The changing face of children's play culture

Children's play, learning and communication in a technology driven world

November 2003

LEGO® learning institute
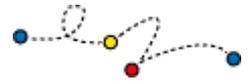
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Executive Summary

The way in which children and young people use different media has been changing for many years in step with the development of new interactive products, and today, interactive media are an integral part of children's everyday lives in large areas of the industrialised world. This development has occurred quickly, and we know relatively little about its importance to children's play, culture and learning. At first glance, it seems that we are observing a new form of childhood that in many ways fundamentally differs from the one children had just a generation ago. This is not surprising as we live in a world where changes are everyday events – not only as regards technology, but also in the context of social and cultural changes which effect children's daily lives.

Although many articles and books are published on the subject of children and digital media, little empirical research has been done on this subject. There is very little research into children's use of the Internet – other than quantitative studies – and almost no research has been conducted into the use of mobile phones and 'intelligent toys' by children. Most of the empirical research to date are studies of the amount of time children spend using interactive media, and studies of the influence of violent video games and other interactive media on children's social behaviour. (Wartella, Lee & Caplovitz, 2002). The lack of research is even more noticeable when it comes to children's play culture and associated learning, and only a negligible amount of research is based on the child's perspective.

In this study, we have attempted to look beyond the assumption that children use new digital media because they are taken in by the marketing of smart new gadgets and the promise of fashion and status, and we have tried to base our understanding on a belief that children start to use new media because they suit their current play environments better than traditional toys. That is not to say that fashion and status have no role to play for children. They do, but behind this lie other, equally important dimensions that can contribute to an understanding of the importance of the media in children's lives. In this regard, we chose to focus on the "child's perspective", in an attempt to view the use of the media in the light of what is important for children in their daily lives and *why* children start to use new media.

The study comprised of two parts - a qualitative empirical study involving interviews with children aged 8-14, and a review of the existing research in this area. The qualitative study was intended to build up knowledge about children's use of digital media, as a supplement to existing research. The interviews focused in particular on gaining insight into how children use different technologies; and more specifically, how they acquire knowledge about the products and how they communicate this knowledge to each other. The products discussed were PlayStation, Nintendo, Game Boy, mobile phones, and computers. The study was conducted by the Danish University of Education in summer 2003, on behalf of the LEGO Learning Institute.
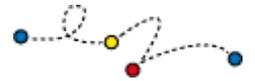
Much of the existing research on play culture and media has highlighted the connections between the use of media and the changes in children's everyday lives that have occurred over the past two decades. (Mouritsen (1996, 1998), Cosaro (1997), Sutton-Smith (1997), Jessen (1999, 2001) and Sørensen (2001, 2002). The changes that have taken place in society have had a considerable effect on children's lives and play culture, which in turn has influenced their use of new media.

Seen from the perspective of play, the most important change is the fact that large groups of children featuring a wide range of ages, as we traditionally saw in town streets and villages, no longer play the same role in children's lives. In many places in the industrialised world, groups of this kind are almost impossible to find outside institutions and other contexts organised by adults. Because of the weakening of the generation-to-generation play heritage, (when older children pass down their knowledge of games to younger children), children are increasingly drawing inspiration and finding tools for play elsewhere – in computer games, toys, video films and TV series, for example.

The new media and toys have become important to children because they stimulate the impulse to play. In a way, it could be said that they function as a "replacement" for the cultural heritage that was previously supplied by older children. This means that children today cannot do without toys and media when they play – alone or with other children. That is not to say that the media and toys repress traditional games and play culture, but rather that they move in and "fill in the gaps" to a greater or lesser extent. From the child's perspective, the main requirement of new media and digital toys is that they have to generate play and social interaction.

However, action games do not generate play in themselves. These tools are still dependent on an existing play culture that consists of both tools and skills in using them to create play. Children do not use interactive products simply because they are new or packed with technology. They prefer them to other toys and pastimes if they can fulfil their needs better. In relation to play culture, children primarily choose interactive products that can be assimilated into their networks with other children and provide the base for play or play interaction which leads to games. Products that can contribute to creating the right conditions for play – including digital communication media when used to contribute to social interaction – are much sought-after by children.

In the case of online games and chat, virtual environments enable young people to find friends online. They present a solution to the problem that arises when there is no group of other children to play with in the immediate physical surroundings. The virtual play environment is always available because it is independent of time and location. Virtual communication seems increasingly to be integrated into young peoples' lives (Jones, 2002) and the difference between physical and virtual contact is no longer always relevant. It is not necessarily a replacement for physical interaction, but rather a supplement to and extension of the children's existing social network.
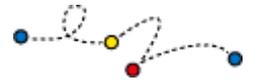
Contrary to popular belief, the increasing ownership and use of mobile phones by children is not based solely on a fashion trend. Mobile communication media facilitate the arrangement of meetings and this maintains an important tradition in children's play culture – that of spontaneous interaction. Children often use digital communication media to communicate with existing friends, while the virtual options may mean that the lifestyles of young children may come to resemble those of older children, who have greater opportunities to make new friends because they have greater freedom of movement (Bravo, 2002).

At present, it is difficult to predict the influence of new mobile technology and the potential to send and receive large volumes of data while 'on the move'. However, it is likely that games and play will take on an important role within this. Development in the use of the mobile phone shows that children are ready and willing to start using new technology, and a virtual, mobile play culture seems to suit the lifestyles of older children and young people. Whereas conventional toys are often bound by time and space and in some cases demand relatively long periods of concentrated input, many of the interactive media are distinguished by their independence of time and space and their suitability for use in short periods.

Although participation in the virtual and mobile play culture applies to only a relatively small number of children today, it is likely that it will spread to encompass more children as the barriers for access to this culture, both technologically and financially, diminish.
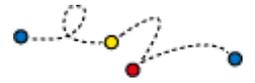
1. Background

The way in which children and young people use different media has been changing for many years in step with the development of new interactive products, and today, interactive media are an integral part of children's everyday lives in large areas of the industrialised world. This development has occurred quickly, and we know relatively little about its importance to children's play, culture and learning. At first glance, it seems that we are observing a new form of childhood that in many ways fundamentally differs from the one children had just a generation ago. This is not surprising as we live in a world where changes are everyday events – not only as regards technology, but also in the context of social and cultural changes which effect children's daily lives.

In a study that focuses on media and technology, there is good reason to highlight the social and cultural changes as it is all to easy to play down the fact that technology is just one of the many factors that influence the way in which children play and learn. If we fail to bear this in mind, we risk in many cases overestimating the importance of the digital and interactive media. In this study, every attempt was made to view interactive products as an integral part of children's lives. This means that we did not simply concentrate on identifying the effects or influences of the new technology on the way children play and learn, instead we tried to question *why* children start to use new media.

There is thus a world of difference between an understanding of media influence based on assumptions that children use new digital media because they are taken in by the marketing of smart new gadgets, or because the media products are linked to fashion and status, and an understanding based on a belief that children start to use new media because they suit their current play environments better than traditional toys, or because they provide the solution to some of the practical problems encountered by children. That is not to say that fashion and status have no role to play for children. They do, but behind this lie other, equally important dimensions that can contribute to an understanding of the importance of the media in children's lives. In this regard, we have focused on the "children's perspective", in an attempt to view the use of the media in the light of what is important for children in their daily lives.

Although many articles and books are published on the subject of children and digital media, little empirical research has been done on this subject. There is very little research into children's use of the Internet – other than quantitative studies – and almost no research has been conducted into the use of mobile phones and intelligent toys by children aged 7–14. Most of the empirical research to date are studies of the amount of time children spend using interactive media, and studies of the influence of violent content in video games and other interactive media on children's social behaviour. (Wartella, Lee & Caplovitz, 2002).

The lack of research is even more noticeable when it comes to children's play culture and associated learning, and only a negligible amount of research is based on the children's
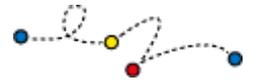
perspective. Nevertheless, in this report we have attempted to apply the knowledge that does exist. A relatively large amount of that research is devoted to computer games, due to the fact that these account for the majority of children's media consumption.

When you start to study the field of children and new media, it is not possible to avoid the fact that we are dealing with a phenomenon that is changing very rapidly. For example, a relatively short time ago, electronic communication was not a relevant aspect to include in such a study, but with the current extent of the Internet and WWW, this type of communication has now moved firmly into children's lives. Indeed, for an increasing number of children, it constitutes a central, invaluable part of everyday life. Similarly, just five years ago, factors such as mobile phones and SMS were still at best an exotic aspect of children's culture whereas today they have become "standard equipment" for children in a great many countries.

The numerous and rapid changes present a problem to researchers in that it is imperative not to be blinded by the media in their concrete form. As Wartella, O'Keefe & Scantlin note: "… the most important focus for researchers in the field is less on the technology platform, but on the kind of content that children experience". (Wartella, O'Keefe & Scantlin, 2000, p. 7). In our study, we have attempted to bear this in mind, well aware that we do not know what the future holds and can only relate to the existing media *per se*.

2. About the study

The study attempted to answer the following questions:
- What makes up a playful, rich, and interesting virtual learning environment for a child?
- What impact do specific technologies have on the way children play, learn and communicate?
- What animates or inhibits a child from freely exploring the play and learning possibilities of these technologies?
- Is there a relationship between a child's age and gender and their urge to interact with these technologies?
- Children grow up in an environment where access to knowledge is instantaneous and expanding, yet much of this knowledge is transient or quickly becomes obsolete. What impact does this ever-changing 'knowledge society' have on children's play culture and learning?
- What is the effect on play and learning of growing up in a world where knowledge is something children construct from many different media?

The report builds on a qualitative empirical study and a review of the existing research in this area. The study was conducted by Carsten Jessen PhD and Camilla Balslev Nielsen MSc from the Danish University of Education in summer 2003, on behalf of the LEGO Learning Institute.

The primary objective in conducting the field study was to build up knowledge about children's use of digital media as a supplement to existing research results. The study focused in particular on gaining insight into how children use different technologies; and more specifically, how they acquire knowledge about the products and how they communicate this knowledge to each other. The products discussed were PlayStation, Nintendo, Game Boy, mobile phones, and computers.

The survey was conducted with a group of 36 respondents aged 8–14 and drawn from two clubs and a recreation centre in the Copenhagen area. The respondents can be said to live in the type of modern environment that is typical of the development conditions experienced by children in the industrialised world. Children in Denmark largely have relatively easy access to digital and interactive media such as computers, the Internet and mobile phones. In fact, 75 per cent of Danish families with children had an Internet connection at home at the start of 2000 as compared to 52 per cent in the United States (Woodard & Gridina, 2000). There were approximately as many girls as boys in the group, and there were no special requirements regarding the children's technical skills.

Throughout the report, the expressions "interactive media" and "interactive products" are used almost synonymously and with a wide scope. "Interactive" in itself is not a well-defined concept in research, but in the context of this report it refers to electronic and digital products that allow users to interact and receive a response. There is still a good deal of debate on the subject of whether it is possible to refer to mobile phones and such products as "interactive" communication media, given that the "interaction" generally occurs through rather than with the product. Here, we have primarily chosen to use the expression "communication media" when it is necessary to differentiate from analogue media.

3. Changes in childhood

Children's play and culture have changed in recent years and this is often attributed to the influence of electronic and digital media. For example, Postmann (1984) agues that the media have drawn children away from communal play in the streets, Kline (1993) suggests that they are detrimental to the imagination and the ability to create personal games, and Lindstrom (2003) finds that they stifle children's creativity.

Childhood and children's culture are often romanticised (Sutton-Smith, 1997; Jenks, James and Prout, Cosaro, 1997), and there seems to be a general expectation that the numerous social, cultural and technological changes that the world is undergoing should have little or no effect on childhood. The changes in society do, however, have a considerable effect on children's lives and they affect children's play culture in fundamental areas, which are also of significance to their use of media. More recent research into play culture and media as expressed, for example in Mouritsen (1996, 1998), Cosaro (1997), Sutton-Smith (1997), Jessen (1999, 2001) and Sørensen (2001,

2002), highlight the connections between the use of media and the changes in the children's everyday lives that have occurred over the past two decades.

Play heritage

Seen from the perspective of play and play culture, the most important change is the fact that large groups of children featuring a wide range of ages (which we traditionally recognised from villages or streets in larger towns, for example) no longer play the same role in children's lives. In many places in the industrialised world, groups of this kind are almost impossible to find outside institutions and other contexts organised by adults.

Play culture previously	Play culture today
• children often in groups • few organised activities • good contact between young and older children • young children learned a wealth of games from older children • games often played outdoors • many games involving motion • playmates close to home • few yet well-defined social relationships	• families with fewer children • fewer groups of children • less free time for adults • more organised activities, more school • less contact between children of different ages • children together with those of the same age • children indoors more, play moved inside • playmates farther afield • daily lives distinguished by changing social relationships

These difference are not caused by the media but stem from a variety of other factors, including the demographical and social changes that have taken place in western society during the twentieth century. Families now tend to contain fewer children, which means that more and more children are growing up with fewer older siblings with whom to share their everyday lives. Similarly, the number of housewives has fallen drastically, resulting in a corresponding decline in the number of children who stay at home. Other causes include parents' unwillingness to leave children alone without supervision – particularly in large towns and cities.

Similarly, recreational institutions and sports clubs tend to organise children into groups according age, because older children do not need the same security and care as younger children. As a result, younger children tend to be involved in day-care arrangements with a higher child to adult ratio. It is also worth noting that pedagogical theories have had an effect on the dissolution of the large groups of children. In schools, children are put into classes according to their age because this approach is considered most conducive to learning.

Whatever the causes might be, children are spending more and more time with children their own age and adults, and less time in the company of children of different ages. In reality, this constitutes a radical break with cultural and historical norms of which we do not yet know the
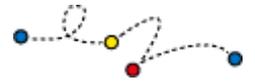
consequences. As far back in human history as we can trace, older children have had a central role in younger children's lives, and large groups of children have been significant for younger children to assimilate to the culture in which they are growing up.

Children's play is dependent on the cultural heritage handed down from one generation of children to the next. Because older children are not as present in the surroundings of younger children, the traditional cultural leaders are gone, taking with them much of the inspiration for play as well as important knowledge about how to organise a game. The cultural heritage that is handed down from older to younger children through the generations is thus weakened. This is the reason why it is less usual for us to find children playing the same games that we played when we were young.

However, this does not mean that children have stopped playing altogether, or that play culture is no longer passed on from generation to generation. Rather, children are now simply seeking inspiration elsewhere, and it is precisely here that the media come into the picture. The media and toys become important to children because they stimulate the impulse to play. In a way, it could be said that they function as a "replacement" for the cultural heritage that was previously supplied by other, older children. This means that children today cannot do without toys and media when they play – alone or with other children. That is not to say that the media and toys repress traditional games and play culture, but rather that they move in and "fill in the gaps" to a greater or lesser extent. Media and digital toys are often good play tools in that they inspire children to interact socially and play together.

Computer games as tools for play and social interaction

When it comes to computer games, boys often seem to enjoy action games with non-stop high-speed action on the screen. The games in this category, which have been on the market for more than 20 years, seem simple and repetitive, and many adults are principally struck by the violent elements to be found in many of them. However, computer games are, after all, still games, and should be compared with other games. For example, look at table tennis. It is fast moving and repetitive, but very few people play it simply to win or to beat others. People play because it is a fun way to spend time together. In other words, it is all about play. If you watch a group of boys playing a computer game, you will see that their interaction and behaviour are not all that different from those you will see around other games. The group closely follows the game and comments on its development and the performance of the player(s).

Children sometimes play computer games on their own – in the same way as they watch TV and read books on their own – as children often use media to pass the time when they are bored, just like adults. But there are very few children who would rather play computer games, watch TV or read books than spend time together with their friends and playmates. For children today, it is not a question of "either …, or …". Using media does not necessarily mean choosing to ignore friends – quite the opposite, in fact.
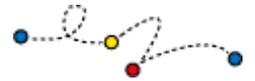
When boys play computer games it is typical for them to do so in a group, and unless the surrounding environment prevents it, this group will consist of boys of different ages – as is often the case in computer clubs or Internet cafés. A large part of the reason why these games are popular is the fact that interest in them gathers together boys of different ages. In this context, young boys have the opportunity to engage in dialogue with older boys.

In this regard, it is worth noting that the age aspect is not only based on cognitive differences between the boys. Young boys can play very complicated computer games that were originally designed for much older children and should thus exceed their cognitive abilities. However, as the boys consider it important to be part of the group, they develop the skills and knowledge necessary. Similarly, games intended for their own age groups can be considered "childish" and therefore of little or no interest.

The phenomenon of "the group around the computer" is also to be found centred around other media. Children arrange "video nights" where they get together to watch a stack of videos. They go to the cinema together, or they use TV programmes as the basis for games or as subject matter for conversations and social interaction.

The use of media does not hinder contact with other children; it is integrated into children's games and social interaction. As we have seen, the media often become the 'tools' for games and important for generating play situations.

'Culture Quality' and generating *play atmosphere*

Action games are a good example of a type of cultural quality that plays a major role in children's everyday lives. Evaluated on the basis of standard quality criteria, many action games fall short of the mark as they are repetitive and perhaps devoid of content. These games often lack the "good story" we usually associate with quality culture. It is not until they are evaluated according to a different set of criteria that their special qualities become apparent. One of these qualities is the ability to generate play or what can be called a play atmosphere.

From this perspective, action games resemble the traditional tools and games found within play culture. These include, for example, tools that give the body a special attitude (swinging, or simply turning around and around), tools that stimulate fear or laughter (ghost stories and jokes), excitement (games like "tag") or intense concentration on a task (construction toys). Because of the weakening of the generation-to-generation play heritage, children are increasingly drawing inspiration and finding tools elsewhere – in computer games, toys, video films and TV series, for example. The requirement of these products is that they have to generate play and social interaction.

These tools are still dependent on an existing play culture that consists of both tools and skills in using them to create play attitudes. Action games do not generate play in themselves. Children may soon find them boring if they play them alone, but when they are included in the social
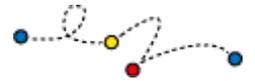
interaction of a group, they are excellent at laying foundations for play. If those involved in a social context of this kind do not know or understand the play culture in question, the games will seldom function as good tools. In terms of gender, most girls find it difficult to create play centred around action games, while in contrast, boys find it hard to establish play based on a Barbie doll.

Cultural and aesthetic products contain quality when they create, or contribute to creating, a play atmosphere. Good play tools must stimulate activity, social interaction and play, and the cultural challenge today has to do with creating toys and other play tools that children can use and develop in games, particularly because these tools must also fit in with the existing play culture to achieve success among children. The best play tools seem to be the ones that contain inspiration for play and promote an exchange.

Is the mobile phone detrimental to children's physical interaction?

The mobile phone is the latest digital medium to have found favour with children, and it is not just a play tool. Of course, children can play games on mobile phones and use them to exchange jokes and stories via SMS, but they also serve another purpose that can be traced back to the dissolution of large groups as the framework for children's social lives.

Until now, we have primarily viewed social interaction as simultaneous presence in the same physical area. Togetherness is all about being in the same place and being able to look one another in the eye. In this context, we often view the new communication media as disruptive and detrimental to close social relations, as these media distract and lead attention away from actual physical interaction. In fact, it is often claimed that the new media constitute one of the most significant reasons why children and young people today can only concentrate for very short periods. Children are described as "zappers" who focus briefly on one thing before turning their attention to something else. This is an obvious, but not necessarily correct, assumption based on a superficial interpretation of the behaviour patterns of children and young people.

A great many children and young people display particularly finely developed skills in creating continuity and coherence in their social relations precisely by using the new communication media. The mobile phone is the best example, because it allows children and young people to master contemporary everyday life, which is often distinguished by constant changes in social relations and physical space. For example, children move between their homes with their parents, brothers and sisters, their school with its classes and different learning groups, and their leisure time with a range of activities, and possibly a part time job. It is quite demanding to maintain continuous social contact and group membership under these conditions.

Traditionally, we have perceived this "diversified" life to be making high demands on children and young people as regards their ability to adapt to and function appropriately in different social contexts. Until now, these social contexts have been separated both temporally and spatially. The new communication media make a fundamental change that alters the serial connections to parallel connections. Individuals can participate in several social groupings at the same time. For
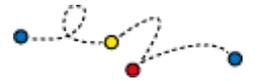
example, people can be home with their families while simultaneously sending and receiving SMS messages and thus participating in their social lives with their friends. From their homes, many children can also access other communication options such as e-mail, chatrooms and Instant Messenger services via the Internet. The use of such options is increasing, and it is very likely that in the foreseeable future they will begin to move away from stationary PCs to mobile communication tools such as mobile phones and PDAs.

Frantic 'zapping' or skilled simultaneous processing?

The way children and young people use these media is generally not distinguished by confusion and zapping, but by something else that older generations may have difficulty in identifying and understanding – namely, simultaneous processes. It is not unusual for children and young people to watch TV, participate in Internet chatrooms, send and receive SMS messages and do their homework – all at the same time (Sørensen 2001, Nielsen 2002). This simultaneous behaviour applies in particular to social relations and communication distinguished by what we could call "simultaneous dialogues". Individuals are not simply zapping from one thing to the next, rather they are running multiple conversations in parallel.

It is primarily in this way that children and young people use the new digital communication media. They increasingly participate in simultaneous dialogues back and forth across physical and temporal boundaries. These dialogues are extremely varied in intensity and duration. They cover everything from quick SMS messages, which are used to co-ordinate activities and arrange physical meetings, through chatroom participation, which often leads to intensive personal conversations, to long-term e-mail correspondence, which can stretch out for years, but still maintains social relations.

Participation in so many conversations simultaneously demands a finely developed ability to concentrate, overview and the ability to adapt and change. These are qualities that most children and young people seem to be able to develop with relatively few problems, and it should be stressed that this development does not automatically strip children of the ability to enter into close, concentrated social relations at other times. It is true that the stereotype of confused, restless and constantly zapping children and young people does apply in some cases, but these constitute the exception rather than the rule. Those children who cannot cope with the new type of social life involving numerous changes make up a new group of socially disadvantaged people in our society. If these children cannot cope with using digital technology to solve the problems caused by the numerous changes in their daily lives, they will be severely socially disadvantaged in the future as they risk being excluded from an important part of the social interaction with their colleagues.

"No mobiles in the classroom!"

Technical development will make it increasingly simple and increasingly common to maintain dialogue across physical boundaries. But at the same time, it will generate new problems in relation to teaching. Many schools already prevent their pupils from using the new communication

media during teaching time by banning mobile phones and blocking chatrooms and surfing on the Internet. In itself, this will be a difficult struggle which will probably not solve the actual problem. It will not change the fact that pupils will feel a kind of "social claustrophobia" if school classrooms become "closed rooms" from a social perspective.

In this regard, the education system is likely to face something of a challenge that will make high demands on our ability to break with convention. For example, convention states that teaching and learning must take place in closed communicative systems, and that the advantage of teaching is that it can close itself in, shut the world out and thus stimulate concentration and focus on the matter in hand. Naturally, such situations are necessary when children are to learn – but not all the time, and not as the only option.

Correspondingly, current development may mean that children's play culture will be distinguished by a greater number of virtual games at an increasingly early stage as these are not dependent on long-term physical interaction. Forms of long-term interaction are becoming increasingly difficult for children to maintain, not because they do not want to but because their everyday lives are distinguished by numerous changes in physical location. It is difficult to develop good games if interaction between children is short-term and varied – in the same way as toys that demand long periods of concentrated presence in one place can be difficult to assimilate – but mobile technology can help to maintain contact across the changing physical boundaries and contexts.

Technology as tools for children's culture

While it is true that the phenomenon of large groups of children in the same physical space is under threat, this is being matched by the simultaneous development of virtual relationships which children and young people are starting to adopt. The "virtual" often functions as a support for social relations because when children and young people move and interact in various physical spaces, there is a need for contact that is not dependent on physical location.

Without mobile communication technology, children and young people today would be much more isolated than they actually are. Mobile phones provide a solution to a problem and keep groups together, even though their members may have been split up on account of the social, physical and cultural changes that have taken place in society. This means that children and young people today are dependent on mobile phones if they are to participate in the communication and social life of the group. However, this dependency is not solely attributable to the invention of the mobile phone.

Media, toys and digital technology are playing an increasingly major role in children's lives in the form of tools which, in a range of guises, are woven into the fabric of everyday life and play culture. These tools are given to children in the form of commercial products rather than as a part of the cultural heritage. Play and games are now more linked to consumption and a commercial market than ever before. To an ever-increasing extent, children have to buy access to games and groups of playmates. The growing market for toys and media products for children can thus be
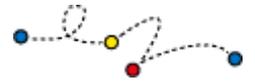
seen as an indication of significant and fundamental changes in children's personal development and play culture. Children's play culture is moving away from focus on the traditional and "inherited" and towards the consumption of products, including media.

Children *learn* in order to participate in the '*play* community'

When children choose to use digital and interactive media, the play value is the central element in exactly the same way as it is with other types of toys. Children attach less importance to what we commonly refer to as "learning" - the skills, qualifications and competencies that children can use outside the context of play and play culture now and later on in life. This is not to say that it is not important to learn something in the context of play culture, but in this regard the central factor is the perspective from which we view the learning.

From the "children's perspective" it is obvious that every child needs to acquire a range of skills and competencies in order to be able to participate in play with other children. These encompass a wide range of competencies, everything from social and communicative skills to specific competencies in the context of specific play formats, toys, media and games. Participation in play culture requires children continuously to acquire and develop new skills and new knowledge – about new products, for example. These learning processes ensure that children can join and remain a participant in the play culture. It is almost the opposite of what applies when children learn at school. At school children participate in order to learn, whereas in play culture, they learn in order to participate.

As Hans Henrik Knoop states (Knoop, 2002), children learn what they perceive they need. People are now increasingly aware that teaching environments should be designed in such a way as to encourage children to acquire the competencies that we consider important. However, in this context it is exceptionally important that we take into account the fact that children primarily need to be full participants in a play community with other children in order to experience a normal childhood.

In other words, learning within play culture is subservient to the game that is the final aim of the learning. For this reason, there are a great many learning processes linked to play that are only of relevance in the context of the play itself. Even though much of what children learn in order to be able to play can also be applied outside the play itself – for example, the ability to socially interact and communicate – this by no means applies to it all. The learning should thus be seen and understood from the perspective of the play, completely in parallel with the cultural quality of toys and media. If the learning processes are viewed from a different perspective, such as the perspective of the subsequent life of the children, a large part of the learning processes will appear superfluous.

What do children actually learn?

It is commonly accepted that play and learning are closely intertwined among children. However, children seldom play in order to learn, but constantly learn new skills in order to participate in the

play community. This applies to all kinds of play and games, including those involving digital and interactive media. In exactly the same way as children can spend a long time learning specific physical skills, they can invest a great deal of energy in acquiring skills linked to interactive media. For example, communication via the Internet and mobile phones demands the ability to read and to write quickly. It also requires understanding of the numerous codes and abbreviations that are used. In the same way, playing computer games often makes high demands on knowledge and skills.

Because participation in children's play culture requires skills and knowledge, this can simultaneously be described as a learning culture. Here, children learn from other children, from their own and older age groups, and they also learn to share their knowledge. The learning culture is of supreme importance with regard to children's use of new media and products, and it is often the reason why children succeed in acquiring the knowledge necessary to use the products.

This applies equally to the use of computers, the Internet, computer games and similar interactive products as to a phenomenon such as Pokémon cards. The learning culture within the play culture is one of the central reasons why boys have long been more advanced computer users than girls. Computers became a part of boys' culture at a very early stage (Jessen, 1990; Upitis, 1995; Jenkins & Cassell, 1999; Jessen, 2001). However, this does not mean that only boys learn from each other. The same applies to girls in other contexts such as that of older girls teaching younger girls about role-play based around dolls.

The fact that children's play culture is also a learning culture is unfortunately far too often overlooked in studies of children and interactive media. However, a recent example can be found in the 2002 literature study by Wartella, Lee & Caplovitz. They note that researchers conducting a survey of how 8–16-year-olds use IT in school observed that in many cases, children help each other with advice and guidance. In this regard, they go on to say that this may be the first important step for the pupils in developing collaborations with other children. Observation of children's use of interactive products for play immediately highlights collaboration – even for children of pre-school age. This is not due to the products themselves, it is a fundamental aspect of children's play and social interaction (Jessen, 1990). The fact that collaboration and the sharing of knowledge also appear in more formal contexts is not surprising, but nevertheless, it has been highlighted as such in a vast number of surveys and observations since Sherry Turkle first identified it in 1984 (Turkle, 1984). This indicates that applying a children's perspective to interactive products is of central importance to our understanding of children's learning in association with these products.

Game knowledge has status and 'trade value'

The close integration of learning and play culture is particularly evident in relation to products that make high demands on knowledge. Within children's groups, advanced knowledge translates into status, as this knowledge has value in the actual use of the products. Knowledge is thus of

value to others, a kind of "trade value" which can play a significant role in social interaction. Pokémon cards are a good example of this, although computer games – with their numerous levels, secret doors, codes, etc. – must almost be considered the archetypal example.

Knowledge is a sort of "raw material" in social interaction, and a large part of this interaction can be built up around the exchange of new knowledge. This applies in particular in a modern play culture, where the constant renewal of the products makes it essential for children to acquire new knowledge and new skills on an ongoing basis. In this regard, it is worth noting that a large number of the interactive products on the market today make relatively high demands on knowledge and learning. At the same time, many of these products are good examples of how important it is that beginners can join in at an early stage and then continuously learn new skills while using the products.

If the learning threshold is high, or if the product demands too high a level of motor skills and practice, it is difficult for individuals to join in, and there is a risk that the children will choose not to use the product in question unless they are extremely motivated, as would be the case, for example, if mastery of the product was their "entrance ticket" to social interaction with older children. If, on the other hand, a product is too easy, there is no knowledge to exchange. This phenomenon is not only apparent in the context of interactive media. It also appears in the context of knowledge about pop and sports stars, as well as in a range of other areas.

Knowledge is an intangible possession, but in this instance, it is similar to material possessions such as toys that require the owner to collect several parts in order to be able to build and create better play options. Intangible knowledge and the learning linked to digital and interactive products often constitute a central element of these products.

Access to play through a 'learning community'

An understanding of the relationship between play and learning can help to explain why some interactive products, which demand a high level of learning, become popular with children while others do not. It is not the complexity in itself that forms the obstacle, rather the motivation generated by the play value and the social interaction. Complicated products can become assimilated into the play culture and often find their way to younger age groups than originally envisaged, because not only are individual children motivated to learn skills that will grant them access to a play community with other children, but also because there is a learning community linked to these products on which the children can draw. It is also within this community that children experiment with and explore new products while testing the options presented by these products, primarily in relation to their play value and social interaction. When children learn through play, they also enter into cultural and social communities with other children.

To what extent can play support learning the types of skills and competencies that we are seeking to teach children in the more formal surroundings of schools? There can be no doubt that through play, children acquire both knowledge and skills that can be used outside the
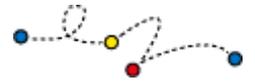
context of the play itself, and this applies to a large extent to toys and media featuring modern technology. Play involving such products leads children to develop competencies to understand, clarify and master technology as a sort of new "general" qualification, and this is naturally amplified by the rapid renewal of the products. However, learning occurs within the context of the play and with the play itself as the overriding goal. This makes it difficult to target the learning processes that are irrelevant to the play. If the play disappears, motivation naturally disappears with it.

The relationship between play and learning new skills is an age-old pedagogical issue, and one to which no final solution has been found, not even through the application of interactive "edutainment" products, despite the fact that such products have been on the market ever since the breakthrough of the home computer in the 1980s. These products have never won popular approval within the framework of children's play culture. Nevertheless, it cannot be denied that such products may have appreciable value in a teaching context – in schools and kindergartens, for example – where children's activities are directed towards learning, and where the right products can make it easier and more enjoyable to learn.

Learning within the framework of play, and with play itself as the final aim, cannot immediately be compared, or transferred, to learning outside the context of play – not even when the products are interactive. This accords well with the theories of situated learning (Lave & Wegner, 1991), which see cognitive development as a result of the acquisition of situated knowledge and situated skills. Learning is not a result of general development independent of situation, but as a development that takes place in close relation to the concrete activities and dialogues in which the learner is involved. Knowledge and skills from one field cannot therefore immediately be generalised and transferred to another field. However, this does not mean that skills are not transformed from one area to another, but when they are, this occurs on a relatively general and abstract level.

Several researchers have proved that computer games reinforce the visual and spatial skills of the player, including the ability to read and understand on-screen information (Subrahmanyam & Greenfield, 1996; Okagaki & Frensch, 1996; Green & Bavelier 2003). In a study of 12–16-year-olds who play computer adventure games, Greenfield (2000) found that computer games can promote the capacity to read three-dimensional images, develop skills in learning by observing and testing hypotheses, generate better understanding of scientific simulation, and promote parallel attention capabilities. It may, however, be just as important to recognise that this learning is not linked to the medium or the technology, but to the actual usage and context. As Salomon notes: "Children's cognitions are not affected by 'Television' or by 'the Computer'; they are affected by specific kinds of programs with which they carry out specific kinds of activities, under specific kinds of external or internal conditions for specific kinds of goals" (Salomon, 1990 p. 41). The content of interactive learning programs and learning environments is therefore crucial.
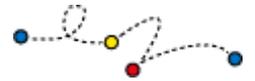
There is general agreement in research literature that interactive products motivate children in teaching contexts, but no theoretical models have been developed that can explain why this should be so. Nevertheless, it is plausible that the social interaction, collaboration, knowledge sharing and play aspect have a significant role. This seems to indicate that it may be advantageous to design teaching programs, products and environments in such a way as to activate the learning culture children bring with them from their play culture.

International differences in children's use of interactive products

Children and young people are a part of the society in which they live, and it is the societal 'norms' that shape children's play, learning and culture. In their efforts to achieve familiarity with a range of interactive products, children and young people may be assisted or obstructed by financial, social, institutional and technological circumstances as well as value-based norms (Suess *et al.* 1998, p. 525). That goes some way to explaining the differences in the interactive products used by children in different regions and countries.

A comparative study of the use of media by children in 11 European countries and Israel (Livingstone and Bovill, 2001) demonstrates that differences do exist in the ways children from different countries use interactive media such as computers and the Internet. Children in the Scandinavian countries and the Netherlands use these media to a much greater extent than those in Central Europe, while children in the countries of Southern Europe make least use of such media. According to the study, these differences may be attributable to social, cultural and financial factors, although children's use of interactive technology seems in general to be closely related to the extent to which the new technology has been accepted by the general public. For example, the IDC/World Times Information Society Index states that for many years, the Scandinavian countries and the Netherlands have been among those in which IT has achieved greatest penetration and is used most, while the countries of Southern Europe are still some way behind in this area. Similarly, the Scandinavian countries top the list when it comes to the use of mobile phones and fixed Internet connections (OECD, 2001). These general differences are naturally of crucial importance to the ease of access children have to digital and interactive technology at home, for example, and this in turn seems to be of significance to the role technology plays in their everyday lives.

Due to the lack of research in this area, it is not possible to establish significant differences between the way in which children use digital technology in industrialised and urbanised societies other than tracing it back to their technological opportunities. However, when it comes to products such as computer games and mobile phones, the existing research does not highlight any cultural differences in the significance of technology to children's play culture. The way in which Scandinavian children and young people use mobile phones as a link to friends and acquaintances thus resembles that of their Japanese counterparts to a remarkable extent (Jessen, 2002; Ito, 2003). The only significant difference between the two is that young people in Japan have access to a wider range of purely technological options such as the ability to use image communication.
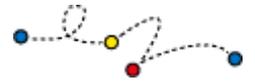
The fact that no significant differences can be found between the way children and young people use technology may be attributable to a lack of depth to the research in this area, although it may – with a degree of caution – equally be attributed to the fact that children and young people are increasingly sharing the same lifestyle conditions, distinguished by modern forms of living with increasing urbanisation, institutionalisation and "detraditionalisation" of childhood. If this indeed be true, then it would follow that the children also share the same need for new tools for play and communication.

With regard to the mobile phone, Jakob Nielsen observes that Israeli children use their mobile phones more than American children do. In a survey, 74 per cent of the Israeli children asked said that they used their mobiles regularly, while only 55 per cent of the American children said that they did (Nielsen, 2002, p. 113). Nielsen did not examine in greater depth the reason why American children do not use their mobile phones as much as their Israeli counterparts. There may be several explanations for this, but if we examine the technological conditions in the United States, Cheskin (the consultancy and research company) observes that the United States is two or three years behind Europe and Asia with regard to the upgrading of their networks and hardware. This is partly on account of the fact that the United States was unable to reach agreement on a standard protocol (Cheskin, 2001, p. 7). This means that the opportunity to send data via a network (SMS) is more limited in the United States than it is in Europe and Asia. One of the results of this is that American children may be less interested in using their mobile phones because they are primarily limited to synchronous communication and the asynchronous data transmission options are not yet widely available. Asynchronous communication options are not only cheaper to use, they are also much more practical as they cause less disturbance to the user's surroundings. Similar to using the Internet, "always on" technologies with flat-rate payment (such as ADSL) play an important role as regards both speed and cost (D'Hanens, 2001).

Parental influence and expectations

The external framework for children's use of interactive products naturally includes their parents, whose attitudes and opinions influence the way in which children and young people gain access to and use the products. Although this applies to the actual acquisition of the products, parents seem to have less influence when it comes to their use *per se*. However, parents do exercise considerable influence on time consumption, particularly in the case of younger children (Van der Voort, W.J. Beentjes, *et al*, 1998), and evidence of differences in children's use of programs being linked to their parents' education has been reported (Becker, 2000). This same report states that the level of family income and of the parents' education does have an effect on the technological facilities the family has purchased for the home computer. Likewise, reports from the United States indicate that high-income families are more likely to have home computers, while low-income families often have only games machines without Internet access, for example.

Parents generally buy interactive and digital media for their children for practical reasons. For example, they bought their children mobile phones on the basis of practical considerations and

for safety reasons in that they wanted to increase their own peace of mind with regard to where their children were and what they were doing (Nielsen, 2002; Cheskin, 2001). However, as Cheskin notes:

They buy phones for their kids to keep track of them and for emergencies, but kids use them mostly to talk to their friends. One trend that was robust across our data: teens used portable devices more for entertainment and fun … (Cheskin, 2001, p. 16)

This matches Jakob Nielsen's findings: According to our survey, most kids (93%) used computers primarily for play. Content activities included homework (63%) and extra curricular learning activities (68%). (Jakob Nielsen, 2002, p. 106). The interactive products are thus made available to children and young people because they live up to some of the needs and requirements of their parents. Similar examples can be found in relation to computers. Most parents place emphasis on their children learning something when they interact with interactive products.

Most adults view the Internet as an opportunity for children and young people to search for information that can teach them something (Wartella, O'Keefe & Scantlin, 2000; Sørensen & Olesen, 2000; Fromme, 2003). This is one of the reasons why children and young people either have a computer of their own in their rooms, or have access to the family computer and Internet connection. According to Sonia Livingstone, children and young people do not, however, share their parents' opinions of what constitutes relevant and interesting information:

… children consider 'information' the most valuable use of the Internet. Yet it also shows the most commonly visited web sites are TV and celebrity/pop sites for girls, and sports or games sites for boys! Clearly, young people's conception of information may not be that of adults concerned with their educational progress. (Livingstone, 2001, p. 2)

Parents hope and expect their children to use the Internet to search for information with a learning content to supplement the teaching at their schools. According to a Nordic survey from the SAFT (Safety, Awareness, Facts and Tools) project, children and young people actually do so, but they also use the Internet to search for information about their leisure interests and for entertainment. The SAFT survey reports that 67 per cent of the Danish children (aged 13–16) asked said that they used the Net for research in connection with their homework. This can be contrasted to their parents' expectations that young people will only spend 10 per cent of their time on such activities (SAFT, 2003).

Many parents see the Internet and the mobile phone as "appropriate" products, and most parents consider them defensible as they can be used for learning or to create a form of security. A product such as PlayStation 2 cannot fulfil some of these requirements as it can only be used for games, music and films. During our survey, we discovered that Christian (aged 13) was not allowed to have a PlayStation because his mother said that it was not good for anything but playing games.

(Christian) My mum doesn't want me to have a PlayStation because you can only play games on it.
(Søren) That's not true – you can watch DVDs and play music on it, too.
(Christian) I know, I've told her that, but she still doesn't want me to have one.
(Søren) Me and my big brother spent ages trying to get mum and dad to buy one because they wanted a DVD player. So in the end they bought one, but my dad said it was no good for watching DVDs, so they gave it to us.

There can be no doubt that the actual use of the products is largely defined by the children themselves, as their play culture and everyday lives with other children take centre stage. Interactive products are generally relatively expensive, and children are therefore often dependent on their parents' approval of the purchase. The products are often purchased because they are believed to be useful to the children's development, or because they provide solutions to practical and safety-related problems. However, they are mainly used because they have value in the context of children's play and their interaction with other children. Generally speaking, older children and teenagers also use interactive media and products to a greater extent than their parents (Montgomery, 2000), and children and young people more often help their parents with problems to do with the computer than vice versa. This seems to indicate that many parents do not have the technological insight that would allow them to evaluate and control their children's use (SAFT, 2003).
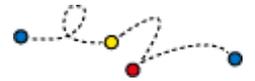
4. Differences between the genders

Surveys of children's use of interactive media conclude that boys and girls have different preferences (see, for example, Drotner, 2001; Nielsen, 2002, p. 5; Suess *et al*, 1998; Wartella, Lee & Caplovitz, 2002). At the same time there may be grounds to highlight the fact that focusing on these differences almost automatically contributes to reinforcing them. Barrie Thorne, the Canadian sociologist, stresses that there can be just as many differences within as between boys' and girls' culture (Thorne, 1993). There is a continuing discussion about whether it is actually possible to divide girls and boys into a twin-culture model based on their differing preferences. Nevertheless, it is difficult to avoid the fact that in a number of crucial areas, boys and girls have different preferences as regards the media and their content. In the same way, the gender differences in children's attitudes to interactive products largely mirror and confirm the differences established in other areas.

Based on existing research and our qualitative study, we found that the differences between how the different genders use interactive technology were most clearly illustrated by children's use of computers and computer games.

How boys' and girls' expectations differ

According to Nielsen, boys and girls begin to use computers at approximately the same age. On average, the first contact is made when children are 4.8 years old, with girls generally starting around eight months before boys (Nielsen, 2002, p. 107). There are, however, differences in the extent to which they use the media. For example, European boys aged 9–16 spend 1 hour and 18 minutes a day playing computer game, which, according to Kirsten Drotner, is four times as long as girls (Drotner, 2001; the figures are based on a survey conducted in 1997–98). According to Woodard and Gridina (2000), who use figures from the United States, boys spend 64 minutes a day playing computer games whereas girls spend only 30 minutes doing so. They also found that there were no significant differences in their use of computers as such. Girls prefer to include computers in other activities where communication and aesthetic productions are some of the preferred choices. In other words, girls use computers to write, draw and chat, for example (Passig & Levin, 2000; Sørensen, 2002).

Boys' and girls' different preferences in relation to the media find expression at an early age according to the American Girls' Games movement that promotes the development of computer games for girls. At an early stage, boys and girls start to display a different mentality along with different skills and learning interests in relation to the media (Jessen, 1997; Sørensen, 2002). According to the Girls' Games movement, this development is more-or-less biologically determined and/or socially constructed and expresses itself in differing gender cultures. This, in turn, results in different approaches to items such as computers and computer games. Cone (2001) refers to the classic difference that exists with regard to boys' and girls' interest in competition. While boys prefer games in which they compete for position and points, and where power and status are important aspects, girls prefer games that place emphasis on social

interplay and collaboration. In this regard, however, we should stress that the boys' penchant for competition does not rule out collaboration. On the contrary, boys build their interaction around computer games on the basis of collaboration and knowledge-sharing. Nevertheless, this is expressed in a different way than among the girls, and the difference is a typical example of the differences that exist between the forms of interaction and play cultures of the two genders.

Children develop gender role patterns on the basis of the social context in which they are reflected, and they learn from adults and children of the same and opposite gender (Aydt & Corsaro, 2003). This can naturally have an effect on which media they choose, and how they choose to use them.

Children's culture builds on more than just gender roles, as children also have to achieve an understanding of themselves and their surroundings. According to Holm Sørensen, culture can be defined as follows: "Culture consists of the processes, structures and symbols that children participate in and create in order to generate meaning and coherence in their own lives and their shared lives. The computer, which is a part of the culture, has a different function in relation to boys' and girls' efforts to generate meaning and coherence in their lives." (Sørensen & Olesen, 2000).

Computers and other media are assimilated to the extent to which children and young people consider them relevant to and meaningful in the different cultural and social contexts. Both boys and girls have an interest in computers, but that they involve them in different ways and in different contexts.

In contrast to girls, boys have built up a network that is both physical and virtual, and in which they exchange information and knowledge about computer games and hardware (Upitis, 1995; Jessen, 2001). Boys have a great deal of knowledge about the technological finesses of the media, and they are interested in following technological development. Computers thus become meaningful for boys when they can fulfil their interest in the technological aspects. Girls do not tend to build up similar networks, as they more often consider the media as tools for specific actions and activities in which the technological aspect is not of crucial importance. Girls do not investigate the technical aspects and opportunities of the media in the same way as boys, as they are more interested in finding out what the media can actually be used for (Cassell & Jenkins, 1999).

However, this does not mean that girls do not investigate the media at all, rather that they consider it more interesting and meaningful to find out, for example, how to use a program in connection with an aesthetical production, than to investigate the technological make-up of the computer for its own sake. According to Holm Sørensen, boys explore and experiment on the program plane itself, while girls do so on the aesthetic plane (Sørensen & Olesen, 2000). Boys' interest thus generates a greater general understanding of the media, whereas girls concentrate on obtaining knowledge and experience within a more limited and more closely targeted field.
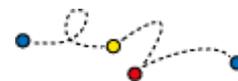
Girls also share their knowledge about the media with other girls, but not to the same extent as boys, who have a social context surrounding their use of the media (Upitis, 1995; Jessen, 2001).

Boys, girls and technology in the social context

As mentioned previously, boys often play computer games in groups. This allows them to exchange knowledge and give each other advice and guidance. Girls often choose to play or to chat in smaller groups, where they place greater emphasis on being together than on the activity itself. Boys' activities are often distinguished by actions with a shared goal. This means that boys prioritise the shared interest – such as a chosen computer game – which pushes the social interaction in itself into the background. The opposite applies to girls, who more readily prioritise the social interaction involved in the activities (Scott Sørensen, 1992). According to Heather Kelly's chart (see fig. 1) of boys' and girls' preferences, boys prioritise competition whereas girls prefer collaboration.

Girls' preferences	Boy's preferences
Tools	Toys
Identification	Mastery of
Collaboration	Competition
Orientation: activity or experience	Orientation: goal (e.g. high scores, higher level)
Co-ordinated play style (a more complex interplay between components)	Linear play style (relatively uncomplicated progress through the levels)
Mistakes forgiven	Mistakes punished
Colour: warm, glowing (not pink – too childish)	--
Attractive graphics	Fast-paced action
Audio: "top 40" music, upbeat, pop	Audio: explosions, loud, unpleasant
No interest in unmotivated violence	"Violence for the sake of it" is OK
Must have a purpose: moral ties	--

Fig. 1
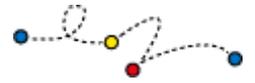
During our qualitative survey, Espen (aged 12) explained that one of the things he enjoyed about computer games was watching other boys play. The reasons for this were, firstly, that he could learn new tricks in this way, and, secondly, that it allowed him to gain insight into the other boys' tactics and strategies which would help him later on when playing against them. Watching other boys play is not only enjoyable for Espen, but it also has a clearly competitive purpose.

The younger boys also enjoy having friends with them when they play. This is not so much out of a desire to play against each other, it is more to have someone to talk to while they play. An example from our survey illustrates this:

(Thomas) When they have gone, I think you get a bit lonely, and so it gets boring. And you don't want to carry on.
(Peter) You want them to come, but when they want to have a go, you don't want to let them. You want them to watch, but they mustn't do anything else.
(Hans) It's also good to have someone to talk to.
(Thomas) Sometimes it's also fun to watch.
(Peter) Yes, and you can have a laugh, because you're sure to hit someone with a hand grenade and then they go flying.
(Thomas) If you haven't tried it before, you can see how to use it. Then you'll know how to do it later on.
(Peter) But he (Thomas) was really good at that game we played.
(Thomas) Not really, because I don't play it that often any more. I play the other game more.

According to these three 9-year-old boys, it is most fun to have others watching them while they play. Some of them prefer to be the one controlling the game rather than one of those watching, but they were all convinced that they could learn something from watching others play. Within the different boys' groups, there are "experts" – boys who are the best at certain computer games. These experts spend a lot of time playing and becoming really involved in a specific game. They lose their "expert" status when a different boy in the group becomes better than them. In the example above, Peter states that Thomas is the expert at the computer game they are talking about. However, Thomas is sure that he is no longer the expert, because he does not play that game so much any more. This is because he has become more interested in a different game in which he is investing more time and is therefore no longer maintaining his knowledge about the first game.

Girls do not have "experts" of this kind, and few of them are "heavy users" in the same way as the boys (Scott Sørensen, 2001). According to Kelly, girls want to work together when they play computer games, although this was not the case among the younger girls in our survey. A number of the 8–10-year-old girls said they preferred to play by themselves because they found it hard to concentrate when others were present. In addition, they were not interested in watching others play, an aspect that Nana (aged 10) explains as follows:

I hate just standing around and watching. I also get annoyed if someone is standing and watching me. I get all confused and bump into everything. When my friends come to visit and they want to watch me play, they fiddle with everything and so I just sit there like this (Nana demonstrates how she sits and turns her head to keep an eye on what her friends are doing while she is playing). (Nana, aged 10)
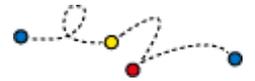
Nana says that it is neither interesting to watch others play, nor to be watched by others while playing. This has to do with the fact that the girls find it difficult to watch others play because they would rather be the "actors" themselves. The younger girls prefer to play by themselves, because they like to do things themselves and find it difficult to concentrate when others are present. The girls do, however, want help from others when they cannot complete a level of a computer game. In this regard, the girls are very much isolated as they have not built up networks like the boys, in which they can sit and learn from each others' playing experience and exchange knowledge about different computer games.

Girls are often dependent on help from their parents or their older siblings. One example from our survey was that of Marie (aged 9), who explained that she always starts one of her games from the beginning and always ends in the same place, because she cannot work out what to do. Nor has Marie learned how to save a game and then open it later. Her parents cannot help her, because she says that they do not understand computer games. This means that for a long time, Marie has spent time playing levels that she has already completed numerous times. She would like help, but she has no network or other opportunities to acquire the knowledge she needs.

Several of the younger girls and a few of the younger boys had difficulties with both the content and the technology involved – without having a network to help them. This is of crucial importance to their ability and, as a result, their willingness, to use new products. The youngest group of children we included in our survey indicated that a major hindrance was the fact that they could not read and could therefore not find guidance in this way. Some products, such as Barbie Fashion Designer, use speech to guide the player through the design process, which makes it possible for new players without support networks to use the program.

In contrast to the younger girls, the older girls enjoy playing together with their friends and exchanging experience with them as they play. However, this network cannot be compared with that of the boys, as the girls do not talk as much about the computer games – and certainly not with the same enthusiasm as the boys (Suess *et al*, 1998). Amanda (aged 11) says that the friends help and praise each other as they play.

It's fun because you can take turns so that it isn't always the same one sitting and waiting. And you can play differently, with someone finding other levels and stuff. For example, there was a time when there was a trapdoor underneath and I didn't know about it, but she did, and she found it. And it's sometimes fun when someone says: "you're really good at that" …
(Amanda, aged 11)

The purpose of sharing their knowledge primarily has to do with completing the game, and only then with achieving a kind of confirmation from the other players. Justine Cassell and Henry Jenkins, who have researched into gender differences in relation to computer games, state that boys often play in groups whereas girls are more person-oriented in their games and prefer computer games that allow them to take turns (Cassell & Jenkins, 1999). The girls in our study place emphasis on taking turns to play when they are gathered around a computer, and they often change places on the principle of equal amounts of time. The boys also use this principle or
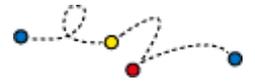
the principle of playing until the character "dies" in the game, irrespective of time and despite the fact that this favorises the "experts".

Girls want adventure, Boys want strategy

The differences between boys and girls do not only apply to the ways in which they include the media in the social context, but also to the media they choose to include, where content and function are the crucial factors. (Wartella, O'Keefe, Scantlin, 2000).

Kirsten Drotner refers to a landscape divided on the basis of gender, where girls are particularly interested in fashion and design games, drawing and painting games, card and board games, and "games that teach me something"; whereas boys are most interested in battle, sports, plane/car and strategy games (Drotner, 2001). This view is fully confirmed by Wartella, O'Keefe and Scantlin's research. In this regard, children's interest in content follows the pattern established for their use of other kinds of toys and media, and interactive media in themselves do not alter children's preferences.

In our survey, the girls said that they played adventure games, used drawing programs and played design games such as Barbie Fashion Designer from Mattel. Marie (aged 9) said that she found adventure games interesting because they require her to explore different levels to find new things or hidden entrances.

(Marie) There are lots of exciting things, and there are lots of things that you can find out. For example, you can come in through a bookcase over there by the door. It's really fun to find out what you can do.
(Interviewer) How do you find out?
(Marie) When I used to play it (referring to the "Buzz Lightyear" game) you went into the living room, and you could jump up on a chair if you pressed a certain button. I think it's the one with C something or other on it. If you press that one, then you fly all the way back and end up on a bookcase. Then you have to … there are all sorts of coins and things up there you have to collect.

This adventure game involves collecting coins and dealing with a range of small tasks in order to advance to the next level. As such, it has to do with acquiring knowledge and experience in order to progress through the game. According to Scott Sørensen, girls are more attracted to adventure games than boys, whose preferences include strategy games (Scott Sørensen, 2002). Both the younger and older boys in our survey stated that this was because they found games of this type more challenging.

I like strategy games because … you have to use your brain a lot more. It's not about destroying and killing all the time.
(Kasper, aged 12)

Kasper (aged 12) thinks strategy games are interesting because he finds he has to use his brain more. To him, the central element of these games is not to kill and destroy, but to have a good strategy. Violence is a part of most of the games that boys consider interesting, but it does not in itself define whether a game is good. Boys also like sports games such as the FIFA football game and the Tony Hawks skateboard game – both of which are built on non-violent themes.
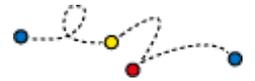
Kelly's chart (fig. 1) shows that there are differences in the interest in violence displayed by girls and boys. Boys do not have a problem with violence for the sake of violence, whereas girls are not interested in unmotivated violence in games. In many studies, this is used as an explanation of why girls are not attracted by the game culture in the same way as boys. This has to do with the fact that the games that dominate the market today are built up around themes involving battle and violent elements (Wartella, O'Keefe & Scantlin, 2000). In our survey, we found contradictory examples of this explanation, as some of the girls actually thought that the violent games were both fun and exciting. Karen (aged 9) explained her perception of and fascination with violent games as follows:

It means I can really get involved in the game. If it's this kind of shooter game, then I'm almost really afraid of getting shot. I think it's so exciting if you really get involved in the game.
(Karen, aged 9)

Girls and boys do not simply have different interests, but also different play cultures, so interactive products affect the two groups in different ways. Computer games involving aspects of violence, battle and competition are examples of products that generally do not find favour with the girls' play culture, while a program such as Barbie Fashion Designer is an example of a product that does. This is one of the best-selling programs, probably because it involves designing clothes – a subject that falls within girls' interest in aesthetic production. In addition, it allows the girls to develop something that they can use in the physical world in their interaction with other girls. In this respect, Barbie Fashion Designer suits the girls' play culture in the same way as battle games suit that of the boys.

There are products that interest both girls and boys – such as Pokémon and Harry Potter – and these are used by both genders. Both phenomena contain numerous aspects and options such as cartoons, games, collector cards, toys and Internet sites that allow them to be used in many different ways. Children can thus place emphasis on either the play and competition aspects or on the creative and aesthetic aspects. A study of the way the different genders play the computer game "The Sims", which has achieved success with both boys and girls, shows that the two genders place emphasis on different aspects and play differently. The boys prioritise the development of figures and surroundings, including the competitive element involved in acquiring more and more things, while the girls are more interested in the development of the game and the interaction between the figures involved (Tønner, 2002 - unpublished).
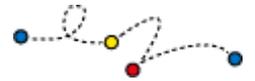
5. Communication –
The Internet and mobile phones

Communication through the media of the Internet and mobile phones has become a central feature of children's everyday lives. Despite the fact that these technologies have only been generally available for a few years, they have achieved a position of appreciable influence, and even though it is perhaps still a little soon to talk of an actual "Net generation" (Tapscott 1997) – i.e. a generation of children who spend a large amount of their time on communication media – these media today are no longer considered exotic or special by children; rather, they are a natural part of their play, social interaction and learning.

Jakob Nielsen notes that children do not use the Internet because it is new, but because it fulfils some of their needs or because it is better than other options. The market for communication media for children and young people is growing rapidly. According to a survey from Mobile Youth (2003), children and young people in industrialised countries spend 13.5 per cent of their available income on mobile products. What is more, the industry today is still unaware of who the consumers are and why they use such a relatively large proportion of their funds in this area. Consumption is highest in Europe and Asia.

Many children and young people see communication as being essential to their everyday lives, which are often distinguished by changes in social context. At the same time, these communication media provide children with new opportunities to experiment with their identity (Cheskin, 2001; Holm Sørensen, Jessen & Olesen). Communication via media plays an increasingly important role as children grow up. While the youngest age groups of children spend most of their free time at home with their families, older children are spending more and more time away from the home in the company of their friends. This changes their media usage (Livingstone & Bovill, 2001; BRAVO, 2002). In this area, new communication technology is becoming ever more important as it allows children to maintain contact with other children – via mobile technology while they are in transit and via the computer and the Internet when they are at home. Relatively little research has been conducted into children's informal communication patterns involving the Net, and almost none into their use of mobile phones. As a result, our conclusions are largely reliant on our qualitative investigation.

Age, gender and mobile phone use

Adults often have a love/hate relationship with their mobile phones as the fact that the phone can ring anywhere at any time of the day or night can be considered both a blessing and a curse. According to Cheskin (2001), children and young people see this form of accessibility as an advantage and an extra freedom as the mobile phone allows them to stay in touch with their friends at all times – something that is very important to them (Ito & Daisuke, 2003, report that young people in Japan accord a similar level of importance to their mobile phones).
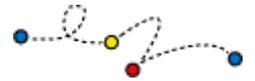
Irrespective of whether they are at home or at school, children can stay in touch with their friends – via SMS, for example, which has the added advantage of not distracting them from whatever else they may be doing. Children and young people are not as distracted by text messages as by having to stop what they are doing in order to answer the phone. Children and young people can answer an SMS in the middle of a school class or during a film; and they can do this silently whereas answering a voice call would attract a good deal of attention (Cheskin, 2001).

According to Nielsen, new forms of communication and new jargon are emerging, with the mobile phone increasingly taking the place of standard fixed-line phones (Nielsen 2002). Today, children and young people commonly perform several actions simultaneously. For example, they can talk on a normal phone while writing SMS messages on a mobile phone and participating in a chatroom conversation. These forms of communication are predominant among 10–14-year-olds, as social interaction with other children is paramount for children and young people of these ages.

It is a different matter entirely for younger children (ages 8–10) who see the mobile phone as primarily a practical tool that they can use to make arrangements and communicate with their parents. In the course of our survey, we found that very few of the younger children owned a mobile phone. Naturally, this does not mean that they did not want one and according to Mobile Youth, the number of 5–9-year-olds who own a mobile phone is increasing. A questionnaire survey run over the Internet by the makers of the interactive toy "Neopets" clearly shows that children want mobile phones. While only 15 per cent of 8–12-year-olds said that they already had a mobile phone, 82 per cent of those who did not said that they wanted one. In the same age group, 76 per cent of respondents said that they regularly use a mobile phone (Arnold, 2002). The survey also showed that children from the youngest age groups mainly use mobile phones to stay in touch with their parents, while older children are more given to using them to communicate with their friends.

In our survey, the 8–10-year-olds had little or no experience with sending SMS messages. Charlotte (aged 10) said that she had a mobile phone because her parents were divorced and she used the phone when she went to see her father on weekends. Even though Charlotte was not allowed to take her mobile phone with her to school, she sometimes used it from home to send SMS messages to her classmates. In the course of the interview, she explained that she had once been annoyed with a boy from her class because he had behaved badly towards her.

(Charlotte) … for example, yesterday I sent an SMS to Kenneth telling him that he was stupid, because it was my turn to use the "cushion room" at the club and he smashed everything up.
(Nana) What did you write to him?.
(Charlotte) I just told him that he was stupid. But he didn't understand that.

Charlotte considered it easier to contact the boy via SMS than to call him. This may have something to do with the fact that SMS messages are not considered as direct and confrontational as a conventional phone call, as text messages allow the sender to remain more anonymous (Cheskin, 2001).
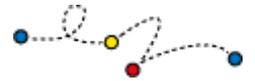
It is common for children to differentiate between those they call on their mobiles and those with whom they only exchange SMS messages. Voice calls are generally reserved for only the closest friends, while SMS messages can be sent to close friends and – in the case of more general messages – to a wider audience (Jessen, 2002). This differentiation is also influenced by the fact that written SMS messages are not always easy to understand. Some of the 14-year-old boys in our study said that it was stupid to send SMS messages. In their experience, these can lead to misunderstandings. For example, they mentioned a friend who thought – on the basis of SMS messages – that a girl was interested in going out with him. However, that was not the case, as he discovered subsequently when he met her at a party. These boys therefore preferred to call their friends and make quick arrangements. They also thought that this approach was more practical and quicker than sending SMS messages. Text messages are often short and built on a range of abbreviations pertaining not only to different words, but also to whole sentences. The boys stated that these could be difficult to understand.

Mobile phones are also used for inter-gender communication. For example, they are used to send jokes and riddles (which are, of course, also part of the traditional vocal play culture). Similarly, SMS is increasingly used to communicate all kinds of information and invitations which would previously have been communicated between children by word of mouth. In one interview, other 14-year-old boys said that they were happy to send SMS messages as long as they had some concrete purpose such as agreeing arrangements about taking part in activities. Some boys used SMS at school to make arrangements with friends from other classes about where to meet and what to do at break-time. They explained that this process helped them to make the very most of the short breaks. Two 14-year-old girls received SMS messages from two boys of the same age from their class. One of the girls received poems from one of the boys on her mobile phone. She explained that she was not really interested in him, but that it was fun to be sent poems. She did not reply to his poems, although she had saved them on her mobile phone and read them occasionally.

Children aged 11–14 see mobile technologies as a part of their everyday lives and a part of their personal identity. Often, mobile phones also have a fashion dimension, with the technological aspect playing a less important role. In this context, simply having a mobile phone symbolises a social status (Cheskin, 2001; BRAVO, 2002). We encountered several examples of this during our survey. Peter (aged 9) explained that he wanted one of the new, small mobile phones that have lots of different functions and a colour display. He says that having a small, smart mobile phone would lead to plenty of attention – which was his goal with regard to mobile phones. For Peter, the appearance of his phone was more important than what he could use it for. The appearance of the phone would give him a special place in the social context. The older girls and boys also mentioned the appearance of their mobile phones, but the girls in particular stressed receiving SMS messages as just as important as this indicated popularity. The girls are very aware of who in their group does and does not receive lots of SMS messages. Sanne (aged 11) and Sofie (aged 12) send and receive a large number of SMS messages during the day. They each communicate
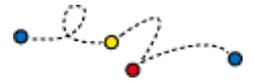
regularly with 3–5 people via SMS. They also mentioned a girl who hardly ever received SMS messages. They thought it was a shame so they sometimes chose to send her messages themselves.

The mobile phone is thus much more than simply a practical tool for children. They see it as a means of staying in touch with their friends, experimenting with contacting the opposite sex, and demonstrating social status. In the following section, we will look in a little more detail at how children and young people use the Internet to experiment with their identity.

Age, gender and use of the Internet

Communication – particularly with other children – is the central factor of children's interest in virtual online environments.

Children use the Internet to find information about their interests, as well as to find new knowledge and downloads for both their schoolwork and their leisure pursuits. To the oldest age groups of children and young people, the Internet today is just as natural a resource as TV, magazines and books (Sørensen, Jessen & Olesen, 2002). However, it is primarily the communication options of the Internet that have captured the interest of children, and they use the Net to communicate with friends from their "real" world and to make new contacts and friends in the "virtual" world.

Boys and girls spend approximately the same amount of time online, but they have different preferences (Livingstone, 2001). Girls place higher emphasis on communication via e-mail and Instant Messenger services than boys do. Boys are generally more interested in playing games, downloading music and games, buying and selling, and setting up home pages (Lenhart, Rainie & Lewis, 2001; Nielsen, 2002). Boys are particularly interested in online games, and if these are taken into account, the picture looks a little different, as games of this type involve communication. Nevertheless, it is important to remember that this type of activity seems to be the preserve of the older age groups. According to Sonia Livingstone, younger children visit the Web sites they know again and again, with boys being primarily interested in sites to do with sports and games. The younger girls prefer Web sites with information about their idols or TV home pages. According to the SAFT report, 54 per cent of children started to use the Internet before they were 10 years old. In addition, 28 per cent of 9–12-year-olds have participated in chatroom conversations.

Age, gender, E-mail and home pages

Our study also revealed that girls are more interested in sending e-mail, often to their friends, parents and other family members, although this form of communication was not particularly widespread among the respondents. E-mail is used most when it is practical to do so. One of the reasons for this is that some children have difficulties with the technology involved, as the following interview with Esther (aged 11) demonstrates:

(Esther) Sometimes I write e-mails.
(Interviewer) Who do you write to?
(Esther) Mainly to my cousin. I don't write to many others because I'm not very good at it.
(Interviewer) At writing?
(Esther) No, I'm good at writing – but I'm not very good at sending them.
(Interviewer) Do you get it wrong?
(Esther) Yes, I do something wrong.
(Interviewer) Why do you write to your cousin?
(Esther) Because she writes to me, and then I write back to her. But I usually send proper letters and SMS messages.

It is quite different for Marie (aged 14) who uses e-mails as part of her job as Web editor of a Danish home page for girls. Marie receives questions by e-mail and then has to answer them. These questions mainly come from girls who need advice about things such as problems at school, with their boyfriends or with their parents. When Marie has answered the questions, she sends them back to the editing team that posts her answers on the home page. Marie has no trouble sending e-mails.

The boys who participated in our survey sent few e-mails. Some of them do have an e-mail account, but primarily for practical reasons. Christian (aged 13) and Søren (aged 11) see e-mail accounts as something they have to in order to be able to go in and play games on the Internet. This is because many home pages require children to set up an account, in which they have to enter an e-mail address.

(Christian) I don't really use my e-mail. I use it for games, because for some games you need to have an e-mail address – such as www.neopets.com.
(Interviewer) When do you have to use your e-mail addresses?
(Christian) Well … for example, when you go in here (www.neopets.com). Then you have to set up an account – an account of some kind (Christian then demonstrates how to fill out a form to set up an account at www.neopets.com).
(Søren) You can also send games to your friends.

The boys have signed up for the newsletters from a number of game manufacturers. As a result, they receive information about new games as well as demonstration versions, which the boys call "demos".

(Søren) Sometimes I get it (the demonstration version) from the two manufacturers – I mean the ones that make the game. So I get some of their latest games as demos. So I can try them.
(Interviewer) Is that because you've signed up for a newsletter?
(Søren) I've done something where I had to tell them my e-mail address. And said that they could send me adverts.
(Interviewer) Do you think it's fun to try the demo games?
(Søren) Yes, I think it's great fun.

The boys have e-mail accounts from two suppliers of free e-mail. When Christian wanted to show us the www.neopets.com home page, he could not remember his code. However, this was not a problem as he had saved his code on his mobile phone.

(Interviewer) Have you saved your code on your mobile phone?
(Christian) Yes I have. It's good for saving things. So if I leave my code here or if I can't remember it Then I can just go in and say: "it's this one".
(Interviewer) So you have saved more than one code on your mobile phone?
(Christian) Yes, this is my e-mail code and this is … another code and … that's all.
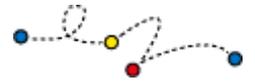
During the interview with Sanne and Sofie, we saw something similar when the girls were asked to say how many hours they used their mobile phones. When asked this, the girls took out their mobile phones and used the calculator function to work out their answers.

As mentioned above, children also use the Internet to search for information for use in connection with their schoolwork and their leisure pursuits. The boys keep up-to-date with their interests (such as computer games) as do the girls, who search fan pages for information about their idols. One interesting and creative example is the "Harry Potter School", which two of our respondents visited on the Net.

(Interviewer) What can you do at the Harry Potter school?
(Charlotte) Well, it's like … do you know Harry Potter?
(Interviewer) Yes.
(Charlotte) He goes to Hogwarts. So it's like a kind of Hogwarts. You can do homework, find things in Diagon Alley …
(Interviewer) As it's a school, what do you have to do?
(Charlotte) You have to do homework.

The girls say that they have to do homework at the Harry Potter school (www.harrypotter-skolen.webbyen.dk), which is a parallel to the Hogwarts school in the Harry Potter stories. When they have done their homework, they receive points from a teacher group made up of a 14-year-old girl and two boys aged 10 and 13. They can then convert the points to Galleons, which they can use to buy things in Diagon Alley. The girls have to do homework every week, otherwise points are deducted from their scores. The homework is based on Harry Potter's schooldays at Hogwarts. It is sent to the girls by e-mail and has to be returned in the same way. The girls think that it is fun to do homework. In some areas, the Harry Potter school – which, it should be noted, is an initiative started by children – can be compared to www.neopets.com. The main difference is that the children who visit www.neopets.com have to play games to collect points, whereas at the Harry Potter school, they have to do homework. In other words, it is not necessarily games that capture girls' interest and attention.

Some children make their own home pages. Thus far, this has demanded a relatively high level of technical skill unless the user was happy to make do with the templates provided. We have not found any surveys that concentrated to a higher degree on illuminating this aspect of children's Internet activities, but children do mention it in the quantitative surveys and they do display interest when the technological conditions are present – e.g. during teaching at school (Audon, 2002; Tholle, 2002).

Age, play culture and the Internet

Age is usually a central parameter in studies of children's play and learning. Conventionally, children are divided up according to their cognitive development, which is closely linked to age. The research literature available today contains few surveys that connect children's use of interactive media with age. Not only do Wartella, O'Keefe and Scantlin (2002) highlight the fact that there is no research that links children's cognitive development and their use of interactive
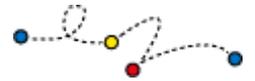
media, but also Wartella, Lee & Caplovitz (2002). In brief, we know little about this area. The studies that are available present the differences in children's interests and activities.

Wartella, Lee & Caplovitz highlight the fact that children of pre-school age typically spend three or four times more time on teaching programs and games (edutainment) than children of school age, who prefer to play sports, action and adventure games instead. It is also typical to find that the time invested in interactive media increases from pre-school age onwards. The 12–14-year-olds are the most intensive users of games, while the 15–17-year-olds are the most committed Internet users. However, these observations are based on only a small number of studies, some of which were completed five years ago when, for example, the expanse and importance of the Internet were nowhere near as great as they are today. There may be good grounds for studying the relationship between age and children's use of interactive media, but at the same time it would be extremely difficult to present reliable and durable research results in this area.

Interactive media are constantly developing, as is our understanding of what they are and what they can do. One of the clearest examples of this is to be found in the numerous attempts made during the 1980s to develop "computer literacy" in children in the form of programming lessons, which at that time played a central role in our understanding of what computer technology was. Very few people today would claim that an understanding of programming is central to understanding the technology we use. Likewise, a subject such as communicative skills in virtual space would hardly have been considered relevant for children at the beginning of the 1990s.

Age is socially defined, say researchers such as James, Jenks and Prout. By this, they mean that the social and cultural definition of what children can do at different ages (and compared to adults) is not a constant, it is at least as much a question of what society considers natural at a given historical time. Electronic and digital media are generally considered to have the capacity to break down established norms about age – a phenomenon Postmann (1984) noted in the context of TV. According to Postmann, children's access to information has long been limited by their inability to read, but TV has changed all that so children now, in principle, have access to knowledge about everything – something that Postmann considers rather worrying. We can see evidence of the same type of worry about the Internet, which is difficult to censor.

Over the past 10 years or so, where computers have become increasingly common throughout the industrialised world, it has also become increasingly common for ever younger children to start using them (Wartella, Lee & Caplovitz, 2002). There are remarkably many examples of young and older children being interested in the same things – when, for example, 7-year-olds play Counter-Strike or The Sims, which are games that also interest 14-year-olds and adults. The section below deals with an example in which two 9-year-olds play Counter-Strike against opponents via the Net and attempt to communicate in a foreign language. The same phenomenon can be observed with regard to mobile phones, which are being used by younger and younger children (Mobile Youth, 2003). This does not mean that 7-year-olds can do and
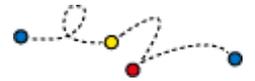
understand the same things as adults, but it does mean that they can be interested in the same products.

Age also plays a role in children's play culture with regard to interactive media and communication media, but it may be more than a little complicated to prove a direct link between age, cognitive development and children's skills with interactive technology. As we have attempted to prove in the preceding sections, children's abilities in this area are largely dependent on their surroundings, including the practical situations and the networks in which they are involved. Siblings, friends and parents all have an influence in these contexts. When it comes to children's interest in specific products, the opinions of other children are crucial with older children in particular setting the norms.

When it comes to interactive media, age is not an unambiguous factor as it is in connection with other products. In play culture, all children of all ages "look up" to children who are older than them. This is of importance, for example, to what is considered "childish" and therefore taboo in certain age groups. Older children are particularly important for the 7–14 age group, whose "members" are increasingly relinquishing the home for social networks with other children, and who are to a greater extent involved in institutions and activities outside the home.

There is one factor that is crucial to children's use of communication media such as the Internet - the written word. This is a barrier, both when it comes to reading instructions and being able to write in order to participate in communication with others. At present, the Internet does not have the same value for users who cannot write. In addition, children who do not speak English have to overcome a language barrier as well. It should be mentioned that this may be only a transient problem, as the current trend seems to be driving the Net towards images, speech and live pictures. These are becoming increasingly accessible in step with the growing spread of fast Internet connections. Therefore, it is likely that these barriers will be broken down in the near future.

Today, it is not uncommon for children playing online to communicate verbally with other players over the Net (see below). However, our study revealed that the youngest age groups had little experience with the Internet. At the recreation centre, Kristina (aged 8) told us that she had a home page that she set up with her father. However, additional questions revealed that what Kristina called a home page was actually an e-mail account, which she never used. Bettina is the same age as Kristina and neither of these girls used the Internet for communication. It was quite clear that they did not understand the meaning of – or the differences between – e-mail and home pages.

It should be added that a lack of ability in the field of written communication does not necessarily prevent the younger children from attempting to communicate in chatrooms, for example, and a number of children learn or improve writing skills in this way (Audon, 2001). Generally speaking, however, Net communication is not common among the younger age groups.
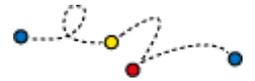
The picture is quite different for the older age groups (11–14), whose members not only use the Internet to visit home pages to do with sport, fashion and idols, but also show great interest in communicating through chatrooms, Instant Messenger services and e-mail (Livingstone, 2001; Wartella, O'Keefe & Scantlin, 2000; Sørensen, Jessen and Olesen, 2003). Girls in particular regularly use chatrooms, whereas boys prefer to communicate in virtual space in connection with online Internet games. Both boys and girls use the Internet to communicate with people they have never met in the physical world. Anonymity on the Internet gives them the opportunity to achieve intimacy with people who are "unknown" to them – a level of intimacy that cannot be achieved through other communicative media (Cheskin, 2001; Thygesen, 2003). In the section below, we will examine in greater depth the phenomena of chat and virtual networks in connection with games on the Internet.

6. Are chatrooms the new playgrounds for children?

The search for self is a normal feature of children and young people. It is here that they try out different personalities in the search for the right one (Cheskin, 2001; Sørensen & Olsesen, 2000). Chatrooms can be considered a resource for the identity construction experiments of children and young people, as they give them the chance to play, to test and, in some cases, to develop different aspects of their identity (Sørensen & Olesen, 2000). When boys and girls visit chatrooms, they generally use a pseudonym. The choice of this user name is central and extremely important as it is one of the conditions for engaging in good chat. User names are often "normal" names that the users can relate to their selves. Children and young people move between different layers of reality and fiction, chatting on the basis of their real lives or from the perspective of a fictional character.

In a recent report from the Danish National Council of Children, Anne Morin Thygesen states that children and young people primarily use chatrooms to talk about friends, free time, boy/girlfriends and sex (Thygesen, 2003). Via the Internet, children and young people have a good opportunity to talk about intimate subjects because they can participate anonymously. One of the advantages of this is that it allows them to let go of their inhibitions and reservations. Their participation in this arena is not limited to fleeting contacts; children and young people often visit the same chatroom repeatedly using the same user name. In cases where children and young people want to be easily recognisable, they choose unusual user names (Sørensen & Olesen, 2000). In addition, some chatrooms require users to set up profiles. This allows children and young people to provide information about themselves through text and images. Several of the girls in our study said that they thought profiles were a good idea, partly because they found it fun to design their profiles with text sections, images and small animations.
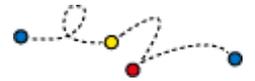
Sanne (aged 11) chats at www.chat.jubii.dk. Sanne spends a lot of time chatting and has therefore purchased an extra chat package (Emote-designer) that allows her to use a range of smiley icons, roses and "kiss-lips". In chatrooms, it is not just about text, but also icons that add to the text. This is because visual impressions can explain users' feelings to the people with whom they are chatting or can define an attitude to what the other person is saying. In order to be able to use the icons correctly, users must have a degree of insight into what they mean, otherwise there is a risk that they will be misunderstood. When children and young people chat, they build up a range of skills that must be considered important and indeed central to a world in which global and virtual realities are the new conditions for growing up. These may include skills in relation to various forms of communication in chatrooms, which can be seen in relation to identity as it also forms part of children's and young people's evaluations of themselves (Sørensen, Audon & Olesen, 2001).

Sanne's profile is based on reality, whereas Hanne and Louise (two 14-year-old girls) have set up two fictive profiles that they use to experiment with different identities. One of their profiles describes an awkward girl who is two metres tall and smokes a pipe, while the other describes a very trendy girl who – from the girls' point of view – does all the right things. The girls prepared these profiles together, and they also read and answer the mails they receive together. According to Hanne and Louise, the awkward girl receives most messages, and they think this has to do with the fact that she is considered more interesting as she stands out from the more usual characters in this Net arena. In this case, the girls use chat to experiment with different personalities that give them insight into the areas that other children and young people find interesting. Thygesen states that in connection with chat, children and young people are interested in other people's reactions, as these can give them an impression of how important feedback from their surroundings is to them (Thygesen, 2003).

Martin Lindstrom states that one of the favourite pastimes of children and young people is to imitate the adult world so as to develop an understanding for it (Lindstrom, 2003). However, chat is not limited to children testing identity. It is also a game in itself – as in the case of the two girls mentioned above who set up fictive profiles to communicate with others. Lone Audon (Audon, 2000) describes how a 13-year-old boy uses chat almost as a game, often with other children watching. He logs onto adult chat channels and pretends to be a woman. The "game" consists of seeing how long he can maintain the charade of being a woman before being found out by his communication partners. Similarly, chatrooms are arenas for different types of play. These can involve throwing snowballs at each other, teasing each other or other kinds of play activities. Obviously, well-developed skills in the use of the written language are required – which is why this form of communication is most widespread among the young (Faurholt, 1998).

Online games

Several types of online games are available. These include what children call "small games", which are typically simple computer games played via the Net (on company Web sites, for example) as well as actual online games that use the communication options provided by the

Internet in connection with the games themselves. Little research has been done into this area, so we have based the following section on our qualitative study, on studies of young people's use of online games, and on research currently being conducted by the Danish University of Education (Sørensen, 2003; Jessen, 2003).

Studies of children's use of the Internet reveal that some boys participate in online games and the associated networks. However, this type of activity is principally the reserve of the older boys, which can probably be attributed to the requirements for writing skills and to the fact that – in the Western World – games of this kind primarily involve communication in English. Nevertheless, the ability to converse orally via the Net is becoming more common and is opening up opportunities for younger children to take part. At the same time, it is becoming increasingly possible to play online in various languages. A distinctive feature of the online games is that they attract a wide range of age groups, including both children and adults. The players are often anonymous, represented only by avatars (game characters) so age and sex are not immediately obvious, or even relevant (Jessen, 2003).

Children who take part in these games talk to and play with and against other children, young people and adults from all parts of the world. According to Wartella, O'Keefe & Scantlin (2000), this form of communication performs a similar function to communication in chatrooms, as the chatrooms of the games are also used to test different identities and to search for knowledge about subjects from the real world. However, in these "game chatrooms", the play aspect is naturally predominant, and the communication is principally targeted at the purpose of collaboration. This means that the players exchange information that is directly related to the game in question, information that can include setting up agreements and arranging terms of collaboration. To a large extent, these activities are carried out in the same way as for games in the physical world. Virtual communication does not appear to present any obstacle to the establishment of social interaction (Jessen, 2001 and 2003).

In online role-play games such as EverQuest, players must complete an intensive learning process in order to be able to decode and understand what is being communicated via the chat channel. This is due to the fact that the chat text is highly compressed and much of the conversation is built on implicit and indirect knowledge. In addition, as the subject matter is often complicated games such as role-play, the players have to learn from each other. Here, too, the aspect of "virtuality" does not seem to present any problems and the players thus demonstrate – in parallel with the play in normal chatrooms – that play culture can be transferred to and survive in virtual space.

It is worth noting that an online game such as The Sims (which has only recently appeared in an online version) seems to appeal broadly to different age groups and sexes, just like the original offline versions of the games did. For years, in fact, this game has been the subject of a kind of fan culture involving numerous official and unofficial Web sites where players could exchange knowledge, figures and residences. Buying and selling – via EBay for example – is also not
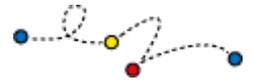
uncommon in relation to online games. Figures and other merchandise for games such as EverQuest are in high demand. On the basis of online trade concerning EverQuest and of the time players spend playing this game, Castronova (2002) has calculated that the game has an economy on a par with those of Russia and Bulgaria. If nothing else, this says something about the attraction of online games and indicates that this area is witnessing the development of a new market with considerable turnover.

EverQuest is rarely played by younger children; it is more popular with teenagers and adults. Nevertheless, there is good reason to highlight online games in connection with children's play culture. Firstly, children are keen to play online if given the opportunity, and secondly, virtual worlds have a range of advantages when seen in relation to the development in children's everyday lives that has taken place over the past 10–20 years.

Through their role as a virtual meeting place independent of time and location, virtual environments present a solution to the problem that arises when there is no group of other children to play with in the immediate physical surroundings. The virtual play environment is always available. When viewed in the light of the fact that most children and adults state that they have strengthened their friendships via the Net, and 24 per cent say that they have found new friends through this medium (The Pew Project, 2001), it seems clear that a virtual play culture is developing. This is not necessarily a replacement for physical interaction, but rather a supplement to and extension of the children's existing social network.

At present, it is naturally difficult to predict the influence of new mobile technology, which will make it possible to send even larger volumes of data. However, it is likely that games and play will take on an important role. Development in the use of the mobile phone shows that children are ready and willing to start using new technology, and a virtual, mobile play culture seems to suit the lifestyles of older children and young people. Whereas conventional toys are often bound by time and space and in some cases demand relatively long periods of concentrated input, many of the interactive media are distinguished by their independence of time and space and their suitability for use in short periods.

Players are not normally physically in the same location when playing online games, as the communication is often only possible through computer-mediated channels. Nevertheless, there are also examples of children using mobile phones to communicate and organise games (Sørensen, 2001). Online games can be played by players who are not in physical contact with each other, but they can also involve groups of players sitting together and playing against other (groups of) players via the Net. An example of this was explained by a 9-year-old boy in our study, who talked about sitting with his friends and playing online games such as Counter-Strike.

Yesterday, Thomas came to my house and we played multiplayer (– on the Net. Comment from Thomas) – and suddenly there was someone there – he was called Denmark. So we asked: "Are you from Denmark?" "Yes," he answered. So we 'spoke' Danish with him. Sometimes, we play people from China, the United States and Great Britain. (Peter, aged 9)

9-year-olds can join in multiplayer games of Counter-Strike, despite the fact that their written and foreign language skills are unlikely to be up to the task, on account of their games networks that give access to the knowledge they need from older more experienced boys whom they watch or play against. In the context of online games, the Danish boys in our study viewed foreign language skills are valuable – on a par with the purely technical knowledge about interactive media. There are great differences between the boys' levels of English, but several of them (including some of the older boys) believe that playing the games helps their English skills. They ask each other and their parents for help, and their understanding of the icons on the screen also facilitates learning.

Taking into account the language barrier, what is the boys' motivation for playing online games such as Counter-Strike? From the interviews, it is clear that they find playing against people from other countries who speak other languages a challenge and an adventure in itself. In other words, online play is unusual – not like playing normal computer games, which has become an everyday event for the boys. In this context, the communication options of the Internet open up a new dimension of experiences to be explored.

The boys use online names that allow other players in the network to recognise them. Players can also use a "friend list" to find players whom they have played with or against previously. The boys often choose opponents whom they have met before and whom they know to be of approximately the same skill level.

If I want to play a decent game I often use the friend list. There's no real point in losing after 10 minutes – it's a bit of a drag. So you just find someone who is about as good as you are.
(Søren, aged 11)

On some occasions, the boys consciously choose a much more skilled opponent to test and try their current skills. The boys explained that it was a positive experience to beat someone who was better than them. In this case, it has to do with some form of experimentation and reflection, where the boys test their own skills and compare them with those of their opponents.

7. Barriers and opportunities to accessing the digital play culture

There is naturally nothing, in principle, that prevents toys not built on digital technology from fulfilling children's needs in contemporary circumstances in the same way as their interactive counterparts. The development of the market for toys clearly demonstrates this. However, we have placed emphasis on the aspects mentioned because they seem to be the decisive factors in explaining the popularity of interactive products among children.

We have not dealt with perspectives which argue that many interactive products are gaining ground because they offer an easy-to-access, intensive and potentially dangerous form of
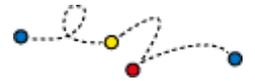
entertainment, as empirical research offers no grounds for such an assertion. In addition, this line of argument is primarily put forward in connection with violent computer games, which we have chosen not to focus on in this report. The discussion about computer games with violent content takes up a good deal of space in both literature and public debate, and it often overshadows the fact that interactive media and products are much more than simply computer games with violent aspects. Similarly, it is far from the truth to designate all interactive products as "easy-to-access" – most of them place high demands for learning and practice on users. In fact, some of them are so complex that it might rather be relevant to ask how children manage to obtain the necessary knowledge and skill to use them in the first place.

Knowledge and learning are actually central elements in children's opportunities to use interactive products. Our studies show that children's knowledge has a great deal of influence on actual use of the products. This is fully in line with several studies (e.g. Woodard & Gridina, 2000) that show that children whose parents use computers use a wider variety of computer programs than children whose parents are unfamiliar with the technology. Lack of access to knowledge thus places an obstacle in the way of children's use of interactive products, while in contrast, possession of the right knowledge opens up a range of new opportunities. The very requirements for exchanging knowledge and skills training must be considered part of the attraction of some of these products – for boys in particular. Nevertheless, they can naturally also be a hindrance.

Knowledge networks – the Internet

Children draw their knowledge about interactive products from their immediate surroundings and networks, which are made up of both adults and other children. For a range of products, the most important, or indeed the only source of knowledge is other children because adults either do not possess the required knowledge or are not interested. The boys who participated in our study use the Internet to keep their knowledge about new games up to date. They also download game demos and use e-mail to tell their friends the latest news. In our study, we found no examples of boys gleaning information from journals or magazines, a phenomenon reported in earlier studies from the 1980s and 1990s (Haddon & Skinner, 1991; Jessen 2001).

The boys' networks around computer games are a part of what we previously called children's learning culture and it is worth stressing that these networks are not simply intended for gaining new knowledge – they also give knowledge to others. Children who know and can do more than others go on to teach the others, and possession of knowledge is a key to status within the children's group. Some boys choose to make their own home pages, which they use to publish information about different games (Sørensen, Jessen & Olsesen, 2002). However, no studies have been completed which analyse this area of children's activities.

Girls also exchange knowledge but have not built up the same kind of networks as the boys around games, and certainly not around the technological aspects of computers and the Internet. They are therefore more dependent on their parents, their schools and their own skills. However, it is important not to overlook the fact that girls also search for information to do with their interests
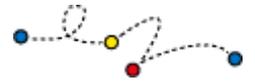
on the Internet and then exchange this information with others within girls' networks. The only difference is that this exchange of information is to a greater extent centred around things which are not normally considered valuable information – e.g. the lives and loves of pop stars. This may be the reason why research into girls' play culture and learning in the context of interactive media is more-or-less non-existent today.

Knowledge networks – Mobile phones

Networks centred on computer games are mirrored in the field of mobile phones, with children eager to exchange information and knowledge about the various functions available. These networks exist for both genders (and across gender boundaries – Jessen, 2002) although when boys receive a new mobile phone, they are more likely to spend time investigating all the different functions, even though they may have no immediate use for them. In the same way as for computer games, the possession of knowledge translates into status, and talk about functions is a part of the mobile phone-based social interaction between boys. Girls do not spend as much time on investigating functions, they prefer simply to learn to use the functions they need. Children seldom read user manuals, partly because they have difficulty in understanding them. As a result, they need access to a knowledge network. It can therefore be crucial to have the same make of phone as the other children in the group. In this connection, children are very aware of brands.

Parents can be a resource for children, for example, boys draw on them for help with reading and language problems but rarely ask them for help with the technological aspects. Girls, on the other hand, also ask their parents for technical assistance when their parents can provide it. Parents are far from children's only source of knowledge, and they are not the most important sources when it comes to the more play-specific aspects. In contrast, they have a crucial role to play in how children use technology for other activities (Wartella, O'Keefe & Scantlin, 2000). According to Keisler *et al* (1999), teenagers are the most important source of knowledge about the Internet in more than half of all families.

Time, space and status

Children's play and interaction are influenced by the time and space structures in their everyday lives. Children's expectations and requirements of games change according to time and place, as well as advances in technological development and the children's own experience with different games. This is of significance to their decision to play with or discard a specific medium or game.

Our study showed that time and space have a significant influence on when children choose to use different technological products. When it comes to the communication media, SMS messages can be used anywhere and, in principle, at any time of the day or night. For obvious reasons, the use of the Internet is largely dependent on access to a desktop computer and this naturally limits children's opportunities to use it – particularly children who do not have their own computer but share one with their parents and siblings. This is precisely one of the advantages of mobile phones – they are personal property.

The area in which the importance of the time and space structure is most clearly illustrated is computer games, because, in contrast to the Internet, they are available on all kinds of platforms (computers, the Internet and mobile phones). In addition, they are available on handheld units such as Game Boys or through toys such as Neopets and POX (the latter is not yet on the market in Scandinavia). What is interesting is the fact that the children chose to play different games depending on their needs and the time available. In this connection, the children in our study differentiated between what they called *big* and *small* games. Computer games such as Counter-Strike, The Sims, Warcraft and Battlefield were designated *big* games, because these games are expansive, comprehensive and time-consuming as they comprise multiple levels and numerous functions. In contrast, games such as the popular mobile phone game Snake are more limited in scope and are therefore referred to as *small* games. Games of this kind can be played in situations where children do not have anything else to occupy their time – when they are waiting for a friend or travelling by bus. Our study shows that children choose to use the technological platform that can give them access to the games that match their needs, resources and time in a given situation. Mobile phone games have the advantage of always being at hand, so children do not have to plan to play such games in advance.

Boys play what they call *big* games at institutions, at home or at computer cafés where they have access to a computer or a PlayStation and where there is room for social interaction. At home, parents are often not keen for boys to gather together in large groups, but there are no such constraints in institutions and at computer cafés. Here, boys gather together either to play against each other or simply to watch the game and be part of the group around the computer. Girls generally play alone or in small groups, either at home or at their friends' houses. When it comes to *big* games, they prefer games such as The Sims.

Children and young people spend a lot of time on *big* games, and they expect a great deal from them. They want games with lots of functions, good graphics and a decent gameplay. These aspects are not as important for the *small* games. Children often use small games to fill in the gaps in their days, to have something to do when they have a little time to kill and they want to avoid being bored. Children and young people are used to a high level of stimulation, and they have a timeless behaviour pattern that the small games exploit (Cheskin, 2001). Søren (aged 11) sees the small games on his mobile phone purely as time-consumers. He explains:

There's no real quality or anything. It's just something that's there. It's just a way of killing time because these games are ancient. You have to be really bored to play them. There aren't any good graphics or anything. It's just some kind of time capsule stuff – real Amiga-type stuff. (Søren, aged 11)

The small games on the mobile technology platforms and the Internet are thus only used in situations where it is not possible to use other media or access better games. For example, the respondents in our survey use small games on the Internet at the institutions while they are waiting for their turn to play some of the bigger games.
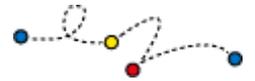
Game Boys, which are more mobile than computers, are used in other situations, such as travel to and from school, during school breaks or on holidays when children and young people do not have access to other interactive media. According to Cheskin, 14-year-olds have generally "grown out of" playing with Game Boys and find it embarrassing to be seen using this medium (Cheskin, 2001). They therefore prefer to play games on their mobile phones, which are products they are happy to be seen using. This corresponds with the results of our study. Our respondents – both young and older – told us that they hardly ever played with a Game Boy, even if they had one of their own. The reasons they gave for this were that the games were boring and technically weak and that Game Boys *per se* were *passé*. In the opinion of the older children, Game Boys are not only *passé*, they are also childish and can only be use when no one is looking.

Sometimes it's a bit embarrassing if someone sees that I'm playing Game Boy. That's because in my class, there is a sort of race to grow up fastest. They say things to you if they see you sitting and playing. It doesn't bother me – I sometimes play on the bus.
(Sanne, aged 11)

Complexity and cost

The most significant barrier or opportunity is the technology itself. Although it is far from front-page news, it is still worth stressing the fact that children often do not have access to the very latest equipment.

… kids usually do not have access to expensive, cutting-edge technology as do people in the business and professional sector. They use computers that have been handed down by parents and siblings. The computers at schools are often donated and tend to be older models with slower connections. (Jakob Nielsen, 2002, p. 105)

Many families find it difficult to keep up with the constant requirement to upgrade and replace both hardware and software. According to Livingstone (2000), both the financial situation and the technological prowess of the parents form barriers here. The installation of programs and games can prove to be an insurmountable obstacle in itself. Slow Internet connections, or more expensive equivalents, clearly limit children's opportunities online (Sørensen, Jessen and Olsesen, 2002). In homes where Internet access is charged by the minute, parents set clear limits on use. We have not encountered any research that highlights the differences between children's use of the Internet in homes with fast connections and in homes where Internet access is charged by time, but in general, it seems that Internet use is much higher in homes with broadband connections (Horrigan, 2003).

As expected, finances have a significant role to play in children's use of interactive media as a whole, both in relation to acquisition and use. The question of finances goes a long way to explaining why children do not ring as much, preferring to send SMS messages. It is also a defining factor in whether or not they choose to download new ring tones or games. As long as they are free, boys in particular are interested in downloading new programs and functions for their mobile phones, but they are generally unwilling to pay for such things. Children also find it a problem that interactive products consume a lot of electricity, so the games and media often

need new batteries. One of our respondents told us that he could not use his Game Boy because the only set of rechargeable batteries in the house are used for the computer mouse.

Making your mark - Graphics, audio and physical appearance

Interactive products and communication media open up new opportunities, but children do not choose these products for reasons that are fundamentally different from those they apply to their choices of other products. One of the strongest arguments in support of this hypothesis is the fact that interactive media do not appear to have changed boys' and girls' preferences essentially. This is illustrated, for example, in boys' preferences for products that build on action, battle and the associated special aesthetics seen in connection with violent effects such as explosions and firearms, or cars with realistic sounds and images. Similarly, they are much more likely than girls to choose programs involving construction options and to consider technology and functions as separate areas of interest. Girls, in contrast, prefer products that are built on different aesthetics, and they are generally drawn to games without battle or action, and programs that allow them to be creative in their own right. Gender differences are typical but by no means absolute. As such, some girls do play action games (as we found in our study) while some boys also play Neopets on the Internet – a game that involves them looking after a baby-like figure. The new communication options thus appear to appeal to both genders.

Cheskin (2001) highlights the fact that children and young people place emphasis on the opportunity to make their own individual mark on products such as mobile phones:

We know from research and experience that colour screens, longer life batteries, customizable physical details (faceplates, antennas, logos, carrying cases), better quality ring tones, and multimedia messaging capabilities are some of the features that appeal to young people. The youth market likes to personalize their devices to reflect a hot trend or a part of their personality. Putting design energy towards the invention of even more options for customizing a device will help to attract a younger audience. (Cheskin, 2001, p. 29)

This tendency to want the opportunity to make a mark on the products can likewise be observed in computer games such as The Sims, which give users plenty of scope to shape the game (depending, naturally, on the skills acquired within the game). In The Sims, experimenting with the furnishing of the game figures' homes constitutes a central part of the gameplay. In the age groups we studied, individual distinction is also a part of the social interaction with other children. The appearance of the mobile phone and the furnishing of the virtual rooms in The Sims take on serious importance in this context.

Graphics and audio elements are of significance to the children's interest in the products. For example, children prefer games with good graphics, but they are willing to compromise if the games have a good gameplay or contribute to the social dimension.

(Nik) If the game is really good, I don't mind too much if the graphics aren't all that good. But if the game is poor and the graphics are bad, too, then it's out straight away.
(Nik) Tennis is good. It's so unrealistic and so badly made – but that is what makes it so great.
(Interviewer) Why is that game good, when the Tony Hawks game, which was also badly made, is bad?

(Nik) You see a hand, and you see a racquet. That's all you see. And then there's this ball thing, and all you have to do is shoot, shoot, shoot. Just press A, A, A and A. That's what makes it fun – it's so bad and so boring.
(Lars) It's easier to control. That's what makes it fun when it's boring.

According to these boys – aged 11 and 13 – a game needs a good gameplay and good graphics for them to think it is good. However, there are exceptions to the rule where, as mentioned previously, children differentiate between *big* and *small* games. This is a subject Christian (aged 13) touches on in relation to playing Neopets on the Internet:

Well, the graphics are OK. This isn't really a "big" game. You could say that there are a number of small things that have been put together in a world. In that way, its OK. That's why the graphics aren't so important here, but in other games that are more focused on one thing, then the graphics have to be good.
(Christian, aged 13)

When the boys talk about graphics, they are not simply referring to the number of pixels or the art lines, they are also taking into account the visual angle on the levels or rooms in the game. The boys talked about this area when asked about the game "Grand Theft Auto" (GTA) versions 2 and 3 for PlayStation.

(Peter) 3's better. I don't think that 2's so good because you see everything from above. The graphics are bad. When you see everything from above, there's no variety.
(Thomas) 3's really good. The graphics and stuff are great.
(Interviewer) So you think version 3 is much better than version 2? Is that because of the graphics?
(Peter) Yes, because you see everything from ground level. In the old game, you see everything from above.

Girls also think that the graphics are important, although to them, it has more to do with whether they think the products are nice or ugly – as regards the colours, for example – than with the number of pixels. The boys are more conscious of the technological basis of the graphics, an aspect that they also mention in their evaluation of whether a game looks realistic or not. They generally class old games as "unrealistic" on the basis of a comparison with newer games, and in this respect, they evaluate both the quality of the graphics (the number of pixels) and the movement patterns of the figures.

In two smaller qualitative studies, Audon (2002) and Tholle (2002) report that children place great emphasis on the appearance of home pages when they make them themselves. The colours, fonts, graphics, effects and content of both their own home pages and those of others are evaluated with a critical eye. According to Audon (2002), they are very attentive to the style of the home pages, preferring pages that live up to the styles currently found on the Net, while pages that represent even slightly older styles are considered "old-fashioned" and dull.

As regards audio, the boys often consider the question of whether it is spectacular. Players notice, comment on and compare features such as explosions, gunshots, motorbikes and the screams and cries of the action figures (when shot, for example). Audio effects are also important to the girls:

Games with a bit of music in them are better than the ones that are silent. It's good if they say things in a more scary way.
(Charlotte, aged 10)

According to Charlotte, a game becomes better when its visual aspect is reinforced with sounds, speech and music. Charlotte finds it exciting to play games where a scary voice speaks to her from time to time. In this regard, it is a matter of varying intensity. The player's attention to the sounds depends on both the aspect that the player is concentrating on, and the specific nature of the sound in question – i.e. its volume and frequency – as well as the general audio profile of the game. For Sofie (aged 12) the audio profile is very important when she is playing the "Rocker Game" on www.dr.dk/skum. In this case, the humorous slant of the audio profile gives the game value.

(Sofie) Then I play the Rocker Game – it's fun.
(Interviewer) What's good about it?
(Sofie) You have to throw … There's the person throwing bottles, and he says: "Hey, d'you want to throw some bottles?" And then you throw some bottles. Then some rockers turn up, and you have to aim and stuff … How hard to throw … And then you throw bottles, and if you hit … And if he dies, another one appears. Then, for example, there's one called Mini who fires a shotgun or rockets. And he says different things. And then there's one that fires bowling balls and things like that. And they say funny things.
(Interviewer) So it's a good game?
(Sofie) Yes, it's not … it's not the game itself, it's more about what they say in the background. That's really funny.

According to Sofie, it is not so much the gameplay that gives the game value, rather the audio profile that generates an entertaining atmosphere. Even though the game is about taking out rockers by hitting them with bottles and rockets, the audio profile prevents the situation from becoming intense or strained – and it is not a game that can immediately be compared to conventional action games. Jakob Nielsen (2002) notes that children are interested in audio content on home pages, and that they are critical in their evaluation of the sound quality. They also want the option of deselecting the audio at any time. This has to do with the fact that it takes longer to download pages that include audio elements.

The physical appearance and quality of the product

The children not only have expectations of the content of the different media, they also make demands on the physical appearance and robustness of the technological products. According to the children in our study, the products are bad if they break easily as in the case of Game Boys – (Game Boy and Game Boy Advance) – mobile phones and PlayStation.

(Nik) Ericsson and Nokia make good phones because they are the toughest.
(Lars) Yes, a kid in my class dropped his phone out of a third-storey window and it didn't break. Only the battery broke. It was a Nokia 3310.

If phones can withstand such treatment, they are considered really good. The boys had a complete list of things they used to back their evaluations of Game Boys and different kinds of mobile phone. The stories were often not drawn from personal experience but rather repeated stories the boys had heard from their friends. It is clear that the children have a communicative relationship in which they exchange experience about the different products, and they can be

influenced by the experience of their friends with different mobile phones (and other technological products) without having to have experienced the same thing themselves. Just like the boys, the girls seem to expect that certain mobile phones must be able to withstand rough treatment.

It's good that my mobile phone is shock resistant, because I often chuck it about.
(Sanne, aged 11)

Even though the girls throw their mobile phones about, this does not mean that they do not like them. Mobile phones are actually very important to girls as a physical item into which they can put feelings. As a rule, they keep their phones close to the bed when they go to sleep. This is partly because they use their mobile phones as alarm clocks. In addition, they need to have their phones close to them in case someone sends them an SMS during the evening or in the morning.

(Sofie) I love my mobile, I like everything about it.
(Sanne) Too right.
(Sanne) It's like a little baby – when you go to bed, you almost have to tuck it in, too.
(Sofie) I actually do that – but I don't mean I put it in a bed with a duvet and stuff. But I put it on top of the speakers next to my bed.

8. Conclusions - the trend for technology in children's play culture

As Jakob Nielsen (2002) has pointed out, children do not use interactive products simply because they are new or packed with technology. They prefer them to other toys and pastimes if they can fulfil their needs better. In relation to play culture, children primarily choose interactive products that can be assimilated into their networks with other children and provide the base for play or play interaction – leading to games. Products that can contribute to creating the right conditions for play – including digital communication media when used to contribute to social interaction – are similarly much sought-after.

Interactive products and digital communication media do not in themselves alter the fundamental patterns of children's play, learning and social interaction. The changes in play culture are more complex and the result of more finely differentiated causes. The products and media help to break down barriers for social interaction and play, and are often used as tools in and for games. In addition, they open up new fields of opportunity such as virtual online games that are not dependent on place and do not need physical items. In virtual space, children can make new friends and build up contacts across time and space. As such, they are not dependent on other children being physically present and they are also free to meet children and young people from other age groups. This can be seen as an advantage in cases in which it is physically difficult for children to find playmates in their immediate neighbourhoods, or as a problem if children drop physical in favour of virtual interaction. As yet, no studies have been done into the question of whether virtual play options have a detrimental effect on children's preference for physical interaction. However, the fear that electronic and interactive products will break down children's play culture is not new. In fact, it appeared in studies of TV in the 1960s (Livingstone & Bovill, 2001) and computer games during the past 10–20 years. And the debate rages on.

In relation to virtual play culture, it is necessary to ask whether virtual interaction is necessarily worse than its physical counterpart – no matter how provocative such a question may be. The evidence suggests that children, young people and adults continue their social interaction patterns from the physical world into the virtual world (Audon, 2000; Jessen, 2001). If we look at the everyday lives of young people, virtual communication seems increasingly to be integrated into their lives (Jones, 2002) and the difference between physical and virtual contact is no longer always relevant. Young people are happy to switch from one form to the other, depending on what is most practical.

Mobile communication media facilitate the arrangement of meetings, depending on whether or not other arrangements have been made previously. This maintains an important tradition in children's play culture – that of spontaneous interaction. The ability to find friends online and independently of physical location and interaction is pushing in the opposite direction. Children often use digital communication media to communicate with existing friends, while the virtual options may mean that the lifestyles of young children may come to resemble those of older

children, who have greater opportunities to make new friends because they have greater freedom of movement (Bravo, 2002). However, it should be stressed that virtual play culture only applies to a very few children today. It is likely that it will spread to encompass more children as the barriers for access to the virtual worlds (technology and finance) are diminished.

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