Using participatory design in the development of a language learning tool

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Abstract
Purpose – This paper aims to demonstrate how participatory design methodologies can be used for the design of interactive learning tools for children.

Design/methodology/approach – This paper presents the methodology employed for the design of a multimedia tool for teaching Greek to young children aged 6 to 12. The preliminary data collection included interviews, questionnaires and observations, whereas the actual design of the tool was carried out using a Participatory Design methodology which advocates a design approach that focuses on the intended user of the service or product, emphasising the active involvement of users throughout the design process.

Findings – The paper provides detailed information from each of the data collection techniques used. It also highlights the successes and difficulties in implementing participatory design in an e-learning context.

Originality/value – Although participatory design has been used in the design of other systems, it is rarely used as the design framework of learning applications. So the paper expands one’s knowledge of implementing participatory design methodologies in learning.

Keywords: Design, Communication technologies, Children (age groups), E-learning, Language, Learning

1. INTRODUCTION

According to the most recent UK Census data, over 150,000 Greeks live in the UK (Office of National Statistics, 2004). Greek has often been learnt informally at home, conversing with parents, or through extra curricular activities such as evening classes, or at Greek schools which are often not local and compete with other social activities (Taylor, 1988). The outcome is that learning the Greek language is often “squeezed out” and not learnt fully or in a structured way.

The demand for learning Greek exists but the supply of new tools and texts to meet this demand is not available. Internet and multimedia tools to facilitate learning Greek are scarce in the UK and often focus on learning Greek for travel purposes and provide only basic communication skills, often without reading and writing skills or/and are of poor quality, not easily accessible and expensive.

This often results in students complaining about lectures being boring and not motivating enough. They feel that their needs are not adequately addressed by the current style of delivery.

The project reported in this paper tried to address this issue by actively involving users in the design and evaluation of a new multimedia tool for teaching Greek to young students in the UK. The design was highly interactive and employed participatory design (PD) techniques.
The students and teachers became design partners in our project and their input became a valuable component of the design decisions made throughout the project. Our goal was not so much to develop a final product, but instead to determine whether an active involvement of users in the design of learning applications is feasible and fruitful. Although PD has been used in the design of other systems it is rarely used as the design framework of learning applications. Although in other domains, it is relatively easy to convince the producer that a good match of the product to the market is necessary for economic success, in education these concepts are very often receive strong criticism. This resistance is even stronger among behaviourists who very often find it difficult to agree with the idea that the learner can (and often should) influence the design of their curriculum material.

The next section describes related work in the domain of Greek Language Learning, Computer Aided Language Learning (CALL) and participatory design. The rest of the paper describes the methodology we employed and the development of a prototype tool.

2. RELATED WORK

2.1 History of Greek Language Teaching Methods

Historically, Greek language teaching material used in UK have been provided free of charge by the Greek Ministry of Education (George and Millerson, 1967; Wright, 1983). The books are produced in Greece as the official set of reading texts, used primarily in the Greek and Cypriot education system. The material are sent from Greece to Cyprus and then to Britain at the expense of the Greek government (Taylor, 1988). A lot of the books had remained virtually unchanged since 1951. These books have two main disadvantages, firstly the Greek used is of archaic form, and secondly, the illustrations are set in rural Greece (Taylor, 1988).

Triseliotis (1976) has claimed that attendance at mother-tongue classes in evenings and weekends adds considerably to children’s physical if not emotional stress. Furthermore, as pupils grow older, and as peer group influences increase, pupils may become more reluctant to attend classes, and it has been claimed that numbers may fall off quite dramatically (Aristodemou, 1979). This adds further evidence for the need for the incorporation of computer tools to facilitate the learning of Greek in different settings.

2.2 Forms of Delivery

Greek in UK is taught in a variety of places; including nursery schools, primary schools, secondary schools, colleges, adult educational institutes, churches and community centres. The majority of Greek teaching is funded by the Greek and Cypriot governments. Of course, there is also private home tuition. Our research indicates that there are seven schools providing full-time Greek and English education; two nursery schools, three primary schools and two secondary schools (Greek education in the UK, 2004).

In addition to the full time schools, there are over 200 afternoon and Saturday courses for Greek in the UK. Greek lessons are often held at local Greek churches on Saturdays, although some are managed by the local Greek community. These special courses fall into the following categories:

- Church-run Greek classes throughout the UK (K.E.S, Central Educational Committee). They offer 72 schools across the UK, including London.
- Greek Cypriot Parent Association-run Greek schools throughout the UK (O.E.S.E.K.A, Federation of Greek-Cypriot Educational Associations of England). They offer 57 schools across the UK, including London.
- Independent Greek classes throughout the UK (A.E.S.A, Independent Greek Schools of London and England). They offer 7 across the UK, including London.
- Private Greek lessons throughout the UK (Hellenic Centre).

2.3 Computer-aided Language Learning (CALL)

Computer-assisted/aided language learning (CALL) has been around over the last 30 years and went through three phases of development: behaviouristic CALL, communicative CALL, and integrative CALL.

The behaviouristic phase of the 1960s and 1970s was based on the then-dominant behaviourist theories of learning. Programs of this phase entailed repetitive language drills and are often referred to as “drill and practice”. The rationale behind drill and practice was not totally spurious, which explains in part the fact that CALL drills are still used today (Brett, 1995). The idea behind the behaviouristic approach is based upon the premise that repeated exposure to the same material is beneficial, if not crucial, for learning a language. A computer is viewed as ideal for repeated drills for the same material as the machine does not get tired, get bored or is not judgmental. Furthermore, the computer allows students to proceed at their own pace by showing material on an individual basis, freeing up class-time for other activities (Warschauer, 1996).

The communicative CALL approach to teaching focused more on using forms. For example, taught
grammar thoroughly; encouraged students to generate original words rather than just manipulate a "made up" language; evaluated the students work rather than judged; rewarded the student with congratulatory messages etc. (Warschauer, 1996).

The third model of computers in communicative CALL involves the "computer as tool" (Brierley and Kemble, 1991), or sometimes referred to as the "computer as workhorse" (Taylor and Perez, 1989). In this role, the programs do not necessarily provide any language material at all, but rather empower the learner to use or understand language. Examples of computer as tool include word processors, spelling and grammar checkers, desk-top publishing programs, and concordances.

The history of CALL suggests that the computer can serve a variety of uses for language teaching. It can be a tutor which offers language drills or skill practice; a stimulus for discussion and interaction; or a tool for writing and research. With the advent of the internet, it can also be a medium of global communication and a source of limitless authentic materials.

A critic of behaviouristic CALL, Vance Stevens, contends that all CALL courseware and activities should build on intrinsic motivation and should foster interactivity, both learner-computer and learner-learner (Stevens, 1989). This slowly leads to the development of online communities of learners that share common tools for learning a foreign language together.

Finally the use of multimedia in CALL offers a number of advantages in language learning as a more authentic learning environment can be created, for example listening combined with seeing, mirrors better the real world. Skills are easily integrated, since the variety of media make it natural to combine reading, writing, speaking and listening in a single activity. Students have greater control over their learning, going at their own pace or progressing on their own individual route, going forward and backwards to different sections of the program, homing in on particular aspects and missing out other aspects altogether. This facilitates a principle focus on the content, without sacrificing a secondary focus on language form or learning strategies (Multimedia, and why we use them for teaching 2004).

3. PARTICIPATORY DESIGN

As mentioned in the introduction section, in this project a participatory design (PD) approach was used. PD is an approach to the analysis, design and development of technological and organizational systems that places a premium on the active involvement of workplace practitioners (usually potential or current users of the system) in design and decision-making processes.

Participatory design (PD) was first used in Scandinavian work with trade unions in the 1960s and 1970s (Bjerknes et al., 1987). Today, some of the concepts of participatory design are becoming standard practice in the computing industry. The emerging common wisdom in the major software-development companies is that it is important to design with the user, rather than to design for the user. Participatory design researchers have devised a variety of techniques to facilitate the communication of new technology possibilities to users and to give the users insight into what it would be like to work with an envisioned system. These techniques include the low-fidelity mock-ups and role-playing activities, as well as technology-aided methods such as the use of “quick-and-dirty” video animation to simulate the patterns of interaction with a new interface (Muller and Kuhn, 1993).

Every participant in a PD project should be viewed as an expert in what they do, as a stakeholder whose voice needs to be heard. The users are a prime source of innovation, design ideas arise in collaboration with participants from diverse backgrounds, and technology is one option in addressing emergent problems. A “system” should be viewed as more than a collection of software encased in hardware boxes.

It is emphasised that PD gives users a voice in the design process, thus increasing the probability of a usable design (Ellis et al., 1998; ErgoSoft, 2005). It enables technical and non-technical participants to participate equally. It also provides an opportunity for developers to meet, work with and understand their users, create a forum for identifying issues and offers an opportunity to enhance user buy-in.

The PD approach recognises that work is fundamentally social, involving extensive cooperation and communication. These principles apply in all workplaces, regardless of the specific interactions between workers and management. They are at the root of design approaches that have been developed with names such as contextual inquiry (Holzblatt, 1993), situated activity (Kuhn and Winograd, 1996), work-oriented design (Ehn, 1988), design for learnability (Brown and Duguid, 1992), and situated design (Greenbaum and Kyng 1991).

Furthermore, Blomberg and Henderson (1990) characterize the Participatory Design approach as advocating three tenets: (a) The goal is to improve the quality of life; (b) The orientation is collaborative; (c) The process is iterative.

Many participatory design projects have been a great success, such as Sun Microsystems, Cisco Systems, Logitech, and others (Tec-Ed, 2005). Participatory Design workshops are most effective when carried out early in the design process, and when ideas can be less constrained by any other design or product (CPSR, 2005).

3.1 How PD Works in Practice

All major stakeholders such as engineers and end-users working together on a design develops a low fidelity
prototype using materials such as index cards, sticky notes, paper, scissors and pens etc, for the graphical user interface and navigation of the tool. The PD team members work together to create designs that reflect the way other potential users will actually use the product. The group members are crucial for the PD sessions as their input enables the developers to understand work environments, the tasks they are trying to accomplish, what works best and what doesn’t, the issues with existing tools and what it is the users actually want (not what the designers think the users want). According to how detailed and difficult the potential tool needs to be, a PD exercise can last between 1-5 days. As a minimum the PD team works around a table to create a low fidelity prototype (paper prototype) of the GUI design. PD sessions can take place at different stages of the design cycle and is often the case in participatory designed product cycles that the users are involved in all activities of design from conceptual design to coding and final product development.

Recoding the design process in some way is crucial as a way to keep track of all the elements tried and rejected or tried and kept. This can be done by videoing all the sessions, taking pictures and keeping a log book of who attended sessions and what happened at each session. This clearly shows what has been carried out as the paper prototype gradually takes shape. Once the paper prototype is created, the group will be needed again to test the actual prototype after it has been developed, as a means of adding continual input. Then, a full-blown application can be created. In general, a one-day session would typically support one major task (a product feature) for one key user audience. It is suggested that PD groups of 4-8 individuals tend to be the most successful (Usability Evaluation, 2004).

PD groups are highly productive and use techniques which can be easily learned and applied in future activities. Good PD facilitators also need to ensure there is appropriate commitment from the organisation concerned. In essence, the PD approach encourages the researcher to be conscious of one’s own role in PD process, that is, trying to be a “reflective practitioner” (Participatory Design, 2004).

3.2 PD and the Design of Language Learning

Studies carried out by Zaphiris and Zacharia (2001a, b; 2002) demonstrated the value of the PD methodology in user-centred design of language learning applications. Zaphiris and Zacharia (2002) state that “user involvement is seen as critical both because users are experts in the work practices”. They emphasise that the rational behind their usage of PD is motivation, commitment and satisfaction of the users of their applications (Zaphiris and Zacharia, 2001a).

One of the main goals of our study is to extend the work carried out by Zaphiris and Zacharia (2001a, b; 2002) to the design and evaluation of a multimedia tool for teaching Modern Greek to young children in the UK.

4. METHODS

As pointed out in the introduction section of this paper, the project reported here tried to address the issue of absence of engaging multimedia applications for learning Greek by actively involving users into the design and evaluation of a new multimedia tool for teaching Greek to young students in the UK.

Our methodology consisted of secondary and primary data collection and participatory design activities.

4.1 Secondary Data Collection

To validate the literature review, secondary data was collected from various academic and government statistical sources. Aspiring to attain a more holistic view on what information currently exists on learning the Greek language, data was also collected from language websites, multimedia websites and Greek websites.

4.2 Primary Data Collection

Primary data collection was essential in order to further investigate how the Greek language is learnt in the UK. Specifically, key informant interviews and survey questionnaires were carried out in the Greek community in London. This was very useful in establishing what Greek learning materials exist, which learning tools are currently available, how accessible they were to different groups and ages.

More specifically:

a. A lengthy structured interview (Preece et al., 2002) with the Cyprus Education Mission representative in the UK was carried out with the aim of obtaining information about the methods and tools currently used in learning/teaching Greek in the UK. Prospects of introducing new materials and tools for the future were also discussed.

b. A questionnaire was run with the Greek community in London. The questionnaire introduced the aims of the project, it included questions on learning Greek amongst the Greek speakers, as well non-Greek speakers, the level of Greek spoken, the methods and
materials used to learn Greek, the venues for learning, and preferences for learning tools and materials, including multimedia tools. A total of 80 questionnaires were distributed to representatives of the Greek community in London. The questionnaires were handed out in key places to maximise a range of respondents: a local Greek school in South East London, a North London Greek restaurant and to Greeks in Camberwell. The questionnaires were distributed to pupils, parents and teachers at the Greek school, staff and customers at the restaurant and to the local community in Camberwell.

c. An observational approach was used to observe a local primary school (Saint Cyprians) in London where Greek is taught. Saint Cyprians is a Greek orthodox primary school with children of all backgrounds. The pupils are taught Greek for one hour every day. Observing the lessons highlighted the current methods used to teach the language to both Greek and non-Greek speaking pupils. Three different sessions were observed in a duration of one day. Each session observed referred to a different year group and age group of pupils, reflecting different academic levels. The observation took place from the back of each classroom, where the teachers conducting the lessons were observed and pupils’ responses and interaction were also noted. The researcher tried to minimise any intervention or disturbance in the sessions observed. After the observations, discussions were held with the Greek teachers to elicit their views on teaching methods and likely demand for computerized Greek learning tools.

4.3 Design Approach

Building on the findings from our secondary and primary data collection methodology (described in sections 3.1 and 3.2) we then engaged in a series of participatory design exercises that helped us develop a low-fidelity prototype of the multimedia tool.

We used a nine stage PD approach in this study. The nine stages and the individual activities under each one of them are presented in Table 1.

For the purpose of this study, a multi-method approach for capturing data was used, employing manual note-taking in conjunction with taking photographs. It was felt that video recording was too intrusive and would not reflect true responsiveness and participation of the PD group. The moderator encouraged participants to speak one at a time to avoid confusion. In line with Morgan’s (1996) suggestion the moderator made field notes after each session to facilitate data analysis. A log was kept enabling the recording of all design sessions.

5. RESULTS

5.1 Interview with Key Informant

The key informant interview with the Cyprus Education Mission representative in the UK provided useful information on the teaching/learning of Greek within and outside of schools in the UK, the content of the curriculum, how it changed over time, the teaching materials used by the teachers and pupils, prospects for the future and the maintenance of the customs and traditions via cultural events, dance and singing.

The interview also established that there are 150 schools in the UK offering evening or Saturday classes to around 7,000 students. However, the mission representative reported that the Greek teaching materials are limited and that “there is a desperate need for more”. It appears that the lack of funds prohibits the timely development and updating of new teaching materials, however he did respond positively to the question regarding the need for a multimedia tool to compliment existing teaching means.

5.2 Questionnaires for the Greek Community

Of the 80 questionnaires 49 were returned completed (61% response). The information obtained from the questionnaires was very useful in providing evidence on how Greek is learnt in the UK and what the potential demand is for new learning/teaching materials, and in particular multimedia tools.

Two-fifths (39%) of the respondents learnt Greek as a first language (before migrating to UK), and 27% learnt the language by talking Greek at home. Another 27% learnt the language by attending a Greek school and only 7% learnt Greek by attending evening or private classes.

In terms of how satisfied the respondents are with how they learnt Greek the opinions are split. 51% reported that they were satisfied; however the majority (59%) said that it was not an enjoyable experience.

The overwhelming majority of respondents (83%) who can speak Greek on some level state that they want to improve their Greek further, which is very encouraging for the development of new Greek language learning tools, especially ones that can give the ability to the user to skip to a level that is more appropriate to their prior knowledge of the language.

The respondents also reported that they would use a variety of media to improve their Greek but over one third (37%) of them stated that they would prefer to use a multimedia tool — the highest answer category. The next popular learning tool was found to be an audio tool (20%) and then books (17%).

Community
The demand for language learning tools is also evident amongst those respondents who cannot speak Greek: the data obtained from the questionnaires indicated that 75% of those who cannot speak Greek do want to learn the language. When direct asking the respondents whether they would be interested in using a multimedia tool for learning Greek, the information obtained showed that the majority of both Greek speaking respondents (i.e. 90%) and also non-Greek speaking respondents (i.e. 75%) would be interested in using such a language learning tool.

5.3. Observation of a Local Primary School

St Cyprians Primary School was observed in November 2004 in order to obtain first hand knowledge on how
Greek is taught in the UK and what materials are used. Full authorisation was obtained for the research purposes. It is the first Greek Orthodox voluntary aided Nursery and Primary School in UK and is under the auspices of the Archdiocese of Thyatira and Great Britain. It is a British state funded mainstream school, teaching Greek as a second language to all its pupils on a daily basis.

The structure of the Greek lessons were very simple and paced slowly. The lower ability group focussed on the simplest of tasks such as an introduction to numbers and words. The higher ability group were involved in using verbs in different tenses, displaying their knowledge of the Greek alphabet. The school observation was very useful in providing information and stimulating ideas and concepts which were later fed into the design of the tool and discussed with the PD group.

The results from the primary research (key informant interview, community questionnaires, and school observation) and the secondary research (literature review, statistics) indicated that there is a significant potential demand for Greek language tuition and the willingness to engage in alternatives to the traditional classroom and textbook based learning. Both Greek speaking and also non-Greek speaking members of the community stated they would be interested in using a multimedia language learning tool for Greek. However, it is important to design and build the tool reflecting the needs and preferences of the potential users, thus the method employed is vital.

5.4 Design and Build of Multimedia Tool

As explained in section 4 our design approach was structured in nine stages. Each stage is revisited here and the main results from each stage are presented.

5.4.1 Build bridges

Potential users and stakeholders were approached to participate in the participatory design of the tool. The profiles of the six participants of the PD sessions were:

**PDGM1:** This member of PD group was a 10 year old male, born in Britain with Greek Cypriot parents who has lived in Britain all his life. He currently attends Greek school on Saturdays to learn Greek and his knowledge is minimal. He also learns French at primary school. He brought learning skills and techniques from both Greek school and primary school to the sessions, he is also a representative user from the target population.

**PDGM2:** This member was aged 25+. She is female and is a Professor of Gerontology. She lives in the UK but was born in Cyprus and participates in the Greek Cypriot community. She learnt Greek in the UK with a tutor up to A-level. This participant brought academic knowledge and research to the group, as well as past learning experience.

**PDGM3:** This participant is aged 25+ and is a mother of 2 who was born in Cyprus but now lives in the UK. Her children attended Greek school and studied Greek up to GCSE level. This participant learnt Greek with a private home tutor up to A-Level. She is currently a secondary school English teacher and has also taught Greek to adults. This member of the PD group brought knowledge and concerns as a parent, as well as teaching skills and past experience.

**PDGM4:** This participant is a primary school teacher and is aged 25+. She was born in the UK and is part of the Greek community with both parents born in Cyprus. This participant learnt Greek at home. She brought children teaching skills to the PD group sessions, as well as learning experiences.

**PDGM5:** This is a father of two and a secondary school teacher aged 25+. This participant was born in Cyprus and has lived in the UK for over 30 years. He learnt Greek in Cyprus and has an academic background with a PhD. He brought teaching skills, parental concerns and learning experiences from Cyprus to the PD group sessions.

**PDGM6:** He is a student aged 16-25 yrs who attended Greek school to learn Greek. He was born in the UK but with Greek Cypriot parents. He also learnt German at school. He brought his modern and young ideas of language learning as well as past experiences to the PD group sessions.

5.4.2 Analysis of existing tools

It was decided that, as a means to bring all participants at a common level of knowledge, it will be beneficial for the PD members to study an existing computer tool that teaches the Greek language.

The Learn Greek Online service available on www.kypros.org was determined to be an appropriate tool for such an analysis.

Learn Greek Online is a free online audio tool to teach the Greek language developed in collaboration with the Cyprus Broadcasting Corporation (CYBC). It is currently composed of 105 real audio files (15 minutes each), online student notes, a collection of collaborative learning tools and an online Greek dictionary and a Greek spell checker. The text version of these lessons has been contributed to by the students of the course (Zaphiris and Zacharia, 2001a).

So the primary means of delivery are textual and auditory. There are no visual (pictures, animation, video) modes of delivery.
Having worked through the current tool lessons, the PD group felt that the tool was simple to use and useful, but there were numerous limitations:

1. Lack of visual aids and interaction with the current lessons.
2. No introduction to the Greek language (the PD team felt that the course begins at a non-elementary level).
3. Not beneficial to the younger generation, particularly children (the PD team thought that the style of delivery was targeting primarily adults).
4. Not easily accessible or available to people with little knowledge of the internet or computers.

5.4.3 Borrow ideas and investigating the constraints

The group built on the work done in activity 2 by studying additional (including paper) materials that are currently used for teaching Greek. Positive and negative issues related to each of the studied material were identified. Figure 1 shows characteristic pages from a popular Greek language textbook used for the last few decades in the UK.

The PD team also developed a number of constraints for the new tool:

- Needed to work on windows;
- Needed to be created within a multimedia package such as Flash;
- Needed to include visual, audio and interactivity; and
- There was no financial budget available.

5.4.4 Discussion of ideas for new tool

The PD group discussed possible age ranges for the lessons, as ensuring to design for a target age group was important given that they highlighted the lack of this as a negative aspect in the Learn Greek Online tool; “no age distinction”. The PD group felt that the children were particularly important within the Greek community and needed to be targeted.

The PD group brainstormed issues and ideas and discussed possible re-designs of the current tool.

5.4.5 Create & evaluate paper prototype for tool

The PD team developed a series of low fidelity (paper) prototypes. This is where all the ideas were transferred to paper, constituting a first draft of ideas for the new tool. These prototypes were then evaluated. The PD group dry ran through the paper prototypes in the form of a storyboard. They discussed and made any necessary changes to the paper prototypes. This step satisfied a precaution step for the group.

Some initial designs of the group are represented in Figure 2. They actively used the idea of bright colours to engage children. Figure 2 also shows the process of progression in the development of the paper prototype of the alphabet lesson. It demonstrates the experimentation of colour and shows how the group used colour to represent their first lesson of the alphabet showing how the group wanted to distinguish each letter of the alphabet separately.

Figure 1  Pictures from currently used textbooks
5.4.6 Build prototype

The aim of this stage was to build a low-fidelity initial prototype of the tool in Macromedia Flash. Figure 3 shows the introduction screen of the tool.

5.4.7 Evaluate prototype

The PD group carried a cooperative evaluation (Monk et al., 1993) of the prototype. The group did this in two stages. Firstly, regarding the design, the group evaluated the imagery, colouring and visuals of the tool. They listed the amendments they wanted to the colouring and particular objects moved around the page. Secondly, the PD group discussed the functionality of the new tool. They determined whether the prototype met the requirements and checked and commented as to whether the tool does what the group had originally set out to achieve.

5.4.8 Build final tool

In this stage, the low-fidelity Flash prototype was developed into a high-fidelity prototype using Flash and evaluated by the PD Group. Here the input and PD group feedback from the paper and flash prototype evaluations was taken into account and used in building the tool in Flash. This was embedded into a detailed design that eventually turned into a final product. Figure 4 demonstrates how the final introduction screen was created from the initial Flash prototype.

5.4.9 Testing and analysis of final tool

A User Acceptance Testing (UAT) document was developed and used to evaluate the final tool. The evaluation was completed by 4 out of the 6 PD group members. This was signed off by each of the four members following successful completion of the five scenarios specified in the UAT.
This demonstrates a fully functional tool. PGDM1, 4 and 5 dry ran through the Installation Guide to ensure that the tool is fully accessible to any potential user of the tool.

All six PD group members were also asked to evaluate the new tool compared to the pre-existing Learn Greek Online tool in terms of functionality and lesson content. The results show that all the PD group members preferred the functionality of the multimedia tool compared to the pre-existing audio tool. Furthermore, five out of the six PD group members reported that they preferred the lesson content of the multimedia tool. Thus on the basis of functionality and content, the multimedia Greek tool was preferred to the existing audio tool.

6. DISCUSSION AND CONCLUSION

This paper reported on a project that used participatory design to facilitate the design and build of a multimedia tool in order to improve the current methods of teaching Greek in the UK.

The project first used a variety of methods to investigate how the Greek language is learnt in the UK and assessed the potential demand for a multimedia tool. The results from the literature review and statistical sources, key informant interviewing, observation of school classes and teaching materials, and circulation of a questionnaire in the Greek community in London produced very useful information on how the language is learnt, what materials are available and how they are assessed by the users.

Given that very few schools in the UK incorporate Greek teaching as part of the curriculum (i.e. seven schools in London), the demand is met by the many classes organised in colleges and FE institutes, evening and Saturday classes, as well as learning by talking in Greek at home.

The research also found that the number and range of materials for learning Greek is limited and the textbooks provided by the Greek government are found by users to be out-of-date and uninteresting, particularly when these materials are competing with sophisticated video games for the attention of children and teenagers. Yet Kypros.org has 53,000 registered users for the online Greek lessons, which indicates a significant potential demand for Greek language tuition and an interest to engage in alternatives to the traditional classroom and textbook based learning. The school observation and key informant interview provided further evidence for the potential demand for a multimedia tool to facilitate learning the Greek language, particularly as Census data indicates that the number of Greeks living in the UK has been increasing markedly with each Census.

It was clear that the most appropriate method to use in designing and building the multimedia tool was participatory design (PD), as the aim was to produce a tool which reflected the needs and preferences of the potential users, fulfils its pedagogic objectives, and be fun to use. The results of the secondary research as well as the school observation, key informant interview and the community questionnaires directly fed into the discussions within the PD group, which consisted of six members from different ages, backgrounds and experiences of learning Greek. The different PD group sessions organised were extremely fruitful in producing the paper prototypes, as well as evaluating both the exiting audio tool and the new multimedia tool. The potential users and their input was central to each stage of the design and build of the tool.

Firstly, the results obtained from the questionnaires circulated in the Greek community indicated that although a variety of media would be used to improve the learning of Greek, over one third (37%) of respondents stated that they would prefer to use a multimedia tool – the highest answer category – whereas only a fifth reported preferring to use an audio tool (20%), and only 17% preferred to use Greek textbooks.

Secondly, the five PD group members evaluated the new multimedia tool and compared it to the pre-existing
audio tool in terms of functionality and lesson content. The results showed that overwhelmingly, all the PD group members preferred the functionality of the multimedia tool compared to the pre-existing audio tool, and that four out of the five PD group members reported that they preferred the lesson content of the multimedia tool. Thus on the basis of functionality and content, the multimedia Greek tool was preferred to the existing audio tool.

The benefits of using PD was that the PD group was highly motivated in participating in the process as they felt they each had a stake in the tool’s success. Each PD group member brought their own language learning experiences to the design table, yet also thinking about the future usability of the tool. The PD group dynamics worked well and they felt they could make many comments and amendments throughout the process. It was important to ensure that their contributions were taken seriously at all times throughout the process. The PD approach produced a wide range of comments and suggestions which went far beyond that which a sole developer could have produced, as well as tailoring the tool to the needs of the potential users and stakeholders.

The final tool was tested by each member of the PD group via a UAT document. The results from the evaluation showed that the tool was fully functional and met all the requirements.

**Limitations**

There are a number of challenges and limitations in using Participation Design in such projects especially the fact that the design process (and its progression) had to be reliant on the group, which is dependent upon bringing a consensus to group discussions and decisions. Furthermore, the PD group sessions had to be run at times appropriate to the entire group, which was not always easy. Including a 10 year old as a PD group member involved even more time and care to ensure he was given a “voice” and his input was given adequate space.

Macromedia Flash was a very useful tool for these sessions as it provided an easy to learn environment that our participants could (and did) utilize to develop prototypes of the tool. But, due to time constraints the full functionality and use of Flash (and any other authoring tools) was not utilised. Although the developed tool is functional its breadth and depth of content is limited. However, it is hoped that further development of the tool in the future will rectify this.

Ideally it would have been useful to have continued to work with the PD group to design, build and implement all the lessons within the three language ability levels (Basic, Intermediate and Advanced). However, time and resources, as well as potential PD group member fatigue, represented major barriers.

Another potential limitation was the size and composition of the PD group. It would have been beneficial to organise a slightly bigger PD group, with at least 2 members having the knowledge and experience of the tool software. This would facilitate progress in the development as well as overcome teething problems with new software issues. It is thus advised that good investment in time and effort is put in selecting PD participants.

**Future research**

The evaluation of the new multimedia tool in comparison to the existing audio tool was useful in providing information about further development of the multimedia tool in the future: e.g. one PD group member reported that he preferred the range of vocabulary and the structured ability levels in the existing audio tool to that in the multimedia tool. Another example is incorporating input directly from the user, such as voice input and manual input from the keyboard, would be a marked enhancement. Furthermore, incorporating a reward process into the tool would maximise user motivation and engagement. These enhancements can be taken into account in future PD developments of the tool.

It is also interesting to investigate ways of modelling interactions in PD sessions. A useful modelling framework that we are exploring is that of activity theory. An activity theory driven model will enable us to better select participants, better organize PD sessions and more accurately document interactions.

It is hoped that this tool is viewed as a useful investment for further development and improvements in the future. As ideally the project’s wider and longer-term aims are to help boost levels of spoken Greek in the community and facilitate greater communication across the generations and the wider UK Greek speaking public. For that reason, it is in our plans to disseminate our findings to the community and engage in future developments of this project.

**REFERENCES**


Panayiotis Zaphiris is a Senior Lecturer at the Centre for Human-Computer Interaction Design, School of Informatics of City University, London before joining City University. His research interests lie in HCI with an emphasis on inclusive design and social aspects of computing. He is especially interested in HCI issues related to the elderly and people with disabilities. He is also interested in internet-related research (web usability, mathematical modelling of browsing behaviour in hierarchical online information systems, online communities, e-learning, web-based digital libraries and finally social network analysis of online human-to-human interactions).

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