

Managing e-Learning: What are the Real Implications for Schools?

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Abstract: This paper is concerned with the use of e-learning in secondary education. It is based on research that has taken place over a period of two years with students aged 14-16 (Key Stage 4). The paper considers the current research in e-learning and identifies the challenges faced by students, the changing role of the learner, and the impact e-learning can have on students. The author argues that preparation needs to be carried out at the school level prior to introducing e-learning into the Key Stage 4 curriculum. It concludes by discussing the findings of the research which identifies a range of issues schools may want to consider, when embracing e-learning.

Keywords: e-Learning, secondary, curriculum development, teaching, learning

1. Introduction

'E-learning has the potential to revolutionise the way we teach and how we learn' (DfES, 2003). There are many definitions of e-Learning available such as 'learning facilitated and supported through the use of information and communications technology' (JISC, 2007). For the purposes of this research E-Learning is defined as students developing knowledge, skills and understanding, through the use of computer-based technologies.

The recent developments in technology are changing the role of the teacher and the learning experiences of school children, engendering an exciting future where students study increasingly from places other than school. A new milestone in the development of e-learning in schools has been the use Virtual Learning Environments (VLEs), enabling new opportunities to personalise learning (Barajas and Owen, 2000), although this can lead to inequity through the digital divide (BECTa, 2001). There is a need for greater research to take place to discover the best practices when e-learning is the primary medium for delivering content, particularly at compulsory education level (11-16 year olds).

E-learning can provide better support for the less able, engage students who do not respond well to 'traditional' classroom learning, provide opportunity for accelerated learning for gifted and talented students, and develop independent learning skills through a personalised learning experience. Increased development with e-learning in schools will enable a more flexible use of the school building and the school day, as well as vertical grouping and movement of students. Increased connectivity of schools to the Internet via broadband in the United Kingdom (UK) has provided greater opportunity for school managers to introduce and make use of e-learning materials across the school curriculum (Hesketh and Selwyn, 1999). The establishment of 10 regional Broadband Consortia to support the development of e-learning within schools, and the continued support of the Government for schools to purchase e-learning materials¹, is resulting in an increased use of e-learning in secondary education. This will continue to develop with pressure from the Government, and the introduction of new teaching standards in 2007 to include the use of e-learning by trainee teachers, thereby raising the level of skills and the development of a pedagogical framework for e-learning.

The use of e-learning within the school curriculum has developed from industry where it has been used, both successfully and unsuccessfully, for training staff; the first recorded use being in 1984. For example Karon (2000) comments on improved accessibility of courses that can be self-paced and available via the Internet at a time to suit the learner, as compared with more conventional distance learning delivery agents. While Urdan and Weggen (2000), suggest that e-learning can result in a higher retention rate due to materials being personalised and reflecting different learning styles. The protagonists of more traditional learning and teaching methods have tended to dismiss e-learning, viewing it as a training tool, rather than reflecting the learning environment of a traditional classroom that encourages debate, discussion and interactive learning. However, developments of e-learning tools are now enabling opportunity for these elements to be present and e-learning is evolving into a virtual classroom.

¹ . The Government ear-marked £100m funding for 3 years for the purchase of e-learning materials, to finish in August 2006, enabling individual schools to receive £1000 plus almost £10 per pupil per year. This money has to be spent on 'approved' software.

Much research has been carried out with Higher Education (HE) and training establishments, identifying a range of issues such as student satisfaction being a significant factor in drop out rates (Levy, 2007, Sachs and Hale, 2003, Chyung et al 1998, Yang and Liu, 2007); the need for a personalised learning pathway and curriculum sequencing linked to learners' ability (Chen et al, 2006); the need for the opportunity to collaborate, a variety of learning stimuli, and effective interactive tools linked to contextual learning and feedback (Yang and Liu, 2007).

E-learning is seen by many as a growth area for schools although there is little research into its use in schools. The Department for Education and Skills (2005) sets out the UK Government's strategy for harnessing the use of technology in schools, including the development of e-learning. This document has tough challenges for schools. Joo (1999) recognises some of the challenges ahead, including the need for motivated teachers and learners who have 'appropriate training, easy access to high quality materials, and systematic academic, administrative, and technical support within and outside of schools'.

This paper, based on research within the secondary school sector in the UK, seeks to identify some of the challenges schools face when using e-learning for the first time, both within the classroom, and when studying from home. It describes the research methodology, the school's experience with e-learning, and the students' perceptions when using e-learning. Finally the paper concludes with considerations for schools when introducing e-learning at the secondary school level, and discusses the question 'What are the real implications for schools when introducing e-learning materials?'

2. Research methodology

The author undertook research over a 2-year period focussing on students opting to take a General Certificate in Secondary Education (GCSE) equivalent course in Information Communications Technology (ICT) via e-learning materials. These students were all aged 14-16 during the period of research. Students opting for this course did so in addition to 8 GCSEs, the 'standard' number of GCSEs taken by students at 16 within the UK. This is still a new area for research into e-learning, the main focus being in HE, training, and post-16 use of e-learning.

The research commenced when the students were in year 9 choosing their GCSE options, and followed their progress throughout the 2 years of the course during years 10 and 11.

This new e-learning opportunity proved popular and 42 students opted to take the course: 20 formed a group at school attending after school twice each week, and 22 took the course at home with hardware and Internet connection provided by parents. Students selected which group they were in. The course was designed to take 3 hours of study per week over 2 years.

This was the first time the school had used e-learning materials. The students had undergone no specific training prior to the introduction of this course, other than that described in this article. The research therefore focussed on how the students utilised the e-learning materials, what factors were identified as important to the students to enable them to complete, and what factors engendered a sense of satisfaction and motivation with their learning.

A range of methods were used to obtain data to ensure triangulation of findings and a fitness for purpose of the research tools used. These include a range of interviews:

- all teachers and students were interviewed each term of the first year, and in the last term of the second year. The teachers were interviewed separately, while the students were interviewed in groups. The initial interviews were to ascertain the background of the introduction of e-learning; the following interviews were to ascertain their level of satisfaction, identified by Sachs and Hale (2003) as satisfaction being an essential element of retention and success.
- an interview with the headteacher prior to the commencement of the e-learning course to identify the aims and purpose of this initiative in the school, as well as the roles of those involved, and the training provided for both staff and students;
- interviews with the school technician who was responsible for providing technical support in school. These had not initially been planned into the research, but it became evident that the technical support was an important factor in retention and success, as identified by Joo (1999);
- interviews with a range of students following the course from home. This group had the highest non-completion rate, which correlates with findings identified in HE-focused e-learning research

by Parker (1999). These students were chosen to gain a representative group of gender and ability, factors that had been identified as important to HE research by Levy (2007),

Classroom observations of the school based group were carried out once each term. Meetings were held with the students studying from home and a questionnaire was sent to their parents to ascertain their perceived role and the amount of support they were giving. Students who did not complete the course were sent a questionnaire to determine why they had decided not to continue.

Additionally, data from Key Stage 3 Standards of Attainment Test (SAT) results was used to establish the prior knowledge of ICT for each group.

The data gathered has been used to reflect factors need to be present to engage 14-16 year olds in e-learning, and what needs to be considered to encourage completion.

3. Prior experience

The school where the research was carried out has a strong commitment to Information Communications Technology (ICT). The Office for Standards in Education² (OfSTED) Report for this school indicated that ICT performance achieved by students at the end of Year 9 was above national average 'Teacher assessments, at the end of Year 9, show the proportion of students reaching national expectations of attainment was well above average' (OfSTED, 2000). Students received one hour each week of ICT in Years 7, 8 and 9 from specialist ICT teachers, plus additional experience of using ICT across the curriculum. In year 10 students could opt to take an ICT-related GCSE or the e-learning route.

As outlined above, the students who opted for the e-learning route could either study entirely from home outside the school day, referred to as the home study group, or they could join a group, supported by an ICT teacher 2 evenings each week, referred to as the after-school group. The students taking the course in both the home study and after-school groups had good ICT skills developed at Key Stage 3. The expected level at the end of Key Stage 3 in the UK is level 5.

Table 1: Key Stage 3 Standard Attainment Target ICT Results³

Level	No. of Students in After-School Group	No. of Students in Home Study Group
4	1	0
5	1	0
6	8	4
7	5	9
8	5	9

The school had no previous experience of e-learning. Staff did not receive any training in the pedagogy of e-learning, or guided to useful references which would provide helpful advice on engaging learners in e-learning, and their role as an e-tutor. When the course was introduced to the students it had been planned to provide a one hour induction, but this was cancelled due to staff changes.

4. The home study group

Table 1 indicates that this group had higher level ICT skills prior to commencing the course, but a lack of awareness of the amount of self-motivation and independent learning skills that would be needed to complete the course and achieve the qualification.

In initial interviews with the students they were motivated by their enjoyment of ICT and their aspirations to gain additional qualifications. They found the e-learning materials were simple to navigate and enjoyed being able to go back to theory they had found difficult. They were enthusiastic about the new method of learning and they enjoyed the novelty of working on their own at a computer. As Papert (in Abbot 2001) stated 'Everywhere, with very few exceptions, I see the same gleam in their eyes, the same desire to appropriate this thing. And more than wanting it, they seem to know that in a deep way it already belongs to them. They know they can master it more easily and more naturally than their parents. They know they are the computer generation.'

² OfSTED was set up by the UK Government in 1992 to help improve the quality and standards of education by regular school inspection.

³ Students are expected to gain level 5 by the end of Key Stage 3 (National Curriculum in Action). Level 8 is the highest level achievable for ICT in the UK.

However, with no induction this group were provided with a sheet giving log on details and assessment deadlines. Their initial enthusiasm soon disappeared as they experienced the tedium of the materials. These were mainly in text-book format with occasional use of voice to reinforce explanations, or use of screen-capture for elements of software development skills. There was no use of video, 3D graphics, or opportunity to collaborate or discuss with others. 'Users have high expectations of multimedia; they judge audio-visual material by broadcast standards and interactivity by the standards of commercial software. They have a low tolerance of material that falls short of these expectations' (Tearle and Dillon, 2000).

There was no opportunity to meet other group members and no list was provided of who these members were. Throughout the course there was no opportunity for the development of support groups. They were assigned to a tutor, but there was no opportunity for them to meet this tutor. Students stated that the start of the course was demotivating and needed to change for future groups.

The group quickly experienced difficulties and expressed dissatisfaction with the e-learning materials, and lack of time-tabled tutorial support. There was no formative feedback on progress until the end of each module when coursework assignments were marked, no reminders of deadlines (all students in this group missed at least one deadline), no feedback on progress, no individual targets, challenge, or extrinsic motivation. The students expressed a feeling of loss of the 'traditional' teacher - 'I miss the teachers' help, support and feedback', 'I need more support with meeting deadlines and would like reminders built into the software'. 'I know I moan about my teachers, but I don't like learning without one'. This corresponds with the research by Yang and Liu (2007).

As the teaching team became aware of the difficulties of the home study group they offered support during break times, providing a 'drop-in' facility for these students to seek individual help. However the students found the 15 minutes at break too short and often filled with other demands, such as choir or orchestral practice, or the simple need to socialise with friends. They also found it time-consuming to log onto the network and access their files, often just getting to the crux of the problem when the bell for the next lesson went; or finding that the software used at home was not compatible with the school's system.

Some of the group experienced technical difficulties at home that often had to be solved by parents, and the use of a slow dial up connection which was frustrating (none had broadband). The school technician provided help where possible, but this raised the question of whether it was the parental responsibility to maintain their own equipment, or the school that is providing the programme of study. In 2 cases the students got too far behind, missed their first deadline, and left the course due to technical difficulties at home.

The main challenge faced by this group was the lack of opportunity to meet and discuss progress. They expressed feelings of loneliness quite early on in the course and a lack of support and motivation from their peers, as found by (Lawton, 1987). As we become more experienced with e-learning, developers are building in opportunities for 'socialisation' via electronic forms such as discussion boards, web blogs, and web-conferencing, but software in this research did not offer such a facility and the only time the group of students came together was for the purpose of this research.

The students were not used to sitting in front of a computer working on their own. Adults know this can be very difficult and takes a great deal of motivation (Macpherson et al, 2004). It is increasingly recognised that students should experience shorter spells of practical work at a computer; and the new UK National Strategy ICT Framework lesson plans (available at www.dfes.gov.uk), indicate short practical sessions broken up with whole class teaching raises achievement, engages students, and helps with motivation. For the students on this e-learning course the expectation of the software providers was that they would sit at a computer for extended periods of time.

The parents of the students working from home were positive of this new curriculum initiative. As Wishart and Blease (1999) found, eighty per cent of parents who took part in this research rated additional qualifications as the main reason for wanting their child to take this e-learning course in addition to their GCSEs. One parent stated it was 'a useful and challenging way to gain additional qualifications and developing ICT skills'. There was some cost involved as some parents purchased additional hardware and all maintained Internet connections. The students appreciated the initial support from parents, but most experienced it short-lived and sometimes found the time they had set aside for completing their e-learning study was taken up with other family activities 'The only time I can do this course is at the weekends when Mum and Dad want me to join in family activities'. In addition several students only had one telephone line in

their home and were continually being asked to log off the internet so the telephone could be used by other members of the family.

In one meeting with this group much time was taken in students expressing feelings of upset that parents no longer took as much interest in their progress: 'At the beginning Mum used to help me and look at what I was doing. Now she seems to have forgotten all about it'. It was felt by the author that the students expected their parents to take on the role of 'teacher' in encouraging, challenging, looking at what they were doing, and reminding them of assignment dates. Selinger (2001), in her discussion on teacherless classrooms, acknowledged the importance of students having a person to support their learning. In this situation this role fell mainly to the parents. This raises the issue of whether parents should receive training from the school in supporting their children in e-learning, particularly when the full course is being taken from home.

5. After-school group

In the UK it is increasingly common to find many activities taking place in schools after the traditional school day has ended. At this particular school after-school activities were more difficult because approximately 70% of the students went home on school buses. For these students, and their parents, arranging alternative transport home, often to outlying villages, was problematic. Due to transport arrangements attendance at sessions was not always good. Those students that maintained regular attendance were among those that ultimately completed the course.

In observing the after-school sessions it was clear that the students enjoyed this new method of learning. The students welcomed the fact that they could control their own learning (Lepper, 1993), but not all learning styles were met in all sessions through the e-learning materials, which sometimes led to dissatisfaction with the materials (Oh and Lim, 2005). The students were supported by a teacher during each session, and technical difficulties were quickly managed by the on-site technician. As the teachers became more confident with the learning environment they encouraged students to help and support each other, a process also observed by Hexel, et al (1998).

This group received good support during sessions, deadline reminders for coursework, feedback on progress, and the teachers maintained a form of monitoring of progress, although these were often based on completion of coursework, rather than individual progress during sessions which would have provided greater motivation (Black and Wiliam, 1998). Their parents also received reports on their progress as part of the usual reporting system within the school.

The satisfaction aspect for this group was much higher than the home study group. This was reflected in the final completion and pass rate of the whole cohort, which was much higher for this group.

6. Findings

Overall the after-school group were the highest satisfied, scoring an overall satisfaction score of 69%. The areas they were least satisfied with were the slowness of downloading the materials 62%, and the tedium of the materials 78%. The areas they found most satisfaction with were the support of the teacher 67%, the support of the school technician 64%, meeting as a group 64%, and formative feedback 83% which they identified as being an important motivating factor. There was little gender difference with 64% of girls enjoying the learning experience, 60% of boys, which is supported by Levy (2007).

The home study group were the least satisfied, scoring an overall satisfaction score of 29%. The areas they were least satisfied with were the lack of teacher support 93%, the tedium of the materials 75%, lack of opportunity to work collaboratively 73%, and technical problems 66%. The areas they found most satisfaction with were opportunity to work when they wanted to 52%, and being able to revisit theory they didn't understand 59%. There was little gender difference with 31% girls enjoying the learning experience, 28% of boys.

6.1 Satisfaction rates

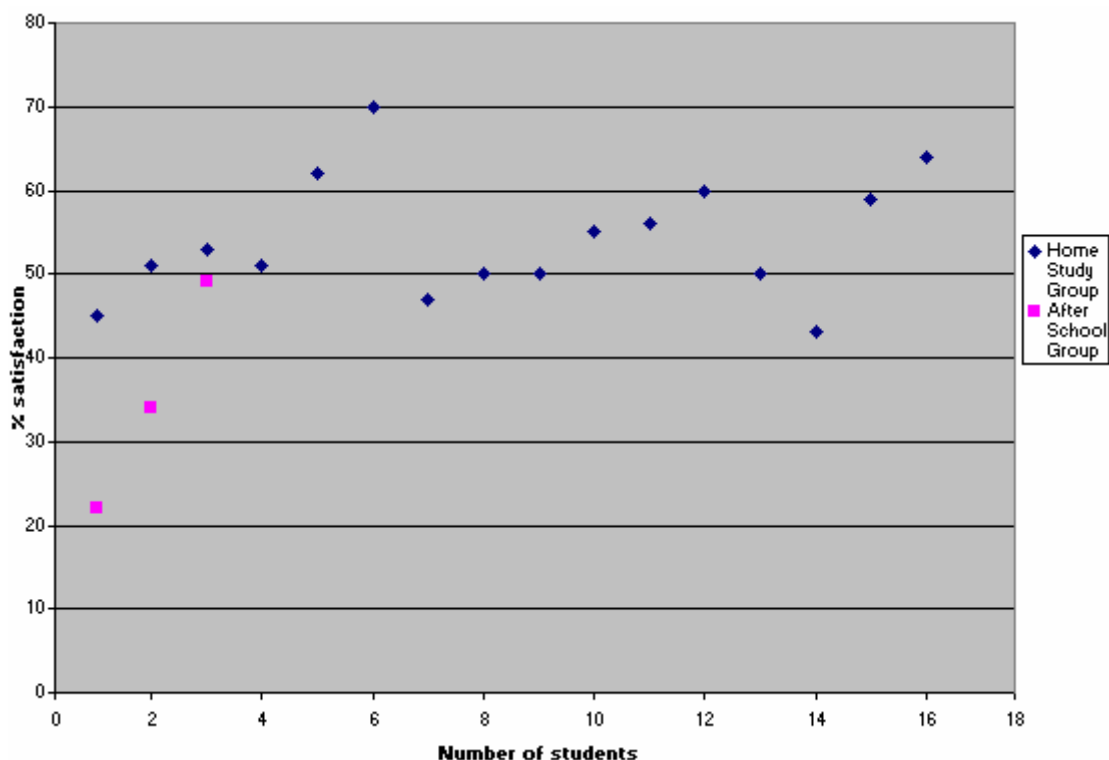


Figure 1: Scatter graph showing satisfaction of students

By the end of the first year 72% of the home study group had left the group. Ultimately only 3 of these completed, 3 transferring to the after-school group to complete the course.

The after-school group was more successful with only 7 leaving during the course, gaining a completion rate of 80%, including 3 students that transferred from the home study group.

Factors that were identified as important to the students to complete included those shown in table 2.

Table 2: Factors identified as important

Factor	No. of students – Home Study Group	No. of students – After-School Group
Ease of use	22	20
Induction and opportunity to meet the group	22	5
Timetabled tutorials built into the school day	18	4
Assessment on-demand	12	9
Regular feedback on progress	19	8
Target-setting	15	8
Built-in reminders about deadlines	20	10
Opportunity to collaborate and interact	22	9
An individual pathway linked to your knowledge and ability	17	16
More exciting materials including 3D and audio-visual materials of broadcast standards	20	18

These areas identified by the students correlate with the findings of the main areas in Chung and Liu’s research (2007) into what the virtual online classroom should be. Pituch and Lee (2006) have also developed a ‘technology acceptance model’ for successful e-learning where perceived usefulness and perceived ease of use leads to an intention to use the system. They also support the importance of being able to interact with other students and the teacher as the key to effective use of e-learning.

Research findings indicated that in HE factors such as student satisfaction with the course was a main contributor to non-completion. This is supported with the findings in this research. The opportunity to take the course was optional, but it is important to reflect on how students in this age group, with no prior-experience of e-learning, would engage with e-learning as a regular method of learning. As this school found, e-learning has many advantages, but also presents many challenges for those involved. Ensminger et al (2003) found that the successful implementation of new technology depends on well-managed change, efficiency and performance improvements, recognition or reward for taking part, and having sufficient resources to make the change. This should include careful preparation and training for all those involved.

Table 1 indicates the prior achievement of the students in ICT. There was some correlation with completion between their achievement levels, but not a significant amount, and with other factors to take into account the author was not able to make the same confident conclusion as Levy (2007). It should be noted that the one student who embarked on the course with a level 4, ie the lowest ICT skills, completed the course successfully.

It may be appropriate to introduce students to e-learning and blended learning tools at an early age so that students establish e-learning skills that they can then develop into life-long learning. This may help retention figures in HE or provide experience to make an informed choice about whether to take an e-learning course after school. All e-learning students need to develop a new range of skills such as managing their own pace of learning, learning how to become autonomous independent learners, and taking greater responsibility for their own learning. As Leask (2001) states 'we need to develop in young people, abstraction, system thinking, experimentation, collaboration and learner training, allowing them to meet the challenging requirements of the information society and equip them with the ability to be flexible, change and learn new skills for emerging contexts'. As e-learning continues to become more available, and schools offer an increasingly flexible curriculum, school managers will need to consider how to engender these skills in the students.

School managers may also want to consider the role of parents where they are going to take on the role of supporter for students using e-learning from home. There is a digital divide in the UK as reported by BECTa (2001) with access to resources and quality of software and hardware. National and local decisions need to be made as to who will be provided with home computers in order to ensure equality of access to e-learning.

As the use of e-learning, particularly from home, increases, the issue of who maintains the hardware will need to be addressed. For some parents, with poor computer skills the smallest technical problem may prove a barrier. As the students in this study found, any delays in getting hardware repaired, or upgraded to meet the requirements of the software, meant the students quickly fell behind. Incompatibility with school and home software led to a reduced level of satisfaction.

Finally, it is recognized that the issues raised in this research may be outweighed by the many benefits of e-learning and it must be acknowledged that software applications are becoming more intelligent and responsive to the user (DfES 2002) which will result in more personalised e-learning materials and an opportunity for higher standards of achievement for all students.

It is also recognised that the size of the sample, based in one school may limit the findings from larger scale research.

7. Conclusion

e-Learning certainly has a place in the future curriculum of secondary schools, but there needs to be an awareness that younger students of full-time compulsory school age do need training in using e-learning materials and developing independent learning skills. Schools may want to consider planned parental involvement for students working from home, and careful preparation of students, together with tutorial support and opportunity for collaborative work.

It was disappointing that a significant number of students failed to complete the course, but the school has learnt much from the experience, the teaching staff have developed much greater confidence in preparing students for e-learning, and senior managers have realised that there is a need to support the introduction of e-learning on a small scale at an earlier age, as well as provide timetabled tutorial support for the students. It is anticipated that the experience will ensure greater completion rates in following years, and the introduction of more e-learning materials across the school.

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