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## Investigating second language teachers' knowledge: implications for ICT training

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### Abstract

This paper outlines a framework for the study of teachers' knowledge, which should be considered as the starting point for future Information and Communication Technologies (ICT) training. Following this framework, second language teachers' knowledge is explored and findings from three case studies are discussed. Due to the situational nature of teachers' knowledge a qualitative methodological approach was adopted. Differences but also similarities in their approaches were identified. Due to teachers' lack of training and previous experience of the educational implications of ICT, the proposed ICT activities by the teachers themselves involved practice tasks, where more advanced approaches were identified in their practices. It is suggested that a learner-centred approach should be adopted for teachers' ICT training, that would allow them to relate ICT to some of the more advanced aspects of their normal practice. In this way, it may be possible that their expectations of the place of ICT in teaching and learning will be raised, imposed change will be avoided and real change may be anticipated in collaboration with the teachers in the study.

**Key Words:** ICT, Teachers' Knowledge, Second Language Teaching, Teacher Training

### Περίληψη

Σκοπός της εργασίας αυτής είναι να παρουσιάσει ένα πλαίσιο σχετικό με την έρευνα που αφορά το γνωστικό υπόβαθρο των εκπαιδευτικών ως προς το αντικείμενο διδασκαλίας τους, και θεωρείται ως αφετηρία για την μελλοντική επιμόρφωσή τους στις Τεχνολογίες της Πληροφορίας και της Επικοινωνίας (ΤΠΕ). Με βάση αυτό το πλαίσιο εξετάζεται το γνωστικό υπόβαθρο των καθηγητών ξένων γλωσσών σε τρεις διαφορετικές περιπτωσιολογικές εργασίες (case studies) τα αποτελέσματα των οποίων παρουσιάζονται σε αυτή την εργασία. Εξαιτίας της απομικιστικής και εξελισσόμενης σε συγκεκριμένο φυσικό χώρο κάθε φορά, φύσης της γνώσης που κατέχουν οι καθηγητές χρησιμοποιήθηκαν ποιοτικές μέθοδοι για τη συλλογή και ανάλυση των δεδομένων ώστε να εντοπιστούν οι τυχόν διαφορές και ομοιότητες. Η έλλειψη ειδικής εκπαίδευσης και προηγούμενης εμπειρίας στις εκπαιδευτικές εφαρμογές των ΤΠΕ είχε ως αποτέλεσμα, οι προτεινόμενες από τους εκπαιδευτικούς διδακτικές πράξεις σχετικές με τις ΤΠΕ να περιέχουν ασκήσεις απλής εξάσκησης, παρόλο που προχωρημένου επιπέδου πράξεις παρατηρήθηκαν και καταγράφτηκαν κατά τη διδασκαλία τους. Τέλος, μέσω αυτής της εργασίας προτείνεται, η μεθοδολογία για την εκπαίδευση των καθηγητών στις ΤΠΕ να λάβει ανθρωποκεντρικό χαρακτήρα (learner-centred) για να μπορέσουν οι εκπαιδευτικοί να συσχετίσουν και να εφαρμόσουν τις ΤΠΕ και σε σχέση με τις προχωρημένου επιπέδου διδακτικές μεθόδους τους. Με αυτό το τρόπο πιθανά να ενισχυθούν οι προσδοκίες τους σχετικά με τις ΤΠΕ και την εφαρμογή τους στην τάξη. Τέλος, αναμένεται ότι ετσι θα επιτευχθεί πραγματική αλλαγή σε συνεργασία πάντα με τους εκπαιδευτικούς του κλάδου.

### Introduction

Teachers are bound to be significant to the process of implementing Information and Communication Technologies (ICT) as, to bring ICT into their practice, they must consider its potential for teaching and learning as it relates to the particular context in which they work. This, in turn, depends upon them being willing to explore and explain their theoretical and practical philosophies of teaching with a view to its improvement (Scrimshaw, 1997).

Until early 90's efforts to train teachers to use ICT tended to focus on developing their skills on a range of computer software and hardware available, and on offering pre-specified ideas and activities to adopt (Wright, 1993). However, recent developments in training, both in the United Kingdom (UK) and around the world, are clearly moving towards more learner-centered approaches that would explore the ideas embodied in teachers' every day practices and then encourage the development of practices that are in accordance with them (Soloway et al, 1996, DFEE 1998 ).

The research reported here is the first part of a collaborative Action Research project (see Carr and Kemmis, 1997, pp. 162-175) conducted in connection with a PhD and was developed in a particular area in Greece. The project aims to develop and improve in-service practices in relation to the uses of ICT through an approach to in-service training that was sensitive to the teachers as learners. It was considered essential to involve teachers themselves in a process of reflection in order to capture and scrutinize their current practices and initial thinking as related to ICT. This would serve as an immediate starting point for planning the actions to be taken in the action research. It would also be valuable in the future as it could enable the practitioners "*to develop a more refined understanding of what they are doing and what they are trying to achieve*" while integrating ICT in their subject areas, and the researcher "*to develop theories of educational practice*" with ICT, "*that would be rooted in the concrete educational experiences and situations of practitioners*" (Carr and Kemmis, 1997, p. 118).

### **Framework for the study of Teachers' knowledge**

Shulman (1987) suggests the following as components of teachers' knowledge base: (a) knowledge of content or subject matter that is the major ideas and components of a particular discipline, (b) knowledge of curriculum (e.g. knowledge of syllabi, of resources, and of skills to develop schemes of work), (c) knowledge of student learning and motivation and (d) knowledge of educational contexts which is the knowledge of the classroom environment within which teachers develop their strategies to serve their aims and purposes for teaching. Moreover, Shulman (1987) suggests that teachers also have 'pedagogical content knowledge'. This is knowledge which is distinctive to teachers in that it is the amalgam of teachers' knowledge of subject matter and pedagogy. It consists of all classroom related strategies adopted in order to make the subject matter comprehensible to particular groups of pupils. 'Pedagogy' is originated in teachers' "*wisdom of practice*" (Shulman, 1987, p. 8), and according to the literature "*it is to be found in the experience of its presence – that is in concrete, real life situations*" (Van Manen, 1982).

Referring to teachers' knowledge Fenstermacher (1994) makes a distinction between 'formal knowledge' and 'practical knowledge', where the first one is based on literature deriving from research about effective teaching and the latter is generated by teachers as a result of their every day experimentation and reflection within the classroom context and as such it is personal, situational and tacit. It could probably be claimed, therefore, that teachers' subject knowledge and curriculum knowledge are essentially formal forms of knowledge; their pedagogical subject knowledge is essentially practical knowledge; their knowledge of student learning and educational contexts may be an amalgam of both.

The above theoretical orientations imply that , along with any formal forms of knowledge, teachers, will bring a rich store of 'situated knowledge' of content, classroom processes and intentions, tasks and students' understanding which ought to be scrutinized beforehand in an attempt to integrate ICT within them.

Within this framework, the present study seeks answers to the following questions: (a)what strategies/activities are adopted in second language teachers' classroom for the learners' benefit, and how do teachers understand these practices; and (b) how do they currently use ICT, and how do they feel it could be integrated into their current approaches to achieve given goals for learning. Answers to such questions would serve as the starting point for

taking teachers in a process of reasoning and action (Shulman, 1987), that could lead to an effective integration of ICT into their existing approaches to teaching.

Further insights to the study of the strategies adopted by second language teachers in particular are provided by Richards and Lockhart, (1994, see pp. 163-166), who classify the activities involved in teaching as follows: presentation, practice, memorisation, comprehension, application, strategy, affective, feedback and assessment activities and further claim that they are a result of decisions either conscious or unconscious, taken either before or during or after teaching depending on teachers' teaching experience. This distinction between activities, however, can not be regarded definitive as there could be teaching practices that overlap these, i.e. a practice or an application activity can also be used to determine how much students have learned – assessment.

### **Sampling**

The purpose of sampling in an action research study is not to produce a representative sample of research subjects from which generalisations can be drawn through statistical processes, but to identify a group of research participants from which rich descriptions and understandings can be developed. The insights gained from such research can be generalised in the sense that they can be used by *others if they have meaning for those other users* (Patton, 1990). The crucial issues therefore are that the sample is accessible to the researcher, and that there is sufficient rapport between researcher and researched for the former to gain access in depth to the latter's practice and thinking.

These considerations led to the present focus on second language teachers, as this was the subject specialism of the researcher herself, and to the selection of teachers who volunteered for involvement in the project. Interestingly, an earlier questionnaire delivered to all teachers servicing in the particular area of Greece where the research took place had established that no one made use of ICT in subject areas apart from computer science teachers (Polyzou, 1999). Even if it had been possible to work with a different subject area, or a range of subject areas, it would not have been possible to construct a sample of teachers with a wide range of ICT experience as such range simply did not exist. Similarly, all those who answered the questionnaire were positive in terms of ICT for teaching and learning, so it would not have been possible to construct a sample containing a wide range of attitudes.

However, as the following phases of the project would involve training to use ICT and classroom implementation of ICT practices, it was essential that the ICT related resources available in the schools teachers were servicing at the time of the research would be considered and recorded. Availability of such resources would eventually permit the successful complementation of all phases of the Action Research project.

In the area of Greece in which the research was done there is huge variation in school sizes, and this inevitably results in differences in the teachers' work context. The project did ensure that the volunteer sample did include teachers from large and small schools and in this one respect,-maximum variation sampling (Patton, 1990, Miles and Huberman, 1994) was achieved.

High-quality detailed descriptions and explanations of each unique case were documented and shared patterns across them were then established that illustrated their significance (Patton, 1990, Miles and Huberman, 1994).

### **Research Methods and Techniques for data collection and analysis**

The situational aspect of teachers' knowledge has been discussed above. In order to investigate it in its naturally occurring environment, a qualitative methodology was adopted and each teacher in the study was seen as a separate case study. A semi-structured interview schedule was developed to capture teachers' current practices and views about ICT. In order (a) to verify these interview data and (b) to provide prompts for further exploration of teacher

thinking (Brown & McIntyre, 1992) , teachers were observed by the researcher herself. Unstructured notes were kept and post-observation interviews were conducted to verify these observation notes and to give further opportunities to explore the thinking behind the practices observed. Two hours of observation were carried out in each case. This was considered sufficient as initial analysis illustrated regular repetition of the practices described in the initial interviews.

Data were coded according to the “three levels” model advocated by Miles and Huberman (1994). This approach involves the coding of the data – coding derived from the general categories in the interview schedule-, identifying patterns (pattern coding) and, finally, developing propositions (theory building). A follow-up visit for the purpose of providing feedback to staff was arranged in the term resulting in a further refinement of findings. However, a deeper subsequent analysis will adopt “grounded theory” approaches, which will be the subject of a follow up paper.

### **The teachers in this study**

The Action Research project has involved six case studies, but within the time and word limits for this paper, it was not possible to discuss them, so three of them are presented. These give a reasonable sense of findings.

The teacher of French had 18 years of teaching experience, always teaching in a small rural school. She had basic word-processing skills and had used the computer for administrative purposes. Interestingly enough she had seen examples of ICT classroom implementation, where CD ROMs had been used for drill and practice.

Teacher of English A had 25 years of teaching experience and teacher of English B 15 years. Both of them were working at the same large school, which is situated in an urban area. Both of them had attended different intensive courses on word-processing, but neither had practised their skills since. Teacher B had also attended a short course to use the INTERNET but again had not practised the skills taught.

### **Discussion of findings**

#### **A. Strategies and Classroom Processes**

The strategies adopted by each teacher seemed to be very much influenced by the goals set for learning, which were extremely text-book oriented, probably due to curriculum requirements. Such text-book oriented teaching was verified during the observations, where in all cases teachers invited pupils “*to open their course books*” on entering the classroom. It was also observed that the main resource used in teaching was the course book, where in two cases, in particular, the teachers used to hold up the text book in order to ask questions about the pictures contained. When interviewed, teachers mentioned:

*Teacher A (TA): (having the course book open) having in mind the course book that I'm teaching, if it's a reading text I will the reason that I'm doing this is to make them speak...at times I will ask them to do this for homework, just to write a small paragraph... then, if I have the cassette recorder, they will listen to it...then the next lesson could be the reading, first comes the grammar, then the reading and then the listening. We do not spend so much time in writing....because I don't have the time.*

*Teacher B (TB): I will have to follow the course book syllabus, where I will have a look at the dialogue or the passage to read through... the grammatical phenomenon that is apparent.. in terms of reading, I don't do anything in particular. I just use the course book processes...in terms of grammar, I use photocopies....to complete what I want to teach... there are usually pictures in the book and I will ask them questions to describe the pictures... if there is a listening activity, they will have to listen to it..*

*Teacher of French (TF): ...although the books are the same for so many years, I will go through the next lesson in the course book...*

*...I will proceed with the next lesson, which could be a dialogue, so they will have to listen to it from the tape recorder or we may have grammar to finish started in the previous lesson...they will write down the words they have heard... Further on, I will ask them to open their course books...I will ask them to read it through...then, they will do the vocabulary...*

There was little observed variety in the priorities set for learning, as all teachers focused on the teaching of language skills and items-such as reading, listening, speaking, a little writing and grammar. This is indicated in the above interview quotations, as well.

Teaching was certainly conducted according to text book procedures but there may also have been influences from the subject matter, from factors such as time restrictions – teachers were teaching the foreign language for two/three hours a week, - and from pupil attitudes towards learning the foreign language at the state school- attitudes towards English were negative as the great majority of them were attending private afternoon classes, but, this was not the case with French, which is not such a popular language as English so pupils were not attending private classes. Such negative pupil attitudes were not observed in the particular cases, but were recorded in the interviews. However, further analysis of the data will be required if it is to identify thoroughly all external factors influencing such priorities for teaching.

The issues of time pressure and pupil attitudes are clearly indicated in the following quotations:

*TA: My main problem is that although I am positive to ICT, I say 'yes, to ICT', teaching English in secondary Education, is so few hours on one hand, and on the other, there are the private afternoon classes...within two hours that you teach English per week, and three in the first grade, I do not have the time within the school year to finish things....*

*.....kids attitude towards English at school is that it is a subject of secondary value because they will think that they will go to the private school, where the teachers are better, they will be provided with more teaching hours and they think that they will learn better English there. Now, whatever you tell them here at the State school, they will tell you 'we know all this' or 'are we going to do these things? We will do it at the afternoon classes...'*

*TB: ...you will need to be teaching these kids for more hours a week....*

Teacher of English A, who considered grammar to be the backbone of the language, always started with the teaching of the grammatical phenomenon in the unit. Practice activities were used where at the same time the teacher evaluated the learners' performance (assessment). This was obvious in all observations, where the teacher always started with activities involving grammar practice, where pupils had to read out the missing words or rephrase given sentences and then proceeded with the lesson in the course book.

*TA: grammar is the backbone of the language if you want to make correct sentences...it could be fill in the missing word...*

*[reasons for asking pupils to read the exercises] to see if they have done mistakes and correct them, to see if they know them...if there are mistakes, I will try to remind them what we have said before about the phenomenon...*

Moreover, consolidation of grammatical forms was assessed by involving learners in situations where they had to use the patterns and functions previously taught in order to finish the teaching process (application/assessment activities). The researchers' experience during the observation verified such use of activities in which the teacher at times during the flow of the lesson encouraged use of 'direct/indirect' speech by asking pupils to rephrase her actual wording or their own wording into the indirect speech. This was the grammatical phenomenon dealt in the unit.

*TA: Because that was the grammar taught in the particular unit and by doing this I wanted to complete a teaching process because this question that I posed, this 'Read it', was the whole grammar of the unit..... Once I realize that they still remember and they know, you know that you don't need to spend more time, neither to repeat it again.....*

As communicative teaching was adopted, vocabulary practice involved application activities, as well. Language skills (reading, listening, speaking) involved comprehension/assessment activities aiming to test learners' understanding, and at the same time to encourage them make judgements that were based on the information provided in the text. Strategy activities were also observed where pupils were encouraged to make predictions based on settings and people involved in the stories. Answers given by the pupils at this stage were all accepted, as such.

*TA: the most important thing in my lesson is to be able to transfer the things in the book, the bookish English as I call them into communicative English.....what I will mainly do is to develop a little bit of dialogues between me and the kids to practice what they have learned..... All I'm trying to do is to give them the opportunity to develop creative speaking.... I will simply ask them to read it through.. and then there are the true/false questions....because I want them to understand the story...and to check out whether they have understood correct....Then, there will be role playing....they have seen the story itself, they have already made their guesses, why not experience the story in real, on their own..*

While observing Teacher' B approaches the researcher identified common approaches between her and teacher A- practice activities were used for the teaching of grammar-complemented by strategy activities. This could probably be due to the fact that both teachers were using the same course book.

Teacher B used comprehension approaches for reading, listening and speaking. In addition, application/affective activities were used for effective learning, where pupils were given opportunities to apply knowledge and skills in new contexts by relating them to their own ideas and experiences.

*TB: I will prepare photocopies... for additional practice, such as fill in exercises where they will have to ... practice the vocabulary...or finish a sentence if it is to practice the grammar, reported speech for example.....*

*This general discussion can take a more personal character....i could ask questions such as if sth like this has happened to them.... It is more lively in the sense that they have experienced this situation and using the episode on the video, you can expand it using their own experiences and values.... I believe that kids like to personalise situations....they get more interested....*

The teacher of French, believing in the development of close relationships between learners and the teacher resulting in a relaxed atmosphere for effective learning, had made clear cut explanations to the pupils for the reasons which she had adopted particular processes and such processes were followed religiously. Therefore, as her teaching was based on developing simple language skills (ability to perform simple grammar forms), practice activities were used.

In terms of vocabulary, reading and listening, a dual approach was adopted: (a) memorisation by learners dictating new vocabulary or reading passages as a means to embed language items and (b) affective activities in the listening where all answers were accepted. It should be clarified that any reading activity was proceeded by listening and therefore, there was no differentiation in the content between these two. Such practices were verified during the observations, where the teacher would always collect pupils' dictation before starting the lesson. Also, correction was kept to the minimum and this was latter justified by the teacher as an approach to develop pupil confidence and positive attitudes towards new learning situations.

Additionally, the approaches adopted were the most appropriate, according to the teacher, given the young age of pupils (12-13 years old) along with their low level of the target language (beginner's level).

*TF: they will write down words... I'm not interested in the correct spelling... the reason for this is to reduce their anxiety... this is very good for kids' learning as they become familiar with the written speech...what I am trying to say to kids is that whatever new we learn, this*

*dictation process will help them for further practice... and this will help them better remember things.....*

Finally, in all three cases learners' practice in the classroom was accomplished through teacher pupil interaction –even in the case where a communicative language teaching was implemented, due to pupil attitude for practice and restrictions of time to teach alternative forms of practice. Time constraints was also a reason for teachers not practising writing in the classroom as well as pupil's negative attitudes towards it.

### **B. Teachers' ICT suggested Strategies: Implications for training**

All three teachers seemed very enthusiastic about ICT for teaching and learning and emphasised the value of the visual potential it offers. However, they expressed their concern about ICT probably leading to alienation and diminishing of their roles (Somekh, 1997) as they put value in the human presence for teaching.

*TA: Teaching and learning with machines could be much more interesting to the pupils, but there is much essence in the human contact..... I think of it as a nightmare of science fiction, thinking that kids would be only taught with computers...*

*TF: I believe that we are human beings and such we need other human beings in our every day life.....*

This concern should seriously be considered in teachers' ICT training if it is to maintain their positive attitudes towards the new mode. An appropriate ICT training approach could probably be the one that would encourage teacher initiation, responsibility and control over implementing procedures in the hope that teachers would realise the importance of their presence even when ICT would be used.

Obviously ICT was not included in the teachers' current teaching processes as none of them had previous training or support about the educational aspects of it. The activities suggested by the teachers when they were asked how they would organise a lesson with ICT were practice ones, such as using CD-ROMs for drill and practice, where there had been observed that the nature of their current practices involved tasks on advanced levels. Table 1 illustrates such evidence.

*TA: I don't know many things about ICT, or I don't know anything about it. I imagine that I could use CD ROMS to teach, but I don't know any. There, you could let your pupils to practice the grammar, the vocabulary... they can fill in words ....*

*TB: I don't really know how you could possibly make use of ICT in the class...you can use the computer to get the kids practice what you want to teach... I don't really know. I could just think of exercises with grammar or vocabulary to fill in and things as such...*

*TF: I am not skilled in using ICT, the only thing that I know is how to use the word processor. I have seen how ICT can be used, as I have seen CD ROMS to practice grammar and vocabulary... [which] have been based on what already exists in books... pupils will press buttons to accomplish the tasks or the exercises....*

It could probably be suggested that apart from using applications representing the developers' own philosophies for teaching, teachers should be encouraged to reflect back in their current practices, challenged to rethink about their strategies and they themselves suggest ways to relate ICT to the more advanced aspects of their normal practice (Somekh, 1997) as it is believed that this may possibly raise their expectations of the place of ICT in teaching and learning. Subsequently, it may be possible that this will entail changes not only in their teacher-centred methods for teaching but also in the nature of learning.

It could probably be suggested that training should include open-ended packages (Scrimshaw, 1997), that would allow more flexibility, creation and adoption. In addition, changes in teachers' practices and roles as a result of ICT for teaching and learning should not be pre-specified by the developers of the innovation, but in close collaboration between them and the teachers those changes should be anticipated.

### Concluding Remarks

Rather than imposing changes, a more “social constructivistic” approach for training is suggested, where teachers would be encouraged to further reflect upon their current practices and propose not only the ICT related materials to use but also to be able to use packages that would allow the development of such materials in accordance to their philosophies for teaching. In other words, it is expected that by taking teachers towards a process for reasoning and action (Shulman, 1987), it could be possible to “scaffold” their knowledge, while they engage in ICT classroom activities that would otherwise be out of their reach.

Real change therefore, could probably be promoted by involving individuals in a process of self-exploration and experimentation on how the computer might be used to support and develop the theoretical and practical implementations of their own knowledge of teaching (Scrimshaw, 1997).

Taking an alternative approach where changes in teachers practices are imposed by external bodies would endanger conflicts between what the teachers are doing and consider as appropriate to the situations in which they act upon and these new approaches introduced by developers, probably resulting in confusion, alienation and thus, decrease in teachers’ commitment to work (Sikes, 1996).

Table 1: Overview of Teachers’ Activities

		Present- ation	Practice	Memori- sation	Compre- hension	Applica- tion	Strategy	Affective	Feed-back	Assess- ment
Teacher of English A	Current Practice		*		*	*	*			*
	Practice with ICT		*							
Teacher of English B	Current Practice		*		*	*	*	*		
	Practice with ICT		*							
Teacher of French	Current Practice		*	*				*		
	Practice with ICT		*							

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