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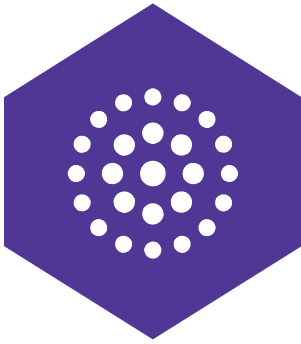
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## Mobile Incidental Learning to Support the Inclusion of Recent Immigrants

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# Mobile Incidental Learning to Support the Inclusion of Recent Immigrants

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*Abstract: Social inclusion of recent immigrants is a challenge in many countries for both immigrants and the host communities. To harness the potential of social, situated and opportunistic mobile interactions for the social inclusion of immigrants in a host country, we have developed an Incidental Learning Framework. This supports the design and evaluation of MApp, a suite of smartphone tools and services for recent immigrants. Developed within the European Union's MASELTOV project (<http://www.maseltoev.eu>), the MApp delivers language learning activities, image-to-text translation, context-aware and interest-based recommendations, local information, game-based cultural learning and social support to immigrants in cities. Preliminary field trials in Vienna, Madrid and London have highlighted issues of mobile literacy, affordability, ethics and privacy challenges, as well as insights into motivations and possible measures of success. Incidental learning implemented on a smartphone app has implications for the relationship between formal and informal learning; new systems of learner support by other immigrants, mentors and volunteers; the design of learning materials that combine immediate assistance with longer term learner development; and potential conflicts between technological affordances, e.g. context awareness and learner tracking, and user preferences among vulnerable groups such as recent immigrants.*

*Keywords: Lifewide Learning, Informal Learning, Social Inclusion*

## Introduction

Social inclusion of recent immigrants is recognized as a significant challenge in many countries for both immigrants and the host communities (e.g. Oxman-Martinez *et al.* 2012; Campomori and Caponio 2013; de Vroome, Verkuyten and Martinovic 2014). Social inclusion is “the process of improving the ability, opportunity, and dignity of people, disadvantaged on the basis of their identity, to take part in society” (World Bank 2013) and social *exclusion* is identified as a problem since it contributes to inequities in many spheres of life including health, education, citizen engagement and employment. To reduce the risk of social exclusion, and to foster inclusion, newcomers can be supported in acquiring new knowledge and skills needed for life in an unfamiliar country, but new thinking is needed to devise learning models that are in tune with these learners’ lives and their desire for social interaction (see for example Clyne *et al.* 2013). There is a particularly salient need for recent immigrants to acquire language skills in the host country’s official language or languages, including pragmatic or social use of language to build rapport with local residents. Derwing and Waugh (2012), who examined the relationship between official language knowledge and the social integration of adult immigrants to Canada, concluded that many talented immigrants, even those with relatively high language proficiency, “struggle because they do not have a grasp of the soft skills that help with the establishment of social bonds” (p.26). Pragmatic competence, or the ability to use language appropriately and in a nuanced way according to context, is difficult to teach, but Eslami-Rasekh (2005) argues that raising learners’ awareness is as important as providing opportunities to practise.

Since many immigrants rely on mobile phones to stay in touch with friends and family abroad and to obtain information about their surroundings, the phones are constant companions

and can also be used deliberately for learning (Ros *et al.* 2014). However the ways in which everyday technologies might assist in the immigrants' transitioning have remained underexplored, with some notable exceptions such as the work of Pearson (2011a, 2011b) and Palalas (2012). In a review of ICT use for linguistic integration in Western societies, Collin and Karsenti (2012) argue that since most relevant ICT tools are for autonomous learning and do not provide for human interaction, it is unlikely they would cover all language aspects needed for adequate integration:

In fact, the absence of human interaction favours the development of certain competencies and discourages the development of others, in particular OP [oral production]. Yet OP is an essential asset for immigrants when they arrive in the host country. ICT tools that fail to address this competency would therefore support only some aspects of linguistic integration, and not overall integration. (Collin and Karsenti, 2012, p.248)

MASELTOV ([www.maseltoveu.eu](http://www.maseltoveu.eu), 2012-15) is a European project aiming to respond to some of the above challenges by harnessing the potential of social, situated and opportunistic interactions on mobile phones to enhance the social inclusion of immigrants, particularly those who originate in countries outside Europe and are trying to make a new life in an unfamiliar European city. The MASELTOV consortium has been developing a suite of smartphone services and tools packaged in an integrated app, known as the MApp. The services will support navigation around the city, the development of communication skills, situated incidental learning of the target language and culture, and finally foster employability.

The project's Learning Services work package, led by The Open University, has centered on the development of an Incidental Learning Framework (ILF) to support the design and evaluation of the MApp. The first step was to consider the opportunities and constraints of 'incidental learning', in the context of a city environment where people can learn every day, informally, yet with the assistance of a smartphone and in conjunction with support structures that could be provided by organizations working with immigrants. The MApp delivers language learning activities, image-to-text translation, context-aware and interest-based recommendations, local information, game-based cultural learning and social support. Preliminary field trials have taken place in Vienna, Madrid and London with further field trials at the end of 2014 and a trial in Milton Keynes (UK) focusing on language learning planned for 2015. We consider how incidental learning with a smartphone app has implications for the relationship between formal and informal learning, new systems of learner support, the design of learning materials, and potential conflicts between technological affordances when learning takes place in multiple locations across the city.

## **Incidental Learning and the ILF**

Living in an unfamiliar city is an increasingly common human experience presenting a multitude of learning opportunities and challenges. For those seeking to establish themselves in a new place, the most urgent learning needs are focused on areas such as employment, health, transportation and daily life (Ros 2014; Ros *et al.* 2014). Whilst formal education provision can respond to some of these needs, informal and mobile learning may provide a more rapid and personalized response. Furthermore, since moving around a city can be conceived as encompassing a range of 'incidents' (e.g. social and professional encounters, unexpected events or emergencies, hearing public announcements and seeing important notices), our research has explored the notion of incidental learning. Incidental learning has been defined as "unintentional or unplanned learning that results from other activities" (Kerka 2000, p.1). We are interested in supporting this type of learning and understanding how it can become more effective and sustained.

A first version of an Incidental Learning Framework (Figure 1) was produced to analyse mobile incidental learning in detail (Brasher *et al.*, 2012; Kukulska-Hulme *et al.*, 2012; Scanlon *et al.*, 2014). The Framework considers the place an incident occurs, the task(s) the learner is carrying out, the tools the learner uses, the social support that the learner makes use of, the outcomes to be achieved and the (relative) time the incidental learning occurs. Both place and time can contain contextual information and social support can include collaborative activity. The target users of MASELTOV services have difficulty accessing classroom based learning opportunities due to their other commitments, so mobile learning offers a way of providing better access to resources appropriate to their immediate situation, including assistance with communication in the target language. MASELTOV has a goal of supporting language learning within the context in which it is applied. A central concern is to enable effective learning that takes advantage of the contexts (place, people, and time) in which the resources are used. Brown *et al.*'s recommendations for location-based and contextual mobile learning systems (2010) align well with MASELTOV's goal of supporting mobile situated language learning with multisensory contextual support. They suggest the use of metadata to mark up resources, enabling contextually appropriate material to be retrieved, careful development of notification techniques to enable contextually-sensitive recommendations and providing contextual support that adapts to the user's personal preferences and learning situations.

A particular challenge is to understand learners' needs when they are engaged in incidental situated learning as part of their everyday lives, and the Incidental Learning Framework (ILF) is a step towards developing that understanding. It allows us to both analyse mobile incidental learning by considering key elements of learning such as places, tasks, tools, etc., and how they come into play in different learning journeys across the city. The ILF has also served as a tool for communicating with designers of the tools and services within the project consortium. Testing of the framework has revealed that detailed interrogations of each element of the ILF are required to enable developers to successfully identify suitable learning approaches and resources.

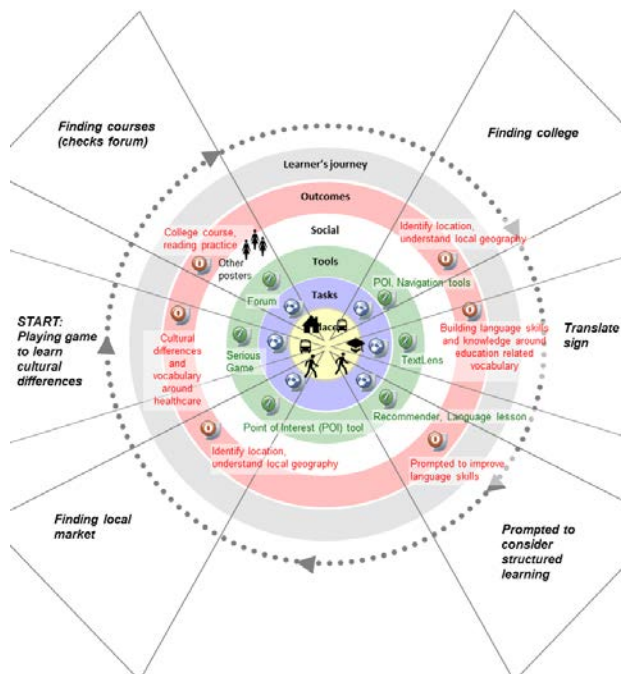


Figure 1. An incidental learning framework for the MASELTOV project describing key elements of learning: places, tasks, tools, social support, outcomes, and learner's journey.

## Design of the MApp

### *Overall Design Concept*

With a comprehensive suite of services for immigrants, the MASELTOV project (Mobile Assistance for Social Inclusion and Empowerment of Immigrants with Persuasive Learning Technologies and Social Network Services) seeks to provide both practical tools and innovative learning services via smartphones, offering a readily usable resource for recent immigrants (for more details, see Schreitter *et al.*, 2012). The prototypical service implicitly has the potential to scale up to a very large number of end users, complementing popular online social networks for language learning.

The set of individual components is implemented as an ecology of services through the integration of two concepts for persuasion, i.e., through (i) a recommendation engine and (ii) a serious game. The recommendation engine supports the empowerment of users through inter-linkage of services, associating the result of one service with another service of complementary benefit. A context sensing component is continuously monitoring the user's activity and is able to recognise events that can trigger the notification of meaningful associations. The serious game engages the user in challenging virtual tasks and provides a resource which allows users to identify through analogy which cultural differences are most prominent, the form these differences might take, and strategies to address them (Schuller *et al.*, 2013). Every component in the ecology of MApp services is integrated to nurture the user involvement in the game and hence contribute to a global motivation schema: upon successful usage of MApp components, virtual coins are obtained as rewards that can be applied in the game to achieve progress in functionality, to access higher game levels or to adjust the player's self-representation, i.e., the avatar's appearance according to individual taste (Paletta *et al.*, 2013).

The User Profile is a central component of the MASELTOV platform that makes use of a backend database for storing, logging and maintaining information about personal data and user preferences, as well as collected knowledge on usage behaviour, progress and user context recognition (Dimakis *et al.*, 2010). In this way, it enables the personalization of used services, for example triggering of personalized recommendations on MASELTOV functionalities, targeted services and assistance (Figure 2). Feedback and progress indicators that are maintained with the User Profile will facilitate the overall learning journey, allowing the monitoring of user satisfaction with the available services and offering advanced personalized targeted services such as Points of Interest to visit.

The objective of the recommender system is to issue useful personalized recommendations to its user based on the events and notifications it receives from other MASELTOV app (MApp) applications. Recommendations can feed into serious game components, such as, recommending playing a specific component of the mobile serious game, e.g., buying a ticket at the virtual bus stop. The information that is carried through the events and notifications allow the recommender system to formulate the required level of context awareness, and, in combination with a set of rules that specify the preconditions under which actions should be taken, allow it to issue targeted recommendations.

The stored information can also be used by more advanced recommender systems, either rule based ones or based on statistical processing of data. In this manner, the recommender component would enable application of rules that have been extracted to be meaningful for a whole user group of immigrants, using machine learning, to adapt to a personal progress style, and to consider specific developmental aspects of social inclusion.

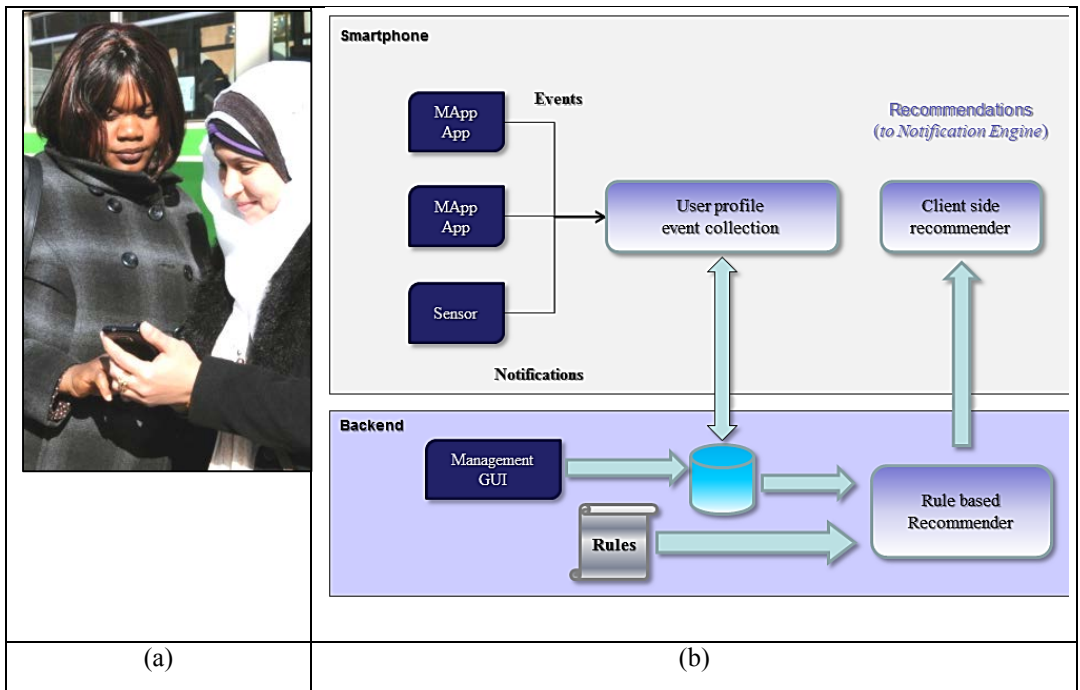


Figure 2: (a) MASELTOV used in the urban environment. (b) Schema of MASELTOV services and functional components.

### *Design of Language Learning Materials*

The incidental learning approach invites consideration of what kinds of learning resources might be made available to MApp users and how these resources should be designed. We know that many immigrants attend language classes, so use of the MApp is likely to be supplementary and closely intertwined with everyday activity. The Incidental Learning Framework has facilitated scenario-building around envisaged journeys between the home and city centre, mindful of the fact that learning might be done at home, when walking or taking public transport, in various locations around the city and on the way home. In the early requirements gathering phase of the MASELTOV project, target users had mentioned that they would need language support in locations such as the job centre, the health centre, their child's school, the police station, and so on.

It was agreed within the consortium that a collection of mobile language lessons would be produced, organised around 6 'modules' that introduce language in relation to broad themes of relevance to the lives of immigrants, covering basic expressions as well as travel and transport, healthcare, education, employment and administration. Each module is divided into 3-4 'lessons', a 'situations' page and 'emergency vocabulary'. The lessons, which use text, pictures and audio include various activities and tests, and encouragement to practise language in the real world. They are aimed at specific language levels aligned with the Common European Framework of References for Languages (CEFR) levels A1-B1.

To familiarise learners with language that might regularly be encountered in the city, the 'situations' page provides audio and written snippets. For example, this might include common announcements at train stations. This page is designed to be experiential rather than provide specific tuition; learners can spend time listening to phrases and common announcements that they are likely to hear, and consider equivalents in their native language. The emergency vocabulary is designed to be a quick reference for words and phrases that might need to be



accessed when a situation arises (such as missing a train or falling ill). Words and phrases are organised around types of situations to make them easier to access. Translations into the user's native language are offered.

To encourage users to practise language in the real world, the activities challenge the learner to use the language to perform a task in everyday life, to research some information or to practise the language by doing a short piece of writing. They also encourage the learner to participate in the social areas through sharing the results of these activities. There are direct links to an online forum for MApp users, and also to the MASELTOV language learners Facebook group.

Language learning and cultural learning are also supported in the MApp through an image-to-text translation tool which can be used to take photos of notices and posters and discuss translations in the forum, and through the serious game.

### ***Forms of Learner Support***

MApp currently provides a combination of structured learning, services for incident-focused support for users, and services that offer users the ability to connect and communicate with other users. These forms of support are summarised in the following paragraphs, after which an indication of some planned functionality is given.

- **Geosocial Radar (or Help Radar):** This relies on a database of vetted volunteers who each make themselves available to provide help at self-selected times and dates throughout the year, and in particular geographical areas. If a user of the MApp is out in the city, and an issue arises that needs an immediate resolution, the user can search for assistance using the Geosocial Radar, the radar will return a list of available trusted volunteers (vetted and registered through an organisation supporting immigrants) in order of their proximity, and will provide brief information about each person. The user will then be able to contact a volunteer of their choice via a text based chat service, the intention being that the volunteer will be able to support the user to work towards a resolution of their issue. Examples of the type of unplanned incident that the Geosocial Radar could be applied to, include a traffic accident or being the victim of petty crime. This service can also be used in a planned way, i.e. users can book appointments for support at a scheduled time and place.
- **Social Forum:** A conventional online forum is available within the MApp. This allows for asynchronous discussion between MApp users, and MApp users and volunteers. The forum can be used to chat about a range of subject matter, including language points arising from use of the language learning service or cultural points arising from use of the serious game. It can also be used to discuss personal learning goals.
- **Progress and feedback indicators:** Progress indicators available within the MApp include a view of time spent using each service represented as a pie chart. In addition, each language lesson shows a bar chart of the percentage of the lesson completed so far, and the test score achieved. Within each language lesson users can give feedback about their confidence, enjoyment and the likelihood of their using the language more, and this feedback is represented visually as a bar chart. The MApp will also 'award' the user with 'coins' as they use particular services in particular ways; these coins can be spent within the MApp game.

Functionality planned for the next release of the MApp includes a goal setting facility, and a service which generates personalised recommendations intended to enable users to progress further in their learning.

- Goal setting facility: To promote reflection on learning, the next version of the MApp may provide users with the ability to set and store learning goals. This would enable users to enter a free text statement about a personal goal and set a deadline for completion. In addition, the goal setting facility can provide several pre-set goals or ‘challenges’ which the user can choose to attempt.
- Recommendations: Users will be prompted by recommendations of steps to take to further their learning. For example, if their user profile indicates that they are interested in cookery, and the user has just completed the language lesson related to shopping in a supermarket, the MApp’s recommendation engine can send a message to the user, e.g. for learners of English: ‘We see you’re interested in cookery. Why don’t you try an English recipe to practise what you have learnt? You could try a recipe from this selection [link to recipe]’.

## Learning with the MApp

Field trial testing has been employed to test the MApp services ‘in the wild’ – in authentic conditions with target users in the likely environments that we seek to finally deploy the services. There are limitations to the authenticity: project funding limits the time and number of participants and hence some testing still has been artificial, however this is a method that generates valuable data about how the services may be used in the real world.

A first round of field trials was completed in May-June 2014 (one week duration) in London (UK), Madrid (Spain) and Graz (Austria). All services completed to that time were tested, though the recommendation service and awarding of coins was not yet implemented. Services were tested in Spanish (in London), Arabic (in Spain) and Turkish (in Austria) (Table 1). Ten participants tested the services in each location, recruited through partner organisations that support immigrants. Each trial had a different emphasis: in London, the focus was on language learning and the serious game. In Madrid, the focus was on communication skills, and in Graz, the focus was on navigation services (eye tracking study, Paletta, 2014). The participants were asked to consider their goals for learning and inclusion (e.g. to be confident in speaking on the telephone or meeting people from different cultures), try the services, keep a diary, and report afterwards on how useful they found the services in achieving their personal goals.

Table 1 MASELTOV services evaluated by Latin American, Arabic and Turkish immigrants.

| Services and Modules  | Country                         |                |                   |
|-----------------------|---------------------------------|----------------|-------------------|
|                       | United Kingdom (Latin American) | Spain (Arabic) | Austria (Turkish) |
| Profile               | x                               | x              | x                 |
| Translation tool      | x                               | x              | x                 |
| Help Radar            | x                               | x              | x                 |
| Forum                 | x                               |                | x                 |
| Navigation service    | x                               |                |                   |
| Pedestrian navigation |                                 | x              | x                 |
| Places of interest    | x                               |                | x                 |

|                         |                         |               |            |
|-------------------------|-------------------------|---------------|------------|
| Language lessons        | x                       |               |            |
| Game                    | x                       |               |            |
| FOCUS of the evaluation | Language learning, game | Communication | Navigation |

Services were generally well received; with translation and language learning tools being highly popular and a number of participants indicated that trying these services out had led to them practising language skills and further exploring the tools. Participants recognised the value of continued engagement to gain the greatest value from services. Within the short duration of the first field trial, it was not possible to gather meaningful data about progression in skill levels, but this will be evaluated in two further trials: a seven week trial in London and Graz in Autumn 2014, and a learning focussed three week trial in Milton Keynes, UK, in 2015. The Places of Interest and Navigation services were also well received; indicating that mobility and communication are two key challenges for recent immigrants. A third aspect, social integration, was much discussed with debate around the community and socially focussed services. Users were both keen on these services but also highly cautious of how they might be used. There was an enthusiasm to take advantage of a tool that might help users to interact with others, but concern to make sure they could control how their identities might be portrayed and they could choose how to interact with others.

The serious game was the most divisive service: while some participants rated it as enjoyable, others were not interested in learning through a game or found it a confusing medium. This may reflect the early status of the prototype under development, though equally may point to a lack of interest by some participants in playing games or using a game as a learning tool. ‘Playful learning’ might be a less significant mode of learning for some of the MASELTOV audience, while having tools and services that would enable situated, contextually relevant solutions to immediate problems may be more valuable.

Participants were very active in offering suggestions on how services could be improved, suggesting a high level of mobile literacy and familiarity with other services: evidence borne out by an ethnographic study of immigrants’ mobile phone use carried out in Summer 2014 by one of the project partners (Ros, 2014). Affordability was a big issue, with concerns about many of the services requiring an internet connection to work, and whether the MApp would consume a high data rate (the app itself would be free). As the target audience is generally low income, cost of connectivity is a critical consideration for whether they take up and continue to use a service.

It became clear that our audience might have low levels of literacy in their mother tongue (as well as the language of their host country), so the use of language in the interface needs to be kept simple, and voice-over options need to be offered where possible. The longer field trials planned for late 2014 will allow greater emphasis to be placed on the longitudinal analysis of use, including effect of learning over time.

### Implications of Mobile Incidental Learning

Kukulska-Hulme and Traxler (2007) suggest that mobile technologies such as smartphones are particularly suited for supporting personalised, situated, authentic and informal learning – and in the past seven years there has been considerable research into informal mobile learning (see, e.g. Burston, 2013; Cook, Pachler and Bachamair, 2011; Traxler, 2011; Meek, Fitzgerald, Sharples and Priestnall, 2013 and Vavoula, 2009). An important question raised by this type of research is: Who will support the learners?

Luckin’s notion of a ‘More Able Partner’ (Luckin, 2008) was used within the Incidental Learning Framework to describe the idea that a learner may receive support from a person, a

tool, or a combination of one or more of either of these (Brasher *et al.*, 2012, p. 25.) In conventional formal learning, the teacher is the ‘More Able Partner’, and the teacher acts according to a timetable set by themselves and/or their institution. In the MApp, the role of ‘More Able Partner’ is played by a MApp service, which can be initiated and acted upon at the time and place that an incident occurs. The service could be a technologically provided service, e.g. using the MApp’s TextLens provides image-to-text translation, allowing learners to take photos on their smartphones and receive translations of the text they have captured. Alternatively, it can be a service provided by a person, enabled by MApp functionality (e.g. via the Forum or GeoSocial Radar). As we have described in the ‘Forms of learner support’ section, a planned development is that the MApp will suggest learning goals. In Vavoula’s typology of learning (Vavoula, 2004), a teacher’s (or ‘More Able Partner’s) suggestion of learning goals is in the sphere of ‘formal learning’. Thus we can see how incidental learning supported by a smartphone can begin to bridge the gap between informal and formal learning. Other reports of this kind of bridge include Pearson (2011b) who describes how a ‘large proportion’ (25%) of migrants who had not undertaken any formal language tuition, but used smartphones to learn second language skills, subsequently enrolled in formal English classes.

An integrated app, such as the MApp, may be used on a casual basis to solve everyday problems, or it may play a role in converting casual users to more dedicated learners. One of the challenges identified in the project is getting the target audience, who may have poor prior experiences of formal education, to engage in continued learning, formal or informal. A related challenge is help the target audience reconceptualise fragmented problem-based learning episodes into longer-term learning journeys with more abstract trajectories, which we believe is likely to be facilitated by encouraging personal goal setting and reflection on learning (Gaved *et al.*, 2013). The early requirements gathering and scenario building phases of the project, together with the field trials conducted to date, have shown that trusted social networks, online and in person, are seen as important resources for solving personal challenges. ‘More Able Partner’ support and trusted social networks must therefore be seen as vital components of the incidental approach to mobile learning in the city.

## Conclusions

This paper has discussed a particular approach taken to meeting some of the challenges that recent immigrants to European cities often face, that has been adopted in the MASELTOV project. It is acknowledged that social exclusion is a risk for immigrants, but it may also be difficult for them to take up more conventional ways of learning skills that will support their inclusion into their new community (including learning a new language) and the development of local social capital. One of the principles of the approach taken by the MASELTOV consortium is to support the acquisition of new knowledge and skills within the immigrants’ everyday habits and practices.

Many reported studies on mobile informal language learning (which plays a considerable role in the MApp) have focused on informal learning as a complementary activity to a formal curriculum as noted in Burston’s annotated bibliography (Burston, 2013). The project reported in this paper aims to use learning opportunities that occur within immigrants’ everyday lives and journeys within their cities. Hence, the consortium has developed several services and tools as part of an integrated app accessed via a smartphone, and these are available wherever the learner is located, for example at home or in various locations in the city.

One key element of the project has been the development of the Incidental Learning Framework to support the design of the services that are part of the MApp. This framework has been used to both help understand the learners’ needs (and so to consider what resources the MApp should contain) and to provide a shared resource to facilitate communication between the consortium partners including service designers. It has also enabled us to analyse mobile

incidental learning by considering some of the key elements of learning (places, tasks, tools, etc.,) and how they come into play in different learning journeys across the city. The field trials that took place in three European cities showed that the services were well received on the whole with the translation and language learning tools being particularly appreciated and evidence that the tools led to practising language skills and further exploration. Data about progression in skills levels will be gathered in two longer forthcoming field trials.

Part of the efforts to understand the learners' needs have involved constructing scenarios of learners' journeys around the city and their activities in locations within the city. These have provided a context to the development of a collection of mobile language lessons that include experiential learning resources (for example, support in understanding announcements at train stations) as well as more traditional materials. The language lessons also have a focus on using real life situations and on drawing on and contributing to peer support.

This research contributes to the field of mobile learning in three ways. Firstly, the use of everyday mobile technologies is still under-researched, and so the development of services to support immigrants in this context will, we believe, contribute to our understanding of such everyday use. The focus is on a particular kind of informal learning here: *incidental* learning (*unintentional* or *unplanned* learning) that is embedded in, and arises from the learners' everyday lives, supported by mobile technology. This kind of learning has not received much empirical attention so far. One challenge here is to support learners in connecting together their episodes of learning, which may be fragmentary, into a coherent learning narrative.

Secondly in order to support language learning in everyday contexts, new approaches have been developed with more focus on experiential and in-situ learning.

Thirdly whilst many projects on mobile learning operate at small scale, the service that has been discussed in this paper has the potential to scale up to a very large number of end users, whilst also providing personalized, contextualised learning.

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*Ubiquitous Learning: An International Journal* sets out to define an emerging field. Ubiquitous learning is a new educational paradigm made possible in part by the affordances of digital media.

Ubiquitous Learning is a counterpart to the concept “ubiquitous computing”, but one which seeks to put the needs and dynamics of learning ahead of the technologies that may support learning. The arrival of new technologies does not mean that learning has to change. Learning should only change for learning’s sake. The key perspective of the conference and journal is that our changing learning needs can be served by ubiquitous computing. In this spirit, the journal investigates the affordances for learning in the digital media, in school and throughout everyday life.

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