

Discussion Paper

Information and Communication Technologies (ICT) in the Early Years

*The connections between
early childhood principles,
beliefs about children's learning,
and the influences of
information and communication technologies*

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This discussion paper is a result of several professional dialogues taking place within the South Australian early childhood education arena. The development of the South Australian Curriculum, Standards and Accountability (SACSA) Framework, and initiatives of the DECS Curriculum Policy and Strategic Development Directorates have prompted discussion amongst early childhood educators about the 'place' of *information and communication technologies* * in supporting children's learning in the *Early Years***.

The Junior Primary Principals Association and Preschool Directors Association have also been involved in describing local practice and exploring national research, with a view to establishing common ground from which both practitioners and policy makers can move forward. A *Learning Technologies and the Early Years Think Tank* was held in October 2000, to share information, access and respond to current national research and contribute to the development of future strategic directions.

The purpose of this discussion paper is to draw together underlying beliefs about how children express themselves, make sense of their world and learn, and the rich opportunities that engagement with a range of information and communication technologies presents. The comments and suggested learning technology applications were generated from practitioners attending the Think Tank, and are not seen as a definitive list, but rather as starting points for ongoing collaborative dialogue and action.

Many of the original recommendations resulting from this Think Tank have been implemented, however possible future directions are suggested at the end of this Paper.

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- ***Information and Communication Technologies (ICT)***, rather than Learning Technologies (LT), Information Technology (IT) or Digital Resources (DR), **ICT** is the preferred terminology used throughout the discussion paper.
 - The ***SACSA Framework*** describes Information and Communication Technologies in terms of learners developing and using operational skills to critically design and construct texts, search for and sort information, and communicate with others.

****Early Years** generally refers to children from birth to age eight, and the community of educators and various sites associated with the care and education of this age group. For the purposes of this paper, children in the age range of 3 to 8 years are the focus group.

Children are active and interactive learners

As individuals and members of various groups, children bring a vast range of experiences, knowledge and skills to the learning setting and context. Through making decisions about how and when to use information and communication technologies, and accessing the most applicable tools to explore and represent their learning, children are empowered and valued as co-constructors of meaning and knowledge.

Insights from research

In their paper *Effective learning environments for young children using digital resources: An Australian perspective (2000)*, Downes, Beecher and Arthur make reference to their 1999 study which offers advice regarding the key requirements of educators for the organization of online resources for children birth to eight years. Open-ended, digital resources that promote communication, interaction, discovery and problem solving were categorised into four main types:

- **Design and make resources** – where children can design, draw, paint, create, make, build or construct artefacts such as patterns, pictures, scenes, written texts, galleries, cards, slide shows, music
- **Work and play resources** - where children can play, explore, investigate, look things up, solve problems, and do puzzles
- **Communicate and share resources** - where children can talk, send messages, join in a group discussion, display products of their work and play
- **Online project resources** - where children work collaboratively on agreed tasks on- and off- line with children in other locations.

“Experiences that challenge children to develop new concepts and processes, especially when scaffolded by an adult or peers, are highly appropriate for young children’s development whether they be with manipulatives or symbolic media based on print or digital technologies” (pp.6-7)

Comments and observations from practitioners

As they enter centres and schools, many children are bringing a high level of confidence and understanding about information and communication technologies, because they have been interacting with and immersed in them, since birth. Investigating understandings about the changing contexts of childhood has the capacity to revolutionise the way educators think about knowledge as they critically reflect on what and how children are learning. While some practitioners describe this in terms of changes in power relationships between teacher and learner, all acknowledge that meaningful connections must be made between children’s prior experiences and subsequent learning, to ensure that learning is relevant and continuous.

Information and communication technologies have the potential to provide “rich and alive” tools/mediums (ie attractive, motivating, interactive, positive) for children to engage with learning. The quality technology and programs are multi-sensory, with built-in feedback about success and offer the means to record and reflect on tasks. They support and enhance learning that is child initiated, involves choice, decision-making and problem solving and is fun.

The use of information and communication technologies has enhanced children's confidence – their interest means they will take risks and have a go. The development of social skills is assisted as children interact and learn from each other.

Some applications could include:

- Using a digital camera to capture the moment, instantly record a task, and access immediately for sharing with families (either online or as printed copy)
- Using PowerPoint to create an Electronic Book about each child in the class
- Creating and sharing a Digital Story about a group/class activity (using digital camera and PowerPoint or web publishing)
- Using video production to explore thinking, planning, communication and media presentation processes with children
- Using sound pads and concept keyboards
- Using the Internet and email to expand children's cultural understandings and engage in real time communication with resource people and information sources
- Using the scanner to use children's own resources (eg. photos from home).

Children's learning is non-linear and integrated. Early childhood education focusses on the development of dispositions for learning, as well as knowledge, skills and understandings.

Information and communication technologies do not represent a new world, or the future for children, but the reality of their world now. Therefore it is important that educators are thinking about whose world view, needs, agendas, values, attitudes and prior learnings are being fore-grounded through programs and experiences. Constructivist teaching and learning approaches which actively engage children in constructing knowledge and understandings in supportive learning environments, can foster the development of enabling dispositions for learning eg; curiosity, creativity, concentration, persistence and enthusiasm.

"...The commitment to children's learning with literacy, numeracy and ICTs recognises that their knowledge, skills and dispositions in these areas enable them to make meaning of their world and communicate their understanding to others. This learning is an aspect of the Essential Learning of Communication. The development of these skills and understandings is influenced by the contexts in which they are used, the role of the adults working with children, the intended purposes and the available technologies. The social and cultural contexts within which these understandings are developed play an important role in the way they are taken up in early childhood settings. The diversity of home languages (eg the strengths that multilingual contexts provide, and valuing the funds of knowledge that children bring from diverse cultural and socio-economic backgrounds) is recognised as a fundamental aspect for developing continuity. Facilitating ongoing learning and success in these critically important aspects of the child's world is enhanced through opportunities and experiences in multiliteracies and ICTs."

(SACSA Framework Early Years Band Introduction (p.9))

Insights from research

In her article *Pedagogical Issues and Computer Supported Learning in Early Childhood*, Alison Elliott (University of Western Sydney) discusses the active role educators play in planning for and scaffolding children's learning in sociocultural contexts. Facilitating metacognitive support involves guiding children in problem and goal identification, forward planning, revising, evaluating and checking outcomes.

"Essentially, according to a sociocultural perspective on early learning, it is the interactivity of the environment and guidance by more expert collaborators that promotes thinking that is conceptually rich, and coherently organised (Rogoff 1990). The mere application of a particular combination of information technologies, no matter how sophisticated, is unlikely to improve thinking and problem-solving skills, especially in the case of young children. ...

There is still much to learn about how young children structure learning in computer environments with and without teacher support. What is apparent though is that computer-supported learning environments offer a range of individualised, yet interactive opportunities not previously available in early childhood classrooms." (Elliott)

Comments and observations from practitioners

Information and communication technologies, such as video, digital cameras, and screen grabs provide a means for educators to creatively capture, record and share that "moment" of the child's learning, discovery and excitement in unique and innovative ways. Because children's engagement is high, the impact of the 'teachable moment' is increased (ie the child's readiness to learn a just-in-time skill is high).

Early childhood pedagogy is changing and the way practitioners plan for children's learning needs to be reflective, responsive, adaptable and flexible.

Some applications could include:

- Investing in quality interactive software that enables input and choice by the user, and allows for multiple entry points depending upon individual/group familiarity, progression and interests
- Acknowledging that many children know how to use computers in quite complex ways and setting up routines and structures that enable them to teach others (and us)
- Arranging hardware/equipment to encourage collaboration as children work together/talk together to share their enjoyment, to solve an issue, to make decisions.
- Using computers where relevant to the program, not separate from program and planning for their use as you would with any resource
- Seeking out learning programs that are informed by a range of disciplines and that assist children in expanding their means of finding and using information
- Using *Kidspiration / Inspiration* to storyboard, develop concept maps and brainstorm ideas and develop plans around particular topics
- Exploration of online texts in collaboration with adults and peers.

Much of children's learning takes place through play and exploration of the world around them.

Early childhood educators actively enhance children's learning, by not only providing balanced and purposeful learning experiences and environments, but also by responding to and engaging with children and their learning. When children are encouraged and supported to explore, manipulate, play and interact with concrete materials and imaginative scenarios, they are learning to test and extend their ideas and concepts about the world. For young children "virtual experience" will not replace authentic learning that occurs in "real time" and through self initiated situations, where the child can begin to understand cause and effect relationships and develop a sense of autonomy and agency. Therefore, the use of a range of information and communication technologies is most appropriately viewed as one component of high quality early childhood learning programs and environments.

Aligned with the need for selective and appropriate use of information and communication technologies, many early childhood educators share concerns about children accessing computers and the Internet for long periods and to the exclusion of other experiences. Research and information about the potential physiological risks, developmental delays and cognitive and emotional inhibitors that may be associated with young children's inappropriate use of ICTs, cannot be ignored. Such risks may involve musculoskeletal injuries, visual strain, poor concentration, obesity, limited creative and imaginative expression, exposure to violence and reduced opportunities for language development and social interactions.

Insights from research

Issues about the place and purpose of information and communication technologies in early childhood education are being surfaced and investigated by various commentators and researchers. Differing opinions seem to arise in the understandings and possibilities surrounding the use of 'broadly based' learning technologies/digital resources in ways that are congruent with early childhood beliefs about children's learning and the potential harm of inappropriately using online curriculum /commercially produced software.

The authors of the *Appropriate EdNA services for children eight years and younger report (1999)*, note the high incidence of computers, use of information technology and Internet access in Australian households with children below the age of 9 years.

"This report takes as given the belief that all young children need to express themselves and make sense of their world with digital media, artefacts and tools just as they do with traditional media (paper and sand), artefacts (paintings and constructions) and tools (brushes and spades). To deny some children access to the wide range of media, artefacts, and tools that are common place in the worlds in which they live is to perpetuate social and educational inequities. Traditional "print" media, artefacts and tools are considered not only appropriate but essential components of the early childhood setting, they are the primary resources for leading the young child into a world of ideas, symbols and representations. In today's early childhood settings, digital media, artefacts and tools are also essential. These digital resources offer children other ways to play, to interact with other children and adults, to control their environments and solve problems, to be creative and to represent their ideas with words, sounds and images."

This same excerpt is cited by David McRae in his Curriculum Corporation commissioned report *What to make, and why; Principles for the design and development of online curriculum content (2001)*, as he advises caution about introducing computer-based learning into Preschools and the first years of school. He recommends that the developmental needs of young learners (eg whole-body movement, sensory interaction, focus on language, development of personal agency and the importance of relationships) take precedence in structuring effective early learning programmes.

This view, along with warnings associated with increases in obesity, threats to eyesight etc., pre-suppose that early childhood educators will disregard well established early childhood learning principles and implement inappropriate didactic, technology-driven and isolating teaching and learning practices in response to the digital age.

Current case studies and action research, such as the *Children of the new millennium* ICT research project, refute this view. Through the investigation of home-school connections, and the social construction of children's lives inclusive of a wide range of technologies, the cultural and critical aspects of learning are being interrogated and built upon.

The emerging literature and research about the 'place' of ICTs and young children's learning reveals consensus about the importance of balance and the need for further Australian based research into issues to do with information and communication technologies and the early years.

Comments and observations from practitioners

Children's learning occurs most effectively within trusting and respectful relationships and supportive learning environments, where they feel safe, participate, take risks and succeed. The role of the early childhood educator as an active and supportive, but not dominating, partner in learning, emphasises the importance of the processes of learning as children explore and make meaning of their world.

As part of establishing safe learning environments, practitioners need to consider safety issues and promote balanced, thoughtful use of information and communication technologies. The appropriateness of experiences, as well as the emerging physiological (eg development of vision and fine motor control) and neurological (eg development of abstract thought) implications must continue to be investigated and responsibly acted upon.

Some applications could include:

- Establishing safe-guards for children using technology, e.g., Internet (bookmarks, language, critical use, related links) and acceptable use policies (AUP) in collaboration with families
- Facilitating the development of integrated learning communities, which allow for learning to occur in-class ⇒ out of class, on-site ⇒ off site, at site ⇒ at home and enable learning to be initiated by the child, family, staff, and/or wider community
- Using multimedia programs that enable learners to explore, create, problem solve, experience challenge and have fun

- Ensuring that children have opportunities to explore and play with information and communication technologies for their own purposes
- Enhancing developmental and role play through access to a range of technologies such as OHP, digital cameras, sound recorders and players, tinkering tables, computers, laser measurers, calculators, play phones/keyboards, photocopier, phone, fax, email, mobile phone, microscope, microphones, domestic technology, eg. toasters, ovens, sewing machine.

The emergence and development of literacy and numeracy in the early years is influenced by information and communication technologies.

Information and communication technologies can play an important role in developing literacy and numeracy, by providing new strategies for learning and at the same time offering new concepts to learn. They provide opportunities for educators to reflect on and reconceptualise their understandings of literacy and numeracy particularly in relation to ways of accessing and representing information.

Through using information and communication technologies, the potential for critical literacy and numeracy is high. As learners can easily access so much diverse information it is vital that educators promote critical strategies that keep asking; “Whose view/statistics/data does this represent? What other views/statistics/data are available on the same topic? How do they compare?”

Insights from research

In her chapter entitled, *Reconceptualising Schooling with Technology for the 21st Century: Images and Reflections* (1999), Nicola Yelland (QUT) recounts her discussions with year five learners in a New York classroom.

“The students not only engaged in debates about the relative merits of the Internet, but they also discussed the way in which women are portrayed in the media, how advertisers target their campaigns to decide how they, the students, should spend their money, the ways in which products are marketed after a blockbuster film to saturate the market and make huge profits, the notion of web TV, the glorification/presentation of violence on TV, film and video games, children’s programs on television, and many other such issues. What is important here is that these students were becoming media literate in the process. They were not accepting that the various manifestations of technology were good per se; they were using, evaluating and often critical of the impact on their lives. They were developing strategies to help them decide which form of technology was appropriate for the task they were in the process of doing. They were not simply accepting that it was inevitable or good that they should use technology.... it has been said that we live in an era of data Smog (Shenk, 1997). Skills in the location of information that is useful are becoming very important as are the skills of deciding which parts of the information are useful.” (Pp55-56)

Comments and observations from practitioners

Information and communication technologies provide a variety of ways for children to further develop specific aspects of literacy and numeracy such as reading, writing, spelling, viewing, speaking, listening, editing and proof reading skills and graphing, setting up tables, exploring reflections, translations and rotation, visually representing patterns, accessing a variety of mathematical tools and connecting the concrete to the abstract.

Practitioners considered that there is high potential for enhancing children's literacy and numeracy through ICTs because:

- They can be open ended, relevant, supportive, purposeful and provide fast feedback – eg the use of email
- They present opportunities for new ways to communicate with the real world, alternate worlds and different world views for example through email and the Internet
- Children can experience success because of the range of opportunities for producing multi-modal presentations and products with relative ease
- Access to information for research is much broader and allows children to locate, sort and analyse print, visual and audio information
- They provide for extra time to engage in the learning, solve problems and/or practise skills, rather than spending time producing a product eg graphs, posters, books, tables
- New literacy and numeracy understandings are transferable to general learning activities
- The variety of software can be deliberately selected to target individual need
- There is the potential to keep electronic records of children's literacy and numeracy achievement describing the journey taken, the processes used and the distance travelled
- They are tools that can help children achieve "basic" literacy and numeracy skills. Once they are literate and numerate the potential of the use of learning technologies multiplies dramatically.

References

Effective learning environments for young children using digital resources: An Australian perspective (2000), Dr. Toni Downes, Bronwyn Beecher, Leonie Arthur, University of Western Sydney

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Appropriate EdNA services for children eight years and younger (1999), Dr. Toni Downes, Bronwyn Beecher, Leonie Arthur, Lynn Kemp, University of Western Sydney

What to make, and why; Principles for the design and development of online curriculum content (2001), David McRae, Curriculum Corporation

Reconceptualising Schooling with Technology for the 21st Century: Images and Reflections (1999), Nicola Yelland, *Information Technology In Childhood Education*

See page 11 for the collective views of the participants from the Think Tank suggest the following major areas require further development.

Information and Communication Technologies (ICT) in the Early Years

A strategy for the development of learning technologies with 4 - 8 year old children in South Australia

The collective views of the participants from the Think Tank suggest the following major areas require further development (NB the first three recommendations have been actioned)

1. Professional Development

- 1.1. The view is held that professional development remains the single largest barrier to the implement of the learning technologies in this age range.
- 1.2. **Master Classes** involving speakers such as Dr Nicola Yelland and Dr Toni Downes to further explore their views of young children using technology as a tool for their learning.
- 1.3. Additional courses developed by TSOE that focus specifically on the use of technology in the early years. Possibly the responsibility of a specific consultant.

2. Discussion paper

- 2.1 The personnel in the Early Years group develop a discussion paper for broader consultation. This paper would focus on the values of early childhood and develop the key ideas to show how ICTs can be incorporated to support student learning.

3. Early Years Discovery Network

- 3.1. Clearly it has been difficult to find a range of people who feel they have the expertise and confidence to share their current work. A different approach to this is suggested that nominates staff with a strong interest in further developing their skills and expertise.
- 3.2. These people would be pre school based personnel.
- 3.3. They would work with a mentor. The mentors could be drawn from the expertise that currently exists within the Learning Technologies Project. For example, former Discovery Network teachers or personnel from the Universities.
- 3.4. These people would share their practice at a local and cluster level.

4. Resources

- 4.1. Software remains a high priority for many sites. However, the needs between schools and pre schools differ considerably. This is an area that requires further discussion and investigation as to the specific needs of the two different areas.
- 4.2. Publication of suitable software and websites for easy access. This could be supported by a group of site based personnel looking closely at software already reviewed and checking this software for compatibility and suitability to South Australian standards and learning needs
- 4.3. Linking into and exploring other projects that already exist but personnel know very little to nothing about their existence. Publication of their existence and accessibility.
- 4.4. Laptops were highly featured in the responses received from participants. It is clear from the feedback that people believe Laptops will provide solutions to a number of

issues and their enthusiasm for the leasing option is strongly supported for accessibility, professional development, skills development and flexibility.

5. Research and Pedagogy

- 5.1. Locally-based practitioner research in the area of young children's learning with and through ICTs, in collaboration with Curriculum Policy, University and a range of early learning sectors needs to be initiated and supported – both as short term action research and longitudinal studies.
- 5.2. Curriculum policy directions, implementation and infrastructure support in the field of online learning needs to be determined on the basis of ongoing research and development.
- 5.3 Strategies need to be developed to ensure that South Australian innovative practice in the area of ICTs in the Early Years, is recognised and promoted nationally.