Main Study

Using mobile technology for teaching a second language to dyslexic students

by
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Part 1

Introduction

Introduction

Education should be the foundation for independent living in the big wide world. Across Europe there are ongoing arguments over how to adjust the mismatch between the skills learned in school and those required to take a meaningful place in the real world, including the world of employment. This discrepancy is highlighted especially with SEN children, who find it difficult to engage within the framework of traditional teaching, whereas they clearly show talent in learning important life skills outside the school setting. If the content and delivery are engaging and motivating, these individuals can find ways to overcome their learning difficulties. Anecdotal evidence suggests that the more education resembles motivating real life situations, the more the SEN child can be successfully integrated into mainstream education, even if not necessarily working at the same level as their peers.

Technology has enabled many special needs child to engage in the learning process at a level not previously experienced through individualised e-learning and assistive technology (see for example, Smythe 2004). However, the latest directions as exemplified by Web 2 activities will leave many in this group disenfranchised due to the inconsistency between the skills necessary to engage in these activities and the skill set of this special group.

When O'Reilly coined the phrase "Web 2.0" in 2004, his version of the future was through empowerment of the individual to engage in the process of the web development through collaboratively creating, sharing and referencing content, e.g. blogs, wikis, social tagging, podcasts, etc. However, for the special needs individual, this apparent opening up to all really means opening up to all except the SEN individuals.

The defining issues of the dyslexic individual are problems with the reading and writing elements particularly when carried out in real time (e.g. chat) within social networks. The brief attention span of those with ADHD will create its own problems, while those on the Autistic Spectrum will have problems of social skills i.e. social networking which may need careful management as netiquette and boundaries are much less understood. However, through careful development of a system that acknowledges their strengths and weaknesses, it is possible not only to compensate for these difficulties but also to use social networking as part of a learning (and socialising) strategy, and re-engage those who would otherwise be marginalised in the new web environment.

About Dyslexia

The European Dyslexia Association defines dyslexia as “a difference in acquiring reading, spelling and writing skills, that is neurological in origin.” (EDA, 2008) Furthermore, they suggest that “It may be caused by a combination of difficulties in phonological processing, working memory, rapid naming, sequencing and the automaticity of basic skills.” It is these underlying cognitive deficits and their impact on development of living as well as learning skills that cause dyslexia to have consequences well beyond literacy in the first language.

More specifically those skills such as sound discrimination, sound analysis (pulling sounds apart), sound storage, sound synthesis (putting sounds together to make new words) and memory which cause first language literacy difficulties will also cause problems in learning additional languages. The feeling of frustration and failure in front of their peers will lead to low motivation to learn any subject, especially another language.

Web 2, e-learning and mobile phones

Berners-Lee (Anderson, 2006) has argued that many of the functions that Web 2 apparently offers already exist elsewhere. Irrespective of when they were “invented” the increased focus on certain functionality in Web 2 encourages exploration of new combinations of pedagogy and technology.

According to Nicholls (2003, p3) “The choice of eLearning tools should reflect rather than determine the pedagogy of a course; how technology is used is more important than which technology is used.” He went on to suggest that “Technology is pedagogically neutral” and that “The selection of education approach or philosophy is therefore more important than the selection of the technology itself.” He also suggested that "technology is not content, and technology is not process." Yet if the technology is the only way these individuals will access the specific content, it becomes integral to the process. Furthermore, if pedagogy refers to "the principles and methods of instruction" (http://wordnet.princeton.edu/, accessed through www.dictioary.com) and the method, i.e. the mobile phone, makes a difference, then clearly the technology is part of the pedagogy. Put it another way McLuhan appears to be shown correct again in his phrase "The medium is the message" and we need to study the medium more, as it will impact significantly upon the content.

The question posed by the EU funded project Calldysc (www.calldysc.eu) was whether in the case of these SEN children it would be possible to use the mobile phone (as opposed to the web or CDs) as the medium for learning a second language, an area usually neglected in their teaching. Furthermore, was there potential in using the Web 2 principles to teach, or at least provide motivation toward

re-engagement with a subject that is increasingly important in an international working and living environment.

The Web 2 activities could be described as like speaking instead of just listening, of writing not just reading. And that is when the problem lies. Moving from a receptive to a productive culture creates difficulties for many dyslexic individuals, from the challenges of writing to the interaction of social networks. The problem is about making public ones weaknesses. Having had to endure the ridicule and humiliation of ones peers, they will obviously be reluctant to expose themselves again to such attacks on their self-esteem.

By building a special community for dyslexic learners, Calldysc project provides evidence that a shared environment can be made to overcome the basic fears and negative first experiences of this group who normally have difficulties in learning a new language. The Web 2 principles, including social networking, shared environments, personal blogs, and collaborative learning, even across national boundaries, were adapted to the needs of this group by user prompts, short text, high levels of interaction and other techniques to promote re-engagement into a field many SEN children leave at an early stage.

A blended learning environment was developed where the dyslexic pupil was re-engaged to language learning on mobile phones and portable Playstation game consoles (PSP), and collaborative content creating and sharing activities through a social networking frame. These language teaching games were designed not to substitute traditional language teaching, but as part of a blended learning methodology.

Informal and post-modern theories focus on the origins of the drive for learning and the diversity of the learners and the learning environment (Kilgore, 2001). They emphasize the self-taught nature of learning and how learning in various places can often be more effective than classrooms. Motivation is a key issue when re-engaging SEN pupils, so our learning frame gives them the choice of device (mobile phone, game console or computer) as well as the environment (classroom, remote stand alone or computer mediated peer-to-peer).

Special attention is paid to the learning preferences of the dyslexic student. The teaching material reflects these special educational needs by:

- Multisensory teaching, where the simultaneous, multimodal information processing of the ADHD pupil is better suited. Also, the dyslexic learner responds better to teaching, where the orthographic, phonetic and semantic element of language is presented together. Multimedia programming makes this task easy to solve.

- Non-competitive, collaborative environment, where students' self esteem is not challenged. Most feedback given to learners are positive and individualized, there is no comparison with the results of others, whilst personal improvement can be tracked.

- Game- like learning activities to raise motivation and keep attention. As these games are short units of teaching content (micro learning), they better fit the smaller attention span of ADHD students and they do not resemble the already feared traditional learning format.

- Activities are built up from the easier passive listening level towards the more demanding active (written and spoken) language production to overcome anxiety and oppositional attitude towards learning.

- Dyslexia friendly solutions are used wherever possible. For example there are mother tongue audio instructions to the games, writing is aided by drop down menus to chose words from.

- Careful attention was paid to the collaborative elements, to minimise the potential for ridicule and embarrassment that frequently occur to dyslexics in traditional learning environments. Thus while in some instances several children using one mobile device can be a good learning environment (Lan, Sun and Chang, 2007) due consideration was given to how this part was implemented.

Aims of the Main Study

- To identify how the individual with dyslexia or specific reading difficulties responds to each of the technologies and different language teaching methodologies, and how the positive aspects of those technologies can be brought together to form an integrated learning environment that can be adapted to the needs of the learners with dyslexia and additional language difficulties.

- To create a blended learning environment where the pupil with dyslexia can thrive through integrated e-learning linked to computer moderated peer interaction, with human supervision.

- The innovation of this project is to take concepts understood by e-learning, and consider how these can be more inclusive of the target audience. This will be undertaken by integrating latest technologies with the potential to create increased motivation in a potentially disenfranchised group.

Hypotheses which are tested through the project

- Students with dyslexia learn more quickly through the use of new technologies that can engage them than using conventional teaching methods alone.

- Individuals with dyslexia find using ICT methods more motivating than conventional teaching methods.

- The motivation of students with dyslexia to use the technology in learning languages is higher than that of students without dyslexia.

Part 2

Methodology

Methodology

Testing language skills

The purpose of this research was to demonstrate the motivational aspects of the technology. However, rather than just demonstrate the engagement with the technology, it is preferable to also show knowledge acquisition. For this reason, where possible students were given pre- and post-tests using a vocabulary knowledge scale.

Wesche and Paribakht (1996) developed their vocabulary knowledge scale which was intended to overcome a simple yes/no evaluation of language skills. Although this is not strictly a progressive scale (Meara, 1996) they did suggest a framework for understanding skills which the child could self-evaluate using a knowledge-certainty matrix principle (Segler, Pain and Sorace, 2002). The five stages are as follows:

1. I don't remember having seen this word before;
2. I have seen is word before but I don't know what it means
3. I have seen is word before and I think it means...
4. I know this word. It means...
5. I can use this word in a sentence e.g....

Where possible, each child was given pre- and post-test using this principle in the areas which were to be taught, namely:

G1 Animals and clothes
G2 Food and colours
G3 Verbs and numbers
G4 Colours/nouns and adjectives/nouns
G5 Short sentences

Attitudes

Questionnaires were developed in order evaluate the attitudes of pupils and teachers to technology as well as language learning.

Games development

The activities are designed to include the most popular aspects of everyday web and mobile usage building on a carefully selected vocabulary using repeated exposure to maximise the learning potential (Cobb, 2007). Activities included social networking, editing and sharing personal data and playing synchronous mobile games.

A simple illustration of how the Web 2 principles are adapted for this user group is the personal profile. Instead of the traditional open ended approach to social networking website profiles, the user is able to minimise their writing by selecting from a short list of alternatives highlighting common interests and hobbies, accessed through the mobile interface. Thus the activity is encouraged but not restricted by their difficulties.

In “Wordchain” learners create word chains illustrated by photos taken by their own mobile phones. The player takes a picture of an object (e.g. a red dress) which is published on the website via their mobile phone and the players tag them by using appropriate vocabulary learnt in previous phases: e.g. red dress. Other players can continue the chain with another picture that retains one of the elements (e. g. a “yellow dress” or “red car”). Thus for each addition they only need to add one word. This helps develop the association between the concept (picture) and the written word in a collaborative environment.

Some activities use mashup features, such as a purpose build “community” online dictionary to help students find out the meaning of new words more easily, and collaborate to enhance the dictionary. In another activity, the kids develop their own teaching/learning content to share with others, giving true/false responses to questions about photographs derived from the Flickr picture database. A more subtle and “combative” collaborative learning environment is “hangman” where players use there own mobile so challenge each other, irrespective of their location. The players take it in turn to guess words drawn from the project database.

Pedagogical and technical aspects of Calldysc

The full range of activities in Calldysc includes solo games, synchronous two-player activities as well as the Web 2 activities. Teachers are able to monitor the students participation in these activities through the Learning Management System which monitors results. Data collected include time of activity, final result, intermediate results. The students progress can therefore be monitored. Note that it is more important to see the kids using the system, i.e. they are motivated, than the actual results. However, it was interesting to see that they were keen to learn, and showed progress in language acquisition. Clearly only a longitudinal study would be able to show if the gains were long term.

From a technology perspective, for easy of programming and widespread use and phone costs/availability, the Nokia range was chosen, with the N70 as the preferred device. These robust Symbian devices were a cheap option providing all the necessary features, from internet connect to accepting memory cards. The programming language was Adobe Flash, using FlashLite 2.0 which worked consistently across all devices. Other phones were also used provided they conformed to these specifications.

Calldysc games

Calldysc language teaching games have been designed not to substitute traditional language teaching nor the teachers themselves, but to supplement and augment the traditional materials and methods, as part of a blended learning approach. They are designed to help the dyslexic individual (re)engage in a second language learning environment.

The specific target group is the dyslexic pupil, whose learning preferences are defined and responded to according to age, special needs and earlier experiences.

The teaching material reflects these needs by being:

- Multisensory
- Non-competitive (or at least not “high stakes” competitive)
- Game–like
- Focused on positive feedback
- Built up from passive listening levels towards more demanding active (written and spoken) language production.

The activities have been designed to include the most popular aspects of everyday web and mobile activity of the target group (social networking, editing and sharing personal data, playing on-line games). The games are rendered in a sequence, based on difficulty level, but they can be played in any order. The principle for the project was to concentrate on integrating the multimedia using appropriate pedagogy and data management systems rather than develop new technology. The games can be played on various platforms, such as mobile phones, pda, mda, sub-notebooks and PSP game consoles, and are designed to work both offline and online, depending on the game and the connection limitations.

The full range of games developed is as follows, with brief descriptions.

C01 Vocabulary game
C02 Opposites
C03 Spell the word!
C04 Spell the sound!
C05 Memory game
C06 Dressing game
C07 Paint me!
C08 Hangman
C09 Wordchain
C10 Numbers game
C11 I like/I don't like
C12 True or False?
C13 Personal Profile
C14 Calldysc community
C15 Guess who!

For a full description of these games, please see the Games Report

Participants

Participants were recruited from local schools and those know to be dyslexic either through the direct work of the partner, through the local dyslexia group or through specialist tutors.

- The principle target group is those disaffected pupils with dyslexia who are aged over 10-11 years who have difficulties engaging with traditional methods of language learning.
- The countries undertaking testing (Poland, Hungary, Bulgaria and Sweden) have different learning environments as well as orthographies and differing levels of technical support.

Language choice

The English language has been chosen since it is a part of the national curriculum of the respective countries. The countries of Romania and Wales provide an opportunity to look at other languages, to see how the system could be generalised to other contexts, such as Hungarians learning Romanian or English speakers learning Welsh.

Technology

The partners of the project recognised from the start that the technology was changing rapidly, and that the term “mobile” as was not as clear as previously. Furthermore, there is ambiguity in its use as referring to the technology, non-fixed learning and “away from the classroom” learning.

Therefore it was necessary to clarify the terminology and the direction of the project.

Converging technologies blur the lines between hardware. Some of the mobile phones, such as the T-Mobile Ameo, with 600 x 450 pixel screen provided as much processing power as some of the early netbooks. Furthermore, some netbooks had phone built.

The stated aims of the project were to develop second language learning for use on the mobile phone. Although this is best carried out away from the classroom, problems of security and the shortage of suitable phone in some countries mean that alternative approaches were used in parallel. Using the mobile phones in the classroom, and the use of netbooks, provided alternative scenarios and greater potential to engage in the learning.

The standard phone for the project was the Nokia N70, chosen for its reasonable cost, wide availability (at the start of the project), robustness, and ease of loading the games.

All games were programmed in Flash. This meant that not only were they available on the chosen mobile phones but also they could be access through the internet on all types of browsers without reprogramming, since it is the browser that reads the Flash.

The games were also tested on the Sony PSP, through the browser. Due to the high cost and limited take up in partner countries, meaningful statistics were limited. However, where they were used by experiences PSP users, they were found to be very engaging. The novice user found the typing within the PSP difficult, but the hotspots clicking was well received.

Market share

The survey of technology currently used by participants, collected as part of the pre-test questionnaire, revealed the following usage.

LG	2.6
Motorola	6.7
Nokia	39.4
Philips	0.5
Sagum	1.0
Samsung	14.5
Siemens	3.1
Sony Erikson	32.1

The most popular phone was the Nokia N70, with more than 25% owning that phone. However, another 25% were unsure what Nokia they owned.

Data collection

Data was collected using a sophisticated learning management system developed specially for the project. The system had login for each pupil, and data managing to see how each child was progressing. Results were provided in terms of what games where played when, and results at the overall level and the level of each response. Thus for example a result from the vocabulary game indicated the success in that game as well as which words were a problem.

Results

Pilot study

One of the purposes of the Pilot Study, that was carried out from June till November 2007, was to obtain feed back information on the testing methodology. Information gained here were implemented into the final, Main Study protocol. We had to see how much time the pre-tests take in the dyslexic and non-dyslexic groups, so that our teachers could better plan in the main testing. Also the methodology of taking the tests was examined: as a consequence we developed a downloadable/printable paper version and a digitalized one also, because feed back was diverse on whether which method is preferable.

Theoretical testing proposal for the main study

A mixed methodology is being used – a combination of qualitative and quantitative methods will be used in order to gather information prior to and after the technologies have been used.

Baseline and post- testing occur with the students in order to determine progress made on both learning the vocabulary and the motivation to engage with the learning and to explore ease of use with the technology itself.

The following study design is proposed for the project. This represents a simplistic design in an ideal situation and may have to be modified in each country according to the setting.

Baseline information

An individual assessment of each student engaging with the project takes place (both in the test and control groups). This includes (but is not limited to):

- a report (supplied by the student's teachers) of the student's current reading, spelling abilities in their first language to identify students with difficulties consistent with dyslexia
- A questionnaire from the teacher about their perception of the student's motivation towards learning a second language
- a basic technology assessment (to gauge the student's ability to access the resources being used)
- learning styles preferences checklist (to consider whether the techniques being used are suitable for the " style" of student)
- a motivational questionnaire for the student about learning languages

Implementation

- Students in the control group carry on with traditional teaching methods without intervention.

- Students in the testing group are likely to go through the following stages:

1. The available ICT resources are introduced to the teachers and students (the process of this will vary depending on the context).

2. On the student's first usage of the ICT resources, data about the student's current level of abilities within the second language will be established and recorded for comparison at the conclusion of the testing phase.(specific tests will be determined by each country)

3. The ICT materials are incorporated into the teaching curriculum for use alongside traditional teaching methods for at least 6 weeks.

Post-test information

For both the control and testing groups the baseline questionnaires are re-administered with the student and teacher. In addition additional data will be gathered with regard to games usage (such as number of times the game was used, time spent on the games, progress etc.) and this will also be collated.

Part 3

NATIONAL STUDIES

Bulgarian Partner Report

A) Identification of the cohort

For the purposes of the project 148 /81 boys and 67 girls, aged from 11 to 14/ were tested for symptoms of dyslexia. Were formed 4 /four/ work groups with dyslexic pupils, 6 /six/ pupils in each. In addition were formed 2 /two/ control groups – in one of them dyslexic students who haven't played game, and the other – non-dyslexic pupils /2nd grade/ who has just started learning English.

B) Students' attitude and motivation

Based on the analysis of the student pre-test and post-test and observations
According to the pre-test:

– English lessons are not interesting;
– Can't understand teacher's instructions;
– Despite of the efforts have difficulties to learn the words;
– Most of them can read and write no more than 10-20 words

\Why they would like to learn English?

– Because English is the most relevant language in the world;
– Because it could help them in their future job;
– Because they would like to be able to communicate with their peers from the other countries;
– Because they would like to travel; to understand people in the other countries and to be understood;

C) Teachers' attitude and motivation

Based on the teachers pre-test and adult feedback questionnaire
According to the pre-test:

– Lack of motivation;
– Difficulties to learn English words /even if the children have written a word a numerous times, it rare brings the results/;
– Difficulties to read /caused by the fact that English is not a transparent language/;
– Difficulties to understand even simple instructions /the reason is not knowing the words/;
– Severe difficulties with writing /most of the children writes the words the way they hear them/

D) Test results, learning outcome

- Children think the games help them to easily learn new words – their meaning, and also how to read and write them;
- They think this way of learning English is much more interesting, because they can play and learn at the same time;
- No matter if they are dyslexic or non-dyslexic the pupils found the game interesting and useful;
- They shared they would like to be able to use the Calldysc games in their English classes;
- Teachers like the games, many of them shared that their students /those who took part in the testing/ had learnt a lot of words, started to read and write better, and are not afraid of English any more. Teachers also said they would be happy to have a chance to use these or other similar games in their classes, along with the traditional teaching methods.
- Parents were amazed to see their children interested in learning English, after years of difficulties. Some of them not only express their satisfaction of the results, but also encouraged their children to play the Games at home.

E) Language or country related issues

Anything you find different from other countries, with respect to e.g. language, technology-cultural –legislation background
The difficulties with learning English for Bulgarian children comes from several facts:
- In Bulgarian we use a different alphabet /Cyrillic/;
- In Latin and Cyrillic alphabets there are 11 /eleven/ letters that look the same, but they express different sounds, e.g. B is for [b] in English, but for [v] in Bulgarian; P is for [p] in English, but for [r] in Bulgarian, and so on;
- In Latin and Cyrillic alphabets there are 2 /two/ letters that look the same, but reversed – N for [n] in English and *И* for [i] in Bulgarian, and R for [r] in English and *Я* for [ia] in Bulgarian.
- Bulgarian is very transparent language with very strong rules for reading and writing /with almost no exceptions/; English from the other side is very difficult for the pupils because of the difference between what they see on the paper, what they have to pronounce, and what they have to write.

F) Why the CALLDYSC project is important for Bulgaria?

– Gives a new way of studying English;
– Based on new technologies;
– Can be used out of the classroom and at any time;
– Challenge the kids to complete the game; at the same time there is no punishment if they make a mistake
– Forms feeling of friendship teaching kids to work in collaboration instead of concure each other

Hungarian Partner Report

by Eva Gyarmathy

This is a review of the study on the use of the Calldysc English learning Programme for Dyslexics.

The report includes:

A) Report on the first experiences on the use of the programme
B) Identification of the cohort
C) Students' attitude and motivation
D) Teachers' attitude and motivation
E) Test results

A) REPORT ON THE FIRST EXPERIENCES ON THE USE OF THE PROGRAMME

During the use of the programme, some hitherto unidentified errors and a range of developmental possibilities came to light. These can be grouped into two, namely, technical and learning-related remarks made by teachers and students using the programme.

Technical issues

- The learners' interface does not indicate the name of the games only their numbers. It would be a good idea to include the names, as well.
- Many forget to save their results. A message, like the one used in the Microsoft Word processor could pop up saying "Save? Yes - No".
- The lesson Opposites can only be saved from the main page, but not be from the learners' interface – not even after several times.
- In the lesson People, the programme gets stuck at the words son and daughter, beside failing to translate these two words into Hungarian and playing the pronunciation loud.
- In the Vocabulary Game, the program get stuck in teaching 'I have'. It won't even say what it is in Hungarian and the programme stops there.
- In Activities, not everything is said aloud in Hungarian, and, consequently, the meaning of 'I have' remains unknown to the learner.
- Why is 'I have' under Activities? It is not an activity, similarly to 'I am'. They should be called verbs, instead.
- In Spell the sound, some of the words cannot be heard.
- In Spell the sound, it can be annoying that although the programme keeps counting back from 180 seconds, it often stops pronouncing words to be spelled. Thus, the clock is ticking but the game is not progressing. Sometimes, this happens after 25 words, but sometimes as early as after 2 or 3 words.

- Spell the sound is mute. Neither the learners, nor even the teachers know about the "secret code".
- In Spell the word, it is difficult to see what the task is, because apart from the counter going down, nothing else is happening and the learner is at loss what to do.

Learning issues

- The way the programme teaches words from the very first lesson on is good and helpful. This is what gives the learner enough strength and courage to go on, and this is what is painfully missing in later lessons. In the later lessons, the tasks are not confined to the taught vocabulary and the programme does not teach the words in expressions separately any more like it used to in the beginning. The feeling of former security is lost.
- It is very advantageous that one can listen to the pronunciation of words over and over again.
- The Pair game brings a lot of fun and joy, so that the learners will play it again and again.
- A learning variant to the Pair game: the teacher prepared a domino game using big capital letters.
- It is a shortcoming that there are words on the screen which are not translated. Every single word should be translated and pronounced.
- The question arose what 'activities' meant, and I proposed using the sztaki dictionary (on of the most popular Hungarian online dictionaries). Prompting the use of online dictionaries might be included in the programme. The learners are also interested in words not strictly related to the learning material. For instance, in the titles of games like Vocabulary.
- It is an asset of the game True or false that it is full of new pictures and sentences. However, students can, unfortunately, only pronounce familiar words, but not such sentences! There are many words which can only be guessed from the pictures, but some cannot even be deduced, and as a result, the game is based on guessing, while the only feedback is whether the sentence was true or false, but not its meaning. Thus, the learners might easily be misled by their guesses.
- The secret key works fine in Spell the word, which enables one to practice see-and-hear dictation, which is an essential and indispensible step in teaching writing even within the bounds of Hungarian language. Given that the programme targets children with learning difficulties, a much more thorough and gradual approach is required than usual. These children usually have shorter term memories, owing to which internalization is slower and more difficult. Maybe this key should not be secret, and let the programme say the words aloud!
- There should be a learning phase for sentences, as well, similar to that for words. That is, the learner should see the sentence written down, hear it pronounced and translated and see it on a picture.

- It would be beneficial if the programme pronounced sentences, as well, in English. At least some of the simpler ones. Learners have to listen to words a lot of times, but in sentences, the end of words are even less articulated. Sound discrimination and sequentially constitute serious problems for dyslexics.
- It would be a good idea to develop a vocabulary building game in which the learners could select the picture they wanted to learn. In other words, they could, e.g., chose the animals, upon which the pictures of animals would appear, and whichever they click on, the relevant word will be displayed and pronounced. And a similar construction for sentences would be good.
- Most of the learners can only fill in the questionnaires with help. They particularly don't want to write.
- It is a serious shortcoming of the programme that in Spell the word, the word is pronounced! Writing and pronunciation should always go hand in hand!! Especially when the learner is spelling it. This is how the image of the written word is associated to the sound. Spell the sound can come after that.
- In Spell the sound and Spell the word it would be a good idea to display the picture of the word so that the learners can be sure what the meaning of the word they are writing is.
- It would be nice if teachers could send a private message to their diligent learners. This could be a further source of motivation.
- The programme should read the texts in the Profile aloud, as well. A least the part the learners compile on themselves. Ian has a text-to-speech software.

B) IDENTIFICATION OF THE COHORT

The programme was tested from October to December 2008 in Gyermekház School, Budapest. Most of the children in the dyslexic group display further achievement and behaviour disorders which make learning and integration even more difficult for them. The preliminary study showed that most children, irrespective of age or grade were virtually at beginner's level in learning English. The same applies to the group of non-dyslexics.

The grade levels of participants:

11 persons in the 4th grade
19 persons in the 5th grade
27 persons in the 6th grade
2 persons in the 7th grade

There are no grade-level differences between dyslexics and non-dyslexics.

C) STUDENTS' ATTITUDE AND MOTIVATION

The students used the programme at school in lieu of English lessons. As there were no English teachers, they worked independently with the help of a teacher who knew the programme well. It was apparent already on the first occasion that they can learn very well using the programme. They played diligently and there were no behaviour problems, which otherwise occur frequently in lessons.

About a quarter of the students used the programme outside school, as well. They didn't have a suitable mobile device available, but they had access to the games through the internet.

According to the students, they like learning much more with the programme. They felt that words simply entered their heads just like that.

D) TEACHERS' ATTITUDE AND MOTIVATION

All of the teachers rated the importance and utility of the programme, as well as its place in everyday education very high. A third of the teachers who got to know the programme are still using it continuously and regularly, and a second third of them occasionally use the programme in teaching.

Due to technical and financial reasons, the teachers primarily use the online version. They are of the opinion that few students can obtain an appropriate mobile phone, which means that it is not worth buying and using a mobile phone for themselves. Even the teachers using a mobile phone prefer the online version.

The teachers agree that programme can be a very efficient tool for teaching support. According to the teacher of the test group, the programme might be sufficient in itself to learn English at a beginner's level.

Several teachers created additional materials to accompany the programme. The same words and pictures appeared on filmed cards that were used in the programme. The students thus played even more with the words they learned. This is of great importance given that dyslexics quickly forget the words they learn.

E) TEST RESULTS

The students used the language learning programme for two months. We tested the students' performance before and after using the programme.

According to the test results (see attached), both dyslexic and non-dyslexic learners made progress in their knowledge of English, but in a different way.

Non-dyslexics showed no progress in learning words, because they knew the words more or less already before using the programme. As regards expressions, their translations from English to Hungarian was even a little weaker after using the programme. A reason for this might be a slight fluctuation among the participants. Some of the subjects in the non-dyslexic group left and new ones came. The change was not significant and was below 10%, but it did affect the results a little. The non-dyslexic group, however, showed considerable progress in translating Hungarian expressions into English.

The dyslexic group showed significantly better results in all task types after using the programme. Notwithstanding the great advance, however, they still didn't reach the results that the non-dyslexic group produced even before the use of the programme. In sentence formation, both groups produced basically zero results before using the programme. The little score the dyslexic group showed is fully the achievement of a single dyslexic girl. She had learned English outside school, as well, and consequently produced better results already before the testing, even compared to the non-dyslexics.

Since we also scored spelling, this constituted a huge loss in the results of Hungarian to English translation in the case of dyslexics. Their progress in spelling cannot even be measured, given that at the time of the preliminary testing, they didn't know the words to begin with, or even if they had learned them, they had already forgotten them by the test.

During the use of the programme, the dyslexic group showed progress primarily in learning words, while the non-dyslexic group in spelling English words and expressions and in sentence formation.

As sentence formation is not focussed enough in the programme, only those dyslexics showed some progress in this area who had access to extra help. Non-dyslexics had less difficulty in forming sentences.

To summarize: The results of the tests show that the programme induced significant progress after only two months' use in the case of both dyslexics and non-dyslexics. However, the way these two groups progressed is different.

Polish Report

A) IDENTIFICATION OF THE COHORT

Introduction, how many students, what age, how many dyslexics participated

CallDysc games were tested several times through the life time of the project by the project team in the Centre for Continuing Education in Sopot and their relatives (children with and without dyslexia). Short test results with remarks, indicators and information about necessary amendments to the content and technical part of games had been given to the project technicians and games designers.

Children with dyslexia were involved in two main project pilots organised in Poland:
- first pre-test (pilot) took place during the Partner meeting in Sopot in October 2007
- final test and took place in March and April 2009.

Number of students

Pilot tests: 5 pupils, 13-15 Dyslexics from Secondary School no 2 in Sopot
Main tests 72 pupils, 8-17 Dyslexics and other students from local primary, lower and upper secondary schools in Gdańsk, Gdynia, Sopot

In final test participated:
• 72 children including 51 dyslexics and 21 non-dyslexics, among them 33% female and 67% male
• 32 parents
• 11 teachers, 2 psychologists and therapists, 2 members of Polish Dyslexia Association, 2 members of project team in the CKU Sopot
• 9 primary and secondary schools from three cities of the Pomeranian Region in Poland: Gdańsk, Gdynia and Sopot

B) STUDENTS' ATTITUDE AND MOTIVATION

Based on the analysis of the student pre-test and post-test and observations

The opinions presented below come from pre and post-test questionnaires as well as private conversations with students participating in testing **CallDysc***.*

Pre-tests for students in Poland

26% out of 72 students participating in testing had been learning English for less than 4 years; 17% had been learning for 5 years; 37% for 6-8 years and 15% for more than 9 years. As the graph 1 (below) shows, 78% of students like or like very much learning English; 20% like it so so or just a little whilst only 3% do not like it at all.

The analysis show that those who like English lessons very much assess their knowledge of English as very good. Those who like learning English assess their language skills as good or very good. 23 people out of 72, which is 32% say that they

have average knowledge of English – 13 students out of these 23 learn English for 6 or more years.

There is also a tendency seen that those who claims that they know more than 100 English words (in talking, reading or/and writing) like English or like it very much. It is not really related to the number of years he or she has been learning. 16 persons out of 72 claim that they know not more than 50 words, among them about 6 which claim that they know not more than 20. As a remark, it should be noticed that very young children had difficulties in assessing how many words they really know. In such cases, we believe in teachers' observations and comments.

100% students think that learning English is necessary. As the reason, in almost all cases they mention better possibilities in future, possibility to communicate all over the world, chance for better job in the United Europe. Some of them mention other reasons like watching TV or satisfaction whilst understanding English songs.

Also almost all students participating in testing **CallDysc** games claim that they would like to have better knowledge of English. Only one children – 7 year old boy say that he do not want to because he already knows English very well and no one speaks English better than he does.

When questioned about difficulties in learning English they usually mention:

- reading
- writing
- pronunciation
- remembering
- grammar rules i.e. there is 16 tenses in EN and only 3 in PL which is very difficult to understand the difference for Polish students between English ones

When questioned about the best aspects of learning English they mentioned many different things i.e.as well as for example teachers they like.

Only 5 students claimed that they have never used computer for learning English before.

For the question "Would you like to use games for learning English?" 6 students were not sure, the rest of them, so almost 92% were very interested in using new technologies for learning. No one said "no" in this case.

What do you use your mobile phone for?

9 students were not sure whether they would like to use mobile phone for learning, 18 students were not interested in it (as the results of post test shows [see next part of this report], they prefer computer games from different reasons) and 31 of them would like to try learn English via mobile phones. 6 out of 72 students had no mobile phone, all of them have computers and use Internet.

As the graph 2 below shows, 100% students have access to the Internet. Majority have access at school and at home; 23.5% use Internet only at home and just 3% have access to the Internet only at school.

When asked **"**Would you like to chat with other students learning English?" 54% said yes while only 8% said no. (Don't know 17%, No answer 21%)

Generally students like the project idea very much. They had more suggestions and critical opinion about technical part. For example they would prefer better graphic design as they think it is really poor in comparison to other games available nowadays in mobile devices.

Would you recommend these games to your colleagues?
48 students would recommend games to their colleagues and friends without hesitation. 2 persons gave no answer to this question. Screenshot from the Learning Management System used by the teachers to see students' progress

Romanian Report

A) Identification of the cohort

In the project there were involved 20 dyslexic and 20 non dyslexic pupils. There age is between 9-14 year.

B) Report on the first experiences on the use of the programme

The first experiences related the games are the following:
- Children generally like to use technical devices, especially mobile devices for playing and learning through games.
- 60% of them would better like to play the games on mobile devices, 30% of them of them on computers, 10 % of them are not sure they would use the games further more for learning languages.
- They like to communicate with each-other which is a good sign regarding the accomplishment of our desire, to make the games collaborative, not only technical-dependent.
- The games were inspiring regarding their creativity, which is great.

C) Students' attitude and motivation

Based on the analysis of the student pre-test and post-test and observations

- Student's motivation was even more higher then expected in the first period of exercising the games, but they really want new and new things to discover.
- The technical background is proven to be attractive, especially because of the combination of the several functions of the mobile devices.
- All of them are considering, the games are useful for learning English at their stage.
- In severe dyslexia cases this way of learning through mobile it is proven to be highly motivating, helping to give back the joy of the learning, and the pupil's self estimation. They were really amazed about this possibility.

D) Teachers' attitude and motivation
Based on the teachers pre-test and adult feedback questionnaire

The teacher's attitude was really positive, they enjoyed the children being linked to the technical things in a good way, and especially seeing them to be motivated.

They were open, regardless to their age to motivate children in a good way.
They considered helpful the games especially because of the possibility of learning the pronunciation and the spelling of the words.

E) Test results, learning outcome

The test results are showing that the pupil's language skills are really improved, especially the writing and the spelling.

They were interested even if they new some words before, because of the new combination of the words, because of the original English pronunciation, the possibility of learning in an interactive way.

Because of the information coming in 3 ways: pictures, sound, letters, the children's progress is really measurable at basic level of spelling and writing, but also regarding their motivation, which is maybe the most important thing.

The dyslexic pupils are more willing to continue the learning of the English language on a professional basis.

F) Language or country related issues

Anything you find different from other countries, with respect to e.g. language, technology-cultural –legislation background

Conclusions
In Romania basically the pupils from the project were Hungarians, their mother language being Hungarian. At the same time they have to learn the Romanian language nearly at the same level as their mother language, which is a kind of hard thing for them, because of the different language roots of the 2 languages. So learning languages for our Hungarian pupils, especially for the dyslexic ones could be a stressful task. But learning through the technical devices made a difference, a new door toward a successful learning, which gave a high motivation for them.

Swedish Report

Calldysc - research data summary from Sweden

The Calldysc project was first presented in several different forums in order to establish contact with interested schools. As a result, the project has been implemented in three different schools in Växjö city and surrounding area:

School 1. Pupils with dyslexia in grade 7
School 2. Pupils with dyslexia in grade 4-6
School 3. Pupils with dyslexia in grade 6

The first school was contacted at an early stage of the project (October 2007) and two pupils with dyslexia and with severe reading difficulties in English volunteered to participate. They and their special education teacher were very enthusiastic about the project objectives. However, due to the initial difficulties to get the Calldysc games running, these pupils eventually dropped out of the project.

Two teachers from the second school were also early introduced to the project (November 2007). One of the teachers lost interest when the games was too long time in coming, but the second teacher tried out the games and let also some of her pupils try the games. They used mainly a cell phone to access the games but did not find them user friendly. Based on their common endeavour, the teacher formed the opinion that compared to the other material she used in her daily work; these Calldysc games were too boring and the children did not enjoy working with them. Therefore, this teacher chose to not continue with the project.

The third school was contacted at a later stage of the project (September 2008). Two teachers with an interest in finding new, innovative ways of teaching pupils English wanted to participate. One of the teachers is currently a class teacher for a sixth grade class. The other teacher is an associate teacher that sometimes works together with the first teacher.

We let the sixth grade class borrow two cell phones, and even though it was rather late in the project, we purchased two small laptops (Asus Eee PC with 7 inch screen) for them to use in an attempt to prevent these teachers from also dropping out. The class teacher let all the children in the class play the games but the main target group was the children with learning difficulties. All the pupils liked the games and found them useful.

We believe that the reason for the success in this class is that by this time (November 2008 - March 2009), the Calldysc games were working fine and the children did not encounter almost any problems in using the games. Some games

had minor problems, e.g. the sound disappeared from one game on one of the computers, but their overall opinion of the games was positive. The pupils preferred using the laptop over the cell phones and claimed that with the laptop it was easier to interact with the games. The pupils utilized the mobility aspect of the laptops and used them in different places within and outside the classroom.

The teacher found most of the games to be a useful complement to her teaching.

The class teacher experienced problems with the LMS and did not register all the children there. Instead, she let them use a fictive user number when playing the games, namely 1111. This allowed the pupils to play the games but their results were not saved in the LMS. This led to that almost no child did the pre- and post tests. Even though the teacher did not use the LMS fully, she understood and acknowledged the benefits of that system.

Since only a handful of the pupils did the testing, and since the teacher used the games integrated into her normal class work, it is not possible to state a learning outcome based solely on the games.

Conclusions
There is in Sweden a lack of software to use when teaching pupils with dyslexia English. It is also very rare for teachers to use mobile technology in their school teaching. Even so, most of our teachers did not find the benefits of the project high enough to start to use the LMS and the games in their classrooms. The teacher that did find Calldysc useful saw the games mainly as a complement to her ordinary teaching.

Sweden is a comparatively rich country. A lot of the Swedish children have a cell phone of their own and a computer at home full of games with advanced graphics and interactivity. In the schools, the teachers have access to a rich selection of educational software of high quality. We believe that the lack of interest for our project here in Sweden is mainly due to the fact that the games of the Calldysc project did not meet the Swedish users' expectations. One reason for this is because of circumstances beyond the control of Calldysc, namely that the games developed within the project was not produced by the expert company that initially was assigned for the task.

Another reason may be that while planning for the Calldysc project, the preparation time for production and testing of the games was greatly underestimated. Teachers work today under time constraint and with a cutback on resources. When it was time in Calldysc for the scheduled main project activity, the games was not fully ready which seemed to frighten away some of the teachers that did not have the time or skill to handle this. The last teacher to enter the project encountered a finished

system and well-tested games, and could without problem find use for the project within her ordinary work. This makes us to draw the conclusion that if the project's main activity could have started later in the project, it would have been a lot easier to get teachers and pupils to see the benefits of the game.

However, the advantage provided by Calldysc, i.e. to use mobile devices for learning, was acknowledged by all, teachers and pupils.

Welsh Report

A) Identification of the cohort

The Dyscovery Centre is a clinic that runs workshops for kids as well as seeing them in private consultation. For the Pilot Study four children of an appropriate age were selected to try the materials in principle, prior to developing the tests in Welsh. Since a many of the client group at the centre also have dyspraxia issues, they were also able to provide feedback on the motor difficulties of using mobile phones in this learning environment. For the main study parents of fifteen dyslexic students were contacted.

B) Students' attitude and motivation

There is no doubt that the students were very motivated to use the learning system, especially when they were able to access the Welsh activities. (NB Wales is a bilingual country, and it did not make sense for English speakers to use the English language games.) Unfortunately few of the students had mobile phones of their own. This is because of the nature of their difficulties (poor memory and poor motor skills). Therefore the centre had to lend phones to the students, under parental control.

The pilot tests proved problematic due to technical difficulties. However the students reported an enjoyment of the principles, and made several suggestions about how to improve the results.

Without doubt there was a high motivation factor in learning with the mobile phone. The games were found to be fun, and motivating. Their demand for more activities suggested that they found them enjoyable.

Due to connection difficulties most of the students played with the activities on Nokia N70s in or near the Centre, accessing the games through the memory card rather than through mobile service provider.

C) Teachers' attitude and motivation

Results from the teachers questionnaire suggest that while their attitudes towards the technology are positive, their experiences prior to Calldysc were, at best, minimal. When experimenting with the games, they found them more problematic than the kids due to the small size of the keypad.

The teachers suggested that there could be a number of games developed in the child's first language, adapted from the existing games.

D) Test results, learning outcome

All pupils suggested that they would be willing to continue with these activities if more were available. There results, including feedback from the parents, suggested that the children engaged with language learning far more than in the past. However, it would be important to have a greater diversity of games since dyslexic children may come to this from very different pre-activity ability levels.

E) Language or country related issues

Parents and teachers appreciated the potential of these activities, which led them to ask for more activities to be developed, especially in the Welsh languages. It was felt that adults would also find it enjoyable.

Conclusions

Overall the experience was very good, with all pupils enjoying the opportunity to learn through the medium of the mobile phone and to a lesser extent the PSP (due to the difficulties of entering letters).

Part 4

Review of activities

Review

This section provides feedback from teachers and end users about the games.

What was the most interesting in games?
Below there are listed the most interesting things about **CallDysc** quoted by Polish students:

- “True or False”, “Spell and Sound”, “Pairs”, “Word chain” as well as well known faces from “Celeb game”
- cups as an reword for good results – kind of motivating aspect and competition among students
- possibility to learn and play on the computer at the same time
- general idea of learning and playing at the same time
- different activities in different games / diversity of themes, topics and activities in games
- repeating activities, revising materials, strengthening the knowledge
- fast speed of games, I had to concentrate and think
- the most interesting was that I could play on the computer
- games were different than those available normally
- that it was with computer and not typical lessons
- that they are in the Internet and that it is possible to play via phone also
- easiness, easy to understand everything in these games
- some exercises, riddles and puzzles
- 6 of them gave no answer
- some of them said just “everything”.

Possible changes suggested by students

- *Games were too easy, they should be more advanced / difficult*
- *Instructions for some could be clearer*
- *There should be different levels of each game*
- *Graphic design could be improved*
- *Ability to change ones own password*
- *Pupil access to the results*
- *People in the Celeb game - more famous and well know people (1)*
- *Car racing game would be nice (2)*
- *Install games on my computer and play off-line instead of playing via Explorer or Firefox etc.*

(1) This was created as an activity for students to make their own games using Web 2.0 principles.

(2) This is possible with the newer phones but problematic with older ones.

As well as the above, teachers suggested that similar activities in the child's first language may be very useful.

Preferences – playing on the computer or mobile phone?

Less than one quarter of the users said they would prefer to play the games on a mobile instead of the computer. Although they noted the advantage of using them in different places (e.g. on the bus), the positive sides of the computer mentioned included:

- it has more options, functions and possibilities
- it has bigger screen
- it has better graphic
- it is easier to operate
- it has more comfortable keyboard in comparison to mobile phones
- listening was easier with the computer

This suggests that the mobile phone may be an instrument in motivation, but once the kids realised that there were good games that they could engage with, the computer could be used for extended activities.

Students' opinion about CallDysc games and preferences to use computer or mobile phone

Do you think these games can be helpful in learning EN?

Yes	88%
No	0%
Don't know	10%
No answer	2%

If you had the games in your computer would you use them?

Yes	71%
No	13%
Don't know	14%
No answer	2%

If you had the games in your phone would you use them?

Yes	57%
No	19%
Don't know	24%
No answer	0%

Suggestions for more activity categories

The most quoted topics were as follow:

- animals
- bicycles
- cars
- computers
- everyday expressions (please, thank you etc)
- food
- holidays
- history
- human anatomy
- law
- medicine
- movies
- music
- plants
- politics
- soccer
- sports
- school
- work

Some students (and teachers) also asked for more activities on building sentences.

Extending the work

In the opinion of Polish teachers taking part in the CallDysc project, the biggest difficulties for students in learning English are like follow:

- speaking including breaking language barrier
- correct pronunciation
- writing including writing essays
- reading
- remembering new words
- using proper grammar structure in situation context
- fluency, speaking, spelling
- motivation
- listening reading comprehension
- vocabulary, grammar
- answering question

This opinion was echoed by all partners, and should be a focus of potential development of further activities.

Teachers' preferences about using computer or mobile in teaching process

Would you like to use mobiles to teach EN?

Yes	30%
No	20%
Don't know	50%

Would you like to use computer games while teaching EN?

Yes	90%
No	0%
Don't know	10%

Have you ever used computer games while teaching EN?

Yes	60%
No	40%
Don't know	0%

Do you think that using computer or mobile will help students to learn EN?

Yes	90%
No	0%
Don't know	10%

Teacher familiarity with computer and mobile games

To what extent are you familiar with mobile games?

Well / good	20%
Fair	30%
A little	30%
Not at all	20%

To what extent are you familiar with computer games?

Well / good	30%
Fair	30%
A little	20%
Not at all	0%

As a conclusions, there are some additional comments of teachers:
- *"I am for all innovations which help to motivate students, but I am afraid that they will use mobiles during in other subjects, what is not allowed. That is the reason that I prefer them using computer."* ***(A Z-K)***

- *"For most of my students access via mobile is too expensive, difficulties relating to the necessity of uploading games and analysing of results may discourage using mobile."* ***(K Bo)***

- *"I'm interested in what way mobile could help learning English. I'm glad I can participate in the project; tasks look promising, my students will be delight."* ***(K By)***

Examples of teachers feedback after CallDysc

From the technical side access to the games was very easy, but it would be good if students had access to results to know what was ok and would yet should be done. Game "C11 Celeb" is OK., but it has some out-of date information, not all celebrities are known to students, too subjective info about celebrities; "C11Celeb" and "C12 True or False" the quality of the pictures should be better; in 'CO4 Spell the Word' and 'CO3 Spell the Sound' the word should be displayed on the screen to commemorate its spelling; 'CO2 Opposites' graphic should be netter to show differences between things; "CO1 Words' too Monotonous

When the player stops plying and doesn't switch off the game it should be a reminder; instructions given during the games are too long; in 'Spell the Word' word for spelling should be repeated several times especially if player makes a mistake; instruction how to finish the games and mobile to the next one should appear at the end of the game; it would be excellent if in every game the levels were created

I think that methods elaborated in CallDysc are promising and in spite of small faults I would recommend them for children with dyslexia; too low level for 13-16 years old

I am willing to use these methods in teaching us supplement of my lessons

It would be useful to have the possibility to see mistakes; pity that game; Hangman' doesn't work, results not always sign up in spite of clicking#, in game 'Numbers' it should be pictures of things instead of numerals; students should have the possibility to check their results

Students were sometimes bored testing the games; I reminded them that is education game for English learning not for playing and they shouldn't compare them; the worst was the game '08 Hangman' which in spite of several attempts didn't work, in the game 06 several times pictures didn't appear; it happened that during the game the results couldn't write down in LMS

Excellent idea, it is necessary to work on widening the game offer addressed to students of all levels; elaboration of more tests for teachers would help to check how this method improved to solve the problems relating to teaching language to students with dyslexia; teachers and students learning other languages are interested in this method.

Generally the idea is very good but: graphic is very poor, some games don't work at all, some are half-baked: spelling mistakes, some tasks are impossible to perform, to many reconstructive tasks instead of creative and students get easily bored; in 'Word

chain' it is impossible for learners to see what they created, what is really discouraging

I like the project, though computer room is necessary. Students are having nice time learning English, what motivates them to try harder. I like that subject matters are up-to-date: actors, pop singers students like and listen to.

An in-depth report from one Polish teacher

“I participated in the project and supervised the activity of 14 students testing the Learning Games. All of the students, aged 15-16, were from the same lower secondary school, ZS nr 3, in Sopot. While testing games from 19th February 2009 to 15th March 2009 they took part in a training session and about 15 meetings of testing games with the teacher. Additionally, they were also testing Learning Games at home.

First of all, I found the idea of teaching English with the help of computer games enormously entertaining. In the modern educational environment computers play vital role. They belong to teacher’s obligatory equipment and common teaching aids. CALLDYSC project has combined them with learning and come up with an innovative idea which proved to be successful.

The level of the available Learning Games was rather elementary/pre-intermediate, which happened to be even a bit too simple for the students admitted to the project. Nevertheless, they eagerly tested the games often having fun while doing it. The possibility of winning golden cups was fantastic. Even though the games were simple and quite easily accomplished, they still gave the students sense of personal achievement and satisfaction. Cups and rounds of applause also positively motivated students and allowed them to somehow compete with each other. Although most of the vocabulary items presented in the games were already known to my students, they could by these means revise and drill them. Even the more advanced students can take advantage of using the Learning Games by drilling the vocabulary. The students found the games amusing and rather flawless. The only thing they would change was the level of the games. Some more complex words or phrases could be used in the games to make them more attractive.

The idea of teaching English to dyslexic students in such an innovative and pleasant way can only have its supporters. Even though some games have to be improved, on the whole it is a successful learning platform. The games are aimed to practice basic vocabulary in form of different exercises. We tested them on our computers, but they can be as well tested on the mobile phones. Without a doubt a foreign language is learned in order to be used. The question how we do it does not matter. The more interesting a task is, the more eager the students will be to deal with it.

All in all, I believe that CALLDYSC project proves to be a successful source of really interesting games for dyslexic students. In nearly all games students can see the correct spelling and hear the correct pronunciation of the words which they normally, due to being dyslexic, often misspell or mispronounce.
(Joanna Hyrcza)

Part 5

Conclusions and recommendations

Conclusion and recommendations

Crombie (1999), referring to the dyslexic second language learner, said that “We must ensure we are not imposing an unbearable burden that could result in further failure, demotivation and subsequent behaviour problems.” This project does not claim that the mobile phone is the answer to teaching a second language to SEN children, nor that the difficulties that these SEN children find in the social network can be overcome with mobile phones and an appropriate environment. But children engaged in the activities, and wanted to extend their knowledge beyond what the project produced. Typical responses from the children were “The phone did not laugh at me when I made a mistake.” “It was cool using a phone!”, “Learning English has always been difficult for me and I hated it. This made it fun. Even if I was not good, I think I learned something.” and “The only thing that made me keeping going was that I hate not to win, but my friends did not see my scores.” Clearly they appreciated that their failings were no longer under the watchful eye of their peer group, and given that they were not being judged against others, they appeared to like to show that, given time, they too could succeed. Parents acknowledged the desire for their kids to learn subjects that before had been a no-go area and were pleased to see the level of engagement. Clearly pedagogy should lead, but in collaboration with social and technical trends, it would appear traditional boundaries could be breached. The smaller the gap between the way life skills will be used in learning and in life, the greater the chance of engagement with the learning, irrespective of the subject matter.

Traditionally one talks of a blended learning environment using computer assisted language learning (CALL) in conjunction with assistive technology and teachers to help dyslexic learners. Calldysc has demonstrated that using handheld mobile devices (currently regarded as phone but increasingly may be seen as mobile computers using blended technologies) can increase learning opportunities. But as Nicholls (2003, p9) comments “Only pedagogical and access advantages will provide a lasting rationale for implementing eLearning approaches.” Further quantitative data will be collected for this ongoing project, to confirm the qualitative results to date. Only if the evidence is clear that the effects of learning on the mobile are lasting will they be adopted more widely.

And the future of language learning for dyslexics? There is already an EU project (www.emime.org) that is looking to provide instant translation of language on a mobile phone. You speak into it, and it speaks out the translation using your own voice. Will that eliminate the need for dyslexics to learn a language? No, but it may help them develop social networks in an increasingly multilingual environment.

Fulfilment of the aims of the main study

There were four aims of the project, and the results of each are given below:

1) To identify how the individual with dyslexia or specific reading difficulties responds to each of the technologies and different language teaching methodologies, and how the positive aspects of those technologies can be brought together to form an integrated learning environment that can be adapted to the needs of the learners with dyslexia and additional language difficulties.

The Project provided an excellent opportunity to see how the dyslexic individual responded to the latest technology and the adaptation of learning methods to use within such systems. There were very positive outcomes in all areas, but witht he key area of motivation being the most important, and the area in which the biggest gains were from dyslexic users.

Furthermore, there was clear evidence from teachers, uers and parents that “what is good for dyselxics is good for all”. That is, all students benefited from this type of innovative, motivating technology.

2) To create a blended learning environment where the pupil with dyslexia can thrive through integrated e-learning linked to computer moderated peer interaction, with human supervision.

This was developed and provided valuable feedback to teachers and researchers. Technological (connection difficulties) and cost (connection and having enough of the right type of phone) meant that the learning content management part of the learning environment was in some cases secondary to the stand alone mobile learning. However, games themselves proved a huge success.

The advance in technology over the past four years have meant that any further developments would be able to take advantage of such innovations as using phone browsers, more advanced Web 2.0 methods, and greater mobile data transfer speeds.

3) The innovation of this project is to take concepts understood by e-learning, and consider how these can be more inclusive of the target audience. This will be undertaken by integrating latest technologies with the potential to create increased motivation in a potentially disenfranchised group.

The basic principles of learning through technology were fully utilised, with lessons learned from conventional e-learning applied to all components. Experience suggested that the use of the mobile caused a need to rethink the role of technology.

It is interesting to speculate that the newness of the technology rather than the technology is the key factor. That is, when computers were novel, considerable improvements could be expect from dyslexic users simply due to the novelty and that they had experiences that were prestigious among the peer group. The impact of computers with the dyslexic group compared to non-dyslexics is less now due to the mainstreaming of the activities. As learning through mobiles (or whatever their successors may be!) become more commonplace, so the added value will diminish. However, the addition of the technology should still exceed the non-technology approach, irrespective of the hardware used, since it has the potential to be more individualised and specifically tailored to the needs of the individual. Although this viewpoint is difficult to prove, there was plenty of anecdotal evidence from the users.

Hypotheses testing

1) Students with dyslexia learn more quickly through the use of new technologies that can engage them than using conventional teaching methods alone.

This report suggests that the students learned more from using the new technology. Therefore this hypothsis is proved.

2) Individuals with dyslexia find using ICT methods more motivating than conventional teaching methods.

With conventional teaching, the kids were reluctant to return tothe topic, though many engaged with it when they had no choice. However, almost without exception the kids not only engaged with the activities, but also wanted to work longer than they were given and were proactive in making further suggestions for improvement. Therefore this hypothesis is demonstrated.

3) The motivation of students with dyslexia to use the technology in learning languages is higher than that of students without dyslexia.

Since the non-dyslexic students also enjoyed using the mobile learning and were reluctant to stop the learning at the end of the session, it is difficult to say that the dyslexic students were more motivated with the technology than non-dyslexic students. Therefore if this hypothesis is true, it has not been proved in this project.

This failure to prove the third hypothesis is not of concern, since it is more important that the dyslexic individuals, often excluded from second language learning, have shown their potential to use this technology.

Potential limitations to the study

Due to the time limitations within the project a longitudinal study design was considered, but discounted. However there may be potential in the future to follow up these students in subsequent projects.

The games to be tested will depend on the availability of the technology and the design and content available at the time of testing. However this will inform the results of the study and highlight considerations for future projects.

Variability within the study

The different countries involved within the project require that the project design be modified to meet the needs of the relevant populations. There is also the potential for work within one country to inform how the study is developed within another country; encouraging learning across boundaries.

For these reasons it is anticipated that some countries (such as Hungary and Poland) will potentially be able to carry out a study with whole classes of students, with or without an identified difficulty with dyslexia. In other countries discrete trials of the materials are likely to take place with the potential to also gather more qualitative data with regards to the usefulness of the materials and how realistic they are within their particular educational context.

There may also be differences in the design of the materials due to the technological differences between the different countries. For example mobile phones are commonly used by many students in Wales but may have limited allowable access in school. This will need to be determined on a local level. However similar usage of equipment may not be common in other participating countries.

This variability in sources of information, when brought together is likely to add richness to the data as well as lead to context specific recommendations.

Principle 1
The aims and objective of education should not change with the introduction of the technology. However, the speed and manner in which the aims and objectives are met may change.

Technology can be empowering, and speed up (or slow down) the process. However, the end goals should be the same. That said, the goals can be changed by the technology, allowing more to be done within the timescale.

Principle 2
The choice of educational tools (software and hardware) should reflect the needs of the context (geographical, economic, cultural and educational), and not determine the outcome. How technology is used is more important than which technology is used.

Just because the technology was proved to be very useful in this context, it does not mean it will be the right solution for everybody. Issues such as comorbidity (e.g. do they also have dyspraxia) connection speeds, first language, language skills as well as the content itself will determine the impact. Furthermore, the teacher (and how they employ the software) will have a considerable impact.

Principle 3
Share and learn from mistakes, share ideas and innovation, work collaboratively. Do not assume that the user must have made a mistake as the programmer cannot always anticipate every eventuality.

This may seem obvious, but years of failure means that dyslexic individuals often blame themselves when things go wrong. Unfortunately programmers rarely use a focus group that involves dyslexic individuals. They assume a certain route is followed, their ideas are “intuitive” and the instructions are clear. They ignore that dyslexic individuals do not read instructions, and what is clear to one person may not be clear to everybody.

Principle 4
The tools chosen should be seen as a supplement to classroom practice and not a replacement. Do not assume that the learning experience on a computer can be the same as with human intervention. Teachers should understand what is being taught.

Blending learning was a term adopted as people realised that teaching could not be simply handed over to a computer to perform. And the dyslexic individual frequently needs more support than the non-dyslexic individual, for many reasons, including the need for further information, greater contextualisation, forgetting prior learning etc.

All of this reinforces Marshall McLuhan's (1964) idea that the manner in which content is delivered by the technology affects the perception and learning (often quoted at as *"the medium is the message"*) He went further to suggest that the medium can be more important than the content. It may be argued that he could be referring to future education, where the only "content" that matters will be the need to know how to gather information through the internet. That is, the skill (and personal advantage) is not in knowledge retention as in the past but in understanding and using the most effective methods of knowledge retrieval.

Final observations and recommendations

Many of the recommendation are implicitly in this report. However, some are worth highlighting again.

This project was not about teaching languages using technology. It was about investigating the potential to use the new technologies to increase motivation in dyslexic individuals to start and then continue to learn languages. The partnership feels that it has been successful in its aims and objectives. However, the achievements of many project fail to reach a wider audience, and fail to become embedded in good practice. This project reached a very wide audience through its proactive dissemination strategy. However, the partnership, because of their commitment to the project and the areas of activity, have also ensured that the work will continue, become more widely known, and have a greater potential to form part of mainstream teaching of dyslexic individuals in the future.

In January 2009 Embed (Embedding Dyslexia-Responsive Practices in Lifelong Learning), an EU-funded project started. This project is about revisiting previous EU-funded projects and providing a central dissemination activity to maximise the potential for the results to be embedded within mainstream activities of those with an interest in the field. This new project includes several member of the Calldysc team. This project will ensure the dissemination activities carried out within Calldysc will continue.

A submission entitled TESSERA (Taaching Special needs Students through Edutainment after Required Adaptation) was made to the LLP program. This may be considered as a “Calldsyc 2” project, Results with respect to funding are expected October 2009.

General principles
Teachers of second languages need to be reminded that just because they learned languages easily (that is why they teach languages!) not everybody finds it so simple. Vocabulary learning, sound reproduction, spelling and grammar are problems for most dyslexics in their first language. Therefore they will have problems in these areas in the second language. But these are also the key areas in language learning. But difficulty in acquiring …. is not the same as “Cannot acquire”. By using simple principles as usually employed in teaching the first language (structured, sequential, multisensory teaching)

Clearly the technology continues to change and offer possibilities to developers to engage the individual through both first and second language learning.

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Appendices

Appendix 1 – The Nicols Hypotheses

In order to provide a theoretic setting for e-learning, much of which can be contextualised to the dyslexic individual, Nichols, in this "Theory for e-learning" (Nichols, 2003), suggested that here were a series of hypotheses that should provide a framework for the interaction between the educational and technological components of e-learning. These were then adapted to reflect the needs of the dyslexic individual (Smythe, 2004) as are given below, in an updated form.

Hypothesis 1
eLearning is a means of implementing education that can be applied within varying education models (for example, face to face or distance education) and educational philosophies (for example behaviourism and constructivism). But the needs of dyslexics may exceed those of other individuals. They have a lower tolerance to parameters outside their comfort zone such as background colours and text layout.

Hypothesis 2
eLearning enables unique forms of education that fits within the existing paradigms of face to face and distance education. E-learning may provide the way to manipulate the interface to the needs of the dyslexic individual and to individual more than the human based alternatives.

Hypothesis 3
The choice of eLearning tools, including assistive technology, should reflect rather than determine the pedagogy of a course. How the technology is used is often more important than which technology is used. Put another way, there are many functions of assistive technology that could benefit the dyslexic that are not used because nobody has every said they exist. (And dyslexic individuals will generally not read instruction manuals.)

Hypothesis 4
eLearning advances primarily through the successful implementation of pedagogical innovation. It is does not work well, it will not be used in future. Furthermore, what is good for dyslexics is good for all, and widespread implementation of what works well with dyslexics may have a beneficial impact for others.

Hypothesis 5
eLearning can be used in two major ways; the presentation of education content, and the facilitation of education processes. Both aspect involve the way information is accessed, which is key to the learning for dyslexic individuals.

Hypothesis 6
eLearning tools are best made to operate within a carefully selected and optimally integrated course design model. The e-learning tool would be designed for the case in hand, and not necessarily seen as a tool for all situations. The learning preferences for the dyslexics individual may change with the content and should be adaptable as required.

Hypothesis 7
eLearning tools and techniques should be used only after consideration has been given to online vs offline trade-offs. E-learning is not good for all dyslexics. Some dyslexics may prefer additional support, while others prefer the anonymity.

Hypothesis 8
Effective eLearning practice considers the ways in which end-users will engage with the learning opportunities provided to them. The dyslexic may have greater difficulties in engaging with the learning environment due to prior learning experiences.

Hypothesis 9
The overall aim of education, that is, the development of the learner in the context of a predetermined curriculum or set of learning objectives, does not change when eLearning is applied. However, it may make it more accessible to the dyslexic learner for many reasons.

Hypothesis 10
Only pedagogical advantages will provide a lasting rationale for implementing eLearning approaches. It the dyslexic individual can be shown to learn by these methods, they can be used by others.