



Toilet training

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The virtual environment from a developmental perspective

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SUMMARY

The Virtual Environment (further to be referred to as VE) is fully established in all generations. It started off with radio and television then computers and the internet were the next big step. Computers and cell phones have not yet been around for very long, but they have already largely supplanted television in the younger generations. Children feel at ease in the new environment because they learn to handle the technology easily, without requiring much help from others. The change to an interactive digital environment took place very rapidly. The result is that scientific research into the effects of the VE on the development of children or any other field started too late.

*It is very difficult to describe the influence of the virtual environment and to know how to raise children in this VE. The possibilities seem endless. Twenty years ago, I described the benefits of therapy with children using the computer (Delfos, 1992). In 1994, I described the impact of gaming on the moral development of children (Delfos, 1994). Because the theme of the *Virtual Development of Youth* was what I focused on for some years during my professorate, I decided to combine research, knowledge and experience and applied this to the VE in order to create a model of education in the VE from birth up to 25 years of age. My sources were: firstly the available scientific knowledge about the VE, including my own research; secondly my experience as a therapist since the 1980s about how youth behave on the computer, thirdly there is my experience as a writer of textbooks on developmental psychology and psychopathology (Delfos, 2009a, 2009b, 2012a; 2012b), and last but not least my personal life experience in a world changing to computers and cell phones. I combined all this knowledge and experience in the endeavor to describe how to raise children in the VE. For the critical reader the task is to use this model and apply his or her knowledge, experience and insight to test the result.*

1 The virtual environment

In the twentieth century, the television (1923), radio and video (1953) started the virtual environment. With the advent of the *personal* computer (1981), the picture changed completely, with the VE becoming an integral part of life, at work as well as at home. The VE became a fourth environment alongside the family, school and the world outside (Delfos, 2009c; 2010a, 2010b).

The VE is a fictional world, created by media with a monitor, in a *passive* way (television, video and CDs / DVDs) or an *active* and *interactive* way (especially internet, computer, cell phones, tablets, Wii). This world is the counterpart to *real life*, (which from here on will be referred to as RL). The interactive element has become crucial and is therefore applied to all devices.

It is not easy to estimate the advantages and disadvantages of the VE, because both sides are very prominent, although the benefits prevail. The e-mail, chat and cell phone have changed the pace of life. The expectations of people are adapting to the possibilities of modern media. In a fraction of a second an email is on the other side of the world. There is an acceleration of life that favours strong emotions (anger, falling in love, aggression, cheerfulness) and pushes aside slow emotions (tenderness, respect, compassion, love, humility). It is precisely the slow emotions which are binding, especially in long-term relationships. And commitment is what everyone needs (Delfos, 2010c). It seems as if the VE pushes mankind beyond the human dimension. The pace and pressure to speed up, no longer seems to fit the human being or his/her brain. Even sleep and meals are no longer an evident structured part of the day. The 24-hour communication fostered by the VE dominates the daily structure at work and at home.

The VE is quite different from the RL and on the other hand, is not at all different. One takes oneself along into the VE. And just like in the RL the emotions arise before thought. Experiencing the VE is not necessarily different from experience in the RL. If there is suddenly a monster on your virtual path, your heart beats faster. The relief and pride when you have defeated the monster resemble the relief and pride that you experience in the RL. The brain in the VE, even during gaming, does not really behave differently.

2 The internet

The VE has become an important part of the lives of children and adolescents, but also of adults. The internet is dominant in the digital world. The role of youth in the development of the use of digital devices is undeniable (Lenhart et al, 2005). Adolescents are the innovators; they are very keen on new devices. Young people have made the world mobile. In fact, in the last century two adolescents from the sixties changed the face of the world: Steve Jobs of Apple and Bill Gates of Microsoft (see Figure 1).



Figure 1: Steve Jobs of Apple © (left) (deceased in 2011) and Bill Gates of Microsoft © (right) speaking with each other during a TV programme in 2007. Photo with courtesy of Joi Ito, 2011.

The internet opened up a new world. At the pace of a tidal wave it conquered the world and changed its appearance. The current generation of young people between 12 and 18 years old makes massive use of digital media, especially the internet (De Graaf and Vanwesenbeeck, 2006). Initially men used the 'web' significantly more often than women. However, from 2005 onwards, the proportion of women using the web has been higher than that of men (Meraz, 2008). The internet is a powerful medium and people enjoy using it (Maczewski, 2002). The web density in a country mainly depends on the digital infrastructure.

The VE has become a world where people present themselves both as they are (as themselves) or as a fictitious character (with a fabricated identity and even with changing identities). One can shape a virtual identity in the VE to one's own liking. This is called an *avatar*. It is the image, the virtual identity that people present in a game or in social media. The word 'avatar' comes originally from the Sanskrit. In Hindu philosophy the avatar is the incarnation of a god on earth who has the appearance of a human being. In the VE this is reversed; a human being can present him- or herself as a god in the VE, see figure 2 and 3 for examples of avatars.



Figure 2 and 3: Left: an avatar from World of Warcraft and Right: an avatar in progress.

With the pace at which internet is changing society, whole generations lag behind the children. There is a generation gap between sixteen and twenty years old. Above twenty years old people hardly know what children under sixteen years old are doing and experiencing (Delfos, 2010a). Indeed, the developments are so fast that adults are no longer familiar with the latest equipment or the latest software. The development of virtuality is still on-going. This is great on the one hand, but it also requires thinking about the negative side of it, and also about what threatens to be lost.

Much knowledge is lacking in adults. Children discover more quickly than their parents how something works on the computer, but they lack frameworks into which they can place their experiences. The virtual environment is an educational force that is not intended as such. Basically, alongside all the benefits, the VE still presents two major problems. Both problems can be overcome if people choose to solve them:

- 1: Children are raised *with* this environment, but not so much raised by their parent/s *in* this environment.
- 2: At the beginning of the twenty-first century, the VE, especially the internet, has, for the most part had a commercial basis. Thus, unnoticed commercial motives invade the development of children (Greenfield, 2004). Parents tend to feel insecure and helpless in raising their children in this environment.

The internet is a fascinating medium but, like everything else, it should be presented to children in an age appropriate way. In the RL parents actively guide their children in how to play with each other. Without their parents children would not be able to play with others. Parents teach children not to punch nor bite, nor to grab toys from each other. The fact that children easily learn to deal with computers does not mean that the situations with which they are confronted at the computer, are age- or mind-adapted. The child is not born as a fully developed adult. Children need adults to protect them, to set limits and help them to understand their experiences. Limiting and guiding young people is necessary, because their motivation and drive on the internet know no bounds. The same applies to the VE. The great potential of the VE can only be used on the basis of being educated in the use of the VE.

The VE is a different world with different opportunities than the RL. In the VE boundaries are easily blurred, whereas in the RL they are of utmost importance; literal borders, but also psychological boundaries. In the real world, for example, trespassers are visible, doors have bells you have to ring to be allowed to enter a house

For young people, the internet has become a life environment, not only for recreation, but also a place to meet, to present themselves, to find out what is going on in the world and to obtain information. For adults, the VE at the beginning of the twenty-first century is not so much a social environment, but it develops more and more in that direction, because the young adults grew up with it. The VE is a different world with different opportunities than the RL. In the VE boundaries are easily blurred, whereas in the RL they are of utmost importance; literal borders, but also psychological boundaries. In the real world, for example, trespassers are visible, doors have bells you have to ring to be allowed to enter a house.

3 The fascination of the VE

The adolescent is a 'screenager'. In countries where adults have little access to the internet, children and adolescents find their way into the VE, often through schools. The schools – also in developing countries – are increasingly equipped with computers. The schoolchildren are familiar with them, the teachers sometimes even need the help of the children to work at the computer. In countries where internet access in homes is high, adolescents often are expected to check their school's website first thing in the morning to find out what lessons they will be having that day. In countries with widespread access to the internet, most adolescents also have a cell phone. In the Netherlands, the density is so high that there are more cell phones than inhabitants: 19.310.000 cell phones among 16.574.989 inhabitants (Central Bureau of Statistics, CBS, 2010a). The internet density in households in the Netherlands is almost total at 94% (CBS, 2010b). Within a short time, this will be a fact of life for large parts of the world.

The use of the internet depends on people's level of education. Immigrant children and young people use the internet more than indigenous children and young people (Meerkerk et al, 2006) and this difference appears to be increasing (Van Rooij et al, 2009). Young people with more economic and cognitive capabilities use the internet more for information than for gaming or chatting (Peter and Valkenburg, 2006a, 2006b; Notten, 2009). In school education the computer plays an increasingly important role (Delfos, 2011a).

The majority of children have several devices active at the same time. The VE captivates the young and they spend much or most of their free time in the VE, with all its consequences, from the very negative to the very positive. Take, for example, gaining a good command of the English language. Their knowledge of English is so much better than that of their parents when they were young.

In Bosnia-Herzegovina, the level of internet access is not high, but children find their way onto the internet. I got the opportunity to perform three interviews with focus groups for a project to make children more conscious about their experiences in the VE, for the programme V-Conscious. The three focus groups were teachers, children and parents. In the interview with 12 youngsters between 10 and 14 years old hardly any interpretation between English and Bosnian was needed. The English of the children was excellent, impressive in terms of vocabulary, pronunciation and expression skills. When asked why they could speak English so well, the answer from a number of mouths simultaneously was: 'Cartoon Net! The teachers and the parents needed interpretation into their own language and hardly dared to speak English. The parents did not know that their children's English was so good. The answer to the question posed to the parents as to why they thought the English of their children was so good was: 'Good teachers'. They had no idea of the influence of the VE on their children and saw the television only as a recreational object.

The concentration people deploy when they are working on a computer is extremely high. The hypnotic effect produced by a monitor enhances concentration. Even when images are fast, the processing speed is still slower than what a human being can process through his/her own senses, which are faster than the fastest computer processor. This slower pace of processing can therefore be soothing. Even the repetition of movies is fascinating for children and relaxing at the same time. Falling asleep in front of the television is not an uncommon occurrence for many people. The sleep-wake cycle is regulated by the hormone melatonin, the release of which is also influenced by the light that reaches the brain through the eyes. Because of this the screen influences the sleep-wake cycle. On the other hand, the content of the information can shake a person up, especially when the content is sex or aggression. Sex is about reproduction and aggression is about survival. Both subjects are deeply rooted in mankind and even the baby seems to have a radar for these. The fascination with the VE is reflected in the eyes of the people looking at a screen. They show large pupils that seem to absorb everything they see. Figure 4 shows the intensity in the eyes, so common when playing and working on a computer.



Figure 4: Intensity of 'working' on a computer.

The girl sitting next to the boy watching his game also shows intensity in her gaze. The intensity of the girl seems lower, possibly because she is only watching and does not feel responsible for what happens on the screen, the boy is supposed to control the situation and may need to intervene in what is happening on the screen.

Due to the many problems that arise with the VE, it is overlooked how positive and constructive the VE in general can be for young people. Young people have an enormous drive to work at the computer. It is very difficult to drag children and young people away from the computer. They are not forced to use the devices, but enjoy doing so and are fascinated by the computer, tablet, console or cell phone, et cetera. It gives them control over a powerful medium (Delfos, 2003a). Children and young people experience exciting adventures in games by actively playing a role. They can master a cognitive skill and practice it at their own pace, and repeat this as often as they want to. In no time at all they understand more of the English language than many of their parents do. As great as the possibilities of the VE are, everyone also knows from personal experience that enjoyment can also change into addiction-like symptoms.

4 The VE and the senses

The senses constitute an important difference between the VE and the RL. In the VE the role of the senses is minimal; smell and taste are missing for example. The senses are particularly important in social contact. Sixty percent of our behaviour is driven by non-verbal signals, and the senses play an important role in this non-verbal communication (Birdwhistell, 1955; Philipot, 1983; Burgoon & Bacue, 2003). Many interactions in the VE are therefore difficult to figure out. Not only in social interaction, but also in learning is it necessary to use all senses.

The VE is a two-dimensional world, even if the illusion of a three-dimensional world can be provided. With one's avatar, for instance, one can turn left, right, look up and down, and even see oneself (one can choose a first person perspective or a third person perspective). But it still remains a two-dimensional world.

For all the criticisms people express about the VE, programmers find the solutions. For instance, a solution to the lack of the use of the senses in the VE: the webcam is a solution for the visual sense. However impressive it is to see a relative in another continent and to communicate on screen, it is not possible to look each other in the eye or look in the other's eyes to see their expression or reaction to what we are saying or doing. The webcam shows eyes looking at a place on the computer, not at a person. The only time we look directly into someone's eyes is when that person looks directly at the webcam, which means they are looking at a dark circle in front of them, into the eye of the camera. Their eyes have little expression then. It is similar to a conversation in the RL when the interlocutor is looking at the shoulder or belly of his/her conversation partner. This lack of expression to what some says is caused by the fact that one is looking at the image of the other person displayed somewhere on the screen and not looking in someone's eyes. What is very distracting for a conversation is that the image of oneself is also displayed. In the RL you always only see the other, not yourself. Another effect of the webcam is that it is not quite real. It feels a little bit like acting in a movie. One can easily do things that one would never do in the RL.

There is a solution for the sense of hearing, which is as yet far from perfect, due to the fact that you cannot easily hear breathless listening. Breathing - slower or faster - is a form of non-verbal communication which has an important effect. Breathless listening can be 'heard' when someone or an audience holds its breath while listening. Breathing says something about the contact you have with your listener and the interest of the listener in what is being said. The sense of scent is so subtle and yet so unknown to human beings that it will be difficult to digitally transfer it, but computers that are able to detect scents are being constructed. In the RL, we know that scent drives behaviour and even the influences one's choice of a partner without one being aware of it (Herz and Inslicht, 2002). However, neither touch nor taste are possible in the VE. Despite this, a virtual touch can evoke emotions, as a woman in Second Life (a virtual environment/game) experienced,

when she felt truly sexually harassed by the assault that she experienced. The experience is not real, but the emotions experienced are real. We will see that the amygdalae of the brain initially do not distinguish between whether an experience, a danger is real or not. To spend much time in the VE means a lack of experience of the senses in the regulation of social interaction. Parents and teachers should realize that too much time in the VE can damage development, certainly social development.

5 The loner makes a crowd

Until 2000 research was directed at the influence of the computer, focusing particularly on the cognitive possibilities of the computer. The social impact of the computer only slowly became visible to adults. The VE is becoming the meeting place for young people. It has become the norm to get to know people through chat and email (Sjöberg, 1999), and many new ways of communication arise such as 'ping' (free sms with the Blackberry cell phone), 'What's App' (sharing chats, photo's et cetera in a group of cell phone friends) and social networking media in general.

The speed of communication via social media is so high that it hardly allows any time for reflection. As a result the VE can have an epidemic effect. Good knowledge spreads quickly, but nonsense does too. Messages to stimulating others to take action can spread at an unforeseen speed. One invitation to a birthday party on Facebook had spectacularly good and bad consequences. The girl did not realize that her invitation was not limited to her friends, but that it was spread all over Facebook. Thousands of adolescents came to the birthday party in a small village and many baked cakes or brought presents, but there were also adolescents who took the opportunity to create a riot. This type of thing also happened with the riots in London in 2011.

The loner can stimulate mass action via the VE, notably via the cell phone.

On Saturday 6 August 2011 riots break out in London and four other cities in England. Through social media like twitter and via cell phones people gathered in demonstrations that deteriorated into riots and plundering.

The media fills in the gaps that arise in a changing world which has deficits that are partly caused by the same media. People need to connect to people and the internet offers new and seemingly endless opportunities for contact. The possibilities to make contact with someone anywhere in the world are enormous. To 'make friends' and 'dating' in the VE are daily activities for many people. It is not clear, however, how to behave there, people struggle with the 'compromise' between anonymity and transparent freedom (Jensen, 2011). People also have a daily need for information and the internet provides almost limitless information.

The development is occurring so fast that it is difficult to develop standards (and values) for this expanding VE. There is a need for *virtual codes* since the VE has an influence on the moral development of children and youth (Delfos, 1994).

6 The VE and hormones

Even if it is a virtual environment; one can feel emotions as one does in the RL. The emotions we experience are elicited by hormones produced in our body, such as adrenaline. This also happens in the VE, often at a quicker pace and more continuously than in the RL. Emotions are elicited by fictitious experiences as well as by virtual ones, such as in games. In action games there is a continuous flow of 'danger' and having dealt with the 'danger. These emotions follow each other more or less like the tides.

It often takes a moment after a game for a person to come back to him/herself. When a game stops the level of hormones diminishes at a slower pace. The transition between gaming and starting something social such as eating is often not long enough. With gaming, hormones are produced that cause an alert condition that stands in the way of normal social behaviour, because normal social behaviour is not alert behaviour. It is good for children to learn to build a buffer between the VE and the RL. Especially doing something physical helps 'using up' hormones produced before sitting still at the table for instance.

7 The virtual development of children and adolescents

In the development each phase has its own characteristics. There are general guidelines, but each child has a unique developmental course. Based on the available body of knowledge as described in the introduction, a classification into ten stages from birth to 25 years has been constructed. As we live in a time when children are ahead of adults in the VE, we sometimes seem to forget that the child is not 'accomplished' at birth and that the brains need 27 years to mature. In the course of maturation a child is faced with many developmental tasks such as learning to control him/herself and to develop skills. There are no sharp lines to be drawn as to when a child performs any developmental task, or even which task to develop. It is more an expectation of a developmental task being mastered during a certain period, during a certain age span.

It is important to realize that growing up means that a child is formed, and every experience is linked to that formation. The VE is a part of this formation and through the VE certain conceptual frameworks are developed in children. To be able to assess the influence of and to use the VE in the upbringing and education of children in an intelligent way, this section provides an overview of the general indication of the nature of the formation into ten phases of development with regard to raising children in the VE. The age indications given in the ten phases are general and partly overlap. After this description of phases with regard to the VE, a summary in four periods is given in table 1 (see page 121), and also an indication of the maximum amount of time that children should spend in the VE at different ages is given in table 2 (see page 122).

The material relating to the development of children and adolescents is mainly derived from the textbook *Developmental Psychology Development from a Bird's Eye View* (Delfos, 2009a). It is perhaps surprising to see how little the VE fits in with the developmental tasks of children in the early years and how well it can fit in a few years later.

Each phase contains general development themes, the developmental tasks at those ages and the significance of the VE for that development.

The first phase (0 - 1½)

The first phase runs from pregnancy to approximately one and a half / two years of age and is characterized by the development of physical growth and attachment.

The development of attachment is of utmost importance to children. Children construct a thinking framework about what people do when the child has a problem or needs help. Do they help the child, or do they not help the child? When children feel they are helped when they have a problem, they develop secure attachments, which is a good basis for developing friendships and relationships in the course of life.

The child has a dynamic brain that organizes everything via associations. Good education means to offer the child what it can comprehend. The principle of development during this period is exploration, discovering themselves and the world around them. This exploration primarily takes place through the senses. Children put objects in their mouths and smell the scent that rises when they stick one of their fingers into an orange.

Events and experiences of the first years will be stored into the memory under sensory elements such as an image, a sound, a scent, a tactile feeling or a taste. This makes the memory before seven years of age less accessible, because after 7 years of age a new organization of 'data' occurs in the brains: i.e. storage in language.

Milena did not consciously experience the war. She has no conscious memory beyond what she has been told. She was only three years old when the war was raging in her town. One day, when she was already an adult, she smells a bread spread that gives her immediately an intense, nasty feeling. Asking her mother about this spread, her mother says that this was a spread used during the war and that she had never seen it again since then. Milena quietens down immediately and the smell does not bother her anymore. Her father was shot three times and she has no memory of that. Possibly the unpleasant feeling of war may be associated with the smell of the spread she ate at that time.

Regarding attachment, the VE seems not very useful during this phase, because the VE characters will not be able to help in the case of a need or an emergency. However, the VE can play a role in suppressing bad feelings. The screen has a strong attraction, and may therefore play an important role in suppressing the unpleasant feelings by pushing them into the background.

In the VE not all the senses are stimulated. The pictures and sounds are very powerful and the other senses are neglected. As a result an unbalanced growth can occur in the socio-emotional development of children.

The screen can hold the attention in a hypnotic way and foster concentration, but it can become too strong and foster addiction which becomes a 'programme' in the brain. As long as we do not know exactly what influence the exposure to the VE has on the brains of babies, we should only use the VE when we are convinced that it is only positive. The television has become an important 'babysitter' but should not be used as such or as a sleep aid.

Because the VE both in the area of attachment as well as in the exploratory sensory area is not very suitable, it must be used very selectively during this phase. Not every day, and not for long periods of time. Parents need not be afraid that their children will lag behind their peers without much exposure, because young children do not need much exposure, they learn very quickly and swiftly make it part of their behavioural repertoire.

Suzanne, two years old, is given a small rectangular mirror. She sees her face in it and tries with her hand to 'browse' as she usually does with the cell phone that she plays with.

There must be a sequence in the building up of experiences in general. The RL should be the fundament. First, a base constructed from the basic elements of the RL, and then the VE, so that a realistic formation can occur according at a human pace. Especially in the social-emotional area, it is necessary to let the VE play a modest role, to prevent a skewed development.

The theme of the second phase (1½ - 2½)

The theme of the second phase is that of communication and autonomy through exploration.

This phase involves children's exploration of themselves and their possibilities, and exploring the objects around them. The child learns what falls down and breaks and what does not; what can be pushed behind a cabinet and what cannot. The maturation of the child makes it possible for the child to learn to walk and talk. There is a growing autonomy in all areas. The child will learn to assess him/herself. He/she can tell you what he/she can do by him/herself. During this phase the child in his/her explorations is faced with boundaries. Parents are actively protecting the child by creating a safe environment and setting limits to give the child the maximum opportunity to safely explore.

As in the previous phase, the VE is of limited use. The VE cannot really help the child discover him/herself. Exploration during this period is important so as to make possible that the child can literally and figuratively stand on his/her own feet. Slapping a doll on a computer by waving your hand in front of the monitor, for example, is not a very wise thing to learn if you do not yet know what the effects of such behaviour in the RL will be. It may even be counterproductive, because the child thinks the RL and the VE work in the same way. In addition, what the child is doing in the VE is limited mainly by the possibilities of the 'game', unless the adult is teaching the child not only in the RL but also in the VE. A device like a Wii can help the child to discover his/her own potential, but it must be clear to the child what can and cannot be translated to the RL.

For parents the VE is very attractive during this period because with the VE the child is quiet and does not need much attention, and without the VE he/she requires a lot of attention at this age.

The theme of the third phase (2½ - 4)

The theme of the third phase is the transition from self-centeredness to learning to live together. This is an important period in the me-other differentiation. The child learns to know 'the other' and learns that people set boundaries. The child, who in the previous years believed him/herself to be the centre of the universe, learns that his/her own freedom is limited by the freedom of others. The 'other' comes into the picture as someone rather than only a means of gratification. The child learns to take into account other people's wishes. This is often called the stubbornness phase or the 'terrible twos'. Children test the limits of their own freedom and the limits of others. This stubbornness phase is a training ground for parents and children to enable the child to develop into a responsible and at the same time a free member of society. Exploration is still important, but the environment itself is now being explored. Learning the boundaries and especially learning to accept limits is an important developmental task through which children learn to overcome their egocentrism. It is the period in which the child must learn to entertain him/herself.

The VE should have a negligible role to during this period. In the developmental task of learning to entertain oneself the VE can have a harmful effect on the child. The VE provides perfect and quick entertainment without requiring much effort or initiative from the viewer/user. The VE can also have a negative impact on learning to limit egocentrism. It can enhance egocentrism and this can easily lead to feelings of omnipotence. The child who resides too much in the VE will experience a lack of feedback about his/her own behaviour and will not learn about his/her own limitations, making it difficult to move beyond the feeling of omnipotence of the early years. This may lead to an imbalance in the sense of having an exaggerated expanded ego, not in accordance with the reality of the RL. It can affect learning to live together and the forming of friendships and relationships. The VE should be only play a role in the background to clear the way for outdoor play and learning about social boundaries through effective interactions with others. The use of the VE should be in accordance with this developmental task of children, so that they do not grow up as 'princes' and 'princesses'.

At this age, the VE will, as in the previous stages, contain the risk of the child forming false images of reality.

Tonky is four years old. At school, they could not find him for half an hour. Afterwards it became clear that he had broken into a house and broke every possible object he could find in the house with a stick. Tonky is a nice boy, not aggressive at all. The school is stunned and asks him why he did that. He replies: "To access a higher level!"

This little boy is not really a gamer himself, but watches his big brother play computer games. Therefore his experiences are not age appropriate. He translates his experience in a game in the VE into the RL, which is inappropriate. With his four year old maturity and experience he behaves like children do at his age: they explore and imitate. He is actually a healthy boy who has received an 'unhealthy' life lesson.

The fourth phase (4-8 years old)

The fourth phase is characterized by verbal learning and philosophical development.

Around seven years old there is a hinge age (Delfos, 2009a), a transitional period after which the big concepts that will determine the child's future perspective on the world will be explored. From three to four years of age, the child actively and philosophically explores the world through the 'Why-questions'. Children gather information by endlessly observing everything and through tirelessly asking about the reason for everything. Based on the knowledge gained, the child deepens his/her understanding. It is the period in which a child learns to appreciate the value of information.

The VE is a powerful instrument for increasing the alacrity of children to absorb information. In that sense the VE can begin to play an important role. The information in the VE is not always reliable and is subject to commercial motives. This means that the child is ready to learn that information in the VE is not always reliable, and how that reliability should be tested. Media education can be very fruitful in this period.

Parents cannot always answer the deep philosophical questions of their children. The internet can help with this. It can also help children to realize that knowledge is plural and open to different interpretations. Children need to learn, however, that not all questions can be answered. The discovery that one can find answers on the internet is a valuable and important contribution of the VE to the development of children. During this phase the VE is a helpful possibility, but only by having recourse to parents, guardians or school supervision. To ensure that their knowledge base is healthy, children have to be protected against age inappropriate experiences. Explanations from parents and school are essential. Thus the child learns that the internet is a vast source of information, but is also a source that is difficult to trust. Child friendly browsers and parents, who show that one can find information on the computer and in books, give the child the important conceptual framework that information is available. This provides a solid ground for later learning. Compared with the past, this is a huge bonus. Where once there was information in books, in encyclopedia, it is now easily accessible and available for everyone, text and image. This creates an important framework in children, namely the fact that knowledge is attainable.

Among other possibilities, gaming can be introduced as a form of recreation. Whereas in earlier phases it should be offered only sporadically, it can now be introduced as one of the possibilities. Attention must be paid to limiting the time spent on the computer/device.

The risk associated with the VE, as it is in the twenty-first century, can certainly be felt in this period. When during this phase children access formation without being given the time to process this information, they risk developing distorted images, frameworks and perspectives. Inadvertently, these become building blocks of their fundamental knowledge, of their formation.

George, four years old, plays online in Habbo (see Figure 5), a virtual world. George runs to his mother, crying out loud, because he was told that if he wanted to go through a certain door in the game he would have to have sex with animals. He is shocked. The Habbo is intended for children from twelve years and above, not for four year olds. There is no sex behind a door in Habbo, but you can still tease fellow players. This can be passed to the webmaster and the teasing / bullying player will be called to order and possibly be banned.

It is an unpleasant experience for George, but the most harmful thing is that he hardly gets the time to process this experience or talk about it, because the next experience is already coming up in the fast pace of the VE. This speed is different than in the RL.



Figure 5: The Habbo: The Habbo Mall

It is important to dose the use of the VE and to ensure that adults know what the child experiences and that they can help the child to place what he/she experiences in the right context. It is also important to dose the time between experiences so that the child has the time to process his/her experiences.

The fifth stage (8–10 years old)

The fifth stage is the phase of the development of cognitive skills.

The child learns eagerly. By learning to read, the child enters the world of adults. The creative possibilities are also expanding: drawing and music. In motor development the child grows and sports become an important part of the child's leisure time. Learning is no longer playful, but is largely imposed from outside. Essentially it affects the fun of learning, sometimes through comparison with others, but children remain eager to learn. Children are engaged in developing and demonstrating skills.

During this period, the computer is a great tool for children. The VE can take away the frustrations with the readability of their writing experienced by young children. Playful learning on the computer is natural for children. The computer makes learning at the child's own pace still possible, where school took over from the playing child. It is important to carefully choose games that will stimulate the child: those which are not too hard, and not too easy. There is a huge industry designing games for digital devices, but the effect of games on children has hardly been studied. Commercial motives lead the choice more than scientific motives, educational motives or parental experience.

Due to the enormous appeal of the VE, computer time must be monitored (Delfos, 2007), so that the developmental tasks during this period can be performed in the RL. During this phase, it is advantageous to engage in the prevention of addiction and to observe whether the child shows signs of emerging addiction. Long before addiction occurs, the child can show signs of problems with wanting to control the digital world. I developed the term Game frenzy to address this problem, explained in the paragraph on gaming, (see page 130).

The sixth phase (10–12/13 years old)

The sixth phase is the prepubertal phase.

The development of social identity is important in this phase. Children are concerned with questions such as *How can I be considered a good child in the eyes of society?* (Delfos, 2009a). Because hormones will prepare the biological maturity and the body's growth spurt, it is important that the body is not shaken up too much in a hormonal sense by the VE and that it can develop at its own pace. Forming friendships is very important. During this period children make, break and restore friendships easily. The friendships are not yet very reciprocal at this age, they are superficial: having a number of friends and gaining popularity are important matters for children at this stage.

The VE can play an important role during this period. The possibilities of the VE, especially in terms of social media, fit in very well with young people. The cognitive skills still play an important role in this period. The pleasure of cognitive skills however, is increasingly pushed aside by the recreational possibilities of the VE. Gaming, in particular, can excite hormonal production and stimulate aggression. For over thirty years, extensive research has shown that aggression in the media can promote aggression (APA, 2005; Nikken, 2007). The influence of sex in the media has unfortunately hardly been studied. Because the research lags more or less thirty years behind, methodologically it is hardly possible to investigate the effects, because the effects are there already. It is clear that the sexual stimuli can stimulate hormone production. In the period of prepuberty when hormone production increases, it is important to take the possible influence of sex in the VE into account and protect the child against negative influences. Because of the internet children are being exposed to pornographic material often at an extremely young age; already long before this phase. They have not yet had the opportunity to develop an understanding of sex by the time that the pornographic material enters their world. Children need protection and guidance in this area.

In addition, developing a social identity is an important issue in this phase. Children at this stage are sensitive to idols and characters from the media. Because values ___hardly play a role in the VE and commercial interests are strong, the child runs the risk of receiving untested moral values, without the possibility of having a critical look at these with his/her parents. Parents seem to be not particularly interested in the experiences of their children in the VE, because they seem not to realize that it is more than just a toy. The influence of computer games on the moral development of children in this period is significant (Delfos, 1994). Where children during previous phases are especially sensitive to punishment and reward, during this phase they are now investigating the values that society adheres to and trying to internalize them.

Social media meets the need of children to become popular and make friends. With one click on a Facebook page you can specify *Like* or *Unlike*. Friends can be added, without the depth, reciprocity and continuity that will develop in later phases. Creating a profile page where they can show themselves and their friends fits the needs and interests of this period. One can easily add friends and have hundreds of friends. Research shows that the quality of the friendship is superficial (Antheunis, 2009), but that is not the biggest problem for the children at this age. It not so much the content of the friendship, but just the idea of having friends: the more the better! There may be more experimenting with friendships in the VE than in the RL. Through a profile page it is easy to collect hundreds of friends by accepting, adding, blocking and deleting with an ease that is characteristic of that age. If children are not given proper guidance in the VE, if they cannot gather enough experience of the characteristics of friendships in the RL, they run the risk of lingering in this kind of communication and friendship development. In the VE it is easier to avoid feedback on one's own behaviour through 'blocking' and 'removing' 'friends'. Although children on the one hand can practice more in the VE, in another sense such as in developing adequate social behaviour they learn less than in the RL.

In forming friendships the VE and the internet provide almost endless possibilities, worldwide, and night and day. For example, a medium such as msn was mainly used to expand existing contacts (Gross, 2004) and this certainly applies to social media. In the communication over the internet people lack most non-verbal information, especially if there is no picture or sound. Also the smell is missing, which unconsciously influences the behaviour of people. The emoticons of the VE, little symbols like smilies, can help provide some emotional information to cover the lack of non-verbal communication, but they cannot replace emotions. Because of the lack of non-verbal communication the result is that what is written is often stronger than normally conveyed: the exaggeration replaces the non-verbal expression. As a result outrageous expressions happen fast and easily without people intending to hurt someone else. This is partly why *cyber bullying* has become a serious problem (Ybarra and Mitchell, 2004). The problems of children in the RL seem to be reinforced in the VE (Eijnden et al, 2006). Children, who are bullied, spend more time on the internet and are bullied more severely there (Eijnden et al, 2006).

Limiting and guiding the child are important. Protection is also important and necessary, because the uninhibited youngster can easily become a target for adults who do not mean

well. This happens in the course of commercial purposes, but children and youngsters can also become at risk of sexual abuse.

The seventh phase (11/13–14/15 years old)

The seventh phase is the first step in preparing the psychological identity.

It is the phase of the first steps towards independent living, through rebelling against by giving the signal: *You cannot educate me, I must do it myself* (Delfos, 2009a). In order to develop autonomy, it is necessary for children to rebel against those responsible for them, primarily their parents and teachers. The adolescent needs to have a safe place where they can try out their need for independence. The natural way to feel some security is to meet with one's peers. To hang around and chat with peers becomes important. The formation of the psychological identity makes the young adolescent wonder who he or she is.

The VE is a seemingly endless field where one can operate freely without adult supervision. It is very attractive to do so, but also scary, so the young adolescent needs peers to be with. In the VE, certainly through social media, it is easy to rebel against adults, either anonymously or not. Sometimes children encourage each other to take certain actions when they do not know what they are talking about and do not always fully appreciate the impact of their actions. Rebelling against one's parents belongs to the normal development of children during this period. To sharpen your mind through interaction with others develops maturity. The speed of the VE and the absence of adults, however, leads to the fact that young people cannot always test their opinions or sharpen their ideas.

The environment of the VE is largely formed by peers; mostly classmates or youngsters they know from school, sports or vacation. Chat, email and sms have become conventional ways of making acquaintances (Sjöberg, 1999), followed by social media like Facebook and opportunities such as 'What's App'.

Meike and Bjorn were both fourteen. They fell in love over the internet. They are so in love and wanted to see each other so badly that their mothers decided that they should meet in Real Life. Bjorn comes to the Netherlands, and the two, with their mothers, go to an amusement park. Meike and Björn walk in a clumsy way side by side. They cannot connect with one another. Once they get back to Meike's home they both sit side by side behind a computer and chat joyfully. Their VE relationship did not withstand the test of the RL. Meike and Bjorn were very surprised it did not work. Soon the contact fizzled out.

This example shows how important it is to transfer contacts to the RL.

Adolescents can experiment with their identity in the VE. Identity can be examined extensively in the VE because this environment offers possibilities which the RL does not have. Parents are important here as they should help youngsters to process the interpersonal experiences that they have had in the VE. The young adolescents want and

need not to be protected in the strictest sense anymore. The challenge for parents and teachers is to proceed from protection to counselling, in the VE as well as in the RL.

The eighth phase (14–16 years old)

The eighth phase is the second step in preparing the psychological identity.

Exploration is paramount and the young adolescent wants to conquer the world independently of adults – to move about separately from adults. During this phase young people test through experimenting with the truth of the information they have obtained in previous phases. Experimenting is necessary; otherwise the knowledge is not internalized (see *the Knowledge triangle, p147*) although it is sometimes difficult to see them experimenting, and – out of fear – setting the limits too quickly and too strictly.

In the VE the adolescent can create a world without adults, without parents. This provides developmental opportunities, but also risks. Before entering this stage, children should have received adequate media education so that they do not easily fall victim to commercial goals or to adults who sexually abuse the naivety of young adolescents. Online grooming (making a child ready to be sexually abused, by creating a total dependency) can become a problem during this phase since the child likes to be considered as an adult but often does not see through the machinations of an evil-intentioned adult. Furthermore, peers can also present a risk; group pressure in the VE is paramount and is well beyond what is experienced in the RL. The speed at which things happen in the VE leads to the fact that it is very difficult for the young people to be sufficiently assertive. So that when young people find themselves in a vulnerable social situation they do not feel confident, and quickly feel that they have forfeited their right to protest. However, the VE provides a huge space for experimentation that may contribute to maturation – but here regard must be given as to whether the youngster can bear his or her experiences and *can place* what he or she is experiencing in his or her previous knowledge and experience.

The youngster wants to be heard and seen. The success of YouTube is partly thanks to young people. The subtitle of *YouTube* is not irrelevant: Broadcast yourself. In a world in which social media are becoming increasingly important, the youngster needs guidance for his or her experiences, to be able to test and process information.

The ninth stage (16–18 years old)

The ninth stage is the phase of the development of the psychological identity.

Adolescents benefit from the increase in their intellectual capabilities (Delfos, 2012b). These opportunities arise through the maturation of the brain which includes a proliferation of efficient neurons and connecting fabric, the white matter. In the brain everything gets connected to everything else.

The adolescent is trying to discover him or herself: *What do I think of myself? Who am I?* (Delfos, 2009a; 2012b). The formation of identity is a major developmental task of adolescence, and as profound as the self-examination during adolescence is, it will probably never be like that again. Adolescents are not so adept at self-examination, but they are very active. A person's identity includes several aspects: social, psychological, cultural, religious, sexual and virtual identity.

The VE can meet the needs of adolescents to use their brains extensively, to understand and solve world problems since at any time, worldwide contact is possible. Adolescents tend to throw out their sleep patterns, because sleep is difficult, so they can break through time zones in the VE and meet people on the other side of the world. The VE provides a rich ground for experimentation; adolescents try out roles and identities (Subrahmanyam et al, 2004; Valkenburg and Peter, 2008); experiment with sexuality (De Graaf and Vanwesenbeeck, 2006, Valkenburg and Peter, 2011) and develop a virtual life. In a game like *World of Warcraft (WoW)*, you can play the game through different identities, from soldier to mage, as a man or as a woman, which can be valuable for young people because in developing one's identity experimentation is both healthy and instructive. However, in the VE the possibilities are so immense that it can also be risky experimenting with identities, because one can lose oneself in unrealistic identities. The term I developed for losing oneself in the virtual identity, like being addicted to the virtual identity is *avatarism* (Delfos, 2009c).

Young people in vulnerable situations can lose themselves in the VE, searching for their identity. Depressed young people use the internet for information (Gould et al, 2002). They tend to communicate intensively with strangers and expose more of themselves than those without problems (Ybarra et al, 2005). The risk of addiction is particularly relevant from this phase onwards.

The tenth stage (18–25 years old)

The tenth stage is that of the discovery of sexuality and relationships.

Young people are involved with young people. The process from contact to friendship and further to relationships is the field of the adolescent. They develop reciprocity in relationships and try to understand continuity in relationships. The societal pressure to take up a training and develop one's career can mean that adolescent relationship formation is not given the depth that in fact belongs to this life stage. Experimenting with sexuality is fascinating, certainly for adolescents, both in fantasy and in reality. Hormonally there is great activity going on in the body, and the environment of the adolescent now and then one gets the impression that the youngster is losing touch with reality.

Communicating by internet will meet the enormous need of adolescents to make contact with others (Delfos, 2011b). On the internet adolescents experiment extensively with sexuality (De Graaf and Vanwesenbeeck, 2006). The VE seems a safer experimental ground for budding sexuality than the RL. Because of the explicit verbal information they can access, participants can begin sexual experimentation, despite or perhaps because of, the disembodied nature of the contact in the VE (Subrahmanyam et al, 2004). Adolescents, particularly those who have problems with their parents, often use the internet to form online relationships (Wolak et al, 2003).

With respect to the VE adults should pay attention to the depth adolescents can deploy in relationships – sometimes the pace of the VE makes the adolescent walk through the entire course of the relationship more rapidly than they would like or intend to. They need some reflection time. Making many friends or dating in the VE is superficial and the key to the importance of the relationship appears to be whether it can be translated into the RL.

The ten stages are included in one list with life stages, developmental tasks and the VE in Table 1.

Life stage	Development	Virtual Environment
Baby/infancy	Attachment, sensory development and exploration	VE limited as an object
Childhood	Developing cognitive skills	Protected/coached in VE
Youth	Dealing with peers, identity	Accompanied in the VE, risk of avatarism; risk of addiction
Young Adult	Independently functioning and relationships	Attention to depth and pace in forming relationships in the VE

Table 1: Summary of phases in the Virtual environment

The VE has different applications during different phases of the development of children, and this is one aspect of raising children in the VE. The other is the time children are supposed to spend in the VE – general guidelines for the time to be spent per day at different ages are given in Table 2.

Time schedule including all devices: television, computer, cell phone, consoles	
Up to 4 years of age	occasional, not daily.
From 4 to 6 years	a quarter of an hour every three days.
From 6 to 8 years	no longer than half to three quarters of an hour per day.
From 8–10 years	one hour per day.
10 to 14 years	two hours per day.

Table 2: General guidelines for time spent in the VE at different ages

These guidelines should be viewed as general indications, and can be adapted to the individual child. The guidelines provided are not scientifically substantiated, because no research has been undertaken on this topic. Methodologically it cannot be researched, because research ethics prohibit exposure of children to conditions that are expected to be negative for them. This means that we must make use of existing knowledge and experience from psychology, pedagogy and the experiences of people who have worked with children and computers in order to apply this knowledge to the experience of the parent with their own child.

8 Main activities of adolescents in the virtual environment

The virtual environment (especially the computer or cell phone with internet access) has many features, the most important of which are:

- 1: Making contact with others, here social media play an important role.
- 2: Recreation, television and especially playing games.
- 3: Information gathering, here the search engines play an important role.

9 Social development

Children love to play and learn whilst playing. As long as the child is learning by him- or herself, motivated by an internal source, the concentration can be enormous. This is often the case on the computer. The learning possibilities through the computer and the internet are more than a human being can perform during his/her life, and one can practice things with the computer that are useful in the RL. Children have a reputation for not being able to distinguish fantasy from reality, but they certainly can. However, they become so involved in their game, so full of emotions that they are lost in the game. Adults have that ability too, we can be submerged in a thriller on television for example, and forget that it is a movie. The reason is that the brain in general does not initially distinguish whether a threat is real or not. The amygdala in the brain evaluate whether something is dangerous and the next step is to send the information to the prefrontal cortex to evaluate if the danger is real. This means that the reaction to danger is switched on, whether it is something real or, for example virtual, as in a game (Mathiak and Weber, 2006). The sympathetic system that reacts to danger is activated and hormones are produced. The result is that in the case of a virtual danger this event can be experienced as a 'moment of reality'. Just like the reaction to watching a thriller on television.

Play is probably the main tool for developing social skills (Vygotsky, 1993); by means of play, the child practices social situations, in particular by *pretend-play* like playing at 'father-and mother', 'war' or 'school' (see Figure 6).



Figure 6: An old photo of a timeless game: Three sisters playing 'father and mother'.

Children's play gets progressively more social as the child grows older. Forming friendships develops from playing next to someone (as a toddler) to playing with someone without much reciprocity (the early school child) to intimate reciprocal relationships (Selman, 1981). In the VE we see the age phases come back, for example when friends are 'collected' in a given period; this is normal behaviour at the age of 10 to 12 years.

For vulnerable children, the VE offers opportunities that the RL cannot always provide. For children and adolescents who have difficulties with social interaction, such as people with

ASD (autism spectrum disorders), real life is often hard (Delfos, 2006; 2011c). They connect poorly with others, and making friends is not easy for them. Children with ASD may not be ready for pretend-play, while in other areas they may be far ahead of their peers; people with ASD have a very broad Mental Age Spectrum within 1 Person (MAS1P, Delfos, 2010d; 2011c). This means a rainbow of mental ages throughout the day; with a calendar age of seventeen years old, they can also have a mental age of two years in several social areas and at the same time the age of a trained adult with respect to physics. When their maturation allows for pretend-play, practicing social interaction, their peers will be long past this stage and will not play the game with them. The VE, however, offers plenty of opportunities for practicing social skills via gaming. In contrast, the VE is also limiting because of the limited presence of non-verbal behaviour in the VE. For children with ASD who are often bullied, the world of gaming offers friendships through the clan or guild where the rules are clear, and the rules associated with the specified role you choose to play in the game. It is clear what is expected of you, thus the behaviour of others is often easier to interpret, because the purpose is clear. This can provide a pleasant alternative to constant experiences of failure of contact in RL.

The element of practice and 'discover what it's like to be someone else' is extensively possible in games where you can play a role. These games, the RPGs (Role Playing Games) are very popular and this applies to the MMORPG (Massive Multiplayer Online Role Playing Game), which makes it possible to play a game with many others over the internet. In an RPG you play a role of one's choice, from ordinary soldier to the leader of a group, or a magician, thus trying all sorts of levels with different avatars a kind of extensive pretend-play. Pretend-play in the VE is not the same as in the RL, and lessons learned are not always for the best. What one learns in the virtual environment is not comparable to the RL since the social skills are learned primarily in reality with other children, using all the senses.

10 Outdoor play

Playing outside with other children is the most important resource for children to develop social skills (Schouten, 1998; Both, 2005; Van der Pol, 2005). Physical games are very important, especially for boys, and physical activity teaches children to deal with risks, which in turn reduces the risk of accidents.

However, children increasingly play indoors. Playing in the street during the course of the twentieth century has become more dangerous, especially in the (big) cities. At the same time the advent of the computer has speeded up the development of indoor play. In large cities, one sees very few children playing in the streets. When both parents work, there is often no one home after school. Grand-parents and professional carers step in to help, and children from eleven years and above are often given the responsibility to be at home alone. Children love to play with children and need to play without always having adults around them. The constant supervision of adults leaves little room for experimentation. Children have the need to be free, away from adults, to learn to deal with their own social problems. Bare land or sand dunes and unexpected objects are like treasure island's where you can go exploring. This applies to boys as well as girls. Children help each other more than

parents might think, and are able to mobilise adults when needed. On the computer, children are left alone with all the advantages and disadvantages that entails.

Children can play everywhere, and have the inclination to play. This is why the VE is becoming increasingly important because of all the games. When we see a child at a computer, we realize that as adults we are frightened, slow creatures, who with great difficulty master a device and a new (computer) language. Through 'click and go', by trial and error, the child learns quickly and naturally. They become easily absorbed in a game; the computer is a kind of 'mind-snatcher'.

Working with children at the computer for several decades, I have discovered their reactions. An intelligent boy of eleven years for instance, played a game in which he had to attack a spider. It was a game that did not have the refined graphics of the twenty-first century, consisting mainly of dashes, asterisks and blocks (see Figure 7). He dived into the game and prepared to attack the 'spider'. Startled, he quickly pulled his finger off the arrow button and said: "Does it bite?" For one moment he was not in touch with reality. Of course he could distinguish reality from fantasy, but it was necessary for him to regain consciousness of reality.

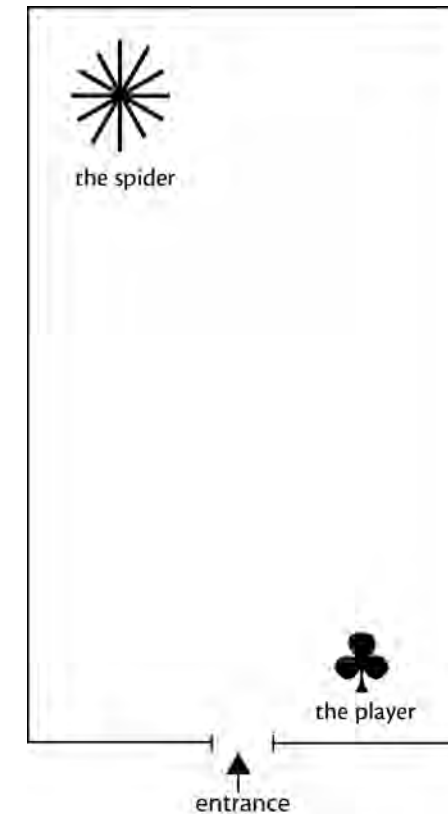


Figure 7: Room of the castle and below in the right corner the cursor for the player and on the left at the top the spider that needs to be slain.

11 Social Media - Social Networking

The VE is active in many areas of human existence, and is even being used by surgeons to operate at a distance. It is a basic need for the human being to connect to other people (Delfos, 2010c). This is the very area of social media, and the VE excels in providing opportunities for making contact. From the beginning of the internet to the situation in the twenty-first century, the possibilities have multiplied considerably. Tim O'Reilly, the internet guru, coined the term *Web 2.0* in circa 2001 to express that a new phase in the use of the internet had emerged: that users were contributing significantly to content, and the term *Social Media* emerged. This is a collective name for online platforms where users, with or without minimal intervention of a professional editor, build content together. Wikipedia, for instance, is an encyclopedia that people create together.

The use of social media has grown exponentially and includes several topics:

Photo Sites, where sharing photos is the main purpose; for example Picasa.

Micro blogs, where users exchange their experiences; for example Twitter.

Video sites, where users share videos; such as YouTube (founded in 2005).

Social networking, where users make contact and exchange information; such as Facebook (2004).

Information sites, where information is shared; for example, Wikipedia (founded in 2001).

An umbrella site is Google, founded in 1998, as a search engine, which has become extremely important. In 2012 Google released a social networking site called Google+ which had 40 million users within six months.

Of the social media, the social networking media have received a great deal of attention. People want to connect with people, and in the VE this is extensively, even endlessly possible via the social networks. Learning to understand people and deal with them is essential, and the VE offers many opportunities to experiment and practice social interaction, but also to expand social contact. Sites like MSN or Facebook have become an important part of the internet. The first major form (ICQ) in the late nineties; the letters stood for 'I seek you', symbolizing the quest of mankind for fellow human beings. Since the development of social skills is vital for humans, lagging behind in social skills is seen to be more of a problem than lagging behind in cognitive abilities.

However, it takes some skill and social security to function adequately in social networking, although youngsters have quite some skills in social media, but these are on a superficial level, and often relationship formation has insufficient depth; friends on the web do not have the same level of friendships than those in reality do (Antheunis, 2009).

Children and young people are extensively present on the social networking sites. After school many children go home and join each other on the internet. It is therefore essential that children learn to handle privacy on Social Media, not only because of commercial motives or abuse, but because of the extent to which personal information is shared. Children should learn to regulate the development of intimacy of contact. Children have to learn these subtleties, to be able to form different relationships during their lives. The VE

is difficult to regulate. In the early days of social networking sites, it was not possible to create a group that was not visible to others. Over time, it became possible to make a real group of friends, separated from the rest; as social media has become more sophisticated. On the other hand, the information on the social media can easily be dispersed for commercial goals. In 2012 Facebook announced that it would disperse all the information for commercial goals.

This means that it is important that parents talk to their children about the privacy on profile pages on the social networking sites. Children have to learn that more people than they intend to, read and see what they share on social media.

Parents can open an account on the social media themselves, but this can also be a way to obtain information about their child's behaviour on the site as it is possible to join groups, without always showing who you are. In RL, activities are largely determined by age, living conditions, work, education and cultural background. In the VE all these features disappear, and one can present oneself in exactly the desired way, with another age, gender, culture and so on. In RL is not possible to be considered to be thirty when you are fifteen years old, and gender differences in the RL are usually obvious. In the VE almost anything is possible. Although there will always be people who abuse it, this is much harder to do in the RL compared to the VE. In the RL the physical limits are clear through houses, streets, buildings and so on - the rules are clear, namely that you cannot step into the intimate space of another person, there are doors and doorbells, for example. In the VE this is all gone.

It is not only that the parents of young people can follow their child, but information spreads easier in the VE than in the RL, because of the large numbers of people in the VE. Groups are tied together by one of the people in the group, forming huge networks of groups, and this can sometimes leads to embarrassing situations, resulting in family members being confronted with information they do not always know what to do with.

Cindy has a boyfriend, but she does not want her parents to know, because he is an immigrant boy and she knows that her parents do not really like this. Cindy has a good contact with her cousin Elisa, who is in her Facebook group. Elisa has added her mother to her group of 'friends'. Cindy's mother is part of the group of Elisa's mother on Facebook. Thus the information is inadvertently passed on.

Privacy is a sensitive point in the VE, the invasion of privacy is huge. Google has an active privacy policy but at the same time records information on human behaviour on the internet, through surfing. This allows Google to respond to the commercial needs of people. It is important that parents teach their children how to handle sites and how to handle privacy, which is easier said than done. Firstly, privacy is a concept that must develop in children, so there are periods in which the idea of privacy does not exist for them, when they are very young, and periods when privacy seems totally undesirable, such as during puberty. Secondly it is nearly impossible to discover the way in which the VE organizations gather information. With the advent of the smart phone for instance, surfing on internet is connected to a telephone number.

12 Language and communication in the VE

Young people want a lot and they want it fast. Social networking is the perfect instrument to meet these needs. There is 24-hour communication in the VE. Erikson (1950; 1968) has already indicated that young people are constantly on the public stage and want to express themselves. The speed of the medium of the internet and the need to express or share so much information so quickly influences the language used. Young people developed a 'language' that needed fewer characters when typing. Not grammatical language, but a speed language, for example: *idd: indeed*. Many of these terms have come into common usage such as *lol*, laughing out loud, and *u2: you too*.

At the technical level, inventors are still trying to solve the defect of the lack of non-verbal communication. With Skype (a kind of telephone on the internet, communication through audio, visual and the written word), it is possible to talk to and see each other from one continent to the other, with oceans no longer hindering instant contact. The tuning of the sound on Skype is different than in the RL, especially in the early days of Skype, repeatedly during a conversation giving rise to the question: *Are you still there?* Skype was set so that it responded only to the human voice, when nobody was speaking the sound stopped, so information about the nature of breathing disappeared. Also on Skype, the sound was set too sharply because of the extensive and rapid transmission over long distances.

In the VE the verbal aspects, the words, are usually written, not spoken. A text message is written quickly, but lacks the context of sound (the intonation with which the message is spoken), of the visual aspects (seeing how someone says something, the facial expressions and gestures), of the touch (someone can touch another to stress a message) and of the odour – smell is a highly neglected but extremely important sense.

The differences in the use of the senses and the lack of non-verbal communication in general account for many of the problems in communication in the VE compared to the RL. In addition, type errors are a separate problem in the VE. Certain errors that are misinterpreted in the VE would have been discovered immediately in the spoken language of the RL through the non-verbal signals the listener transmits, such as the raising of one's eyebrows.

The expression of emotions is at a low level in the VE. Emoticons (faces with emotions) and symbols are intended as a solution for the lack of expression of emotions cannot replace expressing emotions. The difficulty is that an emoticon is not clear in itself; people need to know quite a lot about another person to be able to know what is meant and whether they are being sincere or making a joke.

Learning a language is relatively easy for children in the VE. Kuhl and colleagues found that babies, who were confronted with another language, learn best through exposure to the language in the RL instead of the VE (Kuhl et al, 2003). The question is whether this is also true for older children and adolescents. Contact with people is crucial for a baby; it is possible that part of the effect of learning the language in the RL is because it is important for babies to attach people to them. In the example of the conversation with the children

in Bosnia and Herzegovina who spoke excellent English, there was no exposure to English in the RL for example but very frequent exposure in the VE.

13 Sex in the VE

Sex is an important topic on the internet, which is a commercial and advertising medium and as the saying goes: Sex sells! Children and young people are frequently confronted with sexually explicit material, and may get upset when this happens (Mitchell et al, 2003; Peter and Valkenburg, 2006a, 2006b). In studies in which adolescents and adults were compared, it appears that the reason for the use of sexually explicit material – pornography – is similar for both groups, but adult males make the most use of it (Peter and Valkenburg, 2011a). When the effect of sexually explicit material on risky sexual behaviour is observed, it appears that sexually risky behaviour only increases amongst adult men (Peter and Valkenburg, 2011b). In addition, research shows that the use of sexually explicit material – especially among adolescent girls – leads to greater sexual uncertainty, particularly uncertainty about sexual norms and values (Peter and Valkenburg, 2010).

A specific problem related to internet is the easy distribution of child pornography. The Hotline Child Pornography (The Netherlands) indicates that the number of reports of child pornography has increased from 256 in 1997 to 9,029 in 2009. The most frequent origin of this criminal material is the United States. (Meldpunt Kinderporno, 2010).

The current generation of young people aged between 12 and 18 years makes massive use of the media, especially the internet (De Graaf and Vanwesenbeeck, 2006), seeking information on internet about sexuality, men more than women (Nijkamp, __2007) whilst boys appreciate the information they get there more than girls do (De Graaf, 2010) Much of the sex education through the VE is not aimed at training or education, but at consumption. Since children are easily deceived by the information in the media, the images which children and adolescents develop with regard to sexuality are often overdeveloped on one side and not age appropriate; whilst on the other hand, their knowledge of sexuality is underdeveloped (Delfos, 2003b; De Graaf et al, 2010).

Michelle is an adolescent girl of fourteen years old. She is dynamic, intelligent and enterprising. She experiments and wants to experience everything. Thus, Michelle has done 'it' now. While talking about this her disappointment and fear about the future comes to the fore. Is this 'it', that they are all talking about? Is this what she should expect from relationships? But going further with the conversation, she wants to know about the risks of sexual intercourse without contraception. It is 2006, she is an enterprising and intelligent girl, but asks bluntly: "Do guys menstruate actually?" She lives in the big city, uses cannabis and ecstasy, but she does not know if guys menstruate. She has been taught biology at school, but that was not internalized, it was more 'homework' not so much about her. Now that it plays a role in her life, she is ignorant at a basic level, despite already having done 'it'.

Regarding sexuality there is many lies and nonsense is being communicated – the internet is not a very good source of information on sexuality. The media's focus on sexuality ensures that parents are hesitant to give children sex education as parents mistakenly think that their children already know 'everything', because what they know is often about spectacular and extreme sex. But youngsters are often unaware of the simplest facts. In the VE they find the extremes in sexual behaviour. After the excesses of the sixties a long time was needed before behaviour and expectations returned to realistic limits (Funkhouser, 1973). In the VE, because identity is concealed and there are not always signs to tell you how old participants are, young children experiment whilst nobody sets the limits. Girls especially find it difficult to refuse to do things they do not want to do, and go further into sexual interaction than they would actually like (De Graaf et al, 2005). The number of reports of sexual harassment of teenagers on the internet is growing rapidly (De Graaf and Vanwesenbeeck, 2006).

Where children used to sneak into the attic with a friend to look at what they called 'dirty' pictures, in the twenty-first century they get these pictures presented without seeking them, which stimulates non-age-appropriate development. Previously it took too long to find sexual images, whereas now they come too early, when children are not yet looking for them.

Exposure to age inappropriate sexual material can lead to children getting distorted ideas of sexuality, and even to an aversion to sex. An eleven year old girl said about intense sexual images on the internet: 'I can handle it, but my five year old sister sees it too...!' When a child is looking for sexual images, his or her maturation is normally ready to permit him or her to go deeper into the subject of sexuality. That is healthy, and presents hormonal no problem. When the hormones are latent, however, and the body is shaken up by sexually explicit material this can become a problem. For instance early biological puberty can arise, with an imbalance between the body in the process of maturing sexually when the mind is not yet ready.

Online bullying (Van den Eijnden et al, 2006) and unwanted online sexual behaviour (De Graaf and Vanwesenbeeck, 2006), are new types of problems that arise through the VE. These risks should be addressed to make it possible for children and adolescents to benefit from the opportunities that the internet provides.

14 Gaming

Gaming is one of the most important activities in the VE, for both genders and appeals to a very broad age span. In order to play games, a device is necessary, which at first was only the computer but more recently devices have been developed especially for games. The graphics have improved and control devices have appeared, such as the joystick. When the *World Wide Web* appeared, a huge play platform emerged and the computer became extremely important for recreation. New devices for children were created such as the Game Boy (which appeared in 1989) and later the *Nintendo DS*. These are small handheld devices which make gaming possible wherever people are. Since then it has become

possible for multimedia devices to be linked together: from a single location one can watch television, surf on the internet, play games, chat online, shop online, but also work at home, make payments from home, and so on.

Gaming refers to playing digital games via a computer, game consoles, cell phones and the like. At the beginning of the twenty-first century nearly all such activities are online. Gaming does not mean simply 'playing games', like playing Monopoly, but "games" can be environments where people meet and chat as well, for example, meet together in a 'dungeon' to solve problems and get to a higher level of the game.

Some games can be played with groups of friends which means that young people sometimes stay up at night to play with friends on the other side of the world, unlike most games in the RL which are individual games. There is a whole world that has arisen around games including online gaming tournaments for instance. There are young people who have won a world championship in the VE and enjoy an enormous prestige there whilst in the RL they are not known at all. It is possible to earn money through games such as Poker, which for some people can be very attractive. Trying to become a millionaire keeps many young adults glued to the computer.

In the games you can play with a virtual identity, express yourself or play anonymously. You can say you are twelve when in reality you are thirty or vice versa, and this provides an opportunity to escape from an unpleasant RL. One of the attractive aspects of playing games is that you can join a group in a game, like the people called the 'Horde' or the 'Alliance' in the game *World of Warcraft* (WoW).

Games can be instructive in many areas. Often games are built on historical facts and can teach children and young people history, although it is questionable how far the game is based on true historical facts and how reliable the information is.

The fact that games provide an attractive way of learning has led people in education and training to use games to teach important skills. Games can play an important role particularly in the area of teaching adolescents how to 'plan and organize' (Ke, 2009), and gaming can also be used as a way of learning how to master various tasks, both in business and in sport, in military defense, and in recreational activities. For example, driving and flight simulators have long been used in professional organizations but are now within the reach of everyone through the VE.

One of the most notable skills that can be fostered through gaming is learning to concentrate and persevere. Games like *Tetris* or *Arkanoid* appear to stimulate concentration. *Tetris* has become extremely popular – over 100 million copies were sold for cell phones from 2005 to 2010 (Johnson, 2010). Gaming can also stimulate the executive functions in general (Nouchi et al, 2012). That is, the functions one needs to make a plan, bring it to a satisfactory conclusion and not to be distracted when something new occurs. However, the effect of stimulating concentration is diminished and concentration is

reduced when you play too long. What computer games also stimulate is hand-eye coordination and left-right connections in the brain whilst in the games where you have to form a group to perform an action, you learn to work together, pay attention, distribute roles and devise strategies; WoW is well known for that. Still the computer remains a kind of mind-snatcher.

Djago is nineteen. He plays WoW. The game has released a new continent and new levels. In his group some policemen take a week off from work to achieve the new levels. The group emailed them to say: "Congratulations for not having a life!"

The 'big' games provide a connection to a group, usually called a clan or a guild, provide gamers actions to take, opportunities to chat, to talk, and provide the possibility to share information not only about the actions but also about what people experience in the RL, about their life in general. A friend in a game (m8 = meight = mate / companion) is not the same as in reality (RLf = real life friend), but playing with a group fits in well with the preferences of boys and men. The gamers themselves know very well what the difference is; they ask each other about friends 'Is it a m8 or a RLf?' And a RLf is certainly worth more than a m8.

In this context it is interesting to mention the research of Seo, Can and Chae (2012), which has shown that excessive gamers often have a low level of social competence.

Two young adults are speaking together on a train, exchanging ideas about the actions and the roles they fulfill in the game. Then one of them says: "We must not forget the bonding! We need to make the ties stronger!"

Some games are actually worlds where you can walk around, where you can have meetings or can make appointments. WoW is such a world. Teachers at some universities talk with their students and give lectures or workshops (see Figure 8) in those kinds of world.



Figure 8: Students of teacher Marinka Copier, Utrecht University consult with each other in WoW (not about the game, but in the world of the game!)(Renee Filius with permission of Marinka Copier).

Gaming is often accompanied by much sedentary behaviour at the computer so technical solutions have been invented to counter this. With the Wii (a kind of game device) you can drive a racing car with a 'steering wheel', play tennis with a 'racket' and so on. It combines aspects of the RL and the VE, which will probably be the future.

Children and adolescents are very keen on the internet, and on games in particular and much of their time is devoted to games. The question is - Why? The answer is quite simple: because it is great for young people to play games, to chat, to design a profile page and to update it and so on.

Advantages of games include:

- A game is always available.
- You can play games endlessly.
- If you want to play with someone else, there is always someone else online.
- There is an endless variety of games.
- Games exist in every level of difficulty you desire.
- You can play alone or with others.
- You discover new qualities in yourself.
- The gaming develops new skills.
- Good for developing executive functions such as planning and bringing a plan to a good end.
- You can play in a league with others around the world.
- Gaming helps relieve boredom.
- Gaming is exciting.
- With some games you can make money.
- There are many free games.
- You can chat with others whilst gaming.
- You get to know people from around the world.
- You become familiar with the English language.

Besides the positive effects there are also the negative, and sometimes harmful, aspects of gaming. Children enjoy games, but it is not easy to make them stop playing. The problem actually concerns three topics:

- 1: the huge risk of addiction
- 2: experiencing things that are not age-appropriate
- 3: extreme (hormonal) excitement.

Sometimes it seems that there is a pros and cons debate about gaming, as if it could be either bad or good whereas in fact it is both. It is good and bad, like everything else. Children should be raised in the VE, like everywhere else and adults should take care to create safe worlds for young people online which are not subject to commercial motives. The internet is interesting, adventurous, exciting, scary and sometimes dangerous, but under the guidance and upbringing of parents and through the education in schools it represents a step forward in the dispersion of knowledge throughout the world.

Gaming often involves skills, competition and difficulty. The majority of games on the internet are free – but only because it is exposed to advertising. The fun of the freely available game creates an attitude of demand for gratification of needs, of immediate consumption.

Most games are small games; people can play them at any time and on their own. There are also the RPG, Role Playing games, where you choose to play the role you want. One can play different versions of the game to practice different roles such as the healer (in *WoW* he is the one who keeps his group alive), the soldier, the commander in chief, the magician, the coordinator and so on. Then there are different types of games: platform games, computer versions of board games, racing games, casual games (short games), browser games (that come along with the browser), sports games, fighting games, beat 'em ups, simulations (for instance learning to fly an aircraft); music games (where you can make music or learn to play an instrument), 3 - d shooters, turn-based strategy (TBS), real-time strategy (RTS); adventures, role playing games (RPG), massively multiplayer online (MMO), massively multiplayer role playing games (MMORPG), sandbox games (where the game is constructed during play).

There are more and more games that cannot be classified in a specific category because they fit more than one category at the same time. New games or new editions of games are developed with all the possibilities of many games which were developed previously. For example *Grand Theft Auto* (GTA) which has something of a 3-D shooter game, an adventure, a racing game and a simulator.

Because people want to / need to connect to each other, they need virtual worlds where they can meet, have conferences, give lectures and so on and games are sometimes used for this purpose. Some games are much more than only a game; *World of Warcraft* (WoW) for example is so extensive that you can walk around in it for hours, you can ride around on a 'horse' or a fly over WoW on a 'bird's' back. Figure 10 p.136 is an example of a screenshot that was taken during a flight over WoW. Universities organize lectures and workshops in WoW to be able to gather people from different places in the world. There are also virtual worlds that are constructed by people working together; *Second Life* is an example of such a game/virtual world. In *Second Life*, you can have a (virtual) hotel chain, run a (virtual) newspaper and even live a (virtual) criminal life. In other words, you can have a 'second life' as a journalist publishing a newspaper for instance – a life that is totally different from your life in the RL. A remark from a woman in *Second Life*: "I purchased a rain cloud that I occasionally use, because it's boring always having the same atmosphere." After a time of receiving high public attention, the interest in *Second Life* has dropped sharply but people are still looking for new safe worlds in the VE.

The virtual worlds such as *Second Life* or *Habbo* (Figure 5, p.116) are successful and other games develop in the direction of virtual worlds with chats and profile sites. People want to connect to people. There is a strong need for virtual worlds, secure virtual worlds. There is nothing that technically hinders the creation of secure virtual worlds, but it is something people have to choose to develop. There are more and more initiatives to develop new virtual worlds.

Sex differences exist everywhere in real life, so they exist in the VE. The research of Alexander and Hines (2002) on monkeys with human toys shows that the gender difference in monkeys arises naturally: girl monkeys preferring to play with a doll, boy monkeys with a car (see Figure 9).



Figure 9: The choice monkeys make with human toys: the female monkey chooses a doll and the male monkey chooses a car (Alexander & Hines, *Evolution and Human Behavior*, 2002, 23, 467-479)

At the beginning of the computer era, boys were more active at the computer than girls (Madell and Muncer, 2004; Meerkerk et al, 2006), because there were more fighting games. Boys play more aggressive games, and girls prefer more social games and educational programmes. Children and adolescents spend a large part of their 'free' time active with a VE device, particularly cell phones which have extended possibilities; with the smart phone one can receive e-mail, surf the internet, play games and engage in many more activities. Handy programmes on phones such as 'What's App' make many practical things possible, like holding your phone near a sound to catch a music fragment, and the phone finds the right piece of music within a fraction of a second, or checking the length of delay of a train that is due to arrive at a certain moment. The youngsters in 2009 spent an average of 15 hours per week on the internet; boys (16.5 hours) slightly more than girls (14.5 hours), (Van Rooij et al, 2009). Nowadays, the cell phone is always present, often on the standby function next to other devices since VE-time has increased. In developed countries of course much more than in developing countries.

Among others, the gender differences are visible in the use of games. If you look at the big games the majority of gamers are male, and the majority of the games have also been developed by men. Although one of the first big adventures, *King's Quest*, was developed by a woman (Roberta Williams), this continues to be an exception, although the number of female game designers is increasing.

Most of the main characters in games are white males and more aggressive than television characters (Lemmens, 2006) – reflected in the investigations of some years ago which

showed that the vast majority of families with a son, had computer games in the house (Lemmens, 2006).

Boys and men play the 'big' games; girls and women prefer the casual games. Games that women and girls like are generally not as competitive in the sense of earning points or other assets as those enjoyed by boys/men, and girls have a tendency to search for friends on the internet and even in the games. Women can be interested in violence but are mainly interested when the story around it is interesting (Lemmens, 2006).

An exception is the game *The Sims*, where the goal is not only to gain points and win, but the focus is also on social interaction. This game is therefore not only played by boys and men, but is also popular with women and girls. As a result it is the best selling game on the personal computer since this game was released (*The Sims* franchise, 2005; Jenkins and Cassell, 2008; Vosmeer, 2010).

Women are more interested in games which include social dynamics –exchanges and encounters, whereas men demonstrate preferences for fighting and shooting games and unraveling mysteries. Women find such gaming behaviour of men aggressive, but need to realize that men are expected to protect and stand up for others in dangerous situations. Where would we expect men to learn how to do that, if not in playing 'war' in the RL and in the VE? Women often play a simple game to distract themselves from unpleasant feelings or to stop their brain from incessant thinking and worrying. They often choose simple games. That is, games which are not too easy, because then the brain is turned 'on' again, and not too hard because then the brain is also turned 'on' again (Delfos, 2010a). Although men and women spend the same amount of time gaming (Lemmens, 2006), when we talk about 'gaming', we usually mean the games that men tend to play. These are the so-called 'big games' like *World of Warcraft* or *Call of Duty* (see Figure 10).



Figure 10: Left WoW – *World of Warcraft*, right COD – *Call of Duty, Modern Warfare 3*.

Men and boys enjoy the content of the game, the competition, the shooting and finding the treasure. Very early on there were games where one had to find a treasure or free a princess (like the many editions of one of the first adventures: *King's Quest*), games where one

encountered many monsters en route and had to defeat them, games with problems one had to resolve to be allowed to continue. Games often center on the theme of the Holy Grail: the search for the magical, liberating object that you can only win through strong, morally good behaviour, by being smart and by working together. A true boys dream. Ignoring the details, many games appear like the quest of Lancelot, the Knight of the King Arthur's Round Table, who had to prove himself worthy of the Holy Grail and solve many problems. In these circumstances, the game is not about the result, but about the way of arriving at the goal. Games are an ideal medium for this "Lancelot-drive" (Delfos, 2010a), and in the VE it is possible to practice this day and night, which is not possible in the RL.

You can use role-playing games to choose a role that you want. You choose who you are and what you can handle. You can play different roles in some games, also different gender roles.

15 Age indications of games, the United States and PEGI code

One of the rights of the child is to be protected from harmful information (Article 17, paragraph e of the International Convention on the Rights of the Child; Virk, 1990). On 17 August 2005, the APA (American Psychological Association) published a resolution on the influence of violence in the media reflecting the desperation of scientists who have demonstrated that aggression in the media promotes aggression towards others and do not see this research translated into practice (APA, 2005; Lemmens et al, 2011). Depictions of aggression in the media increase the risk of behavioural problems, especially in impressionable young children (Nikken, 2011). In contrast, there is very little research on the influence of sex in the media.

The more the images in the VE match the RL, the harder it is to distinguish clearly between the two worlds. Violent emotions make it difficult to keep the VE and RL apart, such that aggression, violence and sex in the VE appear to influence behaviour in the RL. Many quarrels started in the VE in the home situation, continue at school, presenting the problems of translating the VE to the RL. This problem is compounded by the speed of the VE and the lack of reflection time, so that social interactions can easily get out of hand.

A few results from research (APA, Resolution on Violence, 2005):

- Children use media violence as social lessons about good and evil.
- Violence against a sympathetic victim suppresses violence.
- There are serious risks of aggressive behaviour in the long term.
- There are serious risks of aggressiveness and imitation of violence in children exposed to images they are not yet old enough to understand.
- Regular confrontation with violence stimulates aggression, especially small aggression like hitting a brother or sister is stimulated

Aggressive media, such as that displayed in some games, can cause problems if the child is confronted with it at a time when their moral and intellectual development is not at a level capable of processing the content (Delfos, 1994). The aggression is then learned, but cannot be compared with adequate moral standards because in young children these standards have yet to be developed. This is partly why education – but also protection in the VE is indispensable.

For children who are already more or less aggressive, it is even more important to limit the VE with respect to aggressive content. On the other hand, the VE with its broad range of aggressive games can also be an excellent therapeutic tool for children to learn to handle their 'short fuse' (Delfos, 1992; 2003a) as the child can learn to discover how he can feel the anger arise, how quickly a good mood vanishes and how he can learn to feel/know when to stop.

A system has been developed for television to give an age indication about programmes. This code is about morality in word, image and sound. Unfortunately there is not much research to be able to assess the age code for all the available programmes. For games the PEGI code has been developed, providing limited information about morality in word, image and sound, see Figure 11.



Figure 11: Icons of the PEGI system regarding morality of image and sound (<http://www.pegi.info/nl/index/>). (PEGI, 2013)

There is an important difference between the age indications on the old-fashioned games people buy in stores and the computer games. On the old-fashioned games the age display refers to the cognitive age and skill development of children, whilst on the computer games the code represents a level of morality in image and sound such as violence (verbal, physical and sexual). The degree of difficulty and skill of the game itself is not taken into account. There are also different systems for age indications on games. In Europe, the PEGI (Pan European Game Information) is used; Germany, however, uses its own system. The PEGI system works with five age categories: 3+, 7+, 12+, 16+ and 18+. America, Canada and Mexico, have the ESRB (Entertainment Software Rating Board) system with the following age designations: 3+, 6+, 10+, 13+, 17+, 18+.

Since the age indication for the games indicate nothing about the skill required, parents can make mistakes:

One father said he bought GTA (18+) as a birthday present for his eight year old son. He thought his son was so skilled at the computer that he would be able to do an 18+ game, not realizing that it is a game for 18 + because of violence and morality issues.

The age at which games are played, shifts to younger and younger children; the games for adults (18 +) are played by young children. Table 3 describes the different age indications.

3+	the game is suitable for all ages. This means that violence only occurs in a comical context, the game contains no profanity and no naked sex. The images and sounds do not frighten children. The game characters in principle are based on fantasy, but they can also be based on actual figures such as football players.
7+ and	the rules are the same as for 3+, but the games can contain scary sounds or shock-like images partially nude figures outside a sexual context.
12+	violence towards fantasy characters or non-realistic violence towards existing figures or animals is allowed. These games may also contain coarse language, but no sexual expletives.
16+ games	games that contain images of violence or sexual activity as can be expected in the RL. These can also contain coarse language and images of tobacco and drug use and criminal activity.
18+	is used for games which either contain brute force or a specific form of violence- such as sexual violence. Also extreme violence, meaning that disgust is generally evoked in the viewer.

Table 3: Age indications and their criteria

16 Addiction in the VE

The VE is very addictive, from television to cell phones. Games are especially addictive, because they are constructed to seduce the player to continue with the game. Addiction is in fact the irrepressible urge to do what one does not want (anymore). At the computer people can get 'cooked', wanting to quit, without always being able to stop.

The term addiction has a specific meaning in healthcare. The DSM-IV (Diagnostic Statistical Manual of Mental Disorders-IV, APA, 2000) is a handbook with a description of all psychological and psychiatric disorders, it also mentions addiction. Game addiction is not mentioned in the sequel, although it is expected to be included in the DSM-5 (Helzer et al, 2008). The characteristics of addiction listed in the DSM-IV have mainly to do with the taking of a substance, such as alcohol or drugs, although there is every reason to think of the possibility of addiction to games, in extreme cases even it can provoke a 'game psychosis' like what can occur with a drugs addiction, the drug psychosis. With respect to games the question is not about taking a substance, but about the overproduction of hormones. It is about producing certain hormones (including adrenaline, melatonin, ghrelin, and cortisol) too much, too little or at the wrong time, also neurotransmitters like dopamine also play a role in addiction.

Compulsive internet use is associated with deterioration in school performance and an increase in depression (Van den Eijnden and Vermulst, 2006). Compulsive internet use is mainly predicted by online gaming (Van Rooij et al, 2009). The new generation is growing up with the computer, and availability makes addiction possible; of young people aged 13-15 years were addicted, that is 1.5% (Van Rooij et al, 2011). For the severe criteria of addiction this is very young.

The use of the computer bears all the hallmarks of addiction itself. With its non-stop distractions, computer use can facilitate the pushing of bad feelings into the background, there is a variable reward: sometimes there is an e-mail, sometimes not, sometimes one succeeds to attain a higher level, sometimes not. It is these quick and continuous alternations of rewards that will strengthen behaviour (Gazzaniga and Heatterthon, 2006),

contributing to the risk of addiction. Slot machines and casinos are based on the same principle of alternation in reward. Even the characteristics of drugs abuse are present; drugs are distributed freely (push), then the users get 'hooked' and the 'dealer' has a client. On the internet, the same principles apply: often you can play for free the first week, but after that you can only play if you pay a subscription. The student in the example below clearly demonstrates nicely his personal criteria.

An eighteen year old student with a job plays World of Warcraft every evening for at least three hours. For a month, he forced himself to limit his game time which helped but on the weekend he began in the morning and went on for hours, forgetting to eat. He's not addicted, he says, because he can still go to school and to work.

Repetition is an important factor in the VE, especially with games for developing skills, but the repetition can induce desensitization to violence, as well as creating the need for more and better incentives. Repetition can take someone into a trance, and one cannot get out this trance easily.

Sometimes we are startled by the media. If there is a mass killing, the message that the killer is a *World of Warcraft* gamer can be circulated, giving the impression that the game is somehow responsible. That cannot be right, because if it were, there would be about eleven million (Ziebart, 2011) people shooting, because that many people were playing *WoW* at that moment. The game plays a role, but there is more to it. The question is, what causes things to go wrong, and especially how can you help children and young people so that they enjoy gaming but do not get into trouble with gaming, especially doing something extreme, like going shooting in the RL. We have to understand more about the addictive elements.

Some addictive elements of games:

- 1 There are so many games, that everyone can find an attractive game: *You will always find something that suits you.*
- 2 Games are constructed in a way that you want to go on playing by using a fine web of rewards: *You always get a kick.*
- 3 The difficulty is constructed in a way that it continues to fascinate: Your ego strengthens.
- 4 You can play solo and together: *You can adapt the social environment to your needs.*
- 5 You can create your own identity, avatar, choose your own role: *You can make your dreams come true.*
- 6 Games are great to turn your brain 'off': *You can push the nasty feelings aside.*
- 7 Games are non-stop, online gaming especially is very addictive: *To be or not to be online.*
- 8 Online games have their own dynamics that often are in conflict with the dynamics of the RL situation of the player. You cannot simply leave your group in the VE, but the RL expects something from you too: *Your daily life is at odds with your game life.*

Taking the characteristics of addiction (DSM-IV) and translating them to gaming addiction amounts to the following list:

- 1 The need for gaming is increasing, there is an increasing need to achieve the desired effect.
- 2 If the gaming is stopped, it is often against the will of the gamer.
- 3 If the game is stopped by an external factor, short-term mood problems from irritation to tantrums arise. In the long term: listlessness, lack of initiatives and lack of undertaking other activities.
- 4 Scarcely any contact is possible when the gamer is gaming. Only with a lot of effort one succeeds in making contact which often is negatively received.
- 5 After stopping the game for a long time, there is irritable behaviour and the gamer does not enter into other activities.
- 6 Other addictive activities are undertaken after the person stops gaming.
- 7 The gamer plays longer than he or she had planned.
- 8 There is a desire to quit so much gaming.
- 9 The attempts to stop gaming fail.
- 10 The gaming negatively affects daily activities and responsibilities, such as school and work.

To be able speak of addiction in any particular case, a number of these characteristics should apply over a period of several months. When we look at the characteristics, we see that there is a 'time-line': the first five elements can apply to children, but six to ten cannot apply to young children, but apply to young people and (young) adults. In children and adolescents it is more about *preventing* addiction than about fighting it. Certain groups run more of a risk of addiction, such as aggressive children, children with ADHD or ASD disorders, and children and adolescents who live in vulnerable family situations. Children can also have a predisposition to addiction, this concerns more boys than girls, men rather than women. Children with ASD are particularly vulnerable since gaming offers an enormously attractive alternative to the sometimes painful situation in RL, where young people with autism often can find no good connection with their peers.

The signals indicating the level of being able to manage dealing with games can be classified into three categories:

1 Enjoy games

Happy face, concentrated, tends to share enthusiasm about the game with others. Desire to involve others in the game. When the child is stopped, protests follow but the child has a tendency to share experiences and to explain that he or she cannot stop.

2 Game Frenzy

Happy face, alternating with angry emotion or being annoyed. Concentrated, but more bitter. Kind of 'war' behaviour when the person is asked to stop gaming. The person is gaming for more than half of their free time. Characteristics 1 to 5 from the list above are applicable.

3 Game addiction

The person is hardly accessible when he or she is gaming. Outside gaming the person is increasingly less accessible. He or she seems to be living in their own world and retreat from the RL. Features 1 to 10 from the list above apply.

In Asia, the problem of addiction has become enormous, long before gaming was that well known in Europe. In the 1990s of the last century, a term was coined in Japan: *hikikomori*, young people not leaving their room, not attending school any more, with their parents bringing food to their room because otherwise they would not eat. These problems turned out to be caused by computer gaming, so popular was the game *Lineage*, and so severe the problems that in Korea gaming was proclaimed 'Health problem 1'. This was not only because of the psychological addiction principles, but because eating and sleeping were severely disturbed, and even forgotten. Gaming suppresses feelings of hunger, but other health problems can occur, such as increased risk of a seizure and disturbance of the blood sugar level in diabetics. The lack of food intake and the decrease in hunger can lead to *game anorexia*.

17 Ego-explosion

Some people lose themselves in the VE. When connecting themselves with others in the RL they feel not or insufficiently successful. Adolescents, who have problems with their parents, often use the internet to form online relationships (Wolak et al, 2003). The likelihood of getting too involved in the VE is greater if relationships in the RL are not satisfactory. This applies to people with autism spectrum disorders/ASD, but also to adolescents who experienced problems or trauma in their youth. Research shows that adolescents with divorced parents game more and use the internet frequently both to search for information, and out of a desire to communicate (Notten et al, 2009). Game addiction is associated with reduced psychological wellbeing. This reduced psychological wellbeing is associated to the quality of friendships in the VE and the RL. Young people were more socially anxious, when they had less good friendships in the RL (Van Rooij, 2011). The RL and VE may get mixed up. The repetition of actions can get stored in the brain as a habit, without specifying that the VE is concerned. There may be severe excesses in the RL that seem unthinkable but in shape are game-like scenes. The adolescent in the following example abused young girls repeatedly in a computer-game way.

John, a seventeen year old boy throws young girls against the wall till they bleed, as in computer games. Then he rapes them. He talks openly about it on the internet and counts the number of girls he has raped.

If somewhere in the world someone is shooting at other people, it is often a gamer. Although it has been demonstrated that playing violent games predicts physically aggressive behaviour at a later time (Lemmens et al, 2011), that does not mean that gaming *leads* to shooting because then millions of young people would shoot. Before the VE existed

mass murderers were always Americans or Russians and usually they were not so young whilst from the twentieth century on the world is regularly shaken up by adolescents who shoot a number of others in the RL. Pathological gaming, regardless of violent content, predicts physically aggressive behaviour in boys but not in girls (Lemmens et al, 2011). It is not only gaming that causes aggression. Aggression is a culmination of factors – among them the most important factor of not being embedded in a network of relationships. In gaming, risk factors in unhealthy development are the excessive reward culture in the VE and the constant repetition. When this atmosphere continues for a very long time (i.e. years) it can lead to *ego-explosion*, a condition in which people no longer have a realistic self-image. This is a typical risk of the VE, especially in combination with an education that has developed in an ego-oriented direction, what is happening in the developed countries. The VE has the tendency to be excessively rewarding with the strong habit formation of variable reward scheme. When people get isolated from their RL environment, and 'live' in the VE, especially excessive gamers, their self-image in the VE can take over and the ego grows to exaggerated proportions. There need not be a psychiatric condition underlying this – the problem is the psychological formation and identity development that is effectuated by extreme exposure to games over time. This was probably the case with Anders Breivik, who was one year old when his parents divorced. They fought over custody for many years. When he was fifteen, he had had enough of the fight and joined a church. He was a gamer from early childhood and developed into a successful gamer, who would spend his day – and part of the night – gaming. He held women at distance because he considered them to be a bad influence. Breivik, son of a diplomat, liked to be seen and photographed. He posed in gala costume. For a long time, he planned an explosion in a government building, his Plan A, and prepared a Plan B, in case plan A was not successful. He made his analysis of society by copying and pasting manifestos from the internet. He wrote about his actions on the internet and expressed satisfaction and pride in his actions, without giving the impression of being in a psychotic state. Being immersed year after year in gaming causes not so much a psychosis as a complete loss of contact with reality in the RL. Prolonged gaming, from infancy, ensures that childhood behaviour and thinking frames are formed by the games these individuals play. While growing up, they develop scripts (behaviour schemes of everyday action sequences that prescribe how to behave in certain situations (Schank and Abelson, 1977)). These scripts are formed in the VE and transferred to the RL, usually unconsciously. The VE can therefore deform the young child.

The ego has been increasingly strengthened, without sufficiently being tested in reality; therefore the self-image can become disproportionate. The estimate of what people think of you, especially your actions, becomes disconnected from reality. As a consequence one's behaviour in the RL is inadequate and forming relationships becomes difficult. However, not everyone develops an ego-explosion, and not everyone ends in the state in which Anders Breivik committed his crimes. This requires further factors, including long-term structural gaming in a social-emotional poor environment.

Anders Breivik has trouble understanding that he is not admired for his actions, because he was formed as a child to receive constant appreciation through gaming in the VE. At the time that he performed his deadly actions, he used to game 16 hours a day.

Anders Breivik was a 32 year old man from Norway who detonated an explosion at a government building on 22 July 2011 causing 8 deaths. Disappointed by the small impact of the explosives he then performed plan B, a shooting on an island where socialist youth were meeting at that time. Plan B was reminiscent of a game; dressed in police uniform, he gathered young people around him and said: "Come play with me." Then he shot 69 of them dead. This scene resembles very closely a scene from the popular game GTA, Grand Theft Auto (moral age code age 18+), and the scene is used in one of the 'movies' of GTA (probably in 2003) and could be found on YouTube. Unlike others who carry out massacres, Breivik did not kill himself. Instead he contacted the police to ensure that they would not shoot him and says he will surrender. He did not want to be hidden from the public, but wanted to show himself. His ego seemed to be strengthened instead of being affected by his acts.

According to this analysis Anders Breivik is the first public example of a mass murderer with game induced ego-expllosion. The agreements and differences with other mass murderers are listed below:

- 1: The absence of a relationship network: *only agreement with other mass murderers.*
- 2: Somewhat older, 32 years: *more like 19th century mass murderers. Long time gamer.*
- 2: Poses actively: *in the VE, appearance is important. With the avatar you create your own identity so presenting yourself publicly is typical of the VE.; the subtitle of You Tube is not for nothing 'Broadcast Yourself'.*
- 3: Actively ensures he will not be shot during the action: *keeping alive is a standard and necessary activity in most action games.*
- 4: Arriving on the island, he says: *Come play with me ...*
- 5: He has a plan A and a plan B: *strategic thinking is part of the big games. The implementation of the first plan disappoints him – the collapse of the building was not as spectacular as in the games. Having collected explosives for quite some time, a disappointing explosion was particularly disappointing. Plan B, is nearly literally a scene from a game, GTA, Grand Theft Auto, (PEGI code 18+, see Figure 12). In this 'movie' police uniforms attract people around you as main character, before you shoot the people who have gathered, search for people who run away and for new victims.*



Figure 12: GTA, Grand Theft Auto, 18 +

18 The school and the virtual environment

For centuries the school had the reputation of being the centre of knowledge. School education was about knowledge transfer, with the teacher being a dignitary of the town because of his/her knowledge. Nowadays, it is not so much about knowledge itself, but about processing knowledge, about 'content' and how to find, assess and download that content. Knowledge here is considered a piece of integrated content with experience and emotion, as a conclusion of assessing a piece of information. School education needs to make a cultural shift. The VE tilted knowledge from 'being transferred' to 'search for yourself'. Children find it natural to look something up on the internet whereas previously, teachers had to encourage children to search for information. The 'éducation permanente' is materialized in the internet now.

"Miss, does the Easter Bunny exist?" "I saw him hop by this morning," says the teacher hesitantly. The boy replies: "I will look it up on the internet at home." The next day he reports: "He does not exist."

Children, but also adults, experience information bombardment on the internet. Youngsters, however, have insufficient frameworks within which they can place new information. The quality of the information on the internet which can be dubious since anyone can put information on the internet, there is no censorship, no authority to organize the information with respect to importance, relevance or truthfulness. Children and adolescents, more than adults, therefore need to learn how to assess information. Jeong and Hmelo-Silver (2009) examined the benefits of learning in a customized electronic learning environment. Students made much use of the virtual environment and developed

a broad perspective on the subject to be studied. However, to be truly successful, the students had to understand the material. The development of a framework in which the information could be placed was an important aspect. Lack of frameworks hindered students understanding, especially the lower-performing students.

The knowledge that comes through the internet is rarely presented in layers. Everything seems as if it belongs to the same layer of knowledge. Even nonsense is presented as knowledge, which is especially true for the commercial elements (that are frequently used because the internet is based on commerce, and not on education or parenting (Delfos, 2010a). Education needs to make the shift to teach to process information, instead of taking a piece of knowledge on the internet at face value, thus education has a function of teaching children and young people how to process knowledge (Delfos, 2011a, see Figure 13).

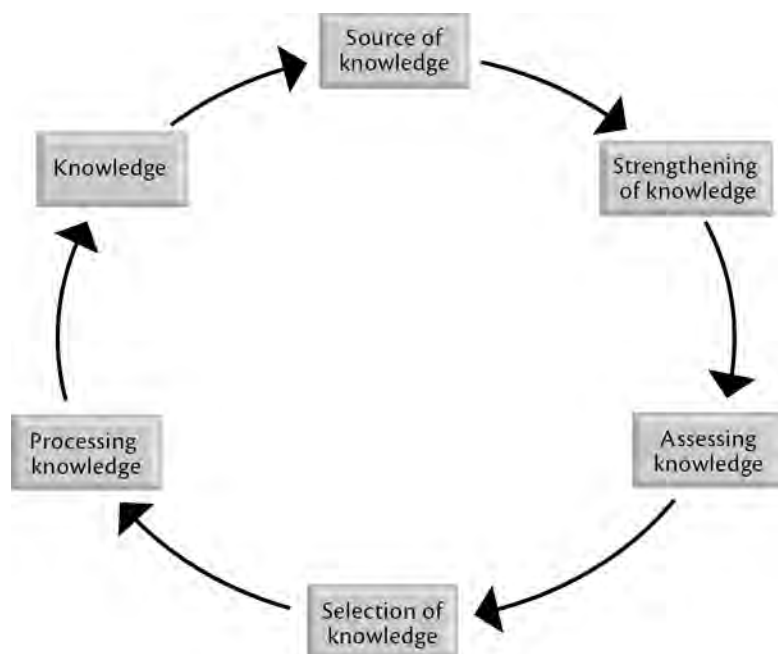


Figure 13: The cycle of knowledge processing (Delfos, 2011a).

The cycle of knowledge processing begins with a source that provides content (step 1). This knowledge should be strengthened by collecting the body of knowledge with respect to such a subject (step 2). The amount of information available, however, is such that limits to the search must be set, and taught. The knowledge must be judged on its value and usefulness for the goal (step 3), which in turn creates the possibility of selection of knowledge (step 4), before placing this new knowledge via frameworks into the person's existing knowledge (step 5). All this eventually leads to new knowledge (step 6), which in turn forms a source of knowledge, thereby attaining step 1 again.

It is indicative of the pace of development of the VE that the pedagogical vision on education *in, with* and *about* the VE lags so much behind. School leaves much to the children and adolescents themselves, because they are generally more proficient in the new media than adults. There is still much research needed about integrating the new media in education, and the results are not always simple. Kose (2009) demonstrated that children in primary schools learn more smoothly with the support of computer presentations, but it had no effect on the sustainability of remembering what had been learned.

Furthermore, the nature of learning changes; there seems to be a shift from a text culture to a visual culture of short texts, no books and more images. However, spoken language and written language did not evolve for nothing, they are vitally important – language will remain the most powerful instrument in communication, and as long as people keep talking, text will remain important. Images are powerful, particularly to transfer emotions which are necessary to store information, but for *awareness*, for *becoming conscious* of knowledge it is necessary to put things into words.

Knowledge consists of layering. If a base of knowledge exists, this means that new information can be placed within/upon it. Knowledge must be built. If we want children to understand and process new knowledge it has to be built up. However, they must first be taught the basic building blocks. In knowledge there is a stratification that ensures that knowledge can progress and new knowledge can be received, see Figure 14 (Delfos, 2011a).



Figure 14: The stratification of knowledge (Delfos, 2011a)

Knowledge acquisition and knowledge processing are based on the stratification of knowledge. To add a new entry in the form of new knowledge, there must exist a basis of frameworks which ensures that the new experience can be properly situated, appreciated and become knowledge. The bottom layer consists of a universal knowledge that is rooted in mankind and remains constant over centuries and cultures. The next layer is formed by the knowledge gained from earlier times that has proven its value over time. Then comes the knowledge of the current time, knowledge that can be placed within the existing

frameworks and tested. Since knowledge itself cannot take root, it is necessary to test it with experience and to store it with emotion, see Figure 15. The memory works best when there is *emotional congruence* (that is, when experience and emotion match) and especially when both are positive (Bower, 1981; Mataros et al, 2001).

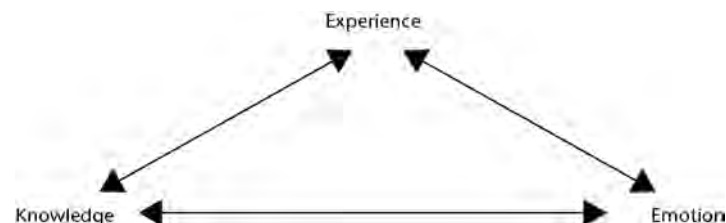


Figure 15: The triad of knowledge-experience-emotion (Delfos, 2011a)

In the VE everything is available quickly, and time becomes less important nearly negligible in gathering information – typing the question takes longer than getting the answer. Time does, however, play a role in the human processing of the information. With the internet offering the newest information, old information easily disappears to the background which means that we can easily gather new knowledge, but often do not have fertile ground to place new knowledge upon. For this, one needs knowledge about the sources that have led to new knowledge, so that one can estimate what the new information means. This, especially for young people is a major problem.

The new reforms in education show a picture of young people with a laptop. The computer is associated with educational reform renewal. The amazing thing is that descriptions of the new pedagogy seldom make reference to the computer, and where it does it is often a commercial reference: 'use tablets, no books is cheaper'. However, children still like to read. The big success of the Harry Potter books teaches us that children can still be immersed in a book, but the shift to reading short texts on the internet is being made, with schools and institutions not favouring books as obviously as they did before. That means two things. Firstly, much knowledge is not available in a digital sense. Second, the stratification of knowledge gets lost, because much knowledge will never be digitalized. Third, reading is done not only with the eyes, but the brain processes all kind of elements of a book that are lost in a digital version of that book, like the feeling of thickness, referring to the space needed to transmit the message.

The quality of what people read on the internet is less clear, they are easily distracted on the internet, especially by commercial pop-ups. To read something in the VE it is not the same as to read a book. Where a book is more about wondering, the VE is more for stimulation and information. A book should be interesting, otherwise one loses interest, and the book does not go beyond the imagination of the reader. Therefore, seeing the film based on the book after you have read the book is often disappointing. You can easily put a book aside if you no longer want to read, but the VE keeps you glued to the screen, even

if you no longer want to be there. A book stimulates the imagination more than the idea that the VE offers, but the VE can also broaden one's perspective. A book on the computer, tablet, e-reader is not the same as a book in the RL. In the RL you use all the senses and feel the book as a whole through your hands, whereas browsing through a digital book is terribly practical. Senses and brains in VE and RL are stimulated differently and store knowledge differently in the memory.

Education should develop a pedagogical and educational perspective on the VE and its use in education and in school. Here too, just like in the recreational area of the VE, children are more or less abandoned, left to themselves.

19 Raising children in the virtual environment

Parents and teachers often feel insecure and uncomfortable about the VE, especially gaming and the new media (Spangenberg, Mountain and Lampert, 2009), opinions fly back and forth, but there is very little support for these opinions.

Parents observe the behaviour of the child, but do not always understand it. Raising children being about fostering opportunities for development and setting appropriate limits where the child require them, therefore you need knowledge about the subject which is lacking about the VE.

In education, we are actively engaged in prevention of RL-addictions. A reward if you do not smoke before your eighteenth birthday, no candy before dinner because then you would lose your appetite. In the VE we must also try to avoid addictions (see the section about addiction) – limiting is a prerequisite, as with all issues in education, but is not enough. Parents also have to educate their children in the VE to make it possible to enjoy the VE. Freedom is experienced only when that freedom is limited, like traffic lights limit the driver. In the same way, children have expressed that they need to be set limits and to know the boundaries in the VE (Delfos and Meere, 2012).

Parents need to join their children in the VE every now and then. In Bosnia-Herzegovina, speaking with a group of children between 10 and 14 years, I asked them what advice they had about the VE. The first and very sensible piece of advice was to teach parents that they have to agree with one another instead of one parent saying 'yes', the other saying 'no'. The children knew their parents meant well, had their best interests at heart and wanted to protect them, but children do not want to be confused, when they simply want to know: *am I allowed to do this or not?* Another piece of advice was for parents to join the children in social media and gaming so that they can understand what these mean for their children. One boy described how his father had once forced him to stop a game, and would not listen when the boy told him it would be a problem for his gaming. He stopped the game and said to his father: *Will you do the game once, and then I will tell you to stop, and you will understand what I mean?* The father said yes, and some time later they did. The father was doing the game and at one point the boy told his father to stop. The father did not want to stop and said: *Now I understand you!*

When joining their children in the VE, parents discover that the computer teaches their children a lot and that the children enjoy spending time on the computer. Through programmes such as PowerPoint or Prezi children easily learn to organize material and present it in a nice way. Parents think they cannot assist their children in the VE, because children are more skilled. However, parents have a lot to offer their child from life experience, and certainly from their experience of knowing their child. For instance, putting information in a proper context is very difficult for young people. When can children be sure that something is true on the internet? What is important and what is not? Making decisions is very important on the internet, and especially quick decisions. For young people it is more or less impossible to make the right decisions due to lack of experience and thinking which is when they need trustworthy adults, their parents and teachers. The VE is, by its nature, an excellent medium to learn that knowledge is plural, and it is important to learn from each other.

Regarding children, the aim of education is to help them develop, to adapt education to their - mental - age in order step-by-step to foster their comprehension, strength, independence and vision of the world. That sounds complicated, but it is in fact what all parents around the world do every day. Through trial and error, they learn every day to raise their child. What parents need to be aware of is that they should do that in the VE as well. This way their own educational style and what is appropriate for their unique child can help the child develop *with* and *in* the VE.

However, because the VE is so large, parents often feel powerless in terms of how to handle it. The message, however, is simple: parenting is the answer. When parents more or less ignore the VE, or give up out of ignorance or a feeling of powerlessness, they do not appreciate the influence of the VE. In fact this is a form of neglect: virtual neglect. Parents often worry that they are too late in educating their child in the VE, or that setting limits makes no sense because the child will do it elsewhere anyway. But raising the child helps! Parents are never too late, maybe for what they want to achieve, but never too late for what they can still achieve through education. Education means that children experience the outside world through the eyes of the parents. These 'spectacles' prepare children, protect them and give them the opportunity to form their own opinion alongside that of their parents. Typically, during adolescence children appear to adhere to totally other opinions than their parents, but eventually in the end they agree with their parents, and parents realise this when their children are raising children themselves. Children seldom compliment parents about their upbringing, but parents need this to find the power to hold on to their ideas. Another adult cannot simply take over, every child needs the specific education of that parent who knows him or her thoroughly, but parents do need each other. The VE is too vast to handle it all by yourself. Parent groups for education in the VE can be very helpful. But parents need more than this. At a time when there is a lack of social structure compared to the past families settle where they receive their professional education and where they work, which is often far from their family of origin. Therefore, parents need especially with respect to the VE, a new form of joint parenting: *group parenting*. Not a group of parents,

but parenting together with respect to some specific agreed subjects. The idea is that parents, together with parents of children who are friends of their own children, form a group with respect to some specific subjects. They develop their own ideas and rules with regard to these subjects, for instance the VE-time of their children. The individual parent will feel stronger when working together in this way and benefits from collective knowledge and experience. Particularly for the VE this is necessary, because parents are better able to stand up for their ideas when they feel supported by others and when their decisions are underpinned by shared knowledge. This is a difficult topic to address, as parents do not easily open up about their educational problems, but it is perhaps an inevitable step as the world is so globalized that not everything can be confined to the microorganisms of the core family, as the world enters the family anyway by internet.

Education requires knowledge about the subject, understanding of the child or adolescent and communication with them on the doubts parents have and the disagreements between parents and children. In the VE like everywhere else, the child cannot solve a problem that he/she does not see due to his or her lack of life experience. To raise children and adolescents, one must also understand a little of what this is all about. What is the difference with the RL? Knowledge is not the most important factor; communication with the child and interest in what the child experiences in the VE are enough to trigger the educational knowledge the parent and teacher have about the child - that is, what he or she can, cannot, and needs.

Educating children helps them benefit from the vast opportunities and possibilities of the VE, the Virtual Environment.

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