ICT IN THE EARLY YEARS : BALANCING THE RISKS AND BENEFITS

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The concern for introduction of ICT for education in early childhood years is centered on the relationship of ICT use in the early years to the cognitive, emotional and social development of young children and their developmental needs. The paper discusses various aspects of the ongoing debate around ICT usage in the early years and tries to answer some of the relevant issues namely, the rationale for early introduction of ICT; the perceived risks and benefits involved in its usage; and fostering developmentally appropriate application of ICT in the early childhood classroom,

INTRODUCTION

In today's world, ICT is a ubiquitous component of our life. Most of the things we use incorporate ICT. What is ICT? Simply put, it stands for *Information* and *Communication Technologies*. It can be defined as "anything which allows us to get information, to communicate with each other, or to have an effect on the environment using electronic or digital equipment" (Siraj-Blatchford & Siraj-Blatchford, 2003). Today ICT and "e-learning" have become important concepts in primary, secondary, and tertiary education. In the context of early childhood education (ECE), ICT could include different types of hardware and software (Bolstad, 2004). ICT includes computers (including desktop, laptop, and handheld computers); digital cameras and digital video cameras; creativity and communication software and tools; the Internet; telephones, fax machines, mobile telephones, tape recorders; interactive stories, simulated environments, and computer games; programmable toys and "control" technologies; videoconferencing technologies and closed-circuit television; data projectors, electronic whiteboards, and more.

SIGNIFICANCE OF ICT IN EARLY CHILDHOOD EDUCATION

The early childhood education sector encompasses young children, practitioners and parents or other people connected to the early childhood setting. There are three reasons why ICT matters in early childhood education. The *first* reason pertains to the pervasive quality of ICT by virtue of which it has an effect on the people (family members, caregivers and early childhood educators) and environments (physical and social) that surround young children's learning. *Second*, ICT technologies present novel opportunities to strengthen many aspects of early childhood education practice such as children's learning and play experiences, practitioners' professional learning and development and relationships and communication between early childhood centers, parents, and other people. *Third*, there is global support and interest across the whole education sector for the development and integration of ICT into education policy, curriculum, and practice. Children today live in a communication-rich environment. The models of communication they encounter in their everyday lives include…a whole range of electronic and digital methods of communication… (Siraj-Blatchford & Siraj-Blatchford 2003). Children's early literacy and play experiences are shaped increasingly by electronic media (Luke 1999). So, in order to empower children and assist them in becoming competent and active participants in their environments, they must be given opportunities to develop "technological literacy", a new form of literacy, which is increasingly considered to represent an essential curriculum entitlement in any broad and balanced curriculum for the 21st century. Today there is a significant amount of support and interest in the education sector for the development and integration of ICT into policy, curriculum, and practice. Some consider that just as it is every child's right to become literate, he or she should enjoy the right to become a skilful user of ICT. Others believe that children should be given opportunities to experience ICT as a tool with vast possibilities for communication and information retrieval/sharing. The UK Foundation Stage (3 to 5 years) curriculum states that as part of their early childhood education, children should find out about and

identify the uses of everyday technology, and that children should have opportunities to use ICT to support their learning (BECTA 2004).

In most countries, policy and curriculum support for the development of ICT in the early childhood education sector is weak. However in some countries such as the UK, early childhood education may actually be leading the way in developing best practice in the use of ICT to support positive learning experiences for children. Similarly, Scotland has recently developed ICT strategies for the early childhood education sector (Learning and Teaching Scotland 2003). Researchers, academics, and practitioners in early childhood education have also published books, articles, and guidelines which provide information and guidance about ICT in early childhood, and aim to support early childhood education practitioners to make well-informed decisions and choices about ICT (NAEYC 1996; Siraj-Blatchford & Siraj-Blatchford 2003). In order to guide future development and policy-making, it is essential to critically examine the role and potential of ICT in early childhood education. The introduction and use of ICT in this sector should take into account the existing knowledge about early childhood learning and development. Technology on its own should never drive the process of ICT development in the early childhood education sector. Rather, all planning for the introduction and use of ICT by children and adults in early childhood education should be based on a clear understanding of the purposes, practices, and social context of early childhood education (O'Rourke & Harrison 2004).

ICT IN THE EARLY YEARS: THE ONGOING DEBATE
The debate on making ICT an integral component of early childhood education has resulted in polarization of opinions. One group advocates the introduction of ICT in early childhood years on the premise that it facilitates learning and development. The other group rejects it on the principle that ICT in early years impedes it.

Perceived Risks of ICT usage in Early Years
The increasing pervasiveness of ICT has led some parents, teachers, and children's advocates to question its relationship to the cognitive, emotional, social, and developmental needs of young children. More often than not, the argument is focused on young children's use of computers and computer games and questions are raised on two accounts. Damaging effects of ICT tools on young children are : *Harmful physical effects of prolonged computer use by children; *Negative effects on children's social development (such as promote anti-social behaviour like isolation or aggressive behaviour); and *Developmental concerns (such as computer use can interfere with children's cognitive development). Specific concerns about the potential harm ICT tools can cause are: *Exposure to unsuitable content (such as material of a sexual or violent nature, or containing inappropriate gender, cultural, or social stereotypes); and *Computer use may displace other important learning and play activities. Some researchers condemn introduction of ICT in the early years on the premise that it is damaging to the development of children in all aspects – physical, cognitive, social, and emotional. Most research on ICT and its impact on young children have focused on the use of computers by them. An argument opposing early introduction of ICT is that as children learn through their bodies, computers are not developmentally appropriate (Haugland 2000). As a screen-based medium, activities at the computer are not as effective as manipulatives in developing understanding and skills in the early years (Yelland 1999).

Hohmann (1998) stated that, except for the coordination involved in using a mouse, computers do not support the development of motor activities or motor skills development. He goes on to assert that, although touch typing is a motor skill that can be learned with the help of a computer, it is inappropriate for most children to begin this before they are about 7 or 8. Critical about computer-use in early childhood years, Elkind (1996) stated that computer proficiency does not mean cognitive development, the latter requiring evidence of the development of an underlying concept. He points to the difference between knowing how to use the internet and learning something from it. Healey (1998) cautioned that

use of computers is damaging to young children's development as well as their learning. Stating that young children need human support and verbal interaction, she concluded that as computers fail to offer intersensory experiences to enhance learning, they are inappropriate as an educational resource for children below the age of about 7 years as using computers before the age of 7 'subtracts from important developmental tasks'. Fomichova & Fomichov (2000) added another dimension to this debate by suggesting that children in economically developed countries spend so many hours alone in front of the computer that a new non-nuclear family system of parents, children and computer has emerged. They refer to the computer as 'intrusion' into the educational system, children's cognition and the family. Yet others believe that computer use might foster learning in a negative sense. For example, solitary game play on computers could lead to children's isolation from social interaction in learning and play, or that violence in computer games could encourage aggressive behaviour. A common concern expressed by most critics is that ICT might displace other important learning and play activities. In fact, Cordes & Miller *(2000)* call for an immediate moratorium on the further introduction of computers in early childhood, except for special cases of students with disabilities. They take the view that children's use of computers should be sidelined in favour of other kinds of learning and play activities. They argue that computer use in early childhood education should be abandoned in favour of the essentials of a healthy childhood. Other concerns surround the health and safety issues of computer use for young children, research-based evidence

about which is inadequate. For instance, there is not enough information on whether or not the radiation emitted by wireless ICT technologies could have harmful health effects for adults and children. There are also concerns about the physical effects of prolonged exposure to ICT, such as repetitive strain injuries, addiction and sedentary lifestyles. The BECT(2001) information leaflet on keyboard skills in schools states that for children with years of typing ahead of them, using the keyboard with index fingers only is highly risky, especially when there may be added strain from playing games on home computers. Moreover, little is known about the possible addictive nature of the internet and computer games on young children, as available information so far is limited to only older children.

PERCEIVED BENEFITS OF ICT IN EARLY YEARS

Many early childhood educationists criticise and reject the *Fool's Gold* critical approach. Some authors point out that similar concerns about harmful cognitive, emotional, physical, and social effects on children have accompanied the emergence of every new technology from the advent of alphabetic print, to the proliferation of film, television, and video games (Linderoth, Lantz-Andersson & Lindstrom 2002; Luke 1999). Computers can play a role in young children's early childhood education experiences alongside many other kinds of activities – ICT should not be seen as a way of superseding or displacing these kinds of experiences. For example, ICT use should not be at the expense of outdoor or indoor experiences which promote development of gross motor skills through running, climbing, jumping, swinging, and using wheeled toys (Siraj-Blatchford & Siraj-Blatchford 2003). Researchers caution that computer use should not be seen as a stand-alone activity, but should be integrated into other planned and spontaneous learning and play activities within the early childhood education classroom. Liang & Johnson (1999) described ways in which computers can be used in activities they label as investigative play, functional play, games with rules, pretend play and constructive play. Using ICT in the early years can foster development of communication skills among young children. Van Scoter & Boss (2002) have illustrated many ways in which ICT can make rich contributions to children's literacy development, in the four interrelated areas of speaking, listening, reading, and writing. For example they have discussed how "talking" word processors support young children's experimentation as they play with language. They highlight that these tools offer possibilities for children to compose and write without needing to have mastered the production of letters by hand. They also suggest using computers and printers to help children make signs, banners, and other props for pretend play, all of which will add interest and basic literacy skills to children's play and decisions involved in making them will give children opportunities to use language. Moreover, this whole exercise of preparing and displaying printed products will create an atmosphere for children where print has direct relevance to their lives. Technology when used

thoughtfully and innovatively can help children express themselves, verbally, visually, and emotionally. ICT provides a variety of ways for children to weave together words, pictures, and sounds, thereby providing a range of ways for children to communicate their ideas, thoughts, and feelings. ICT can support writing for young children as well as reading or pre-reading skills. ICT can hone children's storytelling skills such as even children who are not yet writing could dictate words to go with their pictures, or they could record their voices telling the story, or be videotaped as they tell the story and show the picture. Some studies have shown that ICT use in the early years do have the potential of fostering development of social skills in young children by providing a forum for collaboration, co-operation, and positive learning experiences between children, or between children and adults. This however requires that the practitioners must be conscious of the kinds of learning interactions they would like to induce in the context of ICT use and adopt suitable teaching methods to support these. Other studies suggest that ICT use facilitates social development also by encouraging communication between children, turntaking and collaborative problem solving. However there are only a few good, recent studies available to substantiate this for pre-school children in particular. Nevertheless, sitting with others using a computer, talking and sometimes enjoying an animation together are positive social experiences for the children. Regarding effects of ICT on learning, Haugland (1992) offered evidence that children who had experience of computer use made developmental gains in non-verbal skills, structural knowledge, long-term memory, manual dexterity, verbal skills, problem solving, abstraction and conceptual skills. Also, some research using case studies have shown that ICT can be used to support aspects of learning including language development and mathematical thinking. Lewin (2000) explored the effects of talking books software in UK primary classrooms (focusing on 5- and 6-year-olds) and concluded that electronic books can complement teaching in infant classrooms, having a positive effect on cognitive and affective outcomes.

EFFECTIVE APPLICATION OF ICT IN EARLY CHILDHOOD EDUCATION

For using ICT in early childhood education effectively, it is essential to pay attention to three important elements – health and safety issues, quality of learning environment and developmental appropriateness of ICT.

Health and Safety Issues

This can be ensured by paying attention to children's physical and ergonomic safety; prevention from exposure to inappropriate content (e.g. games or Internet-based material of a violent or sexual nature, or containing undesirable gender or cultural stereotypes) and protection of children's privacy (e.g. in online environments, or when information is published on the Internet). A cautious approach is necessary and the practitioners and children need to become well informed about safe and appropriate ways to work with computers. These health and safety issues must be an integral component of the early childhood practice and policy and "general health awareness relating to ICT and computer use should form part of children's learning about ICT, and should certainly form part of any setting's health and safety policy" (Siraj-Blatchford and Siraj-Blatchford 2003). They recommend that children's use of computers should occur in relatively short spells, usually no more than 10 to 20 minutes for 3-year-olds, extending to no more than 40 minutes by the age of 8.

Quality of Learning Environment

The physical and technical arrangements such as enhancing children's access to computers and other ICT, placement of computers in the room and type of software available determine the quality of learning environment. It also means taking care of the educational and social features of the learning environment such as nature and quality of children's interactions with, and in the context of, the computer, role of adults in supporting and encouraging children's ICT use, degree to which ICT-related activities connect with other activities in the centre and also the practitioner's broader learning goals. Also important is the careful choice of software for using with children as only good software can allow children to engage in self-directed exploration, and can be tailored to children's individual needs.

Developmentally Appropriateness of ICT

The use of ICT in the early years has the potential to enhance educational opportunities for young children. If applied in a developmentally appropriate manner, it can encourage purposeful and exploratory play, discussion, creativity, problem solving, risk taking and flexible thinking. Appropriate use of ICT tools depends on not just the skill and knowledge of the early childhood practitioner but also the "developmental appropriateness" of the technologies for the children in question. Developmental appropriateness forms a guiding principle in much of the literature on ICT in early childhood education. Two widely-cited sets of guidelines strongly emphasise developmental appropriateness: the DATEC (developmentally appropriate technology in early childhood) project in the UK (Siraj-Blatchford & Siraj-Blatchford 2002; Siraj-Blatchford & Whitebread 2003); and the American National Association for the Education of Young Children's position statement on the use of technology with children aged 3 to 8 (NAEYC 1996). DATEC offers eight general principles for determining the appropriateness of ICT applications to be used in the early years: *Allow child to be in control;*Avoid applications that contain violence or stereotyping;*Be Aware of health and safety issues;*Choose applications that are transparent and intuitive;*Ensure an educational purpose;*Encourage collaboration; *Encourage educational involvement of parents; * and Integrate with other aspects of the curriculum.

CONCLUSION

The debate regarding ICT use in early years remains unresolved as indicated by a Scottish literature review of ICT in early childhood education that suggested a "scarcity of good quality research findings on using ICT in educational settings for pre-school children" (Stephen & Plowman 2002). In the end, it cannot be stated in absolute terms that early introduction of ICT is beneficial or harmful to young children for 'there are far more questions than there are answers about what computer and video games and internet use mean to the social, intellectual and physical development of children today' (Wartella, O'Keefe & Scantlin 2000). Nevertheless it can be stated safely that, with due safeguards in place and ensuring developmental appropriateness, ICT in early childhood education can effectively support and enhance children's learning and play experiences although all of this does demand that "practitioners are well trained and skilled in the appropriate uses of ICT with young children" (Siraj-Blatchford & Whitebread 2003).

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