

Factors affecting training teachers uptake of ICT during school practice

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1. Introduction

It is referred that from September 1998, based on the standards in the new curriculum for Information and Communications Technology (ICT), the Qualified Teacher Status (QTS) will only be awarded to teacher students that use ICT with pupils during practice (Adams, 1998). However, a survey of the literature reveals that many students fail to use ICT with children during school practice. Downes (1993), in his study reports that less than half of the beginning teachers used computers at school experience and only a 39% with children, of which two-fifths rarely. Similarly, in an account of a national survey of the ICT skills and attitudes of students entering and exiting from the teacher education institutions in Scotland during 1996-7, Simpson *et al* (1998) found that the percentages of practicing teachers' computer use with pupils range considerably depending on the application used in the classroom. According to their research more than half of the trainee teachers used Text Handling during school placement while only a 10% used Content free software, Image and Sound Handling and Internet applications.

Other relevant surveys seem to be more encouraging suggesting a quite higher percentage of computer use at schools. In a study at Loughborough University with Primary PGCE students during 1989-92 it is reported that trainee teachers' computer use at schools varied from 76%-87% (Hodgkinson, 1994). In a small scale project at University College Chester the outcome of the research point to a 73% of ICT use with pupils by primary student teachers (Bennett *et al.*, 1997). Further, in a research conducted at University of North London, in a partnership-based initial teacher education context, it is referred that the vast majority (80%) of students did use ICT in their teaching (Adams, 1998).

But even if these studies, which present a more optimistic description of practicing teachers' computer use with children, are taken into account, we still have to consider for the declining but significant proportion of 20% to 30% of students that under the current

circumstances would not be awarded a QTS. In the light of these findings the essay in question sets to investigate the parameters that affect trainee teachers' effective pedagogic use of ICT with children at school experience based on the analysis of three studies. A substantial part of this analysis will involve a critical account of the methodological considerations raised within the studies examined. The reasoning behind the selection of these three studies is presented below.

Information and Communications Technology in Initial Teacher Training: the literature spectrum

In the literature covered, studies referring to the area of Information and Communications Technology (ICT) in Initial Teacher Training (ITT), cover the following three categories:

- ◆ Studies investigating: (a) the organization of ICT training at HEI and pilot teaching programmes, the use of ICT with children at HEI (Mockford, 1995, McDougall, 1997, Bennett, 1997, McDonald, 1993), (b) The feelings/degree of satisfaction with the use of ICT in academia (Robertson, 1997),
- ◆ Studies referring to students' (a) qualifications and general ICT competence, experiences in, and expectations of HEI training courses (Mellar, 1994, Lienard, 1995), (b) attitudes/feelings towards ICT, (Summers, 1990, Makrakis, 1997, Simpson, 1998),
- ◆ Student teachers' experiences in using computers during school placement (Adams, 1998, Downes, 1993, Hodgkinson, 1994).

Most of the studies that look at initial teachers training in ICT seek to investigate students' competence and confidence in computer use. There are, however, limitations with the competence/confidence model of assessment. Measurements of perceived ICT confidence/competence may be of some intrinsic interest. Nonetheless, their validity as indicators of student teachers' eventual computer use in the classroom is questionable (Downes, 1993; Haydn and Macaskill, 1996). As Haydn and Macaskill (1996) argue the confidence/competence approach "understates the difference between personal competence and awareness of the potential of ICT on one hand, and classroom confidence and experience in using ICT with children on the other" (Haydn and Macaskill, 1996 p.8). Indeed Adams (1998, p.14) found that: "four out of five students who failed to use ICT

with pupils during the course of the PGCE year had scores which put them well inside the threshold levels for operational skills and word-processing at the start of the course”.

A number of other studies focus on students’ feelings/attitudes towards ICT. Summers (1990) justify the purpose of his study by pointing out that “negative feelings are likely to exist and that teachers educators need to be sensitive to them”. Both, Makrakis (1997) and Simpson (1998) contrast students’ positive ICT attitudes towards engaging with ICT in a professional capacity with negative accounts of their experiences with computer use at HEI. They argue that there is a need for greater integration of pedagogical use of ICT into initial teacher training in order for the students to develop more positive feelings towards ICT. The limitations, however, of studies using attitude measurement instruments is that they consider attitude to be a characteristic that students carry with them and which could actually be measured at any given time with specially devised instruments (e.g. Likert scales). However, collecting information on feelings, attitudes, and beliefs is quite complex an enterprise that can only offer an account of what people responded in a particular question at a specific instance. Such responses, as it is the case with the competence/confidence measurements, cannot constitute a valid indicator of trainee teachers’ ICT uptake in school practice. Thus, studies on attitudes and feelings can be of limited usefulness insofar researchers more than often fail to move beyond simple findings and generalize the principles on which they work.

In response to the above limitations, in this essay I will attempt to move beyond studies looking either into the competence/confidence or the attitudes/feelings of the students and to examine the main factors that might affect trainee teachers’ pedagogic use (or non-use) of computers in the *school experience*. In the literature I have covered, the studies investigating trainee teachers’ use of ICT both at HEI and in the school placement were limited to three only, which will be presented in more detail in two main sections. In the first part I will offer a concise account of two past studies (Downes, 1993, Hodgkinson, 1994) and a recent one (Adams, 1998). In the second section I will provide a comparison of the studies and a presentation of their methodological advantages and limitations. Finally, I will discuss some implications for the design of future research.

The terminology used in the studies on ICT in ITT varies considerably. In this paper the terms trainee teachers, beginning teachers and students are equally used to refer to student

teachers. School experience, school practice, school placement, practicum are used to refer to work taking place at the partner schools while the terms practicing and supervising teachers refer to the in-service teachers.

2. Students' Pedagogic Use of ICT in a partnership context: An Account of Three Studies

All three studies focus mainly on tracking students' computer use from HEI to teaching practice with the aim to examine the extent to which trainee teachers use ICT with children and to note the factors that might contribute to such use at school experience. Each study concentrates on slightly different research matters. While, Downes is interested in examining the difference between personal use and use with children, Hodgkinson and Wild target to track the development of students ICT capability in the institution and on school placements and examine the existing gap between ICT application in the two locations. On the other hand, Adams interest is to measures students' technical competencies on entry, their progress in ICT skills and computer use with pupils on practice and to examine the tensions and paradoxes that arise in partnership-based ITT.

Downes (1993)

The first study presented, focuses on a pre-service education programme in Sydney. Downes used questionnaires, some follow up phone interviews and group discussions with a number of students. He investigated the possible differentiation between personal use and use with children, the extent to which trainee teachers use ICT with children as well as the factors that might contribute to such use.

The study aimed to reveal a discrepancy between students' opinions and actual factors that affect ICT use or non-use in school practice. Interestingly enough, when asked, first year students perceived personal experience, confidence and knowledge about computers as the most important factors affecting ICT use. Second year students placed the teachers' use, enthusiasm and guidance as the prime reason affecting their computer use with children. Third year students emphasized the importance of access to relevant software and hardware at school. In practice, however, it appeared that neither personal use, nor

practical sessions on ICT and compulsory courses on 'using computers for teaching and learning', or any other factor proved to be significant. Indeed, the only factor found to affect ICT use with children, was the extent to which beginner teachers had observed computers being used in the class. So a first year student placed with a supervising teacher who used computers with children was more likely to use computer than a third year student who was placed with a teacher that did not. This view refers to the notion of situated cognition and to what Lave and Wenger (1991) refer to as 'legitimate peripheral participation'. According to this theory the learning best takes place in an authentic situation alongside experienced practitioners of the discipline. In this framework learning is constrained to its context of acquisition. Thus, it might be argued that the abstract knowledge on the educational use of ICT acquired in the academic courses often fails to provide students with the important insights into the culture of computer use in a real classroom.

Even though in the study the role of the supervising teachers was considered to be quite important in encouraging students' computer use with children, it should be stressed that in this study the schools had not received a formal or informal indication from the University that the use of computers was an important part of the practicum. There was also no mention at the supervising teachers and no expressed expectation of students to use computers in the classes. Thus, it is not surprising that the most common reason reported among students for no use was that 'the idea did not occur to me' (21%). The last point indicated the need to change practicum conditions from spontaneous to expected and to expect any computer use to be directed at the supervising teacher rather at the student (Downes, 1993), an argument even more relevant perhaps today in the face of the standards set in QTS awards.

Fostering use with children early in the course, as suggested in the study, is a desirable goal. Nonetheless, the shift proposed by Downes from 'spontaneous' or 'encouraged' to 'expected' or even 'compulsory' use during practicum may be fraught with problems insofar: firstly, conditions/practices in schools vary considerably and secondly, teacher education might be expected to generate innovation in addition to contributing to the reproduction of existing practices in schools. As Hill (1997) argues such an innovative practice requires careful planning and selection of adequately equipped, supportive schools and experienced ICT mentors. However, the selection of schools and teachers

with a positive stance to ICT solely could not cover for everything. McDonald (1993) notes that young teachers have little confidence about most of the tasks that the University asks them. Thus, their first concern is to gain confidence on the subject matter and on classroom management issues, which is quite a reasonable priority to set. However, once they feel confident enough with their teaching and are in control over the class it is difficult for them to make a move forward to use computers with children as such a step would add further organizational and technical complexities to planning and teaching which are difficult to overcome and would disturb the authority relations for which the students have worked hard to establish. There are limitations to the extent to which it is reasonable to ask from the students to become the carriers of such an innovation without sufficient support from their mentors.

The most important perhaps point made by Downes in the paper is that there is a distinction between personal confidence with using computers and confidence to work with computers and children and that the former does not necessarily lead to the latter; in fact, use with children can actually precede personal use. This last view, however, is open to debate as other authors argue that, although personal use does not necessarily lead to sustained use with children, is indeed a significant prognostic factor of ICT use at school practice (Adams, 1998).

Hodgkinson and Wild (1994)

This study, based at Loughborough University, examined the existing gap between PGCE student achievement in the institution and ICT application in classrooms while on school placements. The effectiveness of the ICT academic programme was drawn from the Personal Learning Plans (PLP), the questionnaires which were designed to measure changes in the students' attitudes in perceived ICT confidence and competence, and from follow up interviews which were conducted with a small number of students on the basis of an anomalous or unusual questionnaire responses.

The teaching and learning context at Loughborough University comprised a combination of short, intensive IT teaching and longer term permeation of IT applications through each curriculum subject methods course. The courses offered at the Institution have aimed to

build students' confidence and competence on a limited range of common applications, both-machine specific as well as basic or generic skills. The learning of generic skills was perceived to be a more realistic target than the learning of a range of other software, which may vary within schools considerably. In contrast to the university of Sydney, Loughborough University did not offer a separate subject on the pedagogical uses of ICT. However, students were provided with Personal Learning Plans, a two-page booklet with specific and concrete tasks or goals and practical notes on ICT management, in which trainee teachers recorded their use of IT while in the University and in the school placements. PLP were collected at the end and formally assessed for the year 1991-2 on which the article focused.

The results of this study were more encouraging than those presented in the previous one. Comparison of pre- and post-scores of students' perceived confidence and competence on a five point scale show positive and consistent gains during each year and from year to year with the vast majority (70-80%) considering themselves to be at least adequately prepared for their future teaching with IT. As far as school placement is concerned the research showed steady growth in computer use in schools over the three years from 76%-87%, for the first and third year respectively, with a more than 50% of the students having used computers more than ten times.

In this research, extrinsic motivation seems to be a key factor that affected student's computer uptake in the classroom. The authors consider the role of practicing teachers in developing student teachers' computer use with children crucial and place part of the responsibility to schools by holding them accountable for not moving to establishing effective policies guaranteeing implementation for students in the classroom. However, they recognize as a more feasible objective, and thus place greater an emphasis in the extrinsic encouragement that originates from the HEI and targets to increase the motivation of both schools/teachers and students. They argue: "...a more vigorous prioritisation of the course tutors of IT use at school experience might persuade schools to be more encouraging". The use of PLP might indicate that in this context, in contrast to the previous research, a greater emphasis was placed on the tutors' explicit prompts and encouragement rather than the collaborating schools'. It seems that this kind of extrinsic motivation and explicit request from the tutors might have had some positive effects as a,

not in the least negligible, 30% to 40% of students reported that used ICT despite the fact they had no support from the supervising teacher.

Julie Adams (1998)

This research, carried out in the context of a collaborative project between University of North London (UNL) and a variety of schools from the Greater London area, examines the tensions and paradoxes which arise in partnership-based initial teacher training of PGCE modern foreign languages (MFL) students in ICT. In order to enhance the students' use of ICT in the classroom, the study measures students' technical competencies on entry, their progress in ICT skills and computer use with pupils during teaching practices so as to inform classroom practice and the management of the Partnership.

During the University-based parts of the course, in a like manner to the previous contexts, a variety of ICT sessions took place which sought to increase understanding of pedagogical implications as well as add value in terms of levels of personal ICT skills. Adams, drawing on her pilot study, comments that, in spite of these sessions, only a small number of students eventually used ICT in their subject teaching, and that these tended to be students who had arrived with high levels of ICT skills and were placed in schools with existing good ICT practice. In her main research Adams organized ICT activities that concentrated on the ICT areas, which she proposed that it would potentially be most useful and relevant for MFL teaching and would probably be available at schools. Thus, rather than using databases, spreadsheets, multi-media, CD-ROMS, she restricted the technical courses to the teaching of those which centre on text. Adams subsumes these skills into three categories namely, Operational skills, Word-Processing and Electronic Communications. The choice to teach the above mentioned skills to students seems to coincide with the opinion of many school-based tutors, which recon that word processing and desktop publishing, together with flexibility across equipment should comprise essential competencies for new English teachers (Hill, 1997). However, it could be argued that such a restricted use of computers might lead to a less successful use of ICT in MFL for it does not realise the potential of other software which are might not perhaps be directly related to the subject but which could provide imaginative approaches to MLF classes, a limitation that Adams fully acknowledges in her article.

To audit the students' ICT skills at the beginning, middle and end of the PGCE MFL course questionnaires were used. Each contained quantitative analysis of students' ICT skills, as well as qualitative comments on both practicing teachers' and students' ICT use and access in schools, which were subsequently subjected to some numerical analysis. Students' responses were analysed by applying a numerical value to the grading of ICT skills and were awarded scores as follows 'I do not understand': 0 points, 'I am not confident': 1 point, 'I am partially confident': 2 points, 'I am fully confident': 3 points. 'Threshold levels' were established in each skill area, by taking the 'partially confident' score and subtracting two points. For example the Word-Processing skill area consisted of 7 questions. The 'partially confident' score would be $2 \times 7 = 14$ and the threshold level $14 - 2 = 12$. This means that in percentage terms each threshold level falls at or just below 60%. As anticipated, students arrived on the PGCE MFL course with varying levels of ICT skills, which reflects the findings of other studies (Mellar, 1992, Lienard, 1995). Nevertheless, Adams argues that in the sample an 80% and 72% of the students already reached the threshold levels in the areas of operations and word-processing respectively, implying that with appropriate pedagogic input they might be able to use ICT with pupils from the beginning of the course. This view, however, does not apply for the electronic communications area where a much lower level of competence was observed with only a 20% of the students reaching the threshold level and with 11 students awarding themselves totals of zero. This picture resembles to an account presented by Simpson (1998) where students reported that electronic communications was an area least seen used in the class, and least used by trainees at school experience.

As far as computer use during practicum is concerned, Adams accepts that obligation to use ICT is an important factor affecting ICT uptake in the class. However, that year's cohort were aware that passing their PGCE was not dependent on using ICT with pupils and therefore they did not have made this a priority whilst on teaching practice. As observed in the study, in general, students are more likely to use ICT with pupils later in the course with 68% doing so in the second teaching practice compared with only 28% in the first, although, presumably, they had access to the same ICT facilities. This might imply that students gain more confidence as they progress through the year. On the other hand, there were also cases reported where software/hardware limitations militated against some students being able to use ICT with pupils during their second teaching

practice although they had used it on their first. Generally, the picture of the placement school, as drawn by the students in the questionnaires, was not particularly positive as the big majority reported that ICT was not used in the MFL department, and/or there was a negative attitude to ICT use. This finding is worrying because secondary PGCE students have to spend 24 out of the 36 weeks of their course in schools (Circular 10/97 cited by Adams) and, according to their comments, they are more likely to use ICT with pupils if there is some support for them, either in setting up the task, or delivering it in the classroom. Once again the role of the mentor is considered important in sustaining students computer use in the classroom.

Mentors, on the other hand, requested ICT training if they were to be able to support student teachers effectively, as well as use ICT in their own teaching. To meet this request a series of four twilight ICT training sessions, which included a variety of hands-on activities as well as discussions about ICT on the PGCE MFL course were organized at UNL. Mentors were encouraged to take ideas provided by tutors at the training sessions and try them with their own pupils, reporting back on these activities at the next session. According to Gilroy (1986) this training seems to hide a paradox. He argues: "... it seemed extraordinarily wasteful to require the university teacher educators to train school teachers in order that the school teachers could then do the job that had previously been carried out by the university teacher educators" (ibid p.11). However, what Gilroy disregards is the fact that the job that university teachers had previously carried out cannot possibly be the same as the task that the primary teachers will have to carry out, for these two groups know how to operate in different contexts. In all studies it is well argued that trainee teachers need a mentor in a real classroom situation to encourage and support them with their computer use with children. Academics, however, having an extensive experience with adult teaching only, usually find it extremely difficult, if not impossible, to apply their theoretical knowledge in a real school classroom. Therefore, only serving teachers could undertake the role of the mentors and provide the support needed in ICT use during school practice.

3. Methodological Considerations

All three studies relied heavily on questionnaires for their data collection. Interviews were also conducted in two of them. However, their role in these papers seems to be

subordinate. In Downes' study phone interviews and group discussions with a quite restricted sample were only employed in order to "clarify points mentioned in the questionnaires" (p.22). Wild and Hodgkinson in their research conducted interviews only "on the basis of an anomalous or unusual aspect of the questionnaire" (p.106). The main objective of the studies was to examine any discrepancies between HEI/personal computer use and computer use with children. The information collected in the studies raise important questions insofar the way in which the strategies were employed could serve the objectives initially set. Questionnaires, like PLP (or even interviews on occasions) were instruments used in all studies to collect data that could later be -and indeed was- subjected to some kind of quantification, as for example students' prior ICT competence, number of times students used computers with children, types of software they used and number of times they employed computers in class. These findings are interesting as a descriptive of simple *technical and quantifiable* discrepancies observed in computer use at school and HEI. However, they fail to provide an elaborated description of qualitative, pedagogical instances and discrepancies observed in the two contexts. The studies do not examine how each context affected the development of issues relating to *effective pedagogy* of computer use with children or how trainee teachers think and construct meaning of the *pedagogic uses* and barriers whilst at University and school placement. Thus, It would be fair to say that with the data collected the studies succeeded only partially to examine any existent discrepancies between HEI and school in computer use. The studies could have met their objective in more complete if they had placed in their research greater an emphasis on the collection of qualitative data with the use of extensive interviews and observations that could have tracked more thoroughly students' computer use during teaching practice.

Downes

In Downes' study, from students' answers to open-ended questions, it is suggested that the relevant course on the educational use of ICT had an impact on the nature of computer use. In that it provided knowledge about a range of quality software that related to classroom activities and brought about a shift among the three years of practicum from the isolated ICT activities to curriculum related ones and from the teacher initiated ICT activities to student teacher initiated ones. However, the heavy reliance on numerical data collected from the questionnaires (i.e the measure of percentages of students using computers in class) set aside the examination of very important qualitative parameters like

the impact of the university course on the students' educational use of ICT. In the study the role of the course is presented in the periphery and its value is understated. The limited qualitative data available to the reader, in addition to the absence of field observations does not allow for any strong point to be made relative to the role that the module played on the qualitative nature of students' computer use in the classroom. The author himself seems to enfeeble the role of HEI modules invoking the "need to look beyond course design and consider home use of computers as well as the supervising teachers use of computers with children", an argument that partially seems to contradict the main findings of the study, which stress the independent relation between personal computer use and computer use with children.

Hodgkinson and Wild

In Hodgkinson and Wild the use of PLP seemed to have a great potential in describing issues of quality of students' ICT practice. However, the authors regarded the usability of PLP only insofar it: "made *quantification of students' ongoing records of work* in IT in both the institution and the schools possible and allowed for a distinction to be drawn between gains made within the training institutions and those made during school placements" [emphasis mine]. Such a quantitative approach to the PLP use could be characterized as limiting insofar it tended to treat students' computer use in describable terms of 'equally likely events' (Brown and Dowling, 1998, p.82-3). This suggested that all trainee teachers' accounts of Word Processing, Spreadsheets, Art and Graphics etc. could be treated as the same both among different students' practice and between their experience of ICT use at HEI and placement schools. Based on this belief, the authors came to the conclusion that beginner teachers were gaining much more permeated ICT experience at HEI than at school placements since the vast majority of the students used *more* ICT applications at the department than at the school placements. Nonetheless, the researchers in their PLP employment failed (a) to differentiate among students ICT practices and (b) to elaborate on *how* the use of ICT was affected in each context. Thus, it would be fair to say that in the Wild and Hodgkinson study issues of quantity expressed in terms of categorization of ICT applications and times of ICT uptake in the classroom might have hidden issues of quality that might possibly lie in descriptions of successful ICT use.

Wild & Hodkinson claim that a positive characteristic of the PLP was that they made it “possible to note the extent to which students were able to transfer their ICT use to school at a higher or lower level”. Where higher or lower level transfer refers to the number of different software types the students used at school experience as well as to the number of different occasions the same software was used in the class. The validity of the PLP as a measurement of ICT knowledge transfer is questionable insofar the extent and not the content of computer use is what counts as the unit of analysis for the amount of knowledge transfer. This approach seems simplistic and problematic for two reasons. Firstly, because it decontextualises and underestimates what students have to do in a classroom. Secondly, because it suggests that limited use of software indicates a low level of transfer. The issue of transfer implies that trainee teachers simply re-create the same learning events in school practice as they experienced them at HEI. Hopefully, however, the students do not simply ‘copy and paste’ the technical skills they have learned at the HEI to the classroom. As McDonald (1993) comments they have to take into account the pedagogical context in which they work. They worry about conservation of the established authority relations and pupils’ motivation, timing and national curriculum as well as about available resources and technical infrastructure. Even if the level of transfer could be measured, it would be fair to argue that limited ICT use might not indicate a low level of transfer but rather simply point to a particular choice made from the part of the students at some instance. Indeed, in the article the first most common reason given by year three students for not using computers with children was that it did not fit into the planned activities. This means that many students made a conscious choice not to use the computers at school experience.

Adams

Adams in her study, although she seems to acknowledge the fact that “even when ICT [is] being used with pupils, this [is] not always representative of good teaching and learning practice”, she is mainly concerned with the development of students’ personal ICT skills. In her questionnaires she unduly concentrates on pure Operational, Word Processing and Electronic communications ICT uses either at HEI or during practice refraining from examining students’ good practice at school as well as elaborating how each context affected the development of pedagogical ICT skills.

Results of her study show consistency of improvement over time during the course of the PGCE in terms of both the number of students reaching the threshold levels and those scoring full marks in all three-skill areas. Adams comments that most of the improvement in ICT skills was acquired in the period between the start and the mid-point of the course at a time when students were present in the University more than at any other point during the year. She further claims that “this suggests that students develop their ICT skills fastest while in the HEI, rather than in school”. However, it could be argued that ‘switch on/off’, ‘load disk’, ‘delete text’, ‘locate page using URL’ listed in the questionnaire are of a very low level operational and word-processing skills that once sufficiently practiced at the beginning of a course little improvement would be expected subsequently. Thus, the nature of the skills taught might play an even more important role than the location where taught in determining a further improvement of students’ ICT skills.

In the study the use of self-grading ICT skills forms revealed an additional methodological problem. The researcher noticed that a number of students seemed to have deteriorated in their skill level after the HEI courses. After short interviews she realised that some students were simply not in a position to measure their abilities mainly because they could not understand the questions asked. This impugns the validity of the questionnaires as tools of measuring even simple technical ICT skills and reinforces the need for interviews at least as a complement technique.

4. Results

Taking into account the limitations of the studies commented in this paper, I will move to summarize the main themes presented and to suggest some implications for future research.

Factors affecting teacher-students’ ICT uptake with children

Fullan (1991) argues that most change efforts have unduly concentrated on changes that overlooked people in favour of things, probably because people are more difficult to handle than materials. However, people are also more necessary for success. The studies in question, without neglecting the importance of technical infrastructure, look beyond the provision of resources stressing the significance of the human factor in ICT uptake by students at school placement.

Factors affecting computer use at SE		
Downes	Hodgkinson	Adams
<ul style="list-style-type: none"> ◆ Supervising Teachers' use of ICT ◆ Explicit request to use IT 	<ul style="list-style-type: none"> ◆ Students' teaching practice environment: <ul style="list-style-type: none"> (a) Information about the school (b) Class & Teacher as they relate to the IT use ◆ Students extrinsic motivation, explicit prompts and encouragement from course tutor 	<ul style="list-style-type: none"> ◆ The point of the academic year at which training takes place. ◆ Software/hardware limitations ◆ Tutors ICT use ◆ Support in either setting up the task, or delivering it in the classroom ◆ Obligation to use ICT or fail the course

Table 2: Factors affecting ICT uptake during practicum

4.1. Personalized Use and students ICT Competence

All studies recognize the value of personalized computer use as a factor related to ICT applications with children. It seems, however, that they place different emphasis in this parameter and that their conceptualisation diverges significantly as far as the focus of the location (home, school and HEI) for the acquisition of personal ICT skills is concerned. Specifically, Downes prevails that use with children can actually precede personal use, while Hodgkinson & Wild and Adams are more concerned with raising student competence, in particular technical skills, before entering the classroom. Further, Downes suggestions point beyond course design to the consideration of the personal use at home. On the other hand, Hodgkinson and Wild put much greater an emphasis on HEI courses, supporting that Universities should abandon the didactic method of teaching ICT in favour of developing individualised and open access learning using PLP. Finally, Adams in her study places an equal emphasis on the ICT skills developed in both HEI and placement schools. She emphasizes the importance of personal competence in ICT skills insofar she argues that students are more likely to use ICT with pupils later in the course probably because they gain more ICT confidence as they progress through the year.

Of course, all researchers recognize that personal use does not necessarily assure use with children and that other factors, like the degree of students obligation to use ICT at

practice, whether they have seen ICT being used in the class, or whether the academic tutors use ICT in their teaching, might affect students ICT uptake at school experience. It is these factors that will be discussed below.

4.2. Extrinsic Motivation and Role Models

All three studies stress the importance of extrinsic motivation in sustaining students ICT use during practicum. They differ though relative (a) to the degree of obligation each context in the studies imposed on students in using ICT at practice and (b) on the emphasis researchers place on the institution responsible for prompting the students to use ICT with children.

As far as the former is concerned, in the studies students' use of ICT at school practice varied from spontaneous to explicitly requested and obligatory in spite the fact that all researchers stress the importance of obligatory use of ICT use at SE. In Downes study students were not explicitly asked to use ICT at school experience. Thus, any computer use could be characterized as spontaneous. In the Hodgkinson & Wild and Adams study, however, not only were the beginning teachers encouraged to plan for, and to use ICT, in their school placement, but also they were expected to and formally assessed on their computer use, which had to be recorded in Personal Learning Plans. This variance could partially explain the difference in the percentages of students uptake, varying from 39% for Downes to 76%-87% for Wild and Hodgkinson, to compare the two studies that took place at contiguous chronological points.

In relation to the responsibility placed for encouraging students in ICT uptake at placement schools, a comparison between the studies might reveal a difference in their focus. On the one hand, Downes concentrates more on the role that schoolteachers could play in developing students' use of ICT in the classroom. On the other hand, Wild & Hodgkinson recognize the importance of having the students placed alongside positive supervising teachers towards the new technologies. Nevertheless, they move beyond schools and schoolteachers' constraints and stress, more than Downes, the responsibility that HEI bear in these partnership contexts, both in providing extrinsic motivation to students and in assisting collaborating teachers to urge students with ICT use. Adams more recent study is also orientated towards this direction. Placing, however, an even greater responsibility to both institutions, she, exclusively, refers firstly, to the importance

of academic tutors to constitute a positive role model for the students and secondly, to HEI's obligation to offer INSET in order to practically assist practicing teachers in the demanding task of encouraging trainees in their ICT use in the classroom.

The findings presented in the previous section, concerning the factors that might affect issues of the students' uptake of computers at school experience are significant as they assist HEIs in raising the number of students using ICT at school experience, and consequently, in meeting the criteria for the QTS. There are, however, limitations on the overall educational benefit that these findings can achieve. The studies, being unduly concerned with factors relating to issues of quantity, tend to marginalize the investigation of factors affecting the quality of trainee's pedagogical ICT practice.

5. Conclusion

The essay in question set out to investigate students' ICT use with children during practicum and to research the parameters that affect trainee teachers' effective pedagogic use of ICT at school experience. Aiming to explore issues of ITT in ICT at practice, this paper mainly focused in the analysis of three studies researching the students ICT uptake with children in partnership contexts. A crude extrapolation from the studies suggests that students computer use at schools might be fraught with difficulties insofar there is lack of adequate hardware/software, students, as inexperienced teachers, lack the confidence to use ICT with children and both academic tutors and supervising teachers usually do not represent good role models in computer use in their teaching. Hence, progress in students computer use at placement schools depend upon an amalgam of factors including:

- ◆ The provision of schools with appropriate hardware and software
- ◆ The tutors explicit prompts and encouragement
- ◆ Students personal ICT competence
- ◆ Students obligation to use ICT
- ◆ Academic tutors and supervising teacher's exemplary use of ICT in their own teaching
- ◆ Practicing teachers' ability to develop strategies to support work with students.

Accomplishment of these targets calls for closer collaboration between the institutions, integration of students' work both in the institution and the partnership schools, need for INSET of both tutors and teachers in order to increase their ICT use in teaching and to support students pedagogic use of ICT with pupils. A comparison of the Downes, Hodgkinson and Adams studies might reveal that ITT in ICT has progressed within the last half decade insofar obligation of students to use ICT in practice, primary teachers requirement to apply ICT with children and initial efforts from HEIs to provide INSET to supervising teachers. It seems though as if more effort is needed, from the part of both institutions, in raising the cooperation between class teachers and HEI, and in rendering more explicit the inclusion and permeation of ICT into the subject based work by all course tutors and supervising teachers.

6. Ways forward: some implications for future research

Although, the findings and subsequent suggestions made in the three studies are versatile we should bare in mind that all studies approached the issue of students computer use at practice by examining only the students' accounts of their computer use either as the latter were presented in questionnaires, PLP or follow up interviews. However, As Haydn and Macaskill (1996) report there is a difference in the information about ICT use presented by "providers" (i.e. tutors, supervising teachers, trainee teachers) and "users" (i.e. students teachers) or inspection findings. Perhaps data collected from a different source might have produced different accounts, pointed other aspects of the ITT in ICT and open new paths and ways forward. It would, thus, be both useful and interesting if future studies would investigate the issue of students' computer use with pupils from a different perspective, other than the one presented in beginner teachers comments, by gathering data from classroom observations and/or tutors or supervising teachers interviews.

In the essay I have argued that the studies being excessively concerned with investigating quantifiable issues (i.e. rates of students ICT uptake at class) tend to neglect pedagogic issues in computer use during practice. Probably because firstly, persuading and prompting beginner teachers to use ICT at school experience is quite a difficult target to achieve in itself; and secondly, quality use of computers with children is a pedagogic parameter that cannot be easily and readily investigated, analysed and presented in researches. Especially when no kind of extended interviews or fieldwork has taken place,

as was the case for the studies presented in this paper. Nonetheless, raising the percentages of students' computer use cannot be an end in itself, at least not at the expense of pupils learning. Thus, investigating issues of effective pedagogy and good ICT practice at classroom should constitute not only an important consideration but the main focus of future studies.

Further, as mentioned in this essay, treating the students' account of ICT practice in the classroom as 'equally likely events', the studies in question failed to provide an elaborated account of computer use in both locations. Future researches could address the issue of *whether* and *how* students benefit, in terms of pedagogy, from using ICT with pupils at school experience, instead of having HEI exclusively based discrete seminars on the educational use of ICT.

Hopefully, addressing these empirical questions will refocus the research of computer use in ITT from technical and quantifiable considerations to issues about pedagogy. Future studies should consider the usefulness of an advice stated 25 years ago but perhaps even more relevant today: "Thinking about the computer's role in education does not mean thinking about computers, it means thinking about education" (Ellis, 1974). Similarly, it could be suggested that thinking about information technology in teacher training does not mean thinking about students' computer uptake at school experience. Rather it means thinking about issues of effective pedagogy that students' initiation in teaching in the present technological era should entail.

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