

ARTICLE

Integration and Language Learning of Newly Arrived Migrants Using Mobile Technology

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The purpose of this study is to investigate the mobile activities newly arrived migrants are engaged in when learning the Swedish language and about Swedish culture and society. Further, the study also explores the use of a mobile application (app) provided to the newly arrived migrants to use for pronunciation practice. The study involved 38 newly arrived Arabic speaking migrants participating in an introduction program of the Swedish language and Swedish culture provided by the Swedish government. The participants were divided into two groups: a control group who received training according to the traditional introduction programme and an experimental group who used a mobile app for pronunciation training as a complement to the programme. We applied a combination of qualitative and quantitative methods for data collection and analysis. The participants were interviewed about their use of mobile phones as well as recorded in a number of activities inside and outside the classroom to compare their language evolvement. In addition, surveys, logging of weekly mobile activities and observations were performed.

The results show that the participants used a wide range of different mobile tools, both inside and outside the classroom. However, they used the mobiles mostly for communication with their family and friends rather than for communication with Swedes and learning Swedish. Further, compared to the control group, the experimental group showed an improved speech tempo and self-confidence in speaking. The study thus indicates that focused linguistic training with a pronunciation app is useful for developing spoken language skills, which can lead to improved integration. The participants expressed need and interest in having more mobile apps for both language and culture training.

Keywords: MALL; Mobile learning; Mobile technology; Migrant; Refugee; Pronunciation

Introduction

With the great number of people moving on a global basis, countries experience an increasing influx of migrants in terms of both voluntary migration as well as a vast number of refugees.

For these migrants, it is of utmost importance to become integrated into the host society by learning a new language and culture, so as not to be segregated and socially marginalised or excluded (e.g., Kukulska-Hulme *et al.*, 2015; Pearson, 2011; Roth & Åslund, 2006). This societal transformation of increased migration puts demands on host societies to provide support to migrants in the integration process and their socio-cultural and socio-economic inclusion (Andersen *et al.*, 2009). Additional challenges often arise when moving to a country with a less widely used language, such as Swedish, which, compared to English or French, is hardly spoken outside the country's borders.

The objective of our study is to explore how access to mobile technology can be utilized to support integration of migrants towards sustainable societal inclusion and capacity building (e.g. Andersen *et al.*, 2009; Magis & Shinn, 2009; McKenzie, 2004). In particular, this study investigates how migrants learn a foreign language by means of mobile technology as a mediating device. The project is founded on socio-cultural perspectives of learning, investigating the role of mobile technology as a mediating tool for learning and enabling interaction with other people and cultures. Swedish is both the object of the activity and one of the tools as the teachers use Swedish together with other languages to communicate with the students. Mobile technology is an additional tool that can be used for language learning.

The interaction with Swedes is an additional way to learn about the society, the language and achieve integration. Although this is a small scale study in terms of investigating pronunciation training and mobile use, it offers some interesting insights into language learning using mobile apps and how pronunciation and speech can be enhanced with targeted training.

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Background and research questions

Language skills and awareness of cultural aspects of communication have proved to be some of the most important aspects for integration (see e.g. Roth & Åslund, 2006). Since a large number of newly arrived migrants use smartphones (Ram, 2015), development of mobile technology for integration is something that the Swedish Digitalisation Commission supports when promoting digital transformation and sharing best practices within information and communication technologies (Digitalisation Commission, 2016). Thus, the use of mobile technology in the process of language learning and intercultural communication training is something that needs to be investigated further.

The purpose of this study is to explore the use of the smartphone as a mediating tool for integration of newly arrived migrants. In particular, this study investigates how migrants learn foreign language pronunciation by means of mobile technology. The starting point is to examine the mobile activities that newly arrived migrants are engaged in when learning Swedish. An in-depth analysis of their linguistic development over a period of time is made in order to investigate the development of their pronunciation skills. Although the initial mapping of mobile habits and any language learning activities are taken into consideration, this study focuses primarily on development of oral skills.

The situation around the administration of asylum seekers implies establishing support to a large number of newly arrived migrants in a fast way. In Sweden alone, a country with fewer than ten million inhabitants, there were 160 000 newly arrived migrants entering the country during 2015, which has put a large strain on all levels of society. Early on, it became clear that the reception catering for such a large cohort of primarily Arabic, Pashto and Dari speaking migrants from the Middle East needed to be streamlined. Development of the existing national programmes for learning Swedish played a central role for co-ordinating integration work (see e.g. Economou, 2015), particularly for such a large number of people. At this point, these programmes make little use of digital means for learning as a complement to classroom teaching, particularly lacking tools that support mobile language and culture learning. This digital experience can thus be built on further to explore how individualized learning can be combined with social networking for newly arrived migrants to be integrated into the new community faster.

The backdrop to the introduction programmes for newly arrived migrants is the new Language Act introduced by the Swedish government in 2009 which advocates the individual's right of access to language (Lindberg, 2009). It states that everyone who lives in Sweden shall have the opportunity to learn Swedish. However, teaching oral skills and pronunciation has so far received little attention within the programmes for immigrants (Thorén, 2014), though spoken language skills are essential in everyday communicative activities. One of the reasons that oral language skills often play a minor role in language education is that spoken language is considered more private and subjective in terms of how to assess subtle

differences in pronunciation. According to Thorén (2014) it may be difficult to classify pronunciation because it is non-persistent and temporal. Therefore, a suggested remedy for pronunciation training is listening to pre-recorded speech, recording, playing and listening to own speech, which is something that a mobile application (app) can provide. Thus, with the great influx of newly arrived migrants, their digital competence and spoken language development are the issues worth exploring further.

Our research questions are:

1. What mobile activities are newly arrived migrants engaged in when learning Swedish and learning about Swedish culture?
2. How do pronunciation skills evolve when newly arrived migrants are being provided with a mobile app developed for oral pronunciation practice as a complement to a traditional training course?

Survey of the field

Changes in demography and tighter communication across vast distances are features characteristic of today's globalized world. One of the bridging elements supporting this development is mobile technologies, such as smartphones and other mobile devices. Ease of access and dissemination facilitate the use of such technology, making mobility influence all aspects of life (Findahl and Davidsson, 2015). Learning in such mobile contexts implies that a learner moves across multiple sites of learning (Dyson & Litchfield, 2011; Thorne, 2013). It is claimed that user-generated opportunities for social interaction are increasing due to social networking and using game-based features (Holden & Sykes, 2011; Thorne, 2013).

There is some research related to the integration of mobile devices into everyday life (Conole, 2010; Merchant, 2012). In the plethora of existing apps that can be accessed through mobile devices, it is suggested that mobile language learning is quite frequently determined by whatever users incidentally find as online practice material (Kukulska-Hulme, 2013). These resources are selected on the basis of ease of access or intuitive usage of resources, frequently with a lack of connection between real life communication challenges and learning. For this reason, it is suggested that language learners need "re-skilling" (Kukulska-Hulme, 2013) to better adjust to a mobile world. In other words, learners need to be equipped with better strategies and tools to appropriate the target language and culture. In this process, the learners are active agents augmenting their informal learning activities when crossing boundaries (Akkerman & Bakker, 2011) and moving between contexts.

Another aspect of language learning concerns the social context and the role that mobile technologies have in informing and re-forming identity (Elliott, 2010; Ito, Matsuda & Okabe, 2005). Identity is closely bound up with multicultural issues and migration.

There are studies of uses of mobile technology exploring educational challenges when moving into a new culture (e.g., Brooker & Lawrence, 2012). One example is mobile blogging with Chinese students in the UK (Shao, 2011).

Their understanding of the British culture was enhanced through socializing and exchanging information with students in China. Another example is Pearson's (2011) study of groups of female immigrants from Bangladesh in London, where one group participated in language education and one group did not participate in any formal education. Both groups were diligent users of mobiles, and due to their use of mobiles, their self-confidence increased. Even though some research emphasises the fact that individualized uses of mobile technologies includes self-directed language learning (Stockwell, 2010), technological advancements also point at studies of social interaction and collaborative mobile language learning (see e.g. Mompean & Fouz-González, 2016). With existing research as a background, there is clearly a need to explore immigrants' use of mobile devices in current and emerging situations across different sites. With collaborative online networking, the social side of mobile learning has increased vastly, from being a much more individual activity to a more social one.

To date, there is scarce research on the implications of mobile learning for immigrants. Exploring emerging practices such as ubiquitous learning and augmented learning making use of electronic devices for interaction could be a way forward, i.e. "to include and bring to life different times, spaces, characters, and possibilities. It offers possibilities for the transformation of learners and their learning cocontexts", (Sheehy, Ferguson & Clough, 2014, p. 1). It is also pointed out by Sheehy, Ferguson and Clough (2014) that a strong pedagogical ground is needed in order for technology to become embedded in lasting practices. In other words, augmenting puts an emphasis on extending opportunities to practice language in a variety of social settings and observe how language is used by various speakers. It is claimed that user-generated opportunities for social interaction are increasing due to social networking and using game-based features (Holden & Sykes, 2011; Thorne, 2013).

In Kukulka-Hulme et al. (2015), incidental learning, i.e. learning that is generated as a result of other activities is explored in relation with social inclusion involving immigrants. The MASELTOV project¹ developed a suite of mobile services such as peer reviewed language learning, a mobile navigational tool, a profile system for personalized learning, and a geo-social radar in the form of a helper service. In addition, a text conversion and translation tool and a mixed reality game were developed, emphasizing language understanding, local community building and fostering awareness of cultural differences. The MASELTOV project addressed integration difficulties and how these can lead to fragmented communities and other social problems.

In relation to existing studies, our research concerns newly arrived migrants who recently entered into a new culture with a less widely used language, Swedish. It is seldom the case that these newcomers will have any knowledge of the Swedish language before arrival. As it is vital for them to be integrated in the Swedish society, there should be ample opportunities to acquire Swedish language and culture, especially within the immediate

context of their daily lives. Development of pedagogical features in mobiles, augmented reality and location-aware content delivery are features that can contribute to rich learner-centred environments which need to be explored in terms of their role for linguistic and cultural immersion for users.

Theoretical framework

This research is grounded in a socio-cultural approach to learning where learning, human and social relationships are culturally constituted, playing an essential role in thinking and learning (Vygotsky, 1978). The dialogic process of learning is played out in interactions between users and the mobile devices they engage with. The unit of analysis is the mediated activities the participants are engaged in when using mobile devices. These activities are part of the boundary crossing that the participants perform when moving between sites (Akkerman & Bakker, 2011). The process has a reciprocal nature and the concept of appropriation has been introduced as a way to emphasize transformation; appropriation, i.e. "to bring something into oneself or to make something one's own" (Wertsch, 1998, p. 53) originates from Bakhtin (1981).

The concept of communicative competence, introduced by Dell Hymes in 1974, became a milestone for language teaching. This concept implies a focus on language skills and knowledge that allows us to communicate. For language learning, communicative competence implies a more social and contextual approach to language, including not only linguistic skills, but also sociolinguistic competence (Hymes, 1974).

For language learning, certain theories are connected to how we look at language learning today. Chomsky's theory is based on a cognitive approach to language consisting of structures and rules (Jordan, 2004). Halliday's systemic-functional theory, on the other hand, is more about language as a resource in a social context. Language here is not just a cognitive phenomenon but is also seen from the user rather than a grammatical perspective (Halliday, 2007). However, our study takes its theoretical stance from socio-cultural perspectives on learning (Vygotsky, 1986). Learning languages takes place through interaction with others in a cultural context. In other words, in this perspective language is seen as a mediating resource. Learning the language is a social, meaning-making activity (Vygotsky, 1986). Our knowledge is developed through the tools and resources we use (Säljö, 2005). Digitalisation means enabling other or new opportunities for communication and learning. The teaching that takes place in the digital environment deals with aspects related to communication skills for lifelong learning (Kramsch, 2006). The concept 'literacy' covers a range of skills relating to participation in all kinds of social processes (Halliday, 2007).

Language can be viewed as "cultural glasses" that affect how we see and understand the world. Material tools as cultural carriers "presuppose collective use, interpersonal communication, and symbolic representation" (Vygotsky, 1978; Kozulin, 1995). The ability to adapt to a new culture is not so much dependent on the distance between the original cultures, but the ability of migrants

to maintain cultural transmission under new conditions (Kozulin, 1995).

Spoken language is more instantaneous and situated in the environment where it is produced, while written language is often a slower process, allowing for more time to think in order to create linguistic formulations. From a user perspective both are grammatically complex in different ways (Halliday, 2007). There is discussion about whether written and spoken language should be separated or treated together (Halliday, 2007). Traditionally, written language was regarded the norm although most people learn by listening and talking rather than by reading and writing (Halliday, 2007). However, speech has deeper roots than written language, since humans talked long before they wrote. In addition, listening is one of the key skills in language learning, something that mobile technology can support (Read & Kukulska-Hulme, 2015). The notion that the written language was originally derived from the spoken forms has affected language teaching, bestowing spoken language an inferior position, which is something that this study investigated.

Methodology

The participants in the study were 38 newly-arrived Arabic speaking migrants involved in the national introduction programme for people who had been granted asylum arranged in all municipalities throughout Sweden. The programme includes themes linked to the Swedish labour market, economy, civic orientation, culture and the Swedish language. The participants, who were all literate, had been in Sweden for periods of time from four months to up to one and a half years. They had very little or no knowledge of Swedish. There were 12 women and 26 men, all adults of working age, ranging from the age of 20–60, with most of the participants being in their late 20s and early 30s. Eighteen (18) participants had more than 9 years of schooling, where 10 of them had some university education. The analysis in this study does not make any gender or age distinction.

The study took place over a period of ten weeks, which is the duration of the two introduction programmes running in parallel. Of 38 participants in the study, all of which participated in an introduction programme, 14 were in the control group who only participated in the introduction programme and 24 participated in the experimental group receiving an additional pronunciation course module based on intensified training apart from the introduction programme. The pronunciation course module was connected to a mobile app called *Sound-to-Speak*, and the setting was based on a combination of teacher instruction and self-studies. The app, which comprises a total of 333 Swedish training sentences, is designed around a method based on use of the pronunciation app together with continuous language classes. It was integrated into the introduction programme twice a week for three hours during 10 weeks. The pronunciation course module in its present form was based on coaching the students by an Arabic speaking Swedish teacher in the classroom. There was a combination of drill exercises where the app was projected on a screen in front of the class to enable discussions of

word and phrase use in the Swedish language. The teacher provided contrastive explanations between Arabic and Swedish pronunciation. During the lessons, cultural differences in ways of life in Sweden and in the participants' home countries were also brought up.

The app was built around a number of Swedish phrases included in the app which enabled learners to listen to, record and play back through repetitions of full sentences and segments of sentences that could be practiced any time they wished. The training was thus a combination of the participants' own practice outside of class with the pronunciation app and the classes where the group speech choir method (Kjellin, 2002) was applied. The speech choir method implies enhancing the power of repetition of sound fragments and sentences in the joint group.

Concerning allocation to groups, the participants belonged to two different training centres in two different places in the same city with identical settings. We invited all participants who had Arabic as their mother tongue in each respective centre to participate in the study, making the smaller of the two groups the control group and the bigger one the experimental group. Though there were more participants in these centres with other linguistic backgrounds, the study was restricted to Arabic speakers only.

To map the mobile activities in general and in relation to learning Swedish and about Sweden in particular, we applied a combination of different qualitative and quantitative data collection methods; questionnaire, recordings, self-assessments, observations and interviews. The starting point was to first identify the mobile activities that the participants were engaged in when learning Swedish and about Sweden, both in their introduction programme classes but also outside the classroom. Although the main focus was the participants' development of oral skills, other aspects related to language development were also taken into account.

The questionnaire was web-based and consisted of three parts. The participants could choose if they wanted to answer the questionnaire in Arabic, English or Swedish. The first part consisted of background questions such as age, gender, languages spoken, self-estimation of language level, educational background, length of stay so far in Sweden, and if the opportunities were available, to speak Swedish outside the classroom. The second part concerned digital activities and questions about the participants' digital habits, types of technologies used and frequency of usage with a specific focus on mobile activities. The third part consisted of six sentences in Swedish to be read aloud and recorded. Sentences 1–3 were only provided in writing, whereas a pre-recorded voice was attached to sentences 4–6 reading the text that the participants could listen to before making their own recording. The sentences were common everyday phrases in Swedish, assembled to contain typical phonemes and sound combinations (see Appendix 1). The recordings of the same sentences took place on three occasions during the study; during the pre-test before the study started, after five weeks

(mid-recording) and after ten weeks (final recording). The aim was to examine whether there was any progress between the occasions in terms of development of oral skills. Designing tests with as few as six sentences is considered to be more effective in order to achieve rigorous comparisons (Westerberg, 2012). With fewer sentences, more attention will be given by participants to being thorough in reading them properly.

In addition to the initial questionnaire and recordings of sentences, the participants also made weekly self-assessments online that concerned their mobile activity outside the classroom in a drop-down list about the frequency of use of communicative and mobile activities during the week 1) How much time have you worked with your Swedish on your mobile phone? 2) How much time have you spent speaking Swedish in your spare time 3) How much time have you been listening to/reading Swedish in your spare time?

To get a deeper understanding of the mobile activities related to the Swedish language and culture, additional information was obtained by observations of the participants' activities in the classroom of the pronunciation training in the experimental group in the classroom but also observations at seminars with the introduction programme. In total, ten weeks of about 55 hours of participant observations were conducted and field notes of the observations were made.

Additionally, 16 individual interviews were conducted with the participants who volunteered to be interviewed (10 interviews in the experimental group and 6 interviews in the control group) in order to achieve complementary information about their background and their digital and mobile activities. The interviews were performed partly with the assistance of an Arabic–Swedish interpreter and partly in English with those participants who were proficient enough to speak English. The 16 interviews conducted started after the mid-recordings after five weeks. The interviews were audio-recorded and transcribed.

In order to investigate the effects of pronunciation training, we based our analysis of the six sentences following Thorén's (2014) suggestion of scrutinising speech in-depth. In our analysis, we designed a matrix with each of the six sentences where we plotted Arabic phonemes and intonation in relation to the Swedish pronunciation, mapping deviations in speech sounds, both phonemes and intonation. Within the scope of this paper, we will not give a detailed account of the phonetic outcomes, but will present some general trends in the participants' pronunciation training progress.

Ethical considerations

The decision to carry through an experimental study was founded in the literature suggesting benefits in investing a combination of training and scrutinizing speech in-depth (e.g., Kjellin, 2002; Thorén, 2014). In addition, in order to explore the context around the usefulness of an existing pronunciation app such as Sound-to-Speak, it was necessary to use the control group/experimental group setting.

With regards to ethical issues, when setting up a study involving an experiment, since the two groups of participants belonged to different centres in the municipality, they were not aware of any differences in terms of the study settings. Although it is arguable that the experimental group had the advantage of having access to the pronunciation app, the control group had access to the same online language learning resources that were part of the ordinary programme as the experimental group had (see **Table 1** below). However, the control group was not given the classes where the group speech choir method was applied.

Prior to the study, all participants gave their consent for participation in the study. Anonymity was emphasised in the consent form as well as the possibility for the participants to withdraw from the study at any point. The participants' names and other material facts, such as place names, identification numbers, etc., have been altered

	Experimental group	Control group
Number of participants	24 persons	14 persons
Teaching part of the introduction programme	Learning basic Swedish: 2 hrs, 5 days per week	Learning basic Swedish: 2 hrs, 5 days per week
Coaching speech in class	Pronunciation activities connected to app: 3 hrs, 2 times per week	–
Survey and pronunciation test online in adjacent computer room to classroom	Questionnaire + recording 6 Swedish sentences: initially, mid after 5 weeks and final after 10 weeks	Questionnaire + recording 6 Swedish sentences: initially, mid after 5 weeks and final after 10 weeks
Weekly self-assessment to be answered individually on phone	4 questions concerning learning Swedish: Once every week	4 questions concerning learning Swedish: Once every week
Interviews	9 semi-structured individual interviews: Started after 5 weeks	6 semi-structured individual interviews: Started after 5 weeks
Classroom observations	40 hours, Mondays & Wednesdays, 4 hrs per week	15 hours, Tuesdays, 1,5 hrs per week

Table 1: Overview of the intervention and data production during a ten-week period.

to preserve their anonymity. In addition, the participants were made aware that their performance would not affect their situation in any way.

Analysis and results

In our analysis, we combined the data from interviews, observations (field notes) and questionnaire to get as complete a picture as possible. To analyse the interviews and the field notes, content analysis was used. Simple descriptive statistics was used to analyse the data from the questionnaire.

In our study, most participants were Arabic speaking Syrians from the Aleppo and Damascus region (35 out of 38 participants). The majority, 32 out of 38 (84%), had smartphones, which is corroborated by Ram (2015). However, our study also shows that only 6 persons (16%) had access to a stationary computer or a laptop.

Mobile activities

The results from both interviews, questionnaires and observations show that the participants were widely engaged in a range of diverse activities through mobile phones for the purpose of communication in general and for learning Swedish in particular, taking part in civic orientation and language training and tools for translating. All participants with smartphones and one more person (about 30% of the participants) were using social media such as Viber, WhatsApp and Facebook for communication, primarily with their friends and relatives in their home country. They also used social media with friends and family living in Sweden, but not for contacts with Swedes. Texting as well as speaking were common activities in social media.

Other, more individualised activities mentioned in the interviews were reading Arabic and some Swedish newspapers, supported by translation tools on the phone and watching Swedish news. Swedish children's programs on TV, with the use of subtitles in Swedish as support, were also mentioned as a way of getting acquainted with the Swedish language and culture. When asked about specific apps used for language training, all of the 16 interviewed participants mentioned Google Translate, which was also confirmed by the observations in the introduction programme classes. This suggests that the participants consider a translation service as a language learning app. They had all downloaded and tried out language training apps with vocabulary and phrase training such as *Duolingo*, *Fabulo*, *Vocabulary Trainer*, and *Hej Svenska (Hello Swedish)*, though only six persons (16%) used any of them on a regular basis.

Opportunities to speak

The weekly self-estimates indicated that participants had little opportunity to speak Swedish every week. The most common answer, given by 14 out of the 38 participants (37%) reported that they spoke Swedish a maximum of 30 minutes per week and did not socialize with Swedes outside of their introduction programme of 10 weeks at all. In the interviews, the participants expressed a desire to have more opportunities to meet Swedes and

talk more Swedish. In addition, observing the classes in the introduction programme, we could see that the participants had little opportunity to practice speaking. Six persons (15%) were not speaking Swedish at all in their spare time and 19 persons (52%) spoke Swedish only up to 30 minutes per week. Only one person reported speaking Swedish for more than three hours per week. Our observations were supported by the information provided in the weekly self-assessments of the participants.

Although the participants spent considerable time on their phones, they were not engaged in communication with Swedes, neither in real life nor on their phones. In fact, the ones in the experimental groups did not use the app in their spare time to the extent that they were supposed to (every day at least for half an hour). The interviews verified that the dearth of usage was due to lack of motivation in listening to sentences and recording over and over again. The participants suggested development of the app to make it more engaging and motivating. The respondents frequently commented that the time spent with the mobile phones could be spent more efficiently, if the available apps would be more coordinated and organised for self-training, at least the *Sound-to-Speak* app used by the experimental group.

Progress in pronunciation and speaking skills

When all data was collected after ten weeks, we made a linguistic analysis (Thorén, 2014) of the six sentences that the participants had recorded, comparing each participant's trajectory in the three recordings as well as comparing the control group with the experimental group. Although most participants made at least two out of the three recordings, all in all, only eight participants from the experimental group made all three recordings. From the control group, only four participants made all three recordings. Reasons for the low response were due to their social situation. Some were absent due to e.g. being away on a part-time job, children being ill at home or they had moved to another city.

Some examples of common deviations in the participants' speech sounds are commonly found within vowels. For instance, the sounds [ə] in "du" (you), is generally pronounced with [ɔ], [y:] in "fyra" (four) is generally pronounced with [t], [ɑ:] in "varit" (been) is generally pronounced with [ɛ]. Part of the explanation to this difficulty is that Standard Arabic only has six vowels whereas Standard Swedish has nine. In addition, Swedish distinguishes between long and short vowel sounds, affecting the semantics, something to keep track of in speech as well. Also, some consonant sounds cause problems, such as [ŋ] in "gånger" (times), generally pronounced [ŋg] or [n] and [p] in "köpa" (buy), generally pronounced [b]. As far as intonation is concerned, the Arabic cohort have a more monotonous melody when speaking Swedish than what is heard in standard Swedish.

As regards the comparison between the two groups with different linguistic support for speaking in the introduction programme (the control group and the experimental group), the focus was on the linguistic analysis of the individual participants' recordings of the six sentences. In

the comparisons of the recordings in the speech sound and intonation matrix, there was a noticeable development of prosody and pace between the three recordings of the participants in the experimental group, who had an improved flow and tempo in the second and third recording round. However, the same non-Swedish sounds and sound combinations generally appeared all the way in all three recordings, even with the ones participating in the experimental group who were using the app.

In contrast, the recordings of the participants' pronunciation in the control group remained unchanged, or characterised by only little change due to recognition of the phrases from previous recording during all three occasions, with slow pace and lack of flow. It is worth noting that two of those interviewed in the control group, which showed no progression in pronunciation in the three recordings, mentioned that they had participated in another training programme for Swedish for over a year without having much oral practice.

Discussion and implications

Although the sample sizes were small in general (38 participants) in our data and for the app experiment about pronunciation and speaking skills in particular (24 participants), it is still possible to see some general trends in the data. Concerning the first research question, the mobile activities which the newly arrived migrants engaged in for learning Swedish and about Swedish culture were limited in scope. Although the majority of the participants in our study had their own smartphones and were engaged in a whole range of activities with them, only some of the activities were related specifically to the Swedish language learning or learning about the Swedish society. In the majority of cases they used the mobiles to keep contacts with family and friends in their home countries. The participants reported that they used their mobile phones intensively on a daily basis, but relatively little time was spent learning Swedish with their mobile. Translating apps, for instance *Google Translate*, were a common tool for most. There were also a range of other mobile tools used by some of them, such as the linguistic training tools *Duolingo*, *Fabulo*, and *Vocabulary Trainer*. A certain self-directed learning activity was devoted through the use of social media, telephone and TV viewing via mobiles.

The findings of the study about the ways the participants used their phones will serve as valuable input for further studies, implementing elements of social networking to be investigated in connection with the mobile technology. The social side of learning, engaging in dialogic process with others (Vygotsky, 1978) is something that clearly could be developed more in the experimental group with the pronunciation app, in terms of how the participants engaged with others to learn.

Concerning our second research question, the effects of using mobile app developed for oral pronunciation practice as a complement to a traditional training course, the analysis of the participants' pronunciation development showed that the experimental group which used the app had a better speech flow and intonation than the control group. It suggests that targeted oral practice (in our

case with mobile support combined with oral practice in classes) increases linguistic self-confidence. The prosodic features (emphasis, quantity and tone) often interact and contribute greatly to the structure of speech and give each language a characteristic intonation (Thorén, 2014). The participants in the experimental group, who were working with listening and recording sentences in the app and in the classroom, were provided with a repetitive activity allowing them to become familiar with Swedish sounds. Listening to self-recorded voice recordings retrospectively provides the learners with an opportunity to track their learning progress. However, even if mobile technology supports this activity, it is difficult to make people use it to the extent needed to train in their pronunciation. In addition, development of tools and apps should be appropriate for mobile devices and smartphones.

The results of the study provide an insight into how newly arrived migrants use their mobile phones and how they take advantage of their mobile phones to integrate in the society and learn a new language. Furthermore, the results show that newly arrived migrants wish to have more contact with locals in the community so as to talk and learn more Swedish.

The mobile app was situated as a mediating resource in a context of classroom training with the Arabic–Swedish speaking teacher as well as individual practice. The next step would be to investigate how a more independent learning methodology could be adapted, to promote self-study but with opportunities for communication, participating in social processes (Halliday, 2007). The current design of the course required both a Swedish-speaking teacher and an Arabic-speaking interpreter or a person speaking both Arabic and Swedish to motivate usage.

Another result of the project is that it is difficult for the participants to find the motivation to use the smartphone for studying on their own. Unless the technology has created habits where it is used in an inspiring way, it is also difficult to use it as language practice support in a meaningful and fulfilling way. Finding routines for self-study is something that should be developed further. One such routine is, for instance, implementing elements of social means of engaging with others or gamification in the app (see e.g. Holden & Sykes, 2011; Thorne, 2013).

In order to map out mobile activities that the participants were engaging in, we followed the participants' activities during a specific time period of ten weeks to examine the potential oral development of individuals. The empirical data is therefore composed of a combination of data in the form of three online tests, weekly logging online in the form of questions for each participant to answer, as well as additional observations and interviews with the participants. This combination of methods allowed us to thoroughly map the mobile habits of the participants as well as finding out what the oral development looked like.

Concerning implications for future studies, it would be relevant to build on the data from this study by investigating various learning styles in relation to the activities people are engaged in when migrating into a new context with a new language and culture. The

time frame of ten weeks is too short for implementing new patterns of pronunciation. Also, educational background, age and existing mobile experience are important factors to bear in mind when designing training, since these factors will affect how learning is enacted. Looking ahead, more studies of pronunciation and oral skills are needed to verify the outcomes of this study, which is based on a low number of participants. The participants' social situation, such as neither having a permanent place to live nor a job, affected their participation in this study, giving us only a few participants who made all three recordings of sentences, required for our analysis. Finding ways for more sustainable contact with participants over time is something that a future study will need to consider.

A recommendation for further studies is comparing outcomes of pronunciation modules for newly arrived migrants that include a mobile app versus modules that do not include an app. In relation to the participants' comments about opportunities to interact with native speakers, such a study will therefore be very useful in informing the design and providing added value of mobile support.

Notes

- ¹ Mobile Assistance for Social Inclusion & Empowerment of Immigrants with Persuasive Learning Technologies & Social Network <http://www.maseltov.eu>.

Additional File

The additional file for this article can be found as follows:

- **Appendix 1.** The six sentences to be recorded by the participants with phonetic transcriptions in standard Swedish and an English translation. DOI: <https://doi.org/10.5334/jime.434.s1>

Acknowledgements

This research project is funded by The Asylum, Migration and Integration Fund (AMIF).

Competing Interests

The authors have no competing interests to declare.

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How to cite this article: Bradley, L, Lindström, N B and Hashemi, S S 2017 Integration and Language Learning of Newly Arrived Migrants Using Mobile Technology. *Journal of Interactive Media in Education*, 2017(1): 3, pp. 1–9, DOI: <https://doi.org/10.5334/jime.434>

Submitted: 31 August 2016 **Accepted:** 18 January 2017 **Published:** 05 April 2017

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