

Child's Play: Computer Games, Theories of Play and Children's Development

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Abstract

The purpose of this project is to examine the ways in which classical and modern theories of play may be applied to an analysis of the developmental value of computer software in the early childhood years. Modern and classical theories of play have identified many ways in which play may advance the cognitive, social and emotional development of children. However, in the last two decades there has been concern that play is being replaced by other activities such as computer games, ranging from commercial arcade games to different kinds of educational software. Whilst there has been an ongoing debate about the advantages and disadvantages of children's computer use, increased computer access for children in today's homes and childcare centres has become a reality. In view of this situation it is important that early childhood educators are able to judge the quality of computer games. When assessing the quality of particular items of computer software for young children, researchers refer to its developmental appropriateness. Within this frame of reference, software designers aim to present educational content in a playful way to make it more attractive and accessible to its young audience. However, there is a relative lack of focus on the value of computer use as play *per se*. If computer games are to become a significant part of children's lives we need to look at their developmental value from the same perspective that is taken when considering the significance of play in child development.

Keywords: early childhood education, teacher education, professional development, research, evaluation.

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1 Introduction

In its various forms, technology plays a significant role in the lives of each one of us. We rely on technological products in the workplace as well as the home and, increasingly, educational settings have provided children with opportunities for engaging in activities associated with computers. In addition, a wide range of software has been designed with young children in mind. Computer access in the classroom is regarded as valuable, with teachers making use of various software as a resource for teaching and learning. Children appear to respond enthusiastically to the opportunities that computers provide, not only as they engage in learning and problem-solving tasks (Clements 1995), but also as they make use of the many items of software designed for purposes of recreation and play. The benefits for both teachers and children are evident when computers are used as a resource for teaching and learning. A variety of learning theories has been applied to examining the educational value of the range of readily available and newly developed software. However, in the literature, there is a lack of examination of the value of computer use as play *per se*.

The focus of the research which this paper reports is application of classical and modern theories of play to the development of a comprehensive instrument that can be used to assess the developmental value of individual items of computer software for young children. An additional aim is to provide a research base that will support preservice early childhood educators as they consider the use of computers in children's play.

2 Significance of Play in Child Development: Theoretical Perspectives

Early childhood educators know how important play is in children's lives. Play is not only an enjoyable and spontaneous activity of young children but it also

contributes significantly to children's psychological development.

A number of characteristics that distinguish play from other forms of human activity have been identified. (Garvey 1977). Play has been characterised as a spontaneous, self-initiated and self-regulated activity of young children, which is relatively risk free and not necessarily goal-oriented. Play is intrinsically motivated: normally children have an internal desire and interest to engage in play, they are actively involved in creating their play and are in control of it. An essential characteristic of child's play is a dimension of pretend—that is, an action and interaction in an imaginary, “as if” situation, which usually contains some roles and rules and the symbolic use of objects (Leontiev 1981, Nikolopolou 1993).

Modern and classical theories of play have identified the many ways in which play may affect children's wellbeing and advance their cognitive, social and emotional development. While freely engaging in play children acquire the foundations of self-reflection and abstract thinking, develop complex communication and meta-communication skills, learn to manage their emotions and explore the roles and rules of functioning in adult society. Sociocultural theorists discuss the overarching role of play in child development and view it as the most significant “leading” activity of the early childhood years (Vygotsky 1977, Bodrova and Leong 1996).

Theoretical approaches allow us to understand the significance that play has in the development of young children and the ways in which they are able to develop meaning through play. Below we will look at the main theoretical approaches to child's play and outline the characteristics of play that are described as essential for the development of young children, with the view to applying these findings to an assessment of the developmental value of computer games for young children.

2.1 Classical Theories of Play

Classical theories predate the late nineteenth and early twentieth century (Dockett and Fler 1999). They look at the driving forces of children's play and mainly focus on its physical and instinctive aspects.

According to the earliest classical theory, ‘surplus energy’ theory, humans play when they have excess energy. Schiller, a German philosopher, defined play as ‘the aimless expenditure of exuberant energy’ (Schiller 1875:112, in Dockett and Fler 1999:24). Surplus energy theory contends that humans have a finite amount of energy that is used mainly for work and survival. Children tend to play more than adults, as children are not so involved in work and survival activity, and therefore have greater amounts of energy to expend. By discharging excess energy in play, balance is restored to the human body.

While surplus energy theory acknowledges the importance of play as a human activity, its focus rests with physical play. However, children's play takes many forms, including sedentary play. Indeed, some play

theoreticians (Lazarus 1883, in Dockett and Fler 1999, Patrick 1916) have argued that play is used to restore energy—this theory of play is known as Recreation or Relaxation play theory. Like surplus energy theory, this theory relates energy levels to work, which is seen to be essentially distinct from play. From a Recreation perspective, however, play serves to restore energy that we expend in work, and engages our interest in the meantime.

A significant departure from these two energy-related theories of play came in the form of Recapitulation theory, espoused by Hall in 1906. Hall asserted that in play, we relive our evolutionary past. For example, children enact the ‘animal stage’ of evolution by climbing and swinging. (Subsequent stages are savage, nomad, agricultural and tribal). Recapitulation theory also draws on the notion of instinct, claiming that play provides the means for children to express their instincts—and in expressing these instincts, weakening them. For example, children's engagement in fight play weakens the drive to fight as an adult and so this behaviour will fade out as the child matures.

Rather than looking back, an alternative classical explanation of play looks forward, in maintaining that play prepares children for adulthood (Groos 1898, 1901). Based on the assumption that play is unique to childhood, Groos argued that play develops children's physical and mental capacities that will serve them as adults. The significance of this theory rests in part with Groos' focus on play types other than physical play. For example, Groos considered children's enactment of adult roles and activities in what we now call pretend play, make-believe play or imaginative play. In part, too, the importance of this theory lies in its consideration of intellectual or cognitive benefits of play for children.

Classical theories of play together made an important contribution by placing play in the spotlight for philosophers, theoreticians and researchers to consider. In so doing, the importance of childhood was acknowledged and foundations were laid for further advances in contemporary theories of play.

2.2 Modern Theories of Play

Contemporary theories of play are not only historically but also, broadly speaking, conceptually distinct from classical theories. They are concerned with the ways that play benefits children's psychological development. They have continued to impact on early childhood programs, particularly in under-fives settings, where we now see play located at the heart of the curriculum and used as a vehicle for nurturing children's development across its various domains.

Focusing on the emotional domain of development, psychoanalytic theorists such as Anna and Sigmund Freud (S. Freud 1959, A. Freud 1968) and Erikson (1963) looked at play in terms of catharsis. Psychoanalytic perspectives explain the value of play in allowing children to express negative emotions that relate to situations in which they have no control in their everyday lives. These include traumatic experiences and conflicts.

Play is seen to provide a safe context for expressing these emotions and gaining a sense of control. Play resonates with children's reality and therein lies its cathartic power. Children incorporate stressful situations into their play and deal with them. Repetitive play is seen to be important here, as children act out the same situation time and again. In this play, children's mastery over stressful situations is nurtured.

Also focusing on emotional aspects of play, but based on a Behaviourist stimulus-and-response theory, theories known as 'Arousal Modulation' explained play as a means of maintaining a balanced level of arousal (Berlyne 1960, Ellis 1973). Play serves to either raise or lower levels of stimulation, depending on whether a child is under- or over-stimulated. Play provides novelty, uncertainty and complexity at optimal levels for children; these qualities in optimal amounts are seen to be most conducive to individual functioning. The balance between the new and the familiar is often seen applied to education.

With a different focus on the development of communication and metacommunication in children, Bateson (1976) described the shared understandings that are developed between children as they play together. He termed these shared understandings 'play frames.' These frames designate children's actions in a play episode as play, as opposed to talk about the play. Children's talk or dialogue when they are 'in character' is distinct from their talk about what their characters will do, what props they'll choose, and so on. The latter kind of talk is metacommunicative talk, and sees children stand outside their play to talk about it. Metacommunication is seen to be essential to the development of shared understandings about the focus of the play and strategies to communicate these understandings. It lays the foundations for development of children's self-reflection in communication and the awareness of its rules and strategies.

In the play that they make, children often are seen to take on the roles of others in their real lives—such as mother, father, baby, teacher and friend. Mead (1934) viewed children's role play as an important vehicle for developing their sense of self. Mead concerned himself with how children come to see themselves as unique human beings in relation to others. Further theoretical study revealed the importance of the role or dramatic play children's exploration of the roles and rules of functioning in adult society.

Piaget (1962) shifted the focus of study from social and emotional aspects of play to children's cognition. He placed play within his stage-based theory of cognitive development and assigned it a significant role in the growing of children's minds. Underpinning his views of how play contributes to children's cognitive development are two processes whereby children construct knowledge, assimilation and accommodation. Piaget maintained that it is assimilation that is dominant in play—children take something and make it fit to what they know, such as when a child makes rolled paper to be a royal sceptre. Talking about symbolic play, he outlined the importance of play in the development of children's mental representation and abstract thinking. This idea was further

developed in socio-cultural theories of play (Vygotsky 1978, Leontiev 1981).

2.3 Sociocultural Approach to Play

Vygotsky (1977, 1978) viewed play as highly significant to development. 'Play contains in a concentrated form, as in the focus of a magnifying glass, all developmental tendencies.' (Vygotsky 1978:74). Vygotskians view play as the most significant "leading" activity of the early childhood years (Vygotsky 1977, Bodrova and Leong 1996). This means that the most significant psychological achievements of the early childhood age occur while children engage in play.

Vygotsky espoused the notion of the Zone of Proximal Development—defined as the difference between a child's actual and potential levels of development (known, for example, by what a child can do alone and with the assistance of an expert other). According to Vygotsky (1978), play creates a broad zone of proximal development, both in cognitive and socio-emotional development. In make-believe play children perform above their own cognitive abilities—logical thinking, memory and attention. Their ability for deliberate behaviour and self-regulation in make-believe play is also beyond their everyday norm.

Another important influence of play on development is the separation of thought from actions and objects and the development of mental representation and symbolic function. The pretend situation of play creates an imaginative dimension in which children use substitution of things and acts. Separation of the meaning from the object promotes the development of abstract ideas and abstract, verbal thinking. In actions like riding a broomstick as if it were a horse, children separate the literal meaning of the object from its imagined meaning—this, argued Vygotsky, sees the beginnings of abstract thought.

Vygotsky argued that make-believe play is socially and culturally determined. Playing the roles of real life characters (for example, a mother or a doctor) children achieve a mental representation of social roles and the rules of society. The toys and gestures with which children play are seen to be significant artefacts from their social and cultural settings—so, in play, children are acquiring the tools and meanings of their culture.

As we can see, contemporary theories of play cover a wide range of developmental areas. They have made, and continue to make, a highly significant contribution to how early childhood educators plan and implement their curriculum, set up learning experiences, organise their physical environment with play areas, and observe and assess children's development in play situations. In this context of early childhood education, we now explore the relevance of play theories to assessing the developmental value of children's computer games.

2.4 Stages and Levels of Play

When we talk about children's play we might imagine a child playing on her own or we can think of a group of

children engaging in a complex dramatic role play. Play of toddlers differs significantly from that of preschoolers; while children grow and gain experience their play becomes more complex and integrative.

Play theorists distinguish different stages and levels in children's play. Piaget described the levels of a child's play in accordance with his stages of cognitive development (Piaget 1962). The first level is associated with the sensorimotor stage and is called *functional or practice play* and consists of repetitive motor movements with or without objects. When children are in the pre-operational stage of development they start to engage in *symbolic, or pretend, make-believe play*. Vygotsky further elaborated on this stage suggesting that there are two levels to symbolic play: play with objects or a simple act of pretend and symbolic role play. He stressed the role of symbolic play in the development of symbolic representation such as symbolic function and symbolic action which lays a foundation for further development of children's abstract thinking (Vygotsky 1978). The last stage of Piaget's classification is that of *games with rules*, which is based on understanding and following rules in play activities such as marbles, board games or cards. This play can be performed individually or in a group.

Many theorists (Parten 1932, 1933, in Dockett and Fleer 1999, Piaget 1962, Vygotsky 1978) have discussed different levels of social engagement in play. Parten (1932, 1933, in Dockett and Fleer 1999) described a number of social categories of play, including *onlooker* level, when a child observes play of others; *solitary play* or playing alone; *parallel play*, when children play along with one another but there is little interaction among the players. The final level was labelled *group play* by Parten, which later was broken down into *associative* and *cooperative* play by Rubin, Watson and Jambor (1978, in Johnson, Christie, and Yawkey 1987). These two levels of *associative* and *cooperative* play represent higher levels of interaction when children actually play together, doing similar things and coordinating their actions (Parten 1933, in Dockett and Fleer 1999:61–62). While Parten was criticised for underestimating the ability of young children to engage in social levels of play, the role of individual ways of engagement in play should not be overlooked.

The theories we have identified above focus on either cognitive or social aspects of children's play. An important contribution was made in the 1970s by Rubin *et al.* (1978, in Johnson *et al.* 1987). These researchers combined Parten's social categories with Piaget's cognitive categories (the latter being further adapted by Smilansky 1968). Thus a two-way matrix was developed, with functional, constructive, dramatic and games categories along the cognitive axis, and solitary, parallel and group categories along the social axis. This framework, known as the 'Parten/Piaget scale', widened the lens of both Piaget and Parten, and embraced the scope and depth of children's cognitive and social development and the interplay between these two domains.

With a focus on children's development of self and their social roles, Mead (1934, in Hoorn, Van Nourot, Scales,

and Alward 1999) looked at the levels of child's understanding of the pretend roles in play. He documented three stages of development in the child's dramatic role-play. The first is the *play stage*, where a child slips into a role without much planning or elaboration, such as sitting on a chair and playing teacher. The next level is called the *game stage*, where a child coordinates several roles in relation to the character he or she is playing, such as a child playing a character who is someone's mother nursing her baby; someone's student who is taking dancing lessons; and someone's wife talking to him on the phone. The last stage is the *generalised other stage*, where children develop generalisations about how certain roles work, such as 'doctors do this' and 'firemen do that'. These stages reflect the levels of children's understanding of the social rules and roles of our society.

3 Computers and Children's Play

Whilst there has been an ongoing debate about the advantages and disadvantages of children's computer use, increased computer access for children in today's homes and childcare centres has become a reality. The current generation of children have been born into a computer environment; it has become a normal part of their everyday lives. In addition, parents are happy to see their children exploring computers at a very early age as they become occupied with an activity that they really enjoy.

Given the increased time and opportunities that children have for engaging with computers as they play, it is important to consider the implications this has for them. In view of this situation it is important that early childhood educators are able to judge the quality of computer games. NAEYC (1996) states that it is the responsibility of early childhood educators "to critically examine the impact of technology on children and be prepared to use technology to benefit children."

When assessing the quality of particular items of computer software for young children, researchers refer to its developmental appropriateness. Within this frame of reference, software designers aim to present educational content in a playful way to make it more attractive and accessible to its young audience. However, there is a relative lack of focus on the value of computer use as play *per se*. If computer games are to become a significant part of children's lives we need to look at their developmental value from the same perspective that is taken when considering the significance of play in child development.

3.1 Pilot Study

The aim of the pilot study is twofold: to look at the recommendations of developmentally appropriate use of computers for young children and to see how the computers are used in practice in early childhood settings. This aim involves the application of play theories to the developmental value of computer games—in relation to how their developmental appropriateness is viewed, and to how computer games are implemented in early childhood settings.

3.1.1 Overview

In the early childhood literature, there is a concern that the push for early academics—such as teaching preschoolers to read and learn math and computer skills—is rapidly replacing imaginative play and experiential hands-on learning in young children’s lives (Alliance for Childhood 2002).

Singer (in Alliance for Childhood 2002) warns about the very limiting nature of the new generation of electronic toys such as talking and walking dolls as they don’t leave enough room for children’s imagination and creativity.

The NAEYC position statement (1996) suggests that “developmentally appropriate software offers opportunities for collaborative play, learning, and creation. Developmentally appropriate software engages children in creative play, mastery learning, problem solving, and conversation.” This statement summarises research that suggests that when working with developmentally appropriate software children tend to engage in a variety of social interaction such as joint problem solving, turn taking and cooperative play.

Another aspect of developmentally appropriate software is that it may be included as a prompt in children’s dramatic play. For example, children used the computer to make signs for a restaurant in their dramatic-play area (Apple Computer Inc. 1993, in NAEYC 1996).

Michael Cole describes a range of ways that computers may be incorporated into children’s imaginative play (Cole 1996). He elaborated on an after-school *New Information Technology and Literacy Program*, designed for five to twelve year olds and known as the 5th Dimension. The design of this program was guided by the cultural-historical psychological theory of Vygotsky. The project is structured around computers and telecommunications supported by specially selected software as well as making use of the Internet. The aim was to reinforce learning by including it into the context of make-believe play and communication with peers and adults in a situation of pretend (Cole 1996, Verenikina and Belyaeva 1992).

Appropriate visual and verbal prompts designed in the software expand play themes and opportunities while leaving the child in control. Vast collections of images, sounds, and information of all kinds are placed at the child’s disposal. Software can be made age appropriate even for children as young as three or four (NAEYC 1996).

Sabbeth (1998) describes practical art activities, mostly painting, which can be used with children as part of their constructive play. Flintoff (2002) argues that computer games can be useful in enhancing memory capacity, in concentration of attention and in the problem solving strategies of young children, which can indirectly affect their academic achievements.

3.1.2 Early Childhood Settings

The purpose of our pilot study was to find out how computers are used in early childhood settings of today.

We looked at a small number of early childhood centres attended by our third year students for their practicum. We asked the students to complete a short survey regarding the situation of computer use in their centres. We were looking for answers to the following questions:

- Were there any computers that children used in the EC centres?
- If yes, how often the computers were used.
- What were the situations of the computer use (self-initiated or organised, in groups or alone)?
- For what purposes (learning, play, drawing, writing, printing and so on) were the computers used?

The results of the survey showed that the majority of the early childhood centres that we examined (eleven out of fifteen) had one or two computers in the play area. The computers were in use most of the time and mainly were utilised for playing computer games. Children played in small groups or sometimes alone, using the computers by turn. Most of the children didn’t need adult assistance in playing games. When we asked the students whether they thought that the use of the computer games in early childhood centres was beneficial for the development of children they replied that they were not sure. Students didn’t seem to be able to comment on the developmental value of the use of the recreational computer games.

Only two out of the eleven centres used computers for activities other than playing computer games. The computers were used as a teaching resource and special educational software for drawing, mathematics, language and computer literacy activities was employed. The question that needs to be further discussed is, where do we go from here? Do we envisage computers in early childhood centres in terms of providing teaching resources and educational software? Or should we consider ways of merging new technologies with children’s play, with a view to mobilising the developmental benefits of this important early childhood activity?

3.2 Proposed Study

Our proposed research represents one way in which preservice early childhood educators may be helped to develop necessary skills for examining the relationships between computer games and children’s play. If computer games are to become a significant part of children’s lives we need to look at their developmental value from the same perspective that is taken when considering the significance of play in child development.

The main purpose of this project is to examine the ways that classical and modern theories of play can be applied to the analysis of the developmental value of computer software in the early childhood years.

Preservice early childhood educators need to become aware of the rapidly changing market of computer software for young children. They need to develop skills necessary for critical examination of the developmental value and developmental appropriateness of computer games. When assessing the quality of particular items of

computer software for young children, early childhood educators need to be able to judge their value from the theoretical perspective of child's play. For this purpose we plan to incorporate a new technology perspective into a first year subject of the EC program, Early Childhood Learning Environment 1. Currently we are at the stage of identifying a range of computer software that can be used as a basis for developing an instrument for assessing the developmental value of computer games from a theoretical perspective on child's play.

3.2.1 Supporting Preservice Early Childhood Educators

Preservice educators are in a position where they will be expected to guide and support young children as they explore the possibilities associated with computer use. Resources that allow them to judge the relative appropriateness of different technologies and the software that accompanies them is critical. Effective pedagogies must be developed that will enable educators to facilitate children's play with computers in ways that enhance the development of children.

The context in which these outcomes will be developed is an early childhood preservice subject called EDUF104, Early Childhood Learning Environment I. This subject will be extended to incorporate a developmental examination of computer games, based on play theories, such as described in this paper.

Briefly, this subject focuses on play in terms of children's development and implementation in early childhood programs. Initially, the subject explores play theories (as those summarised in this paper), the development of play in terms of levels and stages (also summarised here), and variations that occur in play across different sociocultural contexts. Upon these theoretical foundations, we build implications for practice – these implications include observing and assessing children's play and the materials with which they play; and the application of play as a vehicle for learning across subject areas of the early childhood curriculum.

The delivery of this subject entails some lectures, with a greater emphasis, however, on workshops that explore theoretical issues and practical implications, and students' self-directed project work that deals with play across the curriculum.

By way of developing students' understanding of the assessment of the developmental appropriateness and value of computer games in terms of play theories, this subject will:

- raise the place of computer games in early childhood programs as a problematic issue that needs to be examined in terms of play theories and developmental appropriateness;
- provide explicit input on how we might link play theories to computer games so we may understand their developmental value for children;
- discuss, workshop and develop a framework for examining computer games in terms of play theories;

- Implement computer lab workshops in which students examine a sample of software in the framework that we have developed in class and which will be further refined through these explorations of software;
- Compose a final version of this framework for dissemination.

Some preliminary thoughts that have so far emerged from our examination of play theories in relation to computer games are summarised below.

3.2.2 Assessing Computer Software

The conceptual framework of our paper is constituted by a number of play theories, previously described, that account for the value of play in children's development. From these theories, we have derived criteria by which early childhood educators may judge the developmental appropriateness of computer games for young children. Below, we summarise these theories and the criteria to which they each give rise. These criteria are intended as potential starting points only, as criteria are to be generated, explored and refined in the context of the approach in EDUF 104 that we have described above.

General characteristics of play:

- Play is a spontaneous, self-initiated and self-regulated activity. Does this computer game allow children to freely engage in play? Does it provide a freedom of choice?
- Children are actively involved in creating their play and are in control of it. Does this computer game allow children to create their own scenarios, rules and characters of the play?
- Play includes a dimension of pretend. Does this computer game enable children acting in an imaginary, "as if" situation?

Levels of play:

- Parten/Piaget levels of play (Rubin *et al.* 1978, in Johnson *et al.* 1987). What level of play does this game support?

Level of play	Solitary	Parallel	Associative/ Cooperative
Functional			
Constructive			
Dramatic			
Games with rules			

Table 1: Piaget/Parten Scale

Classical theories of play:

- Surplus energy theory (Spencer 1873)—play discharges natural energy of the body. Does this computer game allow for discharge of natural energy? If so, in what sense?
- Renewal of energy theory (Patrick 1916)—play alleviates boredom while the natural motor

functions of the body are restored. Does this computer game engage the interests of the child (with particular children in mind as this criterion is considered)?

- Recreation theory (Lazarus 1883, in Dockett and Fler 1999)—play restores energy that is expended in work. Does this computer game allow for rest and relaxation in an enjoyable and engaging way? If so, how?
- Practice for adulthood (Groos 1898, 1901)—play affords opportunities to develop skills and necessary for functioning as adults. Does this computer game provide opportunities for developing adult skills? If so, what kinds of skills?

Modern theories of play:

- Psychoanalytic theories (A. Freud 1968, S. Freud 1959, Erikson 1963)—play reduces anxiety by giving children a sense of control over their world and an acceptable way to express forbidden impulses. Does this computer game enable children to gain a sense of control over events that they could not control in their lives, including traumatic experiences? If so, in what way?
- Cognitive theory (Piaget 1962)—play consolidates learning that has already taken place while allowing for the possibility of new learning in a relaxed atmosphere. Does this computer game have the potential to consolidate existing learning? If so, what kind of learning? Does this computer game have the potential to develop new concepts and skills? If so, what concepts and skills? Does this computer game allow for and nurture the active participation of the child? If so, in what way? Does this computer game engage the child in such approaches as problem-solving and self-discovery?
- Arousal modulation theory (Berlyne 1960, Ellis 1973)—play keeps the body at an optimal state of arousal, relieving boredom and reducing uncertainty. Does the computer game engage and sustain the interest of the child?
- Bateson's communication and metacommunication (1976)—play promotes ability to comprehend multiple layers of meaning. Does this computer game operate at literal and figurative levels of meaning? Does this computer game enable children to reflect on the rules and means of communication?
- Mead's theory of self (1934)—play promotes sense of self in terms of personal identity and social relations with others. Does this computer game develop a sense of a child's own identity? If so, how? Does this computer game develop a child's sense of his/her own social identities in relation to others? If so, how?
- Sociocultural theory (Vygotsky 1977, 1978)—play promotes abstract thought by separating meaning from objects and actions and using actions and objects in symbolic ways; play allows children to reach beyond their actual development in their cognition and self-regulation; in play children achieve a mental representation of social roles and

the rules of society. Does this computer game involve and develop use of symbolic meaning? If so, in what way? Does this computer game allow children to engage in their zone of proximal development and function above their everyday abilities in cognitive and socio-emotional areas? Does this computer game provide children with an opportunity to act out and explore the roles and rules of functioning in adult society? Does this computer game allow for group work and collaboration?

4 Conclusion

In this paper we have presented a work-in-progress, as we begin to provide a platform on which our further research can rest. The aim of the pilot study was to examine the application of the theories of child's play to an analysis of the developmental appropriateness of computer software in the early childhood years. From these play theories, we have derived a list of criteria, thus making a starting point in developing an instrument that can be used to explore the developmental value of individual items of computer software for young children.

The development of this instrument provides a research base for supporting preservice early childhood educators as they consider the use of computers in children's play. Understanding the range of ways that computer games may or may not contribute to the child's development will enable early childhood educators to make an informed decision when choosing particular software for their settings. The next step is to further explore and elaborate the criteria while probing and testing them on a variety of software designed for young children. As a future implication of our research, perhaps, the criteria of evaluating the computer games can be utilised as a guideline for designing developmentally appropriate software for young children.

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