Integrating ICT within Play Based Curricula in the Early Years

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Executive Summary

Aims of the Research

In this project we explored how computer use can be successfully integrated into play-based curricula in the early years. We identified the different ways that computers are used in early years classrooms and the characteristics associated with these uses that children consider to be playful. We then investigated whether children's perceptions of playfulness are related to how involved they are in their daily computing activities and, based on these findings, offer some practical suggestions for teachers at classroom level.

Sample and Research Methods

The sample comprised twelve early years classes from schools in the South Wales area, selected to be representative of small, large, urban and rural provision. All classes were following the play based Foundation Phase curriculum. The research is in three stages. Firstly, we identified the variety of different computing practices in the sample classes via observation and teacher interviews. From this information we elicited characteristics of the various forms of provision and based on day long observations of computing activity at each setting, consider how provision is related to motivation and engagement via rating children's involvement levels across the types of provision. Using clips of our video footage that represent features of provision, we conducted focus groups with 103 children, eliciting their ratings of how much like play the different forms of provision are. We then used the video clips to prompt discussion amongst the children about what made computing activities more or less like play.

Research questions

- In what ways are computers being used in classrooms following the Foundation Phase in Wales?
- Are certain types of computer use more effective in motivating and engaging children?
- Are certain types of computer use considered more playful by children and is there a relationship between playfulness, motivation and engagement?
- In what ways can children's motivation and engagement with computers be enhanced within the context of a play based curriculum?
- What recommendations can be drawn for classroom practice?

Main Findings

- The teachers in the current study recognise the cross curricular benefits of computing provision for young children in relation to subject specific skills but particularly in relation to facilitating autonomous learning and developing children's confidence.
- The teachers in the current study felt relatively well equipped to deliver computing provision within the Foundation Phase, most had a good range of equipment and felt well supported by designated ICT co-ordinators.

- Computers were used in a variety of ways throughout the school day and descriptions of use mainly related to continuous, enhanced and focused forms of activity provision. These forms of provision were consistent with Foundation Phase practice guidelines and appeared to be characterised by whether participation and goals were child or teacher directed. There were no differences in the observed involvement levels of children engaged in activities described by teachers as continuous, enhanced or focused. Children's involvement levels across the full range of provision were high.
- Computing practice could be typified by; modality type (single classroom computer, suite or whiteboard use); teacher absence or presence and; social context (whether children worked alone, in pairs or in small or large groups).
- There were no significant differences in involvement levels according to modality type although the highest involvement levels were those associated with children using the mini-suite.
- Contrary to previous research, teacher presence had no detrimental effect on children's involvement levels.
- Whole group activity led to the lowest levels of involvement. Paired computer use led to higher involvement levels than those associated with whole group activity but interestingly, lower levels of involvement than when the computer was being used alone or in a small group.
- Children consistently rated the video clips presented to them of children using computers as being a lot like play. There was no relationship between how much like play an activity was perceived to be and the involvement levels of the children featured in the clips.
- The quantitative play ratings of clips provided by the children did not reveal any effect of teacher presence. Of significance to the children was not whether a teacher was present, but rather what the teacher was doing. The children were sensitive to how much help was being given and whether this help had been requested. The children also appeared sensitive to teachers adopting a monitoring role (for example, when the teacher was standing behind the children, they described her as looking at their work and it being less like play).
- Consistent with involvement level findings, children found solitary and small group activity more playful than whole group or paired tasks.
- Computer activity was described as more like play when activities were self chosen, enjoyable, participated in for longer or unrestricted periods of time, involved purposeful activity and positive social interaction.
- The use of games and websites were considered to be a lot like play, as were drawing, painting, colouring and musical activities. Less like play were writing and typing.
- Some children were sensitive to features of classroom routine and indicated that activities were more like play because of when the activity was occurring (for example after the children featured in the clips had finished their work or after snack time).

Recommendations for Classroom Practice

- Computer use in small groups is particularly recommended. This appears to work well when 3+ children use the same computer, or when 3+ children engage in parallel use in a mini-suite.
- Children use subtle cues to determine whether or not an activity is more or less like play; offer choice and control over an activity as far as is possible.
- Be aware of the positive effects on both playfulness and involvement of spontaneous paired and group activity and accommodate this by not being overly restrictive about how many children use the computer at one time and allow chairs to be moved to the area to facilitate such spontaneity.
- Children perceive teachers differing roles in their various activities; involvement and playfulness can be maximised simultaneously by being sensitive to children's cues about how much assistance and support they require.
- Be aware that body language and posture convey subtle messages that influence involvement and playfulness; for example in the current study standing over children was seen as a cue to a teacher being in surveillance mode and an unenthusiastic teacher led to unenthusiastic children.
- Understand that whilst paired computer can lead to co-operation and shared learning experiences, this is not automatically the case. Paired computer use generally works best when it is self chosen or where the hardware or software available, facilitate joint effort.
- Consider whether small group rather than whole class sessions might better facilitate involvement and increase perceptions of play.
- If you don't do so already then consider integrating writing and typing activities (commonly described by children as being less like play) into provision with the use of engaging computer games or by allowing choice as to whether or not to use word-processing packages.

1. Introduction

Within curricula for the Early Years across the UK and beyond, considerable attention is now placed on children learning through play and exploratory experience. In addition, the New Primary Curriculum, presented at the Public Policy Exchange in Whitehall on 15th July 2009, highlighted that ICT should form a centre piece of children's early learning experiences. The introduction of such initiatives means that ICT and play must now be integrated into the curriculum for children in the early years. Cuban (2001) however, suggests that computing provision is generally used to extend traditional teaching strategies (e.g. via software designed to support literacy / numeracy) and in addition, a recent report by BECTA (2008) highlighted that teachers felt relatively ill-equipped to deliver ICT within a play based curriculum.

Whilst both play and ICT are seen as important for children's development within curriculum initiatives, previous research has shown that in practice they are often peripheral to the real business of learning in early years classrooms (Selwyn & Bullon, 2000). It is important to understand how ICT, play and learning can be integrated to best effect, and this is the primary purpose of this project. Whilst funding

bodies have supported research into ICT, little emphasis has been placed on research that actively seeks to hear children's voices. We propose that the successful integration of ICT within a play based curriculum is dependent on this approach. Playful, positive experiences with computers could help to ensure that children leave these formative years with a positive disposition towards ICT that will serve them well as they progress into the formal stages of their education (Reeve, 2009).

The benefits of play for early learning are well documented and it is generally accepted that play promotes children's development across domains. Systematic research that has attempted to isolate play from other modes of action has demonstrated that taking a playful approach to a task has powerful developmental potential (Howard, 2009). Our previous research has demonstrated that children generally define play activities as being those that occur without adult presence, are self chosen and can occur on the floor rather than at a table (Howard, 2002). Whilst these may seem like relatively superficial characteristics, subsequent detailed research into problem solving following practice in conditions defined by children as either playful or formal has repeatedly demonstrated that children's perception of an activity as play rather than not play, has a significant influence over their performance and behaviour . In particular, when children perceive an activity as play they show increased motivation and engagement with the task, more purposeful problem solving strategies and increased overall performance (McInnes, Howard, Miles & Crowley, 2009). To maximise on the inherent qualities of play when integrating ICT provision, *we must understand what children feel is or is not play.*

Recent studies of play and ICT in the early years have focused on guided participation and adults direct involvement with children during computer use (Plowman and Stephen, 2007; Kennewell, 2008). Findings suggest that ICT may be best integrated into early years curricula when adults guide children's learning experiences via appropriate dialogical interaction (Siraj-Blatchford, 2002). Whilst this research transmits a powerful message that adults can extend children's thinking, the suggestion that this is a result of *play* is unsupported. Our previous research questions how easily adults can offer guided learning opportunities within a play based curriculum, as adult involvement is often interpreted by children as a cue to an activity being formal rather than playful. Consistent with findings resulting from children's perceptions of play, studies that have inadvertently elicited children's perceptions of ICT, reveal that they are motivated by experiences which offer control, choice and promote positive affect (Selwyn and Bullon, 2000; Capella, 2000). *We propose the benefits of playful interaction with ICT may be overlooked when the research emphasis is placed on adult roles rather than children's own perspectives.*

Many of the areas where play and ICT appear to function harmoniously rely on a definition of ICT that reaches beyond the desk-top computer, for instance touch technology or the role of technological toys in socio-dramatic play**.** However, desktop computers remain the predominant form of ICT provision in early educational environments and are likely to do so for the foreseeable future. Whilst there has been much funded research into the impact of innovative (and often expensive) technologies for supporting ICT in early education, we propose that playfulness is dependent on far simpler social and environmental stimuli, controlled by the classroom practitioner. Combining research into perceived playfulness and ICT can empower practitioners. *In essence, to ensure that children's experiences of computer use are playful (and thus beneficial to development) we must begin with an understanding of children's own perspectives.* Listening to the voices of children will allow practitioners to maximise

playfulness in their ICT practice, to increase motivation, engagement and subsequent learning outcomes.

In this project we explored how computer use can be successfully integrated into play-based curricula in the early years. We identified the different ways that computers are used in early years classrooms and the characteristics associated with these uses that children consider to be playful. We then investigated whether children's perceptions of playfulness are related to increased motivation and engagement and, based on these findings, offer some practical suggestions for teachers at classroom level. Specifically the research considers:

- In what ways are computers being used in classrooms following the Foundation Phase in Wales?
- Are certain types of computer use more effective in motivating and engaging children?
- Are certain types of computer use considered more playful by children and is there a relationship between playfulness, motivation and engagement?
- In what ways can children's motivation and engagement with computers be enhanced within the context of a play based curriculum?
- What recommendations can be drawn for classroom practice?

1.1. Study Design

Data collection took place over a 5 month period. The study took three different perspectives on children's computer use in Early Years classrooms. We began by looking at how practitioner's saw computer use, helping us to structure subsequent parts of the study. In the next stage we collected extensive and diverse video observations of children's computer use, allowing the involvement of children in computer use to be analysed from the researcher's perspective. Finally, and arguably most importantly, we asked the children their views on computer use in the classroom.

The three stages are summarised below:

(1) Identification of types of practice

- Teachers interviewed to establish current classroom practice
- Practice analysed across settings and classified according to predominant characteristics (such as time, location, choice, control, adult involvement, software use)

(2) Observations of types of computer use in practice and measurement of children's involvement

- The collection of a large and wide-ranging set of video observations of children's computer use in Early Years classrooms
- Involvement measured using the well established Leuven Scale (Laevers, 1994)

(3) Elicitation of children's perspectives

- Focus groups of children asked their perspectives on the types of computer use identified in stage (1), using one minute video clips taken from stage (2) as prompts for discussion.

Children also asked to rate each video clip in relation to how playful they perceive the activity to be using a game like ballot card procedure.

1.2. Ethics

The research was conducted in accordance with the British Psychological Society code of conduct and prior to commencement, the proposal was subject to ethics committee scrutiny and subsequently approved by Swansea University. Written informed consent was gained at school, teacher and parental levels (see appendices for copies of the consent forms used). The researchers took all reasonable steps to ensure that the children participating in the study were aware of why they were being asked to take part, and children were able to choose whether or not they wished to be involved in the focus group discussions. Anonymity and confidentiality were assured and all data collected was stored securely on a password protected external hard drive. All members of the research team had current CRB clearance for working with children and vulnerable groups.

1.3. Sample

The sample was selected from an available pool of partner schools in the South Wales area. Twelve schools consented to take part in the project. Table 1 provides a descriptive summary of the sample. Schools were selected to represent small, large, rural, semi-rural and urban settings. All schools were following the Foundation Phase curriculum for children aged 3-7 years. Three were categorised as being in a rural location, four as semi-rural and five as urban. The school sizes varied and the total number of children on roll ranged between 30 and 364. As can be seen in Table 1, the classes targeted for the research included those where a single class was taught in isolation (for example, solely the reception aged group) to classes where there was mixed provision (for example nursery, reception and year one being taught together). Class size ranged between 15 and 60 children. This varied provision is typical across Wales (Farrell & Law, 1998).

Table 1: Descriptive Information on the Sample Schools

Site	Location	No. children on roll	*Class observed	Total no. children in class	No. desktop computers in class	Laptop in class	Smart-board in class	Access to computer suite
A	Semi-rural	212	R	32	1	Y	Y	Y
B	Urban	293	N / R / y1	60	1	Y	N	N
C	Urban	230	R / Y1	28	2	N	N	Y
D	Semi-rural	224	N	25	2	Y	Y	Y
E	Urban	364	R	42	2	Y	Y	Y
F	Rural	60	N / R / y1 / y2	29	1	N	Y	Y
G	Rural	30	N / R / y1 / y2	15	2	N	Y	Y
H	Semi-rural	90	N / R	28	2	N	N	Y
I	Urban	220	N / R	58	1	N	N	Y
J	Semi-rural	230	R	37	1	N	Y	Y
K	Rural	142	N / R	47	1	Y	Y	Y
L	Urban	226	R / y1	21	1	Y	Y	Y

**some classes were single groups and others were mixed.*
Codes used are: R-reception, N-nursery, y1 –year one, y2 – year two

All of the target settings had at least one desk top computer available for use in their classroom, five of the twelve settings had two. In general, the location of the desktop computers was governed by the availability of power points or internet access or the layout of the classroom. In some cases however, teachers told us that they had tried to create specific computing areas that were attractive to the children, had located their computer near to the whiteboard for simultaneous use or had tried to ensure computer use was not interrupted by other noisier activities such as construction play. Six of the settings also had a laptop computer available in the class. Eight of the twelve settings had interactive whiteboards installed for use. Eleven sites also had access to a computer suite. The main type of computer suite was one which was situated away from the classroom in a designated room. These suites were timetabled for shared use across the school and could accommodate large groups of children, often whole classes at one time. Some classes (n = 3) also had access to a mini-suite that housed three or four computers. These were used for smaller group work and were generally located within or proximal to, the target classroom.

2. Understanding teachers views about using computers in the early years classroom

The first stage in the research process was to understand teachers' perceptions of computer use in their early years practice. Specifically, we sought to find out how computers were being used in early years classrooms in Wales (all were following the play based Foundation Phase curriculum), however we also asked the teachers to talk about; what they understood the requirements for using computers to be within the Foundation Phase; how well equipped did they feel to integrate computer use into the Foundation Phase; their feelings on why computer use was important for young children and; how they thought children perceived computer use.

We interviewed class teachers from all of the twelve study sites individually. The interviews were semi-structured. With a semi-structured approach, a pre-determined set of questions or issues to be addressed ensure material pertaining to the study is collected but these can be presented in varying order and in addition, interviewees are encouraged to talk in as much detail as they wish about the topic in question and to introduce new, related topics that might be important to them (Denscombe, 2007). The open ended nature of the responses elicited via a semi-structured approach ensured that we were able to obtain the information needed to develop an understanding about computer use that would inform the remainder of the study in relation to children's perceptions and levels of engagement, but also allowed practitioners to discuss related issues to add context and depth to the report.

All interviews took place in a quiet location within the school setting. Each interview was approximately thirty minutes long. Interviews were recorded using a Diasonic Linear PCM voice recorder (DDR-5300) and from this, transcribed in preparation for qualitative analysis using the ATLAS/ti system and the principles of thematic analysis outlined by Braun and Clarke (2006).

2.1. ICT in the Classroom

2.1.1. What do teachers understand the requirements for using computers within the Foundation Phase to be?

Teachers described that within the Foundation Phase curriculum, there were no specific requirements for ICT provision, rather that ICT applies to the whole curriculum and should enhance all other areas of learning. Some teachers however, perceived that one curriculum requirement was the development of particular computing skills.

> *"[the Foundation Phase document]..only has one little statement that says um and it's under PSE actually…. to develop confidence in new learning situations"*

> *"it's cross curricular and that ICT isn't a stand-alone subject it's …. through all the subject areas"*

> *"I suppose it's… confidence … the mouse control…. the keyboard skills"*

2.1.2. How well equipped did teachers feel to integrate computers into the Foundation Phase?

In general, the teachers felt relatively well equipped to integrate computer use into the Foundation Phase and had access to most basic resources such as classroom desktop computer with internet access, a variety of software packages as well as laptops, suites and whiteboards. Teachers did describe a variety of challenges to integrating computer use into the Foundation Phase however.

Some teachers noted the need to teach some students essential computing skills such as mouse control and basic computer knowledge before continuous provision could take place.

> *"the children haven't got that much experience at home with computers…not this particular group of children but children that we've had in the past… you can tell they're not used to using a mouse for example"*

The available budget was often mentioned as being a barrier to integrating computer use into the foundation phase and this included the need for up to date computers that were powerful enough to allow effective internet access or the running of more sophisticated software. In addition, some teachers noted how provision set up for children's heights was important. Teachers in classes without a whiteboard or laptop noted that this would improve their practice.

> *"you know our computers are well I wouldn't say old but they're not new either ….it's funding really….there's a lot of things you can get …it would be nice to have nice little stations and all the heights and everything all measured out correctly"*

> *"unfortunately we've got really old computers and that is a real challenge because quite often the internet doesn't work very well, even though we have them maintained continuously I think it's just the age ….(it) just takes forever to load up"*

Contrary to the findings of BECTA (2008), most teachers in the current study described feeling well trained to deliver ICT in the Foundation Phase, feeling particularly well supported by the school ICT co-

ordinators and having received in house courses. Some teachers however, did indicate that they could benefit from further training.

"we've got a …confident ICT coordinator … I'm forever calling her down [saying] you know, this has happened my pen doesn't work… and she's there in a flash"

"we've got an excellent coordinator … she's really helpful if you need any advice or certain programmes"

"I'm trying my best, I'm having a go, I have very little training in Foundation Phase ICT to be honest ….we have a lot of Foundation Phase courses but there seems to be very little with ICT"

2.1.3. What benefits do teachers associate with children in the early years using computers?

Teachers sometimes described the benefits of computer use in a general sense in relation to the seven areas of learning within the foundation phase documentation. Teachers noted fine motor skill and co-ordination as benefits, and consistent with the findings of Cuban (2001) they noted particular subject skills acquired through computer use such as those associated with numeracy and literacy. Predominantly however, they described the benefits to social and communication skills as well as the role of ICT in the development of children's confidence and independence.

"Reinforcing number….being able to match and sort things"

"They are explaining to one another, their sort of communication skills….explaining to others….co-operating….taking turns"

"Independence….fine motor skills….co-ordination ability"

"Independency… it encourages their confidence ….they know they can do it without anybody else"

2.1.4. How do teachers think children feel about using computers?

Teachers often described how the children in their classes loved using the computer and were excited about taking part in computing activities. Many teachers stated that they thought children would say most computer activities were like play, but on some occasions they differentiated between general computer use and the completion of particular tasks, the latter being potentially less play like.

"(they think its play)…because it's so visual it's …you know they're not sort of sat down…they don't feel that it's structured, they've got the freedom to control what goes on you know, I think rather than the teacher leading … even with an adult there it's- they're in control of it "

"they would definitely see it as playing when it's free choice possibly not when it's a teacher led, then they would probably think well, we are doing lessons"

2.2. Computer Use throughout the Day

In order to develop the types of practice that would inform the remainder of the research design, we asked teachers to describe how the children in their classes used computers throughout the day. Table 2 presents a summary of the thematic analysis of the data relevant to this topic. As can be seen from

this table the teachers talked about three planned forms of computing provision; continuous, enhanced and focused. These were strongly related to the level of adult involvement and the amount of choice children had about whether to take part and what they would do. Further themes also included; what facilities and activities were utilised, the size of the group involved in using the computer, and whether or not an adult was present during the activity. Each of these elements of provision is discussed in the following sections and comments made by teachers taken from the interview transcripts are incorporated into the analysis.

Table 2: Summary of Topics Identified in the Analysis of Teachers Discussions about the Different Ways Computers are Used in their Classrooms

Planned types of provision	
Continuous	*- Activity available during free choice time*
Enhanced	*- Computer activity suggested by the adult*
Focused	*- Direct teaching of a particular skill*
Teacher presence	
Present at all times	*- Present throughout the activity*
Peripheral	*- In the background setting, near to the activity*
Facilities and activities	
Computing suites	*- The use of large and small computer suites*
Supplementary ICT equipment	*- Equipment like cameras, CD players, Beebots*
Whiteboards	*- Ways of using the whiteboard*
Programmes and websites	*- Particular resources and activities*
Group size when using computers	
Single child	*- One child at a time*
Pairs	*- Two children*
Small groups	*- Three or more in a small group*
Whole class	*- Whole class activity*

2.3. Types of planned provision

The teachers in the study referred to three different distinct types of planned computer use in the classroom. These were continuous, enhanced and focused provision. Continuous provision generally involved little adult presence and children were free to choose whether to participate and what activity they would complete. Focused provision involved direct teaching of specific skills, often involved the whole class at the whiteboard or in a computer suite. Enhanced provision lay somewhere between continuous and enhanced, wherein the teacher might suggest an activity that would extend or apply a previously learned skill (however the child had some choice about whether or not to take the suggestion). During enhanced provision adults might be present but generally this was at the request of the children.

2.3.1. Continuous provision

All twelve teachers in the study made reference to continuous computing provision. Continuous provision meant that children were able to choose freely if they would like to use the computer and also choose freely, what activity they would carry out. Most teachers described how continuous provision happened at a certain time of the day. Descriptions of continuous provision often alluded to there not

being any adult presence in activities, however in some situations a certain level of support was provided, for example when loading up a programme or switching from one programme to another. Sometimes continuous provision was constrained because of large class sizes, fear of damage to the equipment and having to provide fair usage to all children. The time constrictions due to larger class sizes varied, for example some children experienced timed continuous provision for three minutes whilst others had fifteen or twenty minute slots.

"they're on all the time so if the children are not involved in a task with an adult and they're doing continuous provision, they can choose to go on there whenever they want"

"we do the sand timers and things…. if there's no one else wanting to go on they can stay on there for as much as…… twenty minutes, but otherwise they're limited to about ten"

"they have a sand timer and take turns….its three minutes otherwise everyone else would complain"

"this class is very large and we've had the technicians back and forth…they don't have any continuous provision with ICT apart from the CD player, that's the only one ….the least cost to us really"

2.3.2 Enhanced provision

Nine of the twelve teachers described enhanced provision as a time where children might be asked to go onto to the computer or be given the choice of engaging with a particular programme or activity that is linked to, or will enhance, an area of learning consonant with the weekly or termly theme. Enhanced provision, as with continuous provision, generally didn't involve an adult being present. Children were able to seek assistance on a task if they wished.

"if I said to them, oh I'd really like people going off to the computer and doing whatever it might be, finding out about castles….that would be an enhanced task"

"the enhanced would be you know something that you want them to do or you know you might set them a challenge or something you want them to do in that area"

"we might set up a task that we want to do specifically, an enhanced task for them, the children choose where they go… the areas are set up so that they can actually go to them independently but we put programmes on… sometimes we may use it in relation to language so we may say we want you to go on the computers and do the work there"

"we look at the skills that they've learned and um, just enhance it… just enhances the area and then they just…..improve on the skills that they've already learned with the teacher"

"we look for an IT job that will enhance the objectives of whichever lesson we're teaching at the time"

2.3.3 Focused provision

All twelve of the teachers referred to focused computing provision. Teachers often described focused provision as being where the computer was used to complete a task in order to develop a specific skill or achieve a particular outcome. Usually descriptions of focused provision referred to them taking place

under the direction of a teacher and, where available, in the computer suite. The whiteboard was also referred to when talking about this type of practice. Single computer use and one to one work were described but to a lesser extent than whole class activity. Children did not have choice about whether or not to participate in focused tasks.

"They can't choose the package if it's a directed task….for their assessment… then the adult is by the side because the task is directed"

"focused would be something that I would be doing with them really, more sort of teacher-led"

"we take them up to the suite…. set the computers up beforehand for time….put the programme on and then the children go up and then they'll do the structured activity.. if I want them to draw something"

"(focused work is)…more sort of language based and maths based activities in the morning …. that's when I'd use an adult and it would be more structured"

"we're timetabled for a computer suite which is in the junior department every Tuesday afternoon…which is then a focussed ICT teaching"

"we have focused activity where a member of staff will take them on in pairs….a focussed activity on either the scheme of work or just the set (particular) programme"

2.4. Teacher Presence during Computer Use

The teachers described being present or peripheral when children used the computers. They were either present throughout the whole of an activity (generally associated with focused activities) or available to the child on the periphery when and if they were called upon by a child (generally in activities that met teachers descriptions of enhanced tasks or during continuous provision).

2.4.1. Present throughout the whole activity

Teacher presence throughout the whole of an activity was generally related to direct teaching and focused tasks. There was a set aim and the teacher was there to guide the child toward that aim.

"(When working with a child on an activity, the teacher might be saying)…..'well what have you got in your picture' 'what do you think we can include in this picture' 'which tool are we going to need' 'why have you chosen that tool' it's all the where why when what… it's all of those sort of questions….'why have you chosen that colour' 'is a pig that colour' 'is a castle going to be purple'…..it's going to depend on how the children respond to what they're drawing and whether or not what they're drawing is what we're really expecting in the outcome, what we're wanting from the children… if they're not providing it then we'll try and direct with the questioning to see whether or not they can understand and correct themselves"

"if it's a focused task then it'd be usually.. directed… encouraging independent skills …… with each individual child. I would be saying this is what I'd like you to do or whatever"

"I might show them how to load it….sometimes with the ones who have trouble with the mouse, guide their hand over the mouse….show them how to navigate a page"

"If it's a focused task, the adult will go in to teach"

2.4.2. Available on the periphery

Teachers described how sometimes, due to staffing issues, it was not possible for them to always be present during computer use. They also described being present in the peripheral setting for the children should they request help and this was common during continuous provision.

"It's not always possible (to be there with the children)…. you know there's so much going on such a busy classroom….we help with unfamiliar things"

"there's not usually an adult there (during free activity)…there's one around but not specifically sitting next to them, telling them what to do or guiding them"

"when its continuous provision…..we're (the staff) all moving around a lot….the children are quick to come up and ask if they need help"

"in continuous provision, even though staff are not assigned to the area, they'd go and help out if it was needed"

2.5. Facilities and Activities

The teachers discussions about the kinds of computer use the children in their classes were typically engaged in included reference to computer activity inside of the classroom as well as the use of both large and small computer suites. The teachers also described various software packages and websites as well as general activities like typing and drawing, use of the whiteboard and other supplementary materials such as digital cameras, CD players and the 'beebot' (a programmable floor robot). Other more general types of computing activity (such as typing or drawing) were also described.

2.5.1.Use of large computer suites

There were two different types of computer suite described by the teachers, the large computer suite and the mini suite. These tended to be used for different purposes.

Teachers often described using large computer suites for focused provision with the whole class. A large suite would comprise enough computers for the whole class to access a computer singularly or in a pair. Large computer suites tended to be situated away from the main classroom and were available to the whole school and as such, use was on a timetabled basis.

"we come up at least once a week as an ICT lesson……today's is geography….it just depends where it fits in, like if we're doing some research for history (the focus would change)….to be honest it's every subject, if we're looking for something with art… they might go off and have a little look I try and encourage them to do a bit of research and I do it myself myself….show them something I might have looked up…just to show them all (like a demonstration)"

"we take them up the computer suite….we've got a slot on a Wednesday morning"

"we've got a computer suite…..we have a set time…every Tuesday morning…half the children go on the computer first so there's fifteen….then we swap over… they do have a designated ICT lesson every week as well as the bits that we integrate at our focussed lessons"

2.5.2. Use of mini-suites

Three teachers also described using mini-suites as part of their computing provision. A mini suite comprised fewer computers than a large suite and could not accommodate the whole class. A mini suite tended to be located in an area within the main classroom or in an adjacent room nearby. Again, sometimes use was timetabled. Use of the mini-suite could be for a variety of purposes to suit what teachers had described as focused, enhanced or continuous provision. Teachers described how a mini suite suited the needs of early years provision, where constant access rather than intensive formal lessons are important.

"there are six computers outside (next to the class) which have been installed over the last twelve months… that was ideally positioned so that everybody in this department (infants) could use them…we have a timetable"

"within continuous provision…. I would say on an average day everyone will touch base with a computer, whether it's the smartboard or the computer (mini) suite"

"we installed those downstairs (the mini suite near to the class compared to the full suite that is upstairs) so we could access them constantly.... upstairs is similar to ours..... (but) more for whole class teaching"

"the opportunity (to use the large suite) is there if we wish….but it's not something that in the three years that we've had the mini-suite … we've needed to use. We've done our whole class teaching at the smartboard in the classroom and then taken groups in to work in the mini-suite"

"we would more likely introduce a child who hasn't used a computer to the computers in the classroom first before we took them down to the computer suite where it's a little bit more intensive"

2.5.3. Supplementary ICT equipment

Three teachers described using other forms of ICT to accompany computers to enhance the children's development, such as Beebots, CD Players, Listening Stations, Remote Control Cars or Digital Cameras. These were often associated with children's own independent activity.

"we use other things that are part of ICT as part of the foundation phase…CD player… other things like Beebots….computers are mainly used with a teacher"

"we're encouraged to use the things that you're not looking (in this study).. you know, we're encouraged to use microphones and recording devices and metal detectors and Beebots and CD players.. you know, that's all part of it …. so anything where the children use a machine, just an electrical machine themselves, … you know you sort of tick a box…. I think there should be more computer emphasis"

"We use beebots and CD players…we've also got cameras…flip cameras….one thing I have learned is that it's not just computers 'cause initially you do think it's just that but it's not it's so many different other things"

"in their independent tasks they'll be using things like Beebots… digital cameras and microphones"

2.5.4. Whiteboards

Eleven of the twelve teachers described how interactive whiteboards were used to enhance computer provision in their classrooms. Teachers often described the whiteboards as an integral part of IT use within the classroom, using them for directed input and modelling during Focused Provision. The whiteboards were also used during Enhanced and Continuous Provision by the children themselves but this was less frequently described and sometimes explicitly stated not to be the case.

"we use the whiteboard if we're doing maybe a big book and we've got a DVD that goes with it so they will have read the book and we'll watch the DVD and make comparisons between the book and the DVD…it runs through my laptop"

"with the whiteboard we'll take a group of about four on a particular day…. it'll be their chance to have some kind of input…. I'll put something specific on…we've got Easy Teach and there's like a maths focus"

"(with a) whiteboard …. you can demonstrate skills like loading a programme"

"the computer we have there is linked to the smartboard where the main teaching is done …in the classroom where the interactive lessons go on"

"One computer is linked to the whiteboard….I wouldn't let them play with the whiteboard on their own"

"(We have a) smartboard yeah, we use it for maths games we use it for everything really….always focused provision though…never continuous"

"when they come into school they find it really exciting it's something different and the whiteboard they absolutely love"

2.5.5. Software and websites

Teachers described how the computer was used for a range of tasks linked to the areas of the Foundation phase. This included drawing, writing and a variety of websites and software packages that the children used or were accessed by practitioners as teaching resources. Choice of the programs or websites was often decided by the school ICT co-ordinator or the teacher themselves. Sometimes teachers described the children as being part of the choosing process. Reasons for software and website choices included perceived learning benefits and budgetary constraints.

Websites described included:

Cbeebies, NGFL, Cymru, Topmarks, Teds Times Education, Nickelodeon, Tweenies, Sebran, CBBC, Coxhoe Durham, Crickweb, BBC General Teachers pages.

Software packages discussed included:

2Simple Collection (being mentioned most), Granada Colours, Blackcat, Smartboard notepad, Jolly Postman, Easyteach, Primary Maths, Number Train, Tizzy's toybox, Tizzy's Island, Fizzies Numbers, Powerpoint, Old MacDonald's Farm, Millie's Maths House, Bailies Book House, Sebran, Teddy Twt, Flic-ar-Flac, Come Alive Nursery Rhymes, Come Alive Numeracy, Granada toolkits, Nelson Thorne

Scheme of Work, Red Ted, POPAT, Dress Teddy, Paint, Notepad, Smart Island, Active Primary, Sally Mali, My First Dictionary, My World.

2.6. Group Size when Using Computers

Teachers described various social contexts for computer use in their classrooms. These included a child using the computer alone, children working in pairs, small groups of children or whole class activity. The reasons for particular group sizes were often related to the nature of the task (whether it was freely chosen or a particular set task), to facilitate fair usage or to meet the logistic demands of large class size.

2.6.1. Single child

Ten of the teachers described how children were sometimes directed to use the computer alone and gave reasons why this was necessary, for example having to complete a one to one activity with an adult or in order to finish a particular task. Children sometimes choose to go to the computer on their own during continuous provision.

> *"sometimes within a focussed task and you've got certain outcomes that you need from it….it could be with me or like if we've got a spare person, that can work for one to one….usually I'll be with the bigger group"*

> *"they work within their group but probably individually when they're doing …. the focussed activity"*

> *"when we're in the ICT suite….they all stand around the computer I show them what to do and then they do it themselves"*

> *"(when it's free choice)….there's enough chairs for them to pair up or if they like they can go up there alone"*

2.6.2 Pairs

All of the teachers described children using the computers in pairs and often mention the benefits of this, such as learning skills from one another or sharing information. The placement of two chairs in the computer area was described as a way to facilitate paired activity. Two children at the computer was sometimes the limit used to ensure fair usage. Children could be directed to work in pairs or were able to choose.

> *"we normally say two children on each computer and you know being a small class everybody does get a go really"*

> *"staff try and keep an eye and have a tick-list on who's going on there….they usually go on there in partners, sometimes individually"*

> *"sometimes it's alone (but) generally it's in pairs 'cause we have two seats by the computer"*

> *"you might get a younger child and an older child….they might be saying 'oh yeah this is how you use a mouse' or when I've observed them…you can see a lot of language going on, helping each other …I might put them in pairs…to encourage an older one to help a younger one"*

"sometimes they'll want to work in a pair even though they could have a computer each, they like to work with their partner"

"we try to encourage them sort of to both participate together you know…so the other child's not just sort of waiting there"

2.6.3. Small group

Around half of the teachers described the use of small groups for computer activity. This was often in relation to the computer suites and reasons for using groups included ensuring all children could have a computer to work at and enabling the teacher to manage children's varying abilities. Other descriptions of group activity included when children spontaneously created a group when using the computer by coming together to gather around what one or two other children might be doing.

"if we've got a student in [another adult] …we would usually split them so you can have like an early years based activity and then you know sort of stretching the um year ones and year twos

"well they've got little stickers for each area so they've got to put their sticker on and it's two stickers by the computer for two to go on there, but they do like to watch the others… they'll automatically get a chair from somewhere else and you'll very often get four or five standing there, they'll join in 'cause … they're attracted with songs and sound and stuff so they join in"

"you might have three working together but it would be a specific focussed task…. they would have something specific they've got to research or look at and then they feed back on the information they've got"

"(sometimes) they're… on their own at the computer but there's a group around them and they interact with one another….. they like to see what other people are doing and learn- they're learning from them as they watch"

2.6.4. Whole class

Reference to whole class activity in relation to computer use often pertained to tasks described as focused. Whole class activity was generally used within the large computer suite or in class with the whiteboard but rarely at a single computer. Teachers were generally leading the activity, demonstrating or doing direct teaching.

"in terms of groups it's more where we're sat on the floor or on the carpet and they're using the smartboard, so they're taking it in turns so if somebody is operating the book they could be reading and one person will turn the page"

"there's probably one or two specific lessons we do a week (a whole group session around the whiteboard) … we use it for Welsh every day and POPAT (phonics) we teach every day….so it's more or less every day really"

"when we're on the ICT suite I've show them, they all stand around the computer, I show them what to do and then they do it themselves"

2.7 Summarising the Features of Computer Use Described by the Teachers

Teachers described how they used computers throughout the day in relation to continuous, enhanced and focused forms of provision. These different types of provision were related to the level of choice children had about participation and the level of teacher involvement and direction. Teachers also described different types of computer use according to social grouping; whether children were alone, in pairs, small groups or participating as a whole class. Different modality types were also described, for example the classroom desktop computer, use of a suite or the interactive whiteboard. We endeavoured to collect video footage of computer use in each sample classroom that was representative of these pre-identified types of practice.

3. Video Observations of the Identified Types of Computer Use

Following a previous visit to each of the classrooms, a single day of video observation was taken at each of the 12 settings. Whilst the teacher was aware that computer use would be videoed on this day, they were asked to conduct their planned classroom activities without regard to the presence of the researcher (as much as possible). A Panasonic HDC-HS300 video camera with a 120g hard drive plus tripod, were used to make the observations. During the day spent at each school the researcher attempted to collect observations in all the principle areas of computer use within the observed classroom. Space limitations made it necessary to vary the setup of the camera to an extent from setting to setting, and sub-locations of each setting. However, the camera was always setup to allow the detailed observation of all the users of a particular computer during one episode. In addition to observations of the use of a single computer, observations were made where possible of the use of mini-suites adjoining the classrooms. In these situations, whilst the camera setup was designed to allow the detailed observation of the use of one particular computer, it was also setup to allow 'incidental' observation of other computers 'in shot'. A final category of computer use observed was the use of whiteboard interactive computer displays. Whilst these were not the primary focus of the study observations were made on an opportunistic basis. Occasionally during a particular observation the researcher would reposition the camera to establish a fuller picture of the computer use.

Permission for the inclusion of children in the video observations was obtained from the parent or primary carer of each child. Children who could not be observed were identified at the start of each day of observation. The practitioners and the researcher made sure these children stayed out of view of the camera. Sometimes this required the camera to be switched off mid way through an observation and in one case it required the deletion of the end of a clip during which a child for whom permission had not been granted had appeared in camera shot. The videotape was reviewed after each day of observation to ensure all episodes recorded met ethical guidelines for parent/caregiver permissions.

A total of 53 episodes were collected from the 12 classrooms. The average length of each episode was 22 minutes and 40 seconds (SD = 13 minutes and 42 seconds). Of these episodes 27 were of the use

of single computer, 13 of the use of a single computer with another computer in the background, 8 of the use of a single computer within the context of a suite of computers, and 5 of whiteboard use.

3.1 Selecting Four Minute Clips from Full Recorded Episodes for Analysis

A subset of the raw data collected on each day from the sample settings was used in our analysis. This subset of four minute clips were selected from the full range of available episodes primarily on the basis that i) the nature of computer use during the clip remained constant and ii) the children using the computer remained constant (a precondition of the Leuven Involvement Scale adopted for measurement, described below).

In order to select the four minute clips, the start and end points of candidate episodes were identified. Episodes recorded that were less than four minutes in duration were discarded. In each episode of more than four minutes only the central four minutes of each episode was retained (two minutes either side of the midpoint to the nearest second). It is possible to measure involvement using the Leuven Scale for each child who appears in an episode. We decided to limit the number of children who would be assessed in any one of the four minute clips to three. Only children clearly visible for the majority of the clip were included in the analysis and when more than three children were visible then we decided the three visible children closest to the camera would be chosen (this limit proved unnecessary).

3.2 Analysis of Observational Data

The primary purpose of this part of the study was to address the relationship between the involvement levels of the children observed in the selected clips according to the different types of practice we had identified as potentially influencing this involvement. These variables included; provision type (continuous, enhanced or focused); teacher presence (present versus not present); social context (single child, pair, small group and whole class) and modality (classroom PC, suite and whiteboard).

Children's levels of involvement across the examples of different types of provision, was assessed using the Leuven Involvement Scale. Observation using the scale yields a score between 1 and 5 for each child observation (Laevers, 1994). Each level of the Leuven Scale is characterised as follows:

Level (1) No activity

Activity at this level can be simple, stereotypic, repetitive and passive. The child is absent and displays no energy. There is an absence of cognitive demand. The child may stare into space.

Level (2) Frequently interrupted activity

The child is engaged in activity but half of the observed period includes moments of non-activity in which the child is not concentrating and is staring into space. There may be frequent interruptions to concentration and involvement is not enough to return their focus to the activity.

Level (3) Mainly continuous activity

The child is busy at an activity but it is at a routine level and signals of involvement are missing. Energy is lacking and concentration is routine. The child can be easily distracted.

Level (4) Continuous activity with intense moments

Activity has intense moments that extend those seen at level three. This level is reserved for intense moments where there is high concentration, energy, persistence and intensity. Whilst there may be moments of distraction these are momentary.

Level (5) Sustained intense activity

Intense activity is continuous for almost the whole of the observed period. There is concentration, energy, creativity and persistence.

Involvement was assessed via observation of 39 video clips, each one four minutes long. In each clip at least one child was shown throughout and could be clearly observed. In six of the clips it was possible to observe two children. Consequently a total of 45 involvement scores were obtained for individual children.

Across all 45 child observations, the mean Leuven score was 3.6 (SD = 1.05), indicating medium to high levels of involvement during computer use. A closer look at this data shows only seven observations with involvement scores of '1' or '2' (two were assessed as '1', five were assessed as '2'), whilst eight child observations showed very high levels of involvement (scored as '5').

3.2.1. Level of engagement according to provision type

Video clips for observation were selected to reflect the three types of provision identified following the teacher interviews (continuous, enhanced and focused). Table 3 show the mean involvement observed in each of these three provision types.

Table 3: Mean and Standard Deviation of Leuvens Ratings of Involvement According to Type of Provision Depicted in Video Clip

	n	Mean Involvement	Standard Deviation
Continuous	15	3.67	1.11
Enhanced	15	3.53	1.06
Focused	15	3.60	1.06

It is clear that the mean and standard deviation of the involvement scores for the three different types of provision is remarkably similar. A Kruskal-Wallis test confirmed that there were no significant differences in the scores according to provision type ($p = .881$).

3.2.2. Level of engagement according to teacher presence

Previous research has demonstrated that teacher presence may in some cases reduce a child's playfulness and subsequent learning (see the Introduction). One of the objectives of the observations was to see if there was any evidence for teacher presence affecting the level of children's involvement during computer use. There is a strong correlation between provision type and teacher presence in the video clips. A teacher is present in all of the focused provision and not present in all of the continuous provision. It is only during the enhanced provision that a teacher is sometimes present and sometimes not.

The 45 observations were grouped according to whether a teacher was present during the majority of the clip. The involvement data grouped by teacher presence is shown in Table 4.

Table 4: Mean and Standard Deviation of Leuven Ratings of Involvement According to Teacher Presence in the Video Clip

	n	Mean Involvement	Standard Deviation
Teacher Present	23	3.61	0.98
Teacher Not Present	22	3.59	1.14

Given the close relationship between provision type and teacher presence, it is not surprising that no differences were found between children's involvement during computer use and teacher presence (Mann-Whitney U Test, p = .990).

3.2.3 Level of engagement according to social context of computer use

One key aspect of provision that varied across the clips was the number of children engaged in computer use. In some cases whole classes were involved in a computer activity with the teacher, whilst in others a single child sat alone on the computer with no children in the immediate vicinity. The observations were grouped into those with a single child using the computer, those with a pair using the computer, those with a small group (n = 3+) using the computer and those where the whole class were participating together. The mean involvement scores according to these social contexts is shown in Table 5.

Table 5: Mean and Standard Deviation of Leuven Ratings of Involvement According to Social Context of Computer Use

	n	Mean Involvement	Standard Deviation
Single Child	13	3.69	1.11
Pair of Children	15	3.40	1.06
Small Group (n = 3+)	15	4.00	0.65
Whole Class	2	1.50	0.71

The clearest difference in this data is between the two observations of children within a whole class and the other observations. In the former involvement is low, whilst it is generally high during other forms of computer use. Social context as a variable was shown to have a marginally significant effect on the involvement scores (Kruskal-Wallis Test, p = .054). It is notable that whilst the difference between the Leuven ratings for pairs and small groups was not significant, extra observations may yet reveal an underlying difference (Mann-Whitney U Test, p = .108), this is explored later in the report.

3.2.4. Levels of engagement according to type of computer setup

A further characteristic of provision related to modality type. In some cases a single computer was used, typically against a wall within the classroom. On other occasions mini-suites were used, wherein two or more computers were used simultaneously by children. We also observed some usage of whiteboards, both by the whole class and by smaller groups of children. The mean involvement scores for different types of modality type are shown in Table 6.

Table 6: Mean and Standard Deviation of Leuven Ratings of Involvement According to Type of Computer Setup

	n	Mean Involvement	Standard Deviation
Single Computer	28	3.54	1.07
Mini-Suite	12	3.92	0.67
Whiteboard	5	3.20	1.64

Whilst there did appear to be slight advantage for computer use within mini-suites, this difference was not significant (Kruskal-Wallis Test, p = .586).

3.2.5. Characteristics of clips where children received low involvement scores

In total, only two observations were rated as '1' on the Leuven scale. The first of these was of a child sat at the front of a class observing the teacher whilst a whiteboard was used. Part of the problem here appeared to be that the teacher needed to face away from the class to use the computer. In a second episode scored as '1', a child is alone using a computer. In this case it seems clear that the child would like to be engaged with other children in another part of the classroom (who can be heard in the background). An analysis of the episodes rated '2' on the Leuven scale shows that in four of the five cases the children observed are not directly interacting with the computer and are somewhat peripheral. For example in one clip a Teaching Assistant uses the mouse 'for the child' whilst the child herself looks distracted and uninterested, in another episode a child, using the keyboard but not the mouse, simply and rather mechanically types what another child instructs them to type.

3.2.6. Characteristics of clips where children received high involvement scores

There seem to be few if any common characteristics to the eight episodes rated '5' on the Leuven Involvement Scale. These take place in different social contexts (alone, in pairs and in small groups), in different computer setups (single computer, mini-suites and whiteboards) and across seven of the sample settings. However, all of the clips rated a very high on the Leuven Scale involve the child using the computer directly or actively sharing use with other children. This suggests that very high levels of involvement could depend on children expressing a certain amount of control over the computing activity, either by direct manipulation of the keyboard or mouse or by being involved in a discussion that shapes the course of shared activity.

3.3. Summary of Children's Involvement Levels across Types of Provision

- The Leuven scores for children within the 45 episodes of computer use are notable for the consistently high levels of involvement found across a sample of diverse educational settings (from schools in the South Wales Valleys with large class sizes to small schools in rural Powys).
- Teacher presence has been shown to reduce playfulness and learning in some contexts, but this does not appear to be the case in the present study. Indeed, there was no evidence of any negative impact of teacher presence on children's involvement levels during computer use across the 45 observations.

- There was also no evidence of involvement being significantly influenced by provision type (enhanced, focused or continuous) or modality (computer, suite or whiteboard).
- The social context of computer use may be playing a role in determining children's level of involvement and this appears to relate to control over and interaction with, the activity. Exploratory analysis of clips with very low and very high ratings of involvement broadly supports this suggestion.

4. Understanding children's views about computer use in the early years classroom

4.1. Using Pictorial Methodologies to Elicit Children's Responses

Children are competent partners in research when appropriate methodologies are adopted (Einarsdottir, 2007). Previous research into children's perceptions of their classroom experiences has utilised interview techniques (e.g. King, 1979; Karrby, 1989; Wing, 1995). These have included talking to children whilst they are engaged in their activities or asking children to reflect on activities they have previously completed. On task and reflective interview techniques each have strengths and limitations. When interviews are conducted whilst children are engaged with their activities children more readily report the here and now of their experiences, however researcher questioning can disrupt their activities and it can also be difficult for the researcher to avoid being drawn into the activity as a play partner or teacher substitute. Reflective interviews avoid issues relating to disruption and maintenance of a researcher stance, however they require children to utilise more complex cognitive skills such as remembering what they have been doing and reflecting on what this means to them in a more abstract, hypothetical way.

The AASP (Activity Apperception Story Procedure; Howard, 2002) is an alternative approach to eliciting children's perceptions of their activities using a photographic sorting technique, reflecting evidence that children respond particularly well to game like methodological procedures (Sturgess & Ziviani, 1995). In the AASP children are asked to sort a standardised set of photographic stimuli depicting artificially constructed scenes of classroom activities into those which they feel are play or not play. They are then asked to talk to the researcher about why they have placed the photographs in particular categories. The photographic stimuli used in the Activity Apperception Story Procedure (AASP) are paired according to the presence or absence of particular cues. For example, one photograph might show a group of children at the sand tray, and another might show the same group of children and a teacher at the sand tray, manipulating the cue of teacher presence. The initial sorting element of the procedure allows the researcher to systematically determine whether or not children are responding to a particular cue, whilst the justification element clarifies use of the predicted cue but also accommodates unforeseen responses.

Classroom observations and interviews with the teachers in the current study revealed a variety of different computing practices. These were often broadly defined by the teachers as being continuous, enhanced or focused types of provision and this categorisation formed the basis for video observations of practice across each of the twelve classroom settings. Reviewing the video data that had been collected, it became clear that it would not be possible to capture some of the cues that appeared to differentiate types of computer use within a photograph, for example the level of noise in the environment or the nature of conversation that was occurring. These types of cue necessitated video recorded stimuli. As with photographic techniques, video stimulated recall has proven an effective means of finding out what kinds of things are of importance to children within a particular situation or setting. Theobald (2010) proposes that video stimulated discussion is particularly useful when combined with fine grained analytical techniques. Whilst previous studies have utilised video clips to prompt general discussion amongst children about information and communication technologies (e.g. Morgan, 2007), a strength of the AASP is the systematic way that cues are manipulated and the two part sorting and justification procedure. Therefore in the current study, the procedural elements of the AASP were maintained but photographic stimuli were replaced with a series of short video clips extracted from the original observational data set.

4.2. Video Stimulated Focus Group Discussion

4.2.1. The focus groups

The original AASP is conducted between researcher and child on a one to one basis. It has previously been used to elicit the views of whole classes of children across one or two study sites for collective analysis as well as comparison. Working on a one to one basis with children is time consuming and utilising video rather than photographic stimuli within the AASP significantly increased the time that would be required to complete the procedure with a representative sample of children across all twelve study sites. A focus group technique was therefore adopted.

Using groups for video stimulated recall within educational research is common practice. Focus groups are particularly useful for gaining as much information as possible within a short time frame and in addition, particularly with young participants, they can help to ensure that children feel comfortable with the research process and reduce the need for lengthy researcher acclimatisation periods (Einarsdottir & Wagner, 2006). Whilst the appropriateness of using focus groups for children under the age of six years has been debated due to their less sophisticated social interaction and expressive language abilities (Hennessy & Heary, 2005), the fact that the AASP is a relatively structured procedure that does not rely entirely on free flowing conversation minimised the risk of poor data yield.

There were four or five children in each focus group and a total of 103 children were involved in the focus groups across all sample settings. Teachers within the settings selected which children were involved in the focus groups and no criteria other than where possible, a mix of boys and girls were asked for by the researchers. Typically, the children were selected opportunistically, dependent on what else was happening in the classroom at the time.

4.2.2. Selecting the video stimuli for the focus group sessions

A second important difference between the current AASP procedure and the one used by Howard (2002) is that the stimuli used were derived from naturally occurring episodes of computer use. Whilst it is possible to ask children and teachers to pose for a photograph it is not feasible to ask them to act out a script to be captured on video. For this reason the current study had to take an opportunistic approach to the factors that could be compared in the apperception procedure.

A total of 30 candidate one minute video clips were identified. These included 6 pairs of clips where the presence/absence of the teacher varied (across the pair), 3 pairs of clips where the number of children using a computer varied (across the pair), a pair in which the background context of the activity varied across the pair (busy classroom / quiet classroom) and a pair in which the control of the mouse varied across the pair (teacher present in both, but teacher controlling the mouse in one, child controlling the mouse in the other). Other factors that were included less directly were freedom of choice, type of computer setup (suite / lone computer) and modality type (trackball / mouse / interactive whiteboard). Whilst the nature of the software used in the classroom is not the focus of the current study and could typically not be ascertained from the videos, there were some software related differences between these clips. In particular, a minority of the one minute clips featured software with lots of sounds, whilst most didn't.

Maintaining the attention of young children is an important priority in participatory research and based on pilot work we predicted that the whole focus group procedure would need to be completed within thirty minutes. Therefore a maximum of six to eight video clips per focus group session was a realistic upper limit. However it was desirable to have as many children rate each one minute clip as possible to allow statistical comparisons. Two further constraints on the organisation of the stimuli were i) the need to ensure that children from each setting were not shown one minute clips sourced from their own setting and ii) the need to make sure that only one of set of paired clips was shown to any given child. Whilst showing both clips in a pair to a child would have allowed a within participant comparison of the child's reaction and ratings, the similarity of paired clips was highly noticeable and we reasoned that it would consequently dominate the rating and discussion of the second clip of a pair (had they been presented to the same child). A similar rationale was the basis for our decision not to show children video from their own setting – it seemed likely that ratings and comments would be biased by their knowledge of the other children and practitioners shown. To meet these constraints it was necessary to use three sets of eight stimuli, discarding six of the original thirty. All the paired clips were retained. The 24 clips used included at least one from each of the sample settings.

4.2.3. The procedure

The original AASP is in two parts. The first part requires children to categorise each of the pictorial stimuli as play or not play by posting each photograph into the relevant sorting box and the second part requires a justification of this categorisation. The procedure adopted in the current study differed slightly to reflect the likelihood of subtle differences in children's perceptions of the various types of computer use shown in the video clips and the way in which we wanted to utilise the data gathered on children's perceptions in combination with other measures.

Rather than asking children to simply define an activity as play or not play, we asked children to rate how much like play each video clip was on a scale of zero to five. This meant that for each of the video clips, we were able to quantify how playful children reported the activity to be. To facilitate a quantified rather than categorical approach, after each video clip, children were given a 'secret agent ballot card' that pictured Lego towers of various heights (see Figure 1). Actual Lego towers were placed in the centre of the table and the researcher explained how less bricks indicated not much like play and more bricks indicated a lot like play.

Figure 1: 'Secret Agent' Ballot Card used by Children in the Focus Groups to Indicate 'How Much Like Play' Each Video Clip Was

Children were asked to mark the tower on their ballot card that represented how much like play they thought each video clip was. They then posted their response into a brightly coloured ballot box. Sharing of responses at this stage was minimised by the researcher presenting the activity as a 'secret mission'.

Once all of the children had marked their ballot card and posted the response, the researcher then initiated a discussion about how children had rated each clip. Children were asked whether they thought the activity was play or not play and why. The researcher mediated the discussion to ensure that as many children as possible were able to contribute and also ensured that the topic of conversation maintained a focus on cues to play and not play. Once conversation on one particular clip was exhausted, the next clip was shown. This procedure was repeated through up to eight clips within each session. The three sets of eight video clips were worked through on a rotational system to ensure that each was considered by a comparable amount of children. Using this system, each clip was shown to at least 10 participants (two focus groups).

5. Children's ratings of the different video clips of computer activity

5.1. Analysis of Children's Playfulness Ratings

The 24 short video clips elicited a total of 464 ratings of playfulness. Whilst the children watched the video clips in small groups, they were asked to rate each clip individually, using the response chart to indicate their answer (see Figure 1). This yielded ratings of playfulness between 0 and 5.

Overall children rated the clips of computer use as very playful (mean playfulness rating = 3.69, SD = 1.60), this appears to reflect a genuine enthusiasm for computer use in the children that took part in the focus groups.

Although the playfulness ratings yielded interval data, it was treated as continuous so that the distribution of ratings from each group of children could be adjusted to a shared mean (standard deviation remained unadjusted). This was done to enhance the comparability of ratings collected from different groups of children.

The analysis of the playfulness ratings begins with the two major planned comparisons (teacher presence and social context/group size) and then two minor planned comparisons (background activity and control of the computer). A feature of these planned comparisons is the high comparability of the stimulus material (i.e. video clips) in each comparison. Only the variable of interest is changed in most of these paired clips, so any change in children's ratings between clips should reflect the influence of this variable.

5.2 Planned Comparison of Playfulness Ratings with Teacher Present / Not Present

There were a total of six matched clip pairs (6 x 2) that were rated for playfulness by children. The average playfulness ratings for each pair are given in Table 7.

Table 7: Playfulness Ratings Assigned by Children to Pairs of Video Clips With and Without Teacher Presence (Adjusted Mean and SD)

Clip Pair	No. of children	Computer setup	Teacher Present		Teacher Absent	
			Mean	SD	Mean	SD
A	1	Single	4.42	1.22	3.21	1.62
B	1	Single	3.73	2.02	3.00	1.56
C	1	Single	3.53	1.73	3.84	1.17
D	2	Single	3.40	2.10	3.82	1.69
E	4	Mini-suite	3.95	1.13	3.70	1.64
F	4	Mini-suite	4.26	1.21	3.69	1.70
Total			3.88	1.60	3.58	1.59

The overall mean difference in children's playfulness ratings between clips where there was a teacher present and clips where a teacher was absent, run contrary to our pre-experiment expectations. Rather than teacher presence reducing reports of playfulness, here they increase rated playfulness. For Clip Pair A, playfulness ratings were significantly higher for the clip with a teacher present than for the clip without the teacher, $t(31) = 2.35$, $p = .025$. Though, for other clip pairs the effect of teacher presence did not reach significance ($p > .2$ for all). An overall comparison of ratings for paired clips with teacher present and teacher absent demonstrated no significant difference despite higher ratings generally been given to clips with teacher present, $t(221) = 1.40$, $p = .163$. Whilst these data do not support the view

that teacher presence increases perceived playfulness (except in the case of Pair A), they do support the view that teacher presence is not reducing children's perception of playfulness in computer use.

5.3. Planned Comparison of Playfulness Ratings with Social Context Varied

In the analysis of observations previously described there was a suggestion that paired computer use was less involving for children. In the children's playfulness ratings according to social context, a similar pattern was found. Two of the clip pairs contrasted single computer use with a dyad using the same computer (one of the dyad remained the same in each case). The final clip pair (I) compared a dyad using a computer with a small group using the same computer (including the original dyad). The means and standard deviation of the children's playfulness ratings for these clip pairs is shown in Table 8.

Table 8: Playfulness Ratings Assigned by Children to Pairs of Video Clips With Group Size / Social Context Varied (Adjusted Mean and SD)

Clip Pair	Children in Group	Mean	SD	Children in Group	Mean	SD
G	1	3.73	1.88	2	3.66	1.57
H	1	4.22	1.06	2	3.14	1.90
I	5	4.33	1.46	2	3.69	1.39
Total	1 or 5	4.12	1.47	2	3.56	1.57

Whilst there was no significant effect of group size in Clip Pair G ($p > .9$), the playfulness ratings of single computer use were significantly higher than those for paired computer use in Clip H, $t(30) = 2.06$, $p < .05$. The difference in mean playfulness rating seen for Pair I was not significant, but did approach significance, $t(40) = 1.44$, $p = .156$. Although the natural variability in children's ratings of playfulness makes it hard to draw definitive conclusions, it does appear that computer use in a dyad may be viewed as less playful than computer use in other social contexts.

5.4. Other Planned Comp

There were two additional video clip pairs that were designed to see if children were sensitive to other variables when making their playfulness ratings. The first of these pairs looked at the control of the computer. In the first of these clips a child controlled a computer with a mouse whilst a teaching assistant gave advice (Mean playfulness rating = 3.44, SD = 1.72), in the second clip the same teaching assistant controlled the mouse instead of the same child (Mean playfulness rating = 3.42, SD = 1.69). Unsurprisingly, there was no significant difference between ratings of these clips. In the second clip pair the sensitivity of children to background activity and noise was tested by comparing one clip where a child interacted on a computer in a quiet classroom (mean playfulness rating = 3.86, SD = 1.47) with a clip where the same child used the same computer whilst a teacher and a small group of children engaged in a noisy activity in the immediate background (mean playfulness rating = 4.26, SD = 1.32). Although there was some indication of sensitivity to this variable the difference between the mean ratings of the clips was not significant, $t(38) = .865$, $p = .393$.

5.5. The Relationship between Involvement Levels and Children's Ratings of Playfulness in the Video Clips

The involvement level of each child who was clearly visible in the 24 video clips was rated using the Leuven scale. Where more than one child was visible in a particular clip the ratings for these children were averaged to give a single Leuven rating for each one minute video clip. There was no correlation between the involvement ratings and children's ratings of playfulness for video clips (r_s = -.019).

5.6. Summary of Children's Ratings of Playfulness of Types of Provision

- Across all of the twenty four clips shown in the focus group sessions, children consistently rated computer use as playful, with only a few exceptions.
- Teacher presence did not have a negative impact on children's playfulness ratings. On average teacher presence increased playfulness ratings, in one case significantly so.
- Children showed some sensitivity to the social context of computer use. Paired use was rated lower for playfulness than single or group use (a difference that was significant for one single vs. pair comparison). This reflects the pattern of involvement ratings reported previously (in section 3.2.3).
- Other variables examined (control of computer, classroom context) did not show differences in children's playfulness ratings.
- Observed involvement in the video clips and children's playfulness ratings were not correlated.

6. Children's Perspectives on Why a Computer Activity is More or Less like Play

As previously described, focus groups involving a combined total of 103 children were conducted across the sample settings and these focus groups initially involved children rating each of the presented clips on a scale of 0-5. The second part of the procedure involved using the presented clips to prompt peer group discussion. The aim of this part of the procedure was not the collection of clip specific comments from the children, but more the elicitation of children's general views about what made an activity more or less like play.

Audio recorded data from each of the focus group sessions was transcribed in preparation for open categorical analysis based on the reasons children provided within their discussions for activities being described as more or less like play. Any conversation irrelevant to the consideration of what activity was more or less like play was disregarded.

The analysis of the transcribed responses involved noting every response that the children provided to justify a situation as being more or less like play, categorising these and then grouping related

categories under over-arching themes. Sometimes a response was broken down during the analysis process, for example “because it’s fun games” would fit within the category of enjoyment (i.e. fun) as well as activity (i.e. games).

Over the course of the focus groups, a total of 406 responses were categorised (281 relating to what children thought made activities more like play and 125 relating to what children thought made activities less like play). Table 9 presents a summary of the main themes and categories within these responses in order of predominance, along with response frequencies. Each of the themes is then discussed in more detail using examples of the children’s responses.

Table 9: Justifications Children used for Activities being More/Less Like Play by Theme and Subcategory

	more like play	less like play	total
ACTIVITY			
Modality – computer, whiteboard or laptop	39	4	43
Using a game or website	41	5	46
Other named activities	22	12	34
total	101	22	123
INVOLVEMENT			
Time spent on the activity	12	7	19
How much activity was going on	18	7	25
The nature of children’s engagement	28	29	57
total	58	43	101
SOCIAL CONTEXT			
The number of children present	22	9	31
Features of the interaction	17	9	26
total	39	18	57
ENJOYMENT			
Fun	22	0	22
Enjoyment	16	2	18
Smiling or laughing	4	2	6
total	41	5	46
ENVIRONMENT			
Level of noise	24	12	36
Classroom routine	3	0	3
total	27	12	39
TEACHER			
What the teacher was doing	7	18	25
Whether the teacher was present	1	5	6
total	8	23	31
CHOICE			
Level of choice about taking part	7	2	9
total	7	2	9

6.1. Responses Relating to the Theme of ACTIVITY

Responses relating to the activity engaged in by the children in the video clips were those most frequently used within the focus groups. Children referred to the modality type, use of games or websites and other named activities. Table 10 summarises the frequency of these responses.

Table 10: Children's Justifications for More/Less like Play Relating to the ACTIVITY

	more play	less play	total
Modality – computer, whiteboard or laptop	39	4	43
Using a game or website	41	5	46
Other named activities	22	12	34
total	101	22	123

6.1.1. Modality type

In relation to modality type, children most often justified an activity as being like play simply because the children in the video were using the computer, for example,

Researcher: *so why do you think that one was lots like play?*

Child: *cause' he was playing on the computer*

References to the computer were also made to justify an activity as being less like play, however there was a subtle difference in that these responses were additionally clarified with the preface 'just' or 'only'.

This could suggest that computer use is seen as a form of play but less play like than other activities the children experience. For example,

Researcher: *you thought it was a little bit did you [name]? Why was that?*

Child: *because they was <u>just playing</u> on the computer*

Researcher: *why do you think they were only playing a bit?*

Child: *cause' they were <u>only playing</u> with the 'puter*

To justify that an activity was play, several children also referred to use of the whiteboard, for example,

Researcher: *so what did you think of that one?*

Child: *it was playing, they was on the whiteboard*

One child stated that the activity was a lot like play because they liked doing games on the laptop.

Researcher: *why did you think that was a lot like play?*

Child: *because I like doing games on the laptop*

6.1.2. Games and web sites

Children often justified an activity as being play because the children featured were using games, or as not play because they couldn't see any games going on, for example, in the case of play,

Researcher: *you thought they were playing lots and lots*

Child: *they were playing hundreds and hundreds of games*

Researcher: *why do you think they were playing loads and loads?*

Child: *cause', um….they was on the Simple City*

and not play,

Researcher: *what did you think [name]?*

Child: *well it didn't….it looked noisy but it looked…. I didn't see any games*

The children also referred to particular websites to justify play responses, for example,

Researcher: *why did it look like they were playing?*

Child: *they were playing CBeebies and CBBC*

6.1.3. Other named activities

Other named activities were also described by the children as being more or less like play. In relation to play, children referred to activities that involved drawing, painting, colouring and music. For example,

Researcher: *what did we think of that one?*

Child: *they was playing lots, they had Justin Bieber music on*

Researcher: *why do you think that one was like play?*

Child: *cause' the boy was going on painting and doing blobs*

Researcher: *what would make it more like playing?*

Child: *drawing stuff*

Child: *going on colouring*

Activities associated with not play included typing, writing or doing work.

Researcher: *what did you think {name]?*

Child: *I think it was just a little bit [playing] because they just did typing*

Child: *they just did typing and then they looked at it*

Researcher: *why don't you think they are playing there?*

Child: *because they're doing their work*

6.2. Responses Relating to the Theme of INVOLVEMENT

The children used a variety of ways to describe why an activity was more or less like play because of how much time children spent on the activity, how much activity seemed to be going on and what the children were doing during the activity. Table 11 summarises the frequency of these responses.

Table 11: Children's Justifications for More/Less like Play Relating to INVOLVEMENT

	more play	less play	total
Time spent on the activity	12	7	19
How much activity was going on	18	7	25
The nature of children's engagement	28	29	57
total	58	43	101

6.2.1. Time spent on the activity

The response category of time spent on an activity was a simple polarised one. Children described the clips as being a lot like play when they thought the children spent a long time on an activity. Spending a

short time or a constrained amount of time was related to an activity being not play or less like play. For example,

Researcher: *why weren't they playing as much as before?*

Child: *because they never stayed on there*

Child: *they was only on there for a little bit*

Researcher: *why was it only a little bit?*

Child: *well it was tidy up time straight away*

Researcher: *what made you think it was loads of playing?*

Child: *he was taking long*

Child: *I thought three, in the middle*

Researcher: *oh, so what would make it more like playing?*

Child: *well if they did it really long*

Researcher: *why do you think it was play?*

Child: *they were playing all day on the computer!*

Researcher: *so what would make it so it wasn't loads and loads?*

Child: *if they just got up there and (did) their thing and just went*

6.2.2. How much activity was going on

As well as referring to the amount of time the children featured in the clips spent with the computer, the children also talked a great deal about what level of activity was going on. Again this was a simple polarised category. Clips described as less like play were those where the children thought there was a low level of activity and that the children featured weren't doing much or were doing nothing at all. For example,

Researcher: *why was that not like play?*

Child: *the kids weren't doing anything*

Researcher: *so why don't you think they were playing [name]?*

Child: *cause I didn't see them doing much stuff*

Researcher: *why wasn't it as much playing?*

Child: *cause' he wasn't pl…he wasn't….um…he didn't do much*

Researcher: *what else can you think of?*

Child: *they sat on there and they didn't do nothing and then they walked off*

When the children in the focus groups described certain clips as being a lot like play, they told the researcher that this was because there was a lot of activity going on. For example,

Researcher: *you put four or five, so what made it loads?*

Child: *because the boy was……playing and playing until he dropped*

Researcher: *why did you put lots?*

Child: *because they was doing loads and loads of games*

Researcher: *why did you think it was play?*

Child: *because they were doing so much*

6.2.3. The nature of the children's engagement

Children used lots of reasons for activities being a lot or less like play that were based on what the children featured in the clips were doing. The children appeared to notice how the mouse was being used, whether the children were moving or sitting still, whether they were actively engaged with the computer or watching, and how much effort the children featured seemed to be exerting.

When describing activities that were a lot like play, the children talked about how the mouse was being moved around and how quickly the mouse was being used. In the case of play responses, there seemed to be purposeful or thoughtful mouse use. Clicking of the mouse was also used as a reason for activities being less like play but here, a lack of purpose was indicated, for example by use of the clarifying preface 'just'. For example, in the case of play,

Researcher: *what made that loads like playing?*

Child: *he was really controlling it…really into it*

Researcher: *really into it?*

Child: *yeah, I think he was at the mouse clicking (makes fast clicking action)*

Researcher: *you thought play, why do you think they were playing?*

Child: *because ummm…. clicking to get on a website, they click to play on*

Researcher: *why did you think that was play?*

Child: *cause' they had a mouse and they was moving it around*

And less like play,

Researcher: *why didn't you think that was playing?*

Child: *cause' you could <u>just see clicking</u>, no playing*

Researcher: *so what would make it that they weren't playing*

Child: *cause' they were <u>just clicking</u> on things*

Researcher: *how about that one?*

Child: *no playing*

Child: *not much*

Child: *clicking*

Child: *clicking clicking everywhere*

In the focus groups, children also talked about whether the children featured in the clips were moving or sitting still. Moving around was associated with activities that were a lot like play and standing or sitting still with activities that were described as less play. For example,

Researcher: *what made you think it wasn't play*

Child: *they stayed on the carpet*

Researcher: *you didn't think it was like play, why's that?*

Child: *because they were um…sitting still*

Researcher: *they wasn't moving*

Researcher: *so what would make it more (like play)?*

Child: *if they were moving around more and playing*

Child: *he was just standing there*

The children described how when they thought an activity was a lot like play, there was concentration and effort involved. Children described passivity in the children featured within clips described as less like play, that they were bored or just watching.

For example, in the case of clips described as a lot like play,

Researcher: *what about that one then?*

Child: *I've got five*

Child: *because she was concentrating*

Researcher: *so why did it look like playing [name]?*

Child: *cause' the girl was concentrating on the game*

Child: *She was concentrating and the boy was telling her what to do*

And less like play,

Researcher: *why was that one not play?*

Child: *because he was just on the computer watching*

Researcher: *you didn't think it was play*

Child: *it was boring*

Researcher: *so that wasn't much like playing*

Child: *might have just wanted to do something and then got bored and got off*

Researcher: *why weren't they playing?*

Child: *they were watching*

One interesting example of a response to justify an activity as being less like play referred to the child doing the activity slowly and properly,

Researcher: *why only a little bit playing?*

Child: *because they were doing it slow*

Researcher: *oh*

Child: *they were doing what the teacher was saying, doing it properly*

6.3. Responses Relating to the Theme of SOCIAL CONTEXT

When describing why activities were more or less like play, the children in the focus groups referred to social context. This overall theme could be divided into those responses that related to how many children were present in the clip and what was going on between the children featured. Table 12 summarises the frequency of these responses.

Table 12: Children's Justifications for More/Less like Play Relating to SOCIAL CONTEXT

	more play	less play	total
The number of children present	22	9	31
Features of the interaction	17	9	26
total	39	18	57

6.3.1. The number of children present

In terms of responses that related to how many children were present in the clips, the children most frequently used a larger social group as a justification for increased play. In contrast, a child being on their own was considered not play or less like play. For example,

Researcher: *why do you think it was playing?*

Child: *cause' there was five people on the computer*

Researcher: *is it better when there are more?*

Child: *well then you've got some company as well*

Researcher: *you didn't think she was playing much?*

Child: *no cause' she was on her own*

Researcher: *what would make it more like play?*

Child: *if everyone was playing*

Child: *have more people*

Researcher: *why was it only a little bit [name]?*

Child: *because he didn't have anyone to play with*

6.3.2. Features of the interaction

Certain ways that the children were interacting with each other were associated with being more or less like play. Positive interactions were associated with play responses, for example being nice, kind, taking turns and helping each other. Not taking turns was considered less play like. For example,

Researcher: *what would make it more like play?*

Child: *well I think it would be being quiet and sharing an all*

Child: *I put a cross [indicating not play]*

Researcher: *why did you put a cross?*

Child: *they wouldn't let each other have a go*

Researcher: *what would be more like play?*

Child: *if they didn't snatch*

Child: *if they were kind*

Researcher: *why was that a lot of playing?*

Child: *the boy was telling her what to do…he was pointing*

Talking and chatting were predominantly used to justify activities as being play however on occasion this was also used as a reason for an activity being less like play. For example,

Researcher: *why do you think they were playing loads?*

Child: *they were talking*

Researcher: *why didn't you think they were playing?*

Child: *cause' they were chatting*

Child: *shouting and chatting*

Researcher: *why did you think that wasn't play?*

Child: *cause' they were just talking*

6.4. Responses Relating to the Theme of ENJOYMENT

The children in the focus groups appeared to be sensitive to whether or not the children featured in the clips were enjoying the activity. They spoke about the children having fun, the children enjoying themselves and whether the children were smiling or laughing. Table 13 summarises the frequency of these responses.

Table 13: Children's Justifications for More/Less like Play Relating to ENJOYMENT

	more play	less play	total
Fun	22	0	22
Enjoyment	16	2	18
Smiling or laughing	4	2	6
total	41	5	46

6.4.1. Fun

Whether or not the children featured appeared to be having fun was an important indicator to an activity being regarded as play. There were multiple responses in this category, for example,

Researcher: *why were they playing loads?*

Child: *cause' it looked like fun*

Child: *cause' they was having fun*

Researcher: *they looked like they were playing did they?*

Child: *they were having lots of fun*

6.4.2. Enjoyment

The children also talked about whether or not the children featured in the clips liked what they were doing or looked like they were enjoying themselves. For example,

Researcher: *why did you think there was lots of playing?*

Child: *cause' they like it*

Child: *they like computers*

Child: *they like it*

Researcher: *you put five, why?*

Child: *because I thought they was really enjoying their selves*

Researcher: *what would make it less like play?*

Child: *when they click on bad things and they don't like it*

6.4.3. Smiling and laughing

The children also picked up on signals of enjoyment, and the presence or absence of laughing or smiling was used to indicate that activities were more or less like play. For example,

Researcher: *why did you think it was in the middle?*

Child: *well he wasn't smiling much*

Researcher: *why do you think they were playing lots?*

Child: *they were laughing, cause' they were laughing*

Child: *they was laughing and really having fun*

6.5. Responses Relating the Theme of the ENVIRONMENT

In the focus groups the children gave responses for activities being more or less like play that related to features of the environment. These mainly referred to the level of noise apparent in the clips but there were also some responses that related to the classroom routine. Table 14 summarises the frequency of these responses.

Table 14: Children's Justifications for More/Less like Play Relating to the ENVIRONMENT

	more play	less play	total
Level of noise	24	12	36
Classroom routine	3	0	3
total	27	12	39

6.5.1. Level of noise

The majority of responses about noise related to activities being described as play. Noise and shouting were generally seen to indicate that activities were more like play. For example,

Researcher: *why did we think that was a lot of playing?*

Child: *there was lots of noise*

Researcher: *why did you think that was loads of playing?*

Child: *cause' they was making loads of noise*

Researcher: *why did you think it was loads of play?*

Child: *they was screaming*

Child: *making loads of noise*

On occasion, noisiness was also used to justify activities as less like play too. It seemed as though there could be too much noise or shouting for an activity to be play. An interesting example of differing opinions amongst the same focus group demonstrates this,

Researcher: *what do we think here, lots or not at all?*

Child: *lots*

Child: *lots*

Child: *not a lot*

Researcher: *oh I see. Well why don't you guys tell me why its lots first of all*

Child: *it was really loud*

Researcher: *why wasn't it a lot then (to the other child)?*

Child: *well it was too loud really*

A small amount of responses that related to the children featured in the clips being quieter was used when describing activities that were more or less like play in equal measure. For example,

Researcher: *did everyone think it was playing?*

[several 'yeah' responses]

Child: *it's nice and quiet*

Child: *just a tiny bit of play*

Researcher: *why's that?*

Child: *because I only heard a little bit of noise*

6.5.2. Classroom routine

A small amount of children explained how an activity was more like play with reference to things that seemed to relate to what might usually happen in their classrooms. For example,

Researcher: *why do you think it was lots of playing?*

Child: *because when it was tidy up time he never tidied up*

Researcher: *oh right*

Child: *yeah, he just kept on playing on there*

Researcher: *why do you think it was a lot of playing?*

Child: *because they'd just finished their work*

Researcher: *what was it that made that one play?*

Child: *dunno….perhaps it was just now that they finished having snack*

6.6 Responses Relating to the Theme of TEACHER

Within the focus groups the children not only referred to whether or not a teacher was present in the clip, but also to what the teacher was doing. Mainly, responses that related to the teacher were associated with not play. Responses about what the teacher was doing included the teacher instructing the children, watching or looking at what they were doing or giving help. Table 15 summarises the frequency of responses in this theme.

Table 15: Children's Justifications for More/Less like Play Relating to the TEACHER

	more play	less play	total
What the teacher was doing	7	18	25
Whether the teacher was present	1	5	6
total	8	23	31

6.6.1. Whether the teacher was present

The teacher being present was used as a reason why an activity would be considered less like play. A teacher being absent was used as a reason why an activity would be considered more like play. For example,

Researcher: *what number did you put?*

Child: *I put five (indicating a lot like play)*

Researcher: *why's that*

Child: *Miss wasn't there*

Researcher: *what would make it so it wasn't like playing then?*

Child: *if Miss was there*

6.6.2. What the teacher was doing

Far more of the responses in this theme related to what the teacher was doing, rather than their simply being present. Most often, the teacher helping the children was considered to make an activity less like play. For example,

Researcher: *what made you think this wasn't much like playing?*

Child: *cause' the teacher's helping them*

On some occasions the children referred to help being provided in relation to activities being more like play but in these cases they indicated that there was an element of choice as to whether help was given or used the clarifying preface 'just' as if to indicate that it was only fractional support compared to the assistance that might be offered in other less play like activities. For example,

Researcher: *they were playing lots?*

Child: *they were… umm trying…um…the teacher was just helping him*

Child: *helping is good a tiny little bit if someone needs help*

Researcher: *yeah?*

Child: *but if someone doesn't need help they don't have to have help*

The children described some clips as less like play when the teacher was considered to be doing the activity or when the teacher was watching or looking at what the children were doing. For example,

Researcher: *why didn't you think it was like play at all?*

Child: *the teacher was doing things…typing things…*

Researcher: *but they weren't playing?*

Child: *the teacher was doing work on there and they stayed on the carpet*

Child: *it looked like they was doing work*

Researcher: *why was that [name]?*

Child: *the Miss was looking at*

Child: *the teacher was looking at them*

The teacher giving instruction was used as a reason for both play and not play. For example,

Researcher: *why do you think they were playing?*

Child: *because the teacher told them to play*

Researcher: *why was it just a little bit of playing?*

Child: *because the teacher was telling them*

Researcher: *why do you think it was a little bit?*

Child: *they were going quite slow and the teacher was making them stop*

6.7. Responses Relating to the Theme of CHOICE

A small minority of responses about whether an activity was more or less like play related to choice. Having choice over whether or not to participate in an activity was used by some children in the focus groups as a reason for an activity being more like play. No choice was associated with an activity being less like play. Table 16 summarises the frequency of responses.

Table 16: Children's Justifications for More/Less like Play Relating to CHOICE

	more play	less play	total
Level of choice about taking part	7	2	9

When talking about an activity as being more like play, the children made reference to wanting to take part or being able to choose what they were doing. A child featured in a clip not wanting to take part was used as a reason for an activity being less like play. For example,

Researcher: *why don't you think it was a lot like play [name]?*

Child: *well cause' he didn't want to go on there anymore*

Child: *yeah he didn't want to go on there*

Researcher: *what do you think [name]?*

Child: *they were playing…the teacher said you can choose what you want*

Researcher: *why do you think it was play?*

Child: *well this boy, he was doing whatever he wanted, doing lines and stuff*

6.8. Summary of Focus Group Findings

- The most commonly provided responses within the focus groups related to the activity that the children featured in the clips were engaged in. Children appeared to associate play with use of the computer quite generally and in addition play was also associated with use of the whiteboard. Games and websites were associated with play, as were drawing, colouring, painting and music. Activities not like play included writing, typing or more generally, doing work.
- The involvement of the children featured in the clips was noted in the focus groups. When describing how much an activity was like play children in these groups related the amount of

time spent on an activity with how playful it was (more time was indicative of play). As well as the perceived amount of time at the activity, the children also responded to the level of activity that was occurring, the more activity that the children saw occurring, the more like play the activity became. Within this theme, the children also commented on how the children featured in the clips were engaged in the task, active engagement, purposeful use of the mouse and concentration were features of play whereas random clicking, just watching, sitting still or looking bored were used as indicators that an activity was not like play or less like play.

- In the theme of social context, children clearly indicated that more children using the computer increased how play like an activity was. Activities that were a lot like play involved children sharing, taking turns and being kind whereas not sharing was seen as a sign that activities were less play like. Chatting and talking were discussed in relation to activities that were a lot like play and not like play. In not play situations the children's responses suggested that the talking and chatting that were occurring were not seen as purposeful.
- Children were sensitive to enjoyment and defined activities as a lot like play when they felt the children featured in the clips were enjoying themselves, smiling, laughing, having fun or liked the activities.
- In relation to features of the environment, children were sensitive to the level of noise within the featured clips and in general, noisiness was associated with activities being a lot like play. To a lesser extent, excessive noise and shouting were also associated with activities that were less like play and some responses suggested that children felt it was possible for activities to be too noisy. A small amount of other responses relating to the environment suggested that children had learned when play occurred as a result of classroom routine, for example after snack or after work had been completed.
- Responses related to the teacher (featured within some of the clips) were most often associated with activities being described as less like play. Teacher presence, the teacher being in control of the task, the teacher looking at the children's activities and the teacher helping the children were used as indicators of a less play like situation. The teacher only offering a limited amount of support or providing support when a child requested it, were seen as indicators of an activity being more like play.
- The children noted how much choice they felt the children featured in the clips had over their involvement in the task, and activities described as a lot like play were those where children seemingly wanted to take part.

7. Addressing the Research Questions via Triangulation and Video Clip Exploration

7.1. In What Ways are Computers Used in Classrooms Following the Foundation Phase in Wales?

The teachers in our study describe how there were no particular outcome requirements related to ICT in terms of the curriculum objectives, but that provision was cross curricular with a particular emphasis on the development of children's confidence. They described a range of different uses of computers with a principal theme being focused, enhanced and continuous types of provision. The types of provision described were recommended practices within the Foundation Phase curriculum and reflected differing levels of teacher directed and child initiated activity. A summary of how teachers conceptualised these different types of provision and examples of activities they described in relation to the types is presented in table 17.

Table 17: Summarising Features of Continuous, Enhanced and Focused Provision

Type of provision	Characteristics	Role of the teacher	Activity example
Continuous	• Activities that are always available for the children to freely choose at particular times throughout the day • Activities that children undertake independently • Activities where children develop their own ideas	The teacher is available on the periphery for support if required or requested.	*"the computer's just on and the children decide what they want to do"* *"they go of their own free will and decide what they do"*
Enhanced	• Activities designed to back up a skill that has previously been taught • Extending or enhancing continuous provision by adding a topic related focus or learning outcome • Children can be directed toward the task or the task can be self chosen	The teacher plans the learning outcome of the activity. They may initiate or direct children to the activity and offer support.	*"if our topic was 'space', putting on a programme that related to that"* *"using the alphabet soup game to back up our literacy teaching"*
Focused	• Activity is wholly teacher directed • The learning outcome predetermined • Sessions are directly taught and relate to skill development	The teacher is directly involved in teaching toward the planned outcome	*"our weekly ICT lesson in the suite"* *"teaching children skills like making a space with the space bar, how to make a capital letter, retrieving files and saving work"*

Focused provision was described as that where the teacher had a particular learning outcome in mind and the aim of the activity session was to directly teach toward that outcome. Children often experienced focused provision in whole class or small group sessions and there was no level of choice about their participation. Enhanced provision was that where a particular area of the classroom or particular activity might be suggested to the child, the area or activity was planned to provide an opportunity that enhanced a previously learned skill but children had some degree of control over whether or not to follow the teachers suggestion and sometimes the option of whether or not they would take part. Teachers were sometimes involved in suggesting or initially directing these activities. Continuous provision was activity that was always available for the children during periods of freely chosen activity.

The teachers described using different types of ICT modalities and these included whiteboards, laptops, suites and mini suites as well as a variety of different software packages and websites. Provision was also characterised by social context and the teachers described computing activity that involved the whole class, small groups, pairs of children and children working alone. Sometimes the teachers were directly involved in leading the activity, sometimes their role was to suggest or initiate and at other times they were not present at all. Often these social contexts were related to whether activities were continuous, enhanced or focused.

7.2. Are Certain Types of Computer Use More Effective in Motivating and Engaging Children?

We measured children's motivation and engagement using the Leuven Involvement Scale (Laevers, 1994) by analysing four minute clips of computing activity described by teachers as continuous, enhanced or focused. There were no significant differences in the levels of involvement in the children according to these three different types of provision and across all types of provision, involvement levels were consistently high. Provision described also differed in relation to teacher presence, modality type and social context. Again, using four minute clips of activities that represented these practices, we rated children's involvement levels. Given the strong relationship between the types of provision and teachers levels of involvement, it was unsurprising that we found no difference in children's involvement levels according to whether a teacher was present or absent. In relation to modality type, the highest levels of involvement were those where children were using the mini-suite, however there was no significant difference in observed involvement levels across classroom computer, mini-suite or whiteboard use.

Analysis of the four minute clips did indicate that social context influenced children's levels of involvement. Involvement levels were significantly lower during whole class activity and characteristic of this type of provision was a notable difficulty in capturing and maintaining the attention of all participating children. In one observed clip a teacher was utilising the whiteboard to practice pencil control by pattern tracing with the class in front of her, sat on the carpeted area. Although she attempted to engage the class by asking individuals to come to the front and control the smart board pen, whilst her attention was on a particular participating child, other members of the class quickly lost interest and began to look away and fidget. Sitting on the carpet in a group, watching the teacher and being bored were all reasons given by the children in the focus groups as to why a computing activity would be less like play.

Paired computer use led to higher involvement levels than those associated with whole group activity but interestingly, lower levels of involvement than when the computer was being used alone or in a small group. Analysis of the one minute clips rated by children in the focus group sessions also revealed a similar pattern of findings in relation to perceptions of playfulness. A child using the computer alone was rated as being significantly more like play than a paired activity. In relation to clips where a child was depicted alone, children noted that they thought the child in the clip wanted to take part, appeared to like the activity and was having fun. In their focus group discussions, the children alluded to particular factors associated with the dynamics of paired or grouped activity that influenced their judgements about levels of play. For example, how much control they had over manipulating the mouse or keyboard or whether there was turn taking and co-operation.

The way in which these characteristics of social context could influence levels of involvement is evident by looking more closely at selected clips where paired activity is associated with high involvement and clips where paired activity is associated with low involvement. Characteristic of clips where paired activity is occurring but where children's involvement levels are low is that often, one child is simply watching and waiting to take their turn whilst the active child controls the mouse or keyboard. Often it appears that the children have been instructed to work in the pair and the activity in which they are engaged is not one that easily lends itself to co-operation or interaction. The waiting children in these situations are often observed looking away from the computer at activity going on elsewhere in the classroom, fidgeting or looking listless or bored. Paired activity associated with high levels of involvement often reflected tasks where children discussed what they were doing, made joint decisions about what would be clicked or typed and took turns to use the equipment. There were some lovely examples of naturally occurring paired activity where one child negotiated to join another and activity indicative of high levels of involvement ensued. Similarly high levels of involvement could be seen in clips where groups of children spontaneously gathered around the computer, some standing and some sitting but all talking about the activity and offering suggestions about how the child controlling the mouse might proceed. These children were free to come and go as they pleased (and often did).

7.3. Are Certain Types of Computer Use Considered More Playful by Children and is Playfulness Related to Motivation and Engagement?

We selected twenty four one minute clips for children to rate in terms of how much like play they felt they were. These clips also acted as prompts to more general discussion amongst the children in focus groups about what they thought made computing activities more or less like play. The clips were selected to directly compare features of the video recorded footage taken from all sites in terms of teacher presence, social context, background noise, modality type and physical control over the mouse. Children's motivation and engagement was also measured in each of the clips rated by the children for playfulness using the Leuven Involvement Scale and there was no relationship between these two factors.

Overall, children rated the presented clips as being a lot like play, reflecting a genuine enthusiasm for computer use across the range of contexts presented. The fact that the clips featured children who were

simply 'on the computer' was the most common justification children gave for an activity being a lot like play, supports this view. As described above, in relation to social context, paired activity was rated as significantly less like play than activity where children were alone or in a small group. There were no other significant differences found in children's playfulness ratings.

Interestingly however, the features of the environment which had been manipulated for consideration by paired comparison were all discussed by children throughout the focus groups and used as reasons for activities being more or less like play. For example, although the ratings of the compared clips for control and noise were not significantly different, the children described activities where they had choice and control over what was happening and environments that were noisier, as being more like play, supporting the direction of the mean differences between these ratings. Children talked about how enjoyable certain activities were and some activities, like games and websites, music, drawing and painting were considered more like play than writing or typing.

Overall there was no significant difference in children's ratings of playfulness according to whether or not a teacher was present based on direct manipulation of this cue within the paired stimuli. However the qualitative data strongly suggest that children are sensitive to this cue. In general, a teacher being present, directing the task or helping a child was described in the focus groups to be less like play. Some of the children's focus group responses indicated that simple teacher presence led to less play like activity, however the majority of responses related to far more subtle judgements made by the children about *how* the teacher was involved. Clips involving a teacher that children had rated as more like play (above the overall average) depicted situations where the child or children were in control of the task for the majority of the time and were verbally encouraged by the teacher who only stepped in when invited or when it was necessary (for example when needing to change software). During the focus group discussion these clips elicited comments about children being able to 'do it on their own' and the teacher '*only* helping' or giving help 'because the children had asked her'.

The reasons why teacher involvement was sometimes mentioned as reducing playfulness are seemingly quite varied. Examination of the video clips can help us in this respect. For example, in two clips children are seated at computers and the teacher is stood behind them, guiding but not directly controlling their computer use. Here the children describe how this is less like play because it looked like they were 'doing work' and the teacher was 'watching' or 'looking at it'. In a further clip rated as less like play, the teacher is at the whiteboard explaining a task with the class seated in front of her. The children again described this as work and that the children featured were doing the task 'for the teacher' and had to do it 'properly'. In another clip that the children saw as less like play, the teacher is sat at one computer with two children. The teacher controls the mouse throughout the activity and shows little enthusiasm for the task, the children appear bored and distracted. The children in the focus group describe that this isn't like play because the children are 'not doing anything' and that the 'teacher is doing it all'. The children also say it is 'not playful' which could indicate that they had noticed this particular teachers' lack of enthusiasm.

7.4. In What Ways Can Children's Motivation and Engagement With Computers be Enhanced Within the Context of a Play Based Curriculum?

The children in the current study reported consistently high levels of playfulness in relation to computer use and in addition, levels of observed involvement across the different computing provisions was high. We found no statistical relationship between how much like play children quantitatively reported activities to be and observed levels of involvement, however characteristic behaviour noted during episodes of high involvement was similarly described by children in relation to activities that were regarded to be a lot like play. These characteristics typically related to the amount of control children had over the activity which itself, was related to social context in terms of peer interaction and teacher interaction. Consistent with previous research, there was evidence in the current study that teachers were successful in facilitating children's involvement with computers using guided participation and supportive dialogue (Plowman & Stephen, 2007; Kennewell, 2008; Siraj-Blatchford, 2002). However, what was clear from our focus group discussions with the children was that in order for this computing activity to be occurring within an authentic play experience, control over the activity needed to be carefully managed. This is consistent with previous research that has looked at the way in which teachers manage to negotiate control using open ended dialogue (McInnes, Howard, Miles & Crowley, 2010) and theories of play flow which emphasise the need for practitioners to be aware of and respond appropriately to children's cues in order for play flow to be maintained (Csikszentmihalyi & Csikszentmihalyi 1988; Sturrock & Else, 1998).

One way of understanding the results of our study is to think about the flows of communication and action during children's computer use. These flows can be shown graphically. For instance the simplest situation is when a lone child uses a computer unassisted, this is shown in Figure 2a.

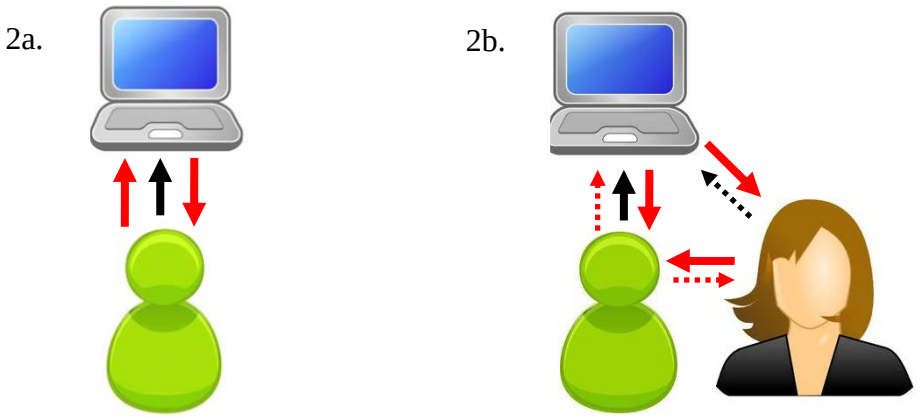


Figure 2a/2b: Communication and Action Flows During the Computer Use of a Lone Child (Figure 2a) and a Lone Child with Teacher (Figure 2b). [Red arrows indicate communication/attention flows, black arrows indicate action flows. Dotted lines show divided or reduced flows]

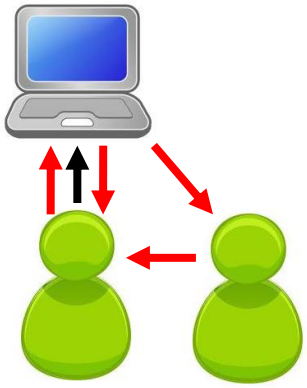
Communication is necessarily limited to computer-child, and action to child-computer. This type of human-computer interaction reflects the design of the computer and typically also reflects the design of the software being used. Whilst there is little scope for the co-construction of action, scaffolding, or human-human communication during this type of provision, the clips of children in the current study working alone often demonstrated deep engagement. Solitary use was also considered to be a more like play than paired activity and this supports the proposition that children benefit from situations that afford them control in relation to the activity and its outcome (Selwyn & Bullon, 2000; Capella, 2000; Howard, 2010a). Also when children were alone at the computer we observed evidence of their verbalising thoughts and problem solving strategies, a finding consistent with previous research that has focused on meta-cognition and self regulation in children during play (Whitebread, 2010).

The situation that occurs when a teacher helps a child is shown in Figure 2b. It is notable that whilst the main flow of action is between the child and the computer, there is also an auxiliary flow from the teacher to the computer – reflecting instances when the teacher will take control of the mouse to assist the child (as seen in our observations). The child is likely to accept this shared control because of the inherent power relationship that exists between teacher and child in a classroom situation. However, maximising scope for the scaffolding of learning during computer use relies on the skill and responsiveness of the teacher, who must also simultaneously maintain an authentic play experience for the child. The key to this appears to be acknowledging when the child wants control and when they wish the teacher to temporarily take control. Previous research has demonstrated that teachers have found negotiating control with children during their play to be relatively difficult, with the practitioner most likely to take on a dominant management, monitoring or directing role (Kontos, 1999; Howard, 2010b). Whilst there were some instances of this observed in the current study, there were also many examples of teachers working alongside children successfully in ways children described as play. The children in the current study differentiated between the teacher taking a leading or directing role (which was considered less like play) and the teacher providing assistance on their terms (which was considered more play like).

The problems associated with paired computer use can be seen to emerge in Figure 2c. Whilst the child with direct physical control of the equipment is engaged in action and communication with the computer, the second child cannot act directly. This second child can only communicate with the child in control, who by necessity is spending much of their time engaged with the computer. Hence a control bottleneck can lead to a situation where the second child is relatively unengaged.

In our observations this bottleneck was less likely to occur when children were in self chosen paired situations, as here children had voluntarily entered into a co-operative situation. In a scenario where paired use did not appear self chosen, the willingness and social skills of the child in control are crucial to successful provision. This is an important finding considering that many of the teachers in the study described facilitating paired computer use or setting up the computer area with two chairs in order to maximise knowledge sharing and co-operation.

2c.



2d.

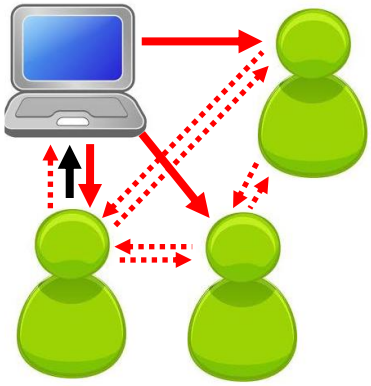


Figure 2c/2d: Communication and Action Flows During the Computer Use of a Pair of Children (Figure 2c) and a Small Group of Children (Figure 2d). [Red arrows indicate communication/attention flows, black arrows indicate action flows. Dotted lines show divided or reduced flows]

The social dynamics of paired use can be contrasted with small group use (shown in Figure 2d), in this situation the same control bottleneck issue occurs but child-child communication is much more robust and not dependent on the controlling child. In such a situation the child in control will have more incentive to share control – if they do not then the child-child communication of the non-controlling children may become the dominant interaction (leaving the child with control of the computer 'out of the loop'). Some of the most playful and interactive computer use that we observed took place when groups of three or four children engaged with a single computer. Of course, paired and group computer use is changed by the presence of the teacher. The control bottleneck is reduced (in a similar manner as with a single child and teacher, see Figure 2b) and there is another person to communicate with, and to facilitate the involvement of the non-controlling child.

It is worth spending some time thinking about ways of reducing the impact of the control bottleneck, particularly in the context of paired computer use. In some of the observed computer use one child controlled the mouse and one the keyboard. Whilst this is effective to a degree, the child with mouse had the vast majority of control (reflecting the design of modern software). In other observed instances non-controlling children asserted control by pointing at or touching the screen. This was a characteristic of some of the most successful shared computer use that we observed.

Instances where children touched the screen are indicative of the potential role of new technologies such as touch screens in the classroom. Already there have been efforts to design touch screen tabletop computer displays for collaborative use (Morris, Huang, Paepcke & Winograd, 2006), though these are currently prohibitively expensive and require specially designed software. Some researchers have looked at a simpler solution for paired interaction, the use of two mice (Stewart, Bederson & Druin, 1999; Pawar, Pal, Gupta & Toyama, 2007). Again, specially adapted software is needed, though successful interaction was often found. The dangers of removing the control bottleneck are nicely illustrated by the example of the drawing programme used by Stewart, Bederson and Druin (1999). This was found to be successful with two children controlling a drawing tool each, allowing for the

creation of shared art. However, when an eraser tool was introduced it was quickly found that children tended to erase their compatriots efforts with alarming frequency, often leading to inter-child conflict.

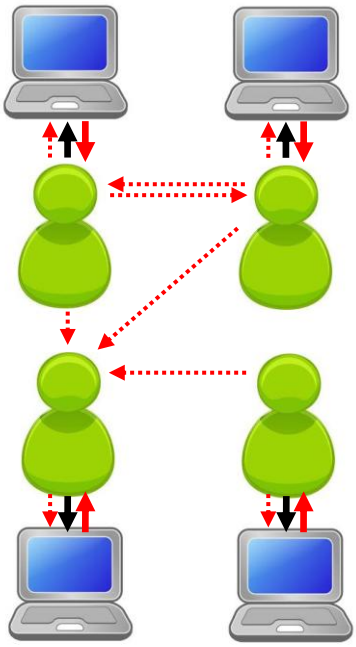


Figure 2e: Communication and Action Flows During the Computer Use in a Mini-Suite by a Small Group of Children. [Red arrows indicate communication/attention flows, black arrows indicate action flows. Dotted lines show divided or reduced flows]

One method of removing the control bottleneck is to use multiple computers. In some observed instances two computers were side-by-side in a classroom. Other settings had access to a mini-suite of computers adjoining the classroom. The situation when multiple computers are used is illustrated in Figure 2e. A scenario is depicted where each child has their own computer, this was typically the case during the mini-suite use we observed (it is notable from the teacher interviews that paired use was often needed during the use of large computer suites for whole class activities). When each child has their own computer control is no longer an issue, but the ability of the children to co-construct their action is potentially limited by the divergence between what is happening on each computer. The danger is that what will occur is simply multiple separate lone child-computer interactions, with little or no scope for co-construction and communication. Our observations are encouraging though, with evidence of children taking interest and helping one another in these mini-suite situations. Indeed, these are some of the most successful interactions observed.

As a final comment it is worth noting how successful the majority of child-child and teacher-child interactions were in our observations. Whilst there is clearly room for a greater understanding of what works and what doesn't, teachers instincts appear to serve them well in most instances.

7.5 Summary of Main Findings

- The teachers in the current study recognise the cross curricular benefits of computing provision for young children in relation to subject specific skills but particularly in relation to facilitating autonomous learning and the development of children's confidence.
- The teachers in the current study felt relatively well equipped to deliver computing provision within the Foundation Phase, most had a good range of equipment and felt well supported by designated ICT co-ordinators.
- Computers were used in a variety of ways throughout the school day and descriptions of use mainly related to continuous, enhanced and focused forms of activity provision. These provisions were consistent with Foundation Phase practice guidelines and appeared to be characterised by whether participation and goals were child or teacher directed. There were no differences in the observed involvement levels of children engaged in activities described by teachers as continuous, enhanced or focused. Children's involvement levels across the full range of provision were high.
- Computing practice could be typified by; modality type (single classroom computer, suite or whiteboard use); teacher absence or presence and; social context (whether children worked alone, in pairs or in small or large groups).
- There were no significant differences in involvement levels according to modality type although the highest involvement levels were those associated with children using the mini-suite.
- Contrary to previous research, teacher presence had no detrimental effect on children's involvement levels.
- Whole group activity led to the lowest levels of involvement. Paired computer use led to higher involvement levels than those associated with whole group activity but interestingly, lower levels of involvement than when the computer was being used alone or in a small group.
- Children consistently rated the video clips presented to them of children using computers as being a lot like play. There was no relationship between how much like play an activity was perceived to be and the involvement levels of the children featured in the clips.
- Children's quantitative play ratings of the video clips did not reveal any effect of teacher presence. Of significance to the children_was not whether a teacher was present, but rather what the teacher was doing. The children were sensitive to how much help was being given and whether this help was requested. The children also appeared sensitive to teachers adopting a monitoring role (for example, when the teacher was standing behind the children, they described her as looking at their work and it being less like play).
- Consistent with involvement level findings, children found solitary and small group activity more playful than whole group or paired tasks.

- Computer activity was described as more like play when activities were self chosen, enjoyable, participated in for longer or unrestricted periods of time, involved purposeful activity and positive social interaction.
- The use of games and websites were considered to be a lot like play, as were drawing, painting, colouring and musical activities. Less like play were writing and typing.
- Some children were sensitive to features of classroom routine and indicated that activities were more like play because of when they were occurring (for example after the children featured in the clips had finished their work or after snack time).

7.6. Recommendations for Classroom Practice

- Computer use in small groups is particularly recommended. This appears to work well when 3+ children use the same computer, or when 3+ children engage in parallel use in a mini-suite.
- Children use subtle cues to determine whether or not an activity is more or less like play; offer choice and control over an activity as far as is possible.
- Be aware of the positive effects on both playfulness and involvement of spontaneous paired and group activity and aim to accommodate this by not being overly restrictive about how many children use the computer at one time and allow chairs to be moved to the area to facilitate spontaneity.
- Children are sensitive to teachers differing roles in classroom activities. Involvement and playfulness can be maximised simultaneously by being sensitive to children's cues about how much assistance and support they require.
- Be aware that body language and posture convey subtle messages that influence involvement and playfulness; for example in the current study standing over children was seen as a cue to a teacher being in surveillance mode and an unenthusiastic teacher led to unenthusiastic children.
- Understand that whilst paired computer use can lead to co-operation and shared learning experiences, this is not automatically the case. Paired computer use generally works best when it is self chosen or where the hardware or software available, facilitate joint effort.
- Consider whether small group rather than whole class sessions might better facilitate involvement and increase perceptions of play.
- If you don't do so already, consider integrating writing and typing activities (commonly described as being less like play) into provision via engaging computer games or by allowing choice as to whether or not to use word-processing packages.

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Appendices

I. School consent form

II. Class teacher consent form

III. Parental consent form

Appendices (i) Consent letter for schools

I have recently been contacted by a group of researchers from Swansea University and the University of Glamorgan about a CfBT funded project they are running entitled Integrating ICT into Play Based Curricula in the Early Years.

Considering the emphasis placed on play within the new Foundation Phase curriculum for young children in Wales, I understand that the aims of the project are to establish:

- Are certain types of computer use more effective in motivating and engaging children?
- Are certain types of computer use considered more playful by children?
- What is the relationship between playfulness, motivation and engagement?
- What are the implications of these findings for classroom practice on the ground?
- In what ways can children's motivation and engagement with computers be enhanced by maximising playfulness?

The team have asked if our school will participate in the project. Participation would include an interview with a Foundation Phase class teacher, a short general observation of classroom practice, video recording children engaged with computers throughout the school day and a discussion with children about their views on using computers in the classroom.

If I agree to participation I understand consent will be gained from individual teachers, parents and children. Participant identity will be protected and all data will remain confidential. I understand that visits will be by prior appointment at times convenient to us and that all researchers visiting the school have full CRB clearance.

I _____ (headteacher) of _____school

agree / do not agree to take part in the project entitled Integrating ICT within Play Based

Curricula in the Early Years.

Date:_____ Signature: _____

**Please retain a copy of this form for your own records and return one copy to the researcher at the following address: Laura Rees Davies, Department of Psychology, Humanities and Social Science, University of Glamorgan, Pontypridd, CF37 1DL.*

Appendices (ii) Consent letter / information sheet for teachers

Dear Classteacher,

Your school has agreed to participate in an exciting research project entitled Integrating ICT into Play Based Curricula in the Early Years. The project involves ten different schools in South Wales and is being co-ordinated by an experienced team from Swansea University and the University of Glamorgan.

Considering the emphasis placed on play within the new Foundation Phase curriculum for young children in Wales, the aims of the project are to establish:

- Are certain types of computer use more effective in motivating and engaging children?
- Are certain types of computer use considered more playful by children?
- What is the relationship between playfulness, motivation and engagement?
- What are the implications of these findings for classroom practice?
- In what ways can children's motivation and engagement with computers be enhanced by maximising playfulness?

Talking to you about the way you use computers in your classroom and doing a brief observation of computer use in your class is a vital part of our project and we would really value your participation. We would like to interview all Foundation Phase teachers in the twelve schools that are taking part in the project and spend a short time observing the day to day running of the classroom to determine the variety of ways that computers are being used.

Once we have ideas about these different types of computer use we will then return to the class to video record children working in different ways on the computer and to talk to children in small groups about using computers in school.

The data will only be seen by the researcher team and will be stored securely at all times. The researcher does not need to identify any participant (teacher or child) throughout the whole process.

We very much hope you feel able to take part. If you would like further information before making a decision then please contact Laura Rees Davies, the lead researcher on lreesdav@glam.ac.uk or Dr. Justine Howard, the project co-ordinator on j.l.howard@swansea.ac.uk.

I have read the information above and agree / do not agree to take part in the research project.

Signed:_____(classteacher)

School:_____

Date:_____

**Please return this form to the researcher by (INSERT DATE HERE)*

Appendices (iii) Consent letter / information sheet for parents

Dear Parent / Guardian,

Your child's school is participating in an exciting research project called Integrating ICT into Play Based Curricula in the Early Years. The project involves ten different schools in South Wales and is being co-ordinated by an experienced team from Swansea University and the University of Glamorgan.

Considering the emphasis placed on play within the new Foundation Phase curriculum for young children in Wales, the aims of the project are to establish:

- Are certain types of computer use more effective in motivating and engaging children?
- Are certain types of computer use considered more playful by children?
- What is the relationship between playfulness, motivation and engagement?
- What are the implications of these findings for classroom practice?
- In what ways can children's motivation and engagement with computers be enhanced by maximising playfulness?

Observing children using the computer and asking the children's own opinions of how computers are used in their classroom are an important part of this project. They are the best people to tell us about what works and what doesn't work. The researchers would therefore like to video the children in your child's class whilst they use the computer and also talk to them in small groups about the kinds of things they like or don't like about using the computer whilst at school. Individual children are not being observed, the research is only looking at the general behaviour and opinions of the children.

The observations are of the children's normal daily activities and as such, your child's education will not be at all affected regardless of whether or not you choose for them to participate. The data will only be seen by the researcher team and will be stored securely at all times. The researcher does not need to identify any child throughout the whole process. You have the option for your child to withdraw from the study at any point and if for any reason you choose to do this, all data relating to your child will not be used.

If you would like further information before making a decision then please contact Laura Rees Davies, the lead researcher on lreesdav@glam.ac.uk or Dr. Justine Howard, the project co-ordinator on j.l.howard@swansea.ac.uk.

I have read the information above and agree / do not agree to my

child_____(child's name) taking part in the research project.

Signed:_____(parent/guardian)

Date:_____

**Please return this form to your child's class teacher by (INSERT DATE HERE)*

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