

Figure 3: A likelihood of selling handmade products using different sales channels.

An important aspect of how to design mobile learning TPACK was identified. The TPACK was introduced as a context for understanding knowledge required for effective ICT integration in any subject matter. In the authors' case, TPACK was needed to support entrepreneurship learning, especially for lower-educated women. Figure 4 shows 14 statements that reflect respondents' ability to cope with technology. Since the mid-point was 3, a basic level of TPACK was found. Ethical behaviour, while using ICT was found to be above average, followed by use of social media. How to troubleshoot problems referring to ICT was found as critical. The ICT seems to be used only for storing and recording information, while assessment of products or learning outcomes was rare. Different ICT-supported visualisations and representations might provide learners with useful feedback about their learning effectiveness and support informed decision-making.

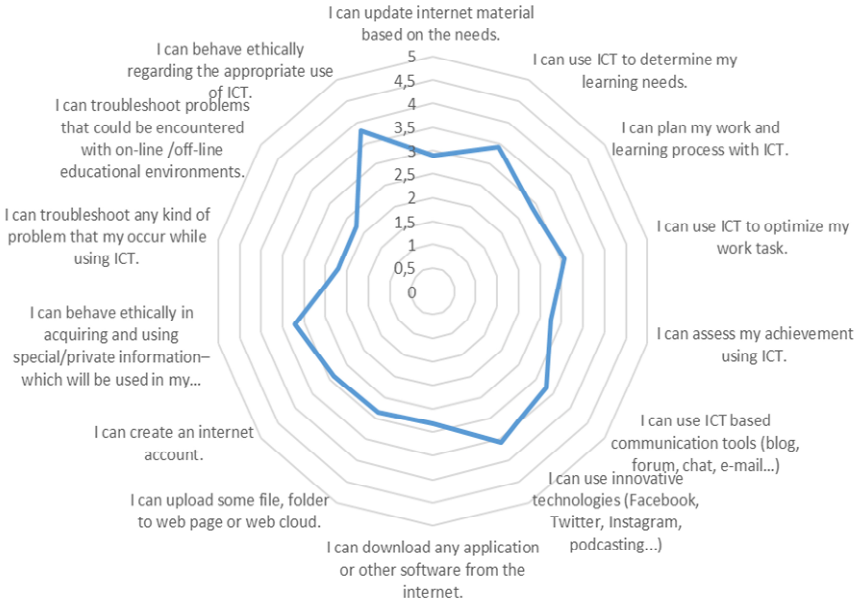

Figure 4: The self-reported technological pedagogical content knowledge of respondents (n = 167).

Digital competencies are highly important in a rapidly changing technological world. Everyone needs a broad range of experiences that reflect real-world uses of ICT. An adaptive ICT technology allows everyone to develop and acquire skills at a level to become an informed and responsible user of ICT in learning or training. Modern teaching is not about providing the theoretical facts by means of digital media, but by an interaction with other professions and peers to apply knowledge and approaches from various disciplines [17].

CONCLUSIONS

Mobile technologies present a huge potential in both formal and informal educational settings. These technologies can provide learners with personalised and timely learning environments for various learning needs. They can also support learners with disabilities and socioeconomic disadvantages. Successful mobile learning can be formal, informal or non-formal. Contemporary mobile devices bring a new paradigm to education, with more accuracy in setting learning goals and with digital tools matching the specific content of a subject area.

Mobile learning brings several benefits; for example, it can: 1) develop knowledge and build skills for learners from underprivileged regions; 2) bridge formal and informal learning, where instructors can use formal educational settings to introduce learners to particular resources and strategies for optimising learning outside of the classroom; 3) improve higher-order thinking skills; 4) support alternative learning environments; 5) enable personalised learning; and 6) motivate learners.

Conclusions from pedagogical preferences and the self-reported TPACK are that lower-educated women, who start business from their homes, prefer to have: 1) simple combined visual and text instruction; 2) smart location of items on a screen; 3) immediate feedback; 4) co-location of feature and function; 5) conventional navigation and smart icons; and 6) direct manipulation and several metaphors implemented on the user interface.

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