Young people, technology and change: understanding the system?

Jóvenes, tecnología y cambio; ¿Comprendiendo el sistema?

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Abstract

This paper begins by offering a brief outline of recent societal changes, emphasising the powerful, global impact of the arrival of information technology in all our lives. It then examines the research evidence about the positive and negative influences of information technology on young people, presenting findings on the following aspects of information technology:

· As a leisure time activity;
· As a source of information;
· For social networking;

The paper concludes by suggesting what the findings may mean for parents and those who work professionally with young people; why it is important to utilise a systemic framework in analysing the issues and by suggesting a range of possible approaches and interventions to improve the usage of information technology by both young people and adults.

Key words: information technology, young people, social networking, computer games.

Resumen

Este artículo comienza ofreciendo una visión general somera de los cambios sociales recientes, destacando el fuerte impacto global de la llegada de la tecnología de la información a nuestras vidas. A continuación, examina la evidencia de la investigación sobre las influencias positivas y negativas de la tecnología de la información en los jóvenes, aportando hallazgos sobre los siguientes aspectos de la misma:

· Como actividad de tiempo libre;
· Como fuente de información;

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• Para las relaciones sociales;

El documento concluye sugiriendo lo que los resultados pueden significar para los progenitores y para los que trabajan profesionalmente con los jóvenes; por qué es importante utilizar un marco sistémico en el análisis de los problemas, y propone una serie de posibles enfoques e intervenciones para mejorar el uso de tecnologías de la información por parte de jóvenes y adultos.

Palabras clave: tecnología de la información, jóvenes, redes sociales, juegos de ordenador

PROLOGUE

A TRUE STORY: My grand-daughter, who was four-years-old at the time, was sitting with me on an easy-chair watching T.V., when an advertisement came on, showing a housewife washing dishes at the kitchen sink, using a well-known brand of washing-up liquid – no white label! - aided by a host of woodland creatures – field-mice, squirrels, voles and moles and so on– helping to dry and stack the dishes on the draining-board. I wanted to have a conversation with my grand-daughter about the little animals, so I said to her: "I wonder how these animals can do that, Chloe?" And Chloe, looking somewhat astounded, answered:

"Don't be silly, Grand-dad, the advert is digitally enhanced……"

INTRODUCTION: SOCIAL CHANGES

As the story in the Prologue demonstrates, societal changes affect us all in various ways, and learning to adjust and cope with these is a significant part of the socialisation process of young people in modern, industrial countries, as it is for adults. Rapid changes in norms and values have made it difficult for young people to identify with adult role models and to adapt to differing, sometimes conflicting, cultural values. In modern societies there appear to be so many possible pathways through the life course that it is clear that developmental transitions and transformations rather than chronological age determine how we progress. Sociologists have called this phenomenon the 'de-standardisation of the life course', meaning that there are no longer expectations as to when or whether individuals should do certain things at certain times in their life. No longer are there age-bound sign-posts for young people to aspire to: It is possible to be a mother at sixteen or at sixty; hold down a responsible job in one's teens or become a university student at 30 not yet embarked on a career; to be a computer 'whizz-kid' as a teenager or be a middle-aged bachelor of 40 still living at home with one's parents.

According to Arnett (2004), such recent social changes allow young people to select priorities in education, career and family and within them to opt for many variations. Furthermore, most of these choices can be reversible: university subjects can be changed or abandoned, romantic partners are inter-changeable, careers can be started and left at any time: This variety of choices leads to many different developmental trajectories towards early adulthood (Arnett et al., 2011).

If so, with few authoritative, adult guidelines or role models to steer the young person, these psycho-social transitions can also be stressful. Any decision made might be a wrong choice; any selected commitment might exclude all other possibilities. So the greater freedom and choices available to today's young people may accompany a loss of security, certainty and guidance. Côté and Bynner (2008) have reasoned that exclusion processes in education and the workplace exist to prevent many young people in certain socio-economic and geographic areas from experiencing important

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developmental transitions, a phenomenon they call 'arrested adulthood'. This is particularly notable in Spain, where almost every second young person is unemployed, and over a third of those who are in work now fear losing their job within the next year (Rodríguez and Ballesteros , 2013).

Hence, to an important extent, development depends upon the cultural context in which young people live, the social institutions they encounter, and the normative and non-normative shifts they experience (Bynner, 2005; Côté, 2000; Ford and Lerner, 1992; Heinz and Marshall, 2003; Hendry and Kloep, 2002). In many countries, young people, especially women in rural areas, quickly make the transition from childhood to adulthood. For example, in Turkey, the mean age for marriage is 21 years (Atak and Çok, 2007).

Findings like those outlined above make it obvious that today's young people develop by meeting and coping with a myriad of challenges from-day-to-day. So, the ways individual adolescents interact with the various forces and factors of the local and wider societal environment facilitates or restricts their developmental variability and influences hugely their transitions and transformations in their many, varied individual pathways to adulthood (Fischer and Bidell, 1998).

THE ARRIVAL OF INFORMATION TECHNOLOGY

One of the most visible and significant global changes in living memory has been the development of information technology. It has revolutionised the world, and created an environment for young people that no other generation before has experienced. For the first time in human history, a learning context exists in which young people may show more competence and have more experience than the older generation. This ability empowers and liberates them massively from adult influence: They possess a new and powerful source of information-gathering. Few parents can monitor what their offspring do on their computers or can interfere with it. In fact, more often, adults beg teenagers for assistance in using computers and other electronic gadgets. However, the media have been quick to point out a number of negative effects of information technology on the adolescent generation (Turow, 1999), and researchers have followed the media's lead. Greenfield and Yan (2006), for example, warn that the Internet has caused various societal concerns about privacy, security, pornography, Internet crime, the virtual community, and intellectual property rights.

Yet, is there strong empirical evidence to justify this moral panic? In this article, we want to review the values and dangers of using information technology, particularly the Internet, by presenting a 'good news-bad news' review of young people and the Web and commenting on the empirical evidence on young people and various aspects of the Internet, namely:
·   As a leisure time activity;
·   for social networking;
·   as a source of information;
·   IT within young people's developmental system; and
·   some implications for research and interventions.

Earlier findings about the Internet were contradictory and problematic, and this was because of the lack of clarification of the term 'Internet use.' Originally, researchers simply measured how many hours young people spent at their computers. Nevertheless, when Internet use became better categorised, for example, distinguishing between chatting, gaming, seeking information, and casual surfing, results became clearer and more meaningful, and here we consider various aspects of information technology in relation to young people.

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1. COMPUTER GAMES

There are millions of video games, with vastly different themes and goals. These games can be played cooperatively or competitively, alone, with other players physically-present, or with thousands of other online participants world-wide, and they are played on various devices from consoles (e.g., Nintendo Wii, Play-station) through computers to cell phones. Because of their diversity in terms of genres and of the differing dimensions of video games, 'a comprehensive taxonomy of contemporary games is exceedingly difficult to develop' (Granic et al., 2014).

Important research has already been conducted for decades on the negative effects of gaming, including evidence of addiction, depression, and aggression (Anderson et al., 2010; Ferguson, 2007). However, contrary to imagined stereotypes, the average gamer is *not* a socially isolated, inept nerd who spends almost all his/her leisure-time alone lounging on a sofa (Lenhart et al., 2008). It is not even young people: The group most heavily engaged with playing games are middle-aged women (Ingram, 2010), and *Farmville* — one of the most popular social networking games on Facebook — hosted over 5 million daily-users in 2012 (Gill, 2012). In these virtual social communities, decisions need to be made instantaneously about whom to trust, whom to reject, and how to lead a group most effectively. Given those highly-involved social contexts that demand the players' complete focus, gamers rapidly learn social skills and strategies that could well generalize to pro-social peer- and family-relations beyond the electronic, gaming environment (Gentile and Gentile, 2008; Gentile et al., 2009). Even aggressive online games have their merits. The critical dimension that appears to determine whether violent games are associated with pro-social behaviours rather than vicious, antisocial behaviours is the extent to which they are played co-operatively rather than alone. For example, those who play violent games co-operatively are more likely to exhibit helpful gaming-behaviours online and pro-social behaviours off-line than those who play non-violent games alone (Ferguson and Garza, 2011). Furthermore, playing violent video games socially, in groups, compared to playing alone, has been found to reduce feelings of hostility (Eastin, 2007), while other studies show that playing *puzzle* video-games —games with minimal inter-face, short-term commitments, and a high degree of accessibility (e.g. *Angry Birds, Bejewled II*) — can improve players' moods, promote relaxation, and ward off anxiety (Russoniello et al., 2009).

One aspect of concern is what we would call 'consumer grooming,' where participation in computer-games costs money: Children are running up huge bills on supposedly free computer-games sold as apps through smart-phones and tablets. These payments are taken automatically from the credit cards of the adult owners of the tablet or smart-phone via an iTunes or Google account, amongst others. Recently, in the USA, both Google and Apple have been forced by the Federal Trade Commission to pay back millions of pounds to parents whose children had made such purchases without their knowledge.

On the other hand, a meta-analysis by Uttal et al., (2013) concluded that the spatial skills improvements, derived from playing commercially available *shooter-video games,* are comparable to the effects of formal (high school and university-level) courses aimed at enhancing these visual skills (Granic et al., 2014). In addition to spatial skills, scholars have also speculated that video games are an excellent means for developing problem-solving skills. One longitudinal study by Adachi and Willoughby (2013) showed that the more adolescents reported playing *strategic, role-playing games,* the more improvements were evident in self-reported problem-solving skills over the next year.

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Ventura and colleagues (2013) used an anagram-riddle task and demonstrated that the extent of video game use predicted how long participants would (beyond the gaming context) persistently attempt to solve difficult anagrams. More generally, Prensky (2012) has argued that exposure to these sorts of games with open-ended problems (and other potential learning experiences on the Internet) has very positively influenced a generation of children and adolescents growing up as "digital natives."

In sum, very much like any other type of playing, computer gaming can have a series of skill-enhancing effects, and only if done excessively, may have harmful consequences like any other obsessive behaviour. While to date the topic awaits supporting research evidence, it is even possible that playing games that provide graded-promotional levels through achievement may enhance young people's self-esteem and, in this way, may prove to be a positive outlet for behaviours and emotions that would be less beneficial than attempts in the real-world to gain 'street-cred.' within the peer group.

2. SOCIAL NETWORKING

Some years ago Nie and Hillygus (2002a, 2002b) predicted that time spent on computers would prevent its use for face-to-face social contacts, thereby restricting young people from acquiring a necessary range of inter-personal experiences, which, in turn would limit their ability to utilise social strategies and skills.

In contrast and perhaps most importantly, contrary to adult expectations, teenagers use the Internet mainly to communicate with off-line friends through e-mail and instant messaging (Gross, 2004; Sanmartin, 2014), continuing the face-to-face gossiping and chatting about daily issues that occurred earlier. Hence, they extend and blend their social learning both online and in the real world. Thus, more usually, it is socially competent adolescents who use the Internet as another vehicle for contacting peers (Valkenburg and Peter, 2007) with the aim of maintaining existing friendships. Such usage is associated with increased well-being in adolescence (Bessière et al., 2008; Kraut et al., 2002). The frequent use of electronic communication leads to the enhancement of 'best' friendships (Blais et al., 2008), which might be due to greater ease of self-disclosure in electronic communications (Valkenburg and Peter, 2007, 2009). This may be of special importance for young men, some of whom have problems engaging in self-disclosure when communicating face-to-face (McNelles and Connolly, 1999), but find it easier to do so online (Schouten et al., 2009). Nevertheless, it seems as if shy people generally feel less handicapped in providing self-information in a written form rather than face-to-face (Lawson and Leck, 2006). Furthermore, people with concerns about their appearance are given an opportunity to present themselves optimally and withhold visual exchanges, at least initially (Clark, 1998). The Internet is also regarded as a safer place to meet strangers and 'unknown people' since it offers greater personal control over how much information is revealed.

However, adolescents who are lonely, maybe because they lack certain contact-making social skills and try to use the Internet to make contacts and chat to strangers, often do not achieve their goals. For them, Internet use is associated with a decrease in well-being (Valkenburg and Peter, 2007, 2009).

Social networking sites such as Facebook and Myspace open up yet another area for socialising that did not exist before: The ability to re-establish contact with long lost friends, to maintain connections with very little effort, and to build up immense global networks. Some young people have

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more than a thousand 'friends' in their virtual networks, and though they might not have met them all personally, they constitute a vast pool of social resources for gaining information or organising group support, thus increasing their 'social capital' (Ellison et al., 2007). Again, there are different forms of social networking sites, and they should not all be treated as if they were all the same by researchers. Some, such as the community 'Habbo', are close-knit and very different from large sites such as Facebook (Taylor, 2015 in prep).

Engaging in activities such as writing blogs helps younger writers to explore and try out new identities, while older ones shape and express their existing identities on their personal home pages (Schmitt et al., 2008). Engaging in chatting and instant messaging also teaches teenagers new ways of linguistic interaction. Merchant (2001) observed how they develop sophisticated and marketable skills in their rapidly written conversations, which combine features of face-to-face talk with explorations in interactive writing and the exchange of additional digital information, such as image files and web addresses. Merchant also emphasised the creativity used in inventing new words and abbreviations in cyber talk.

The advent of mobile phones has enhanced regular communication between family members in daily life and yet creates a paradox between paternal control and freedom for their sons and daughters.

Kerr et al. (2010) showed that where family relationships were warm and friendly, adolescents voluntarily self-disclosed about whom they were with and where they went, when out in the evenings. Where family relations were more authoritarian and parents demanded to know children's peers and venues, children frequently lied. With smart phones, parents can allow children to go to a wider variety of venues and still be in regular contact with them. From the young person's perspective, that gives them more freedom to travel around, on the one hand, while, on the other hand, they always have their parents 'in their pockets': That is, if parents have kept up with modern technology and know how to use WhatsApp and other devices. Another advantage of modern communication technology is that with social mobility – travelling to university or working in another town or city – family contact is easier and young people can keep in touch with their parents wherever they are. On the other hand, young people are aware that modern technology not only facilitates communication, but it also gives parents and boy- and girlfriends greater control over them (Sanmartin, 2014)

Turning to another aspect of adolescent life, young people are often accused of being apolitical and lacking interest in matters of government and affairs of state, and although some studies show that only young people who already are politically active off-line are also active online, international protest movements such as the Arab Spring or the recent uprisings in Hong Kong and Turkey have been largely managed and organised by young people through social networks on the Internet (Parés, 2014). Furthermore, young people's political agenda goes beyond traditional local questions towards issues of global magnitude, which has been made possible through the Internet (Farthing, 2010). For example, in the current economic crisis in Spain young people are not particularly attracted by party politics and great ideologies, but they are more rebellious and more interested in actively solving problems compared to earlier years (Moreno and Rodríguez, 2013; Rodríguez and Megías, 2014). The rules for social participation have changed, and the Internet gives young people an instrument to target the political issues that interest them, rather than follow some party programme. One illustration comes from a recent event in the UK: A nine-year-old Scottish girl, Martha Payne, had started to post pictures of her daily school lunch on the NeverSeconds blog, and gave ratings as to how unhealthy and insipid she found each dish. In a short period of time, the blog became viral. The local council tried to ban her from posting any more photos, but the press had become interested, and she was interviewed by both the national and international media – the council had to reconsider their decision to silence her. She went on to collect donations for the charity "Mary's

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Meals", raised thousands of pounds, was invited to conferences all over the world, met with political leaders and charity organisers and, presently, keeps discussions about the quality of school meals in the public eye. The Internet has made it possible for children like her to get their voice heard and to contribute to changing the world! However, even within the traditional political context, the fact that sixteen-year-olds were allowed to vote in the recent Scottish independence referendum yielded a high voting turn-out of young people, and they were convincing in giving their views to the media for or against independence – an example of young peoples' engagement and conviction if they are really given a chance to make their voice heard, online or in real life.

One of the obvious dangers of social networking activities in the world of high-technology is that it facilitates anti-social behaviours. These behaviours have existed for many decades – gossip, character defamation, bullying, exchanging embarrassing photos – are now intensified by communication technology and given much visibility by the media and by politicians. It is true that the elements of the Internet that attract young people, such as anonymity, interactivity, and connectivity also enable online harassment and cyber-bullying (e. g. Cassidy et al., 2009) and the risk of sexual grooming by adults (Mitchell et al, 2001)."Cyber-bullying" involves using the Internet, e-mail and mobile phones to send round offensive images and character defamations (Dehue et al., 2008; Smith, del Barrio and Tokunaga, 2012). There is the danger of losing control, postings going viral and becoming impossible to eradicate. Hence, there are issues of finding the right balance between trust and caution, disclosure and anonymity, given that deception and exaggeration are common on the Internet (Lawson and Leck, 2006). A recent risk has been seen in the appearance of 'Internet trolling', where anonymous individuals make offensive comments to provoke the Internet community. Young people will need help to deal with such issues. If we consider that in the real-life school context there are more roles involved in bullying than being an active perpetrator, namely co-conspirators, victims, defenders and bystanders (Salmivalli et al., 1996) and that while boys are more likely to be involved in physical bullying, girls are more likely to engage in verbal and relational bullying (James, 2010), it might be possible to design counter-strategies, similar to interventions used in traditional anti-bullying programmes but adding a technological component commensurate with the medium.

Then, a small percentage of young people spend time in chat-rooms, where they have the opportunity to talk to strangers, and where the chat is 'public': That means everybody who logs on can follow the online discussions. This virtual world of mostly anonymous chat may offer a safer environment for exploring sensitive topics, for example aspects of emerging sexuality, than the real world. Subrahmanyam et al. (2006) examined the online construction of sexuality in a large selection of conversations from monitored and unmonitored teen chat-rooms. More than half of the 583 participants (identified by distinct screen names) provided information about themselves that would have been obvious in face-to-face communications, such as gender and age. Participants who identified themselves as 'female' sent more implicit sexual communications; those who self-identified themselves as 'male' sent more explicit sexual communications. The protected environment of monitored chat (with hosts who enforced basic behavioural rules) was an environment with less explicit sexuality and fewer obscenities than the freer environment of unmonitored chat. These differences were attributable both to the monitoring process and to the differing populations attracted to each type of chat room (in the monitored setting more participants self-identified as younger and female; in the unmonitored situation more participants self-identified as older and male). However, even here only about five percent of the content of chat messages consisted of sex-related topics and less than a third of participants engaged in erotic chat.

The similarities between online and real-world forms of social networking are fairly close, but the crucial difference is that with communications technology a massively wider audience is available, which multiplies both the possibilities and the dangers. The majority of young people is aware of this and say

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that they are happy to exchange some of the security available in the real world community for the relative freedom of a more insecure virtual world (Sanmartin, 2014).

3. THE INTERNET AS A SOURCE OF INFORMATION

As widely known, the Internet makes a whole cornucopia of information available to whoever looks for it. Not all this information is harmless. According to researchers, the availability of web-pages and chat-rooms can encourage pathological behaviours such as self-injury, suicide and anorexia and enable extremist groups to flourish. Nevertheless, the educational and psychosocial benefits far outweigh the potential dangers (Tynes, 2007). We have already mentioned the advantages social networking and even gaming can bring to its users. Another value lies in the Internet's capacity for its users to find all kinds of information rapidly. As such, it has become an important source for complementing school work, supporting hobbies and facilitating daily tasks. Whether one looks for historical data, mathematical formulas, sport results, train times or poems, information is just a quick click away. For example, in a study of 130 urban teenagers from low-income families and their Internet use over 16 months, Jackson et al. (2003) found a positive correlation between frequency of Internet use and school attainment. A similar result is reported in Taiwan (Chen and Fu, 2009), which showed that online searching for information helped boost pupils' high school entrance exam scores. However, as information can be so easily accessed and down-loaded, plagiarism is increasing on a large scale (Ercegovac and Richardson, 2004).

Classroom-relevant information is not the only kind that can be retrieved on the Internet. When we consider pornography, young people have always been curious about sex. But while former generations only infrequently gained access to pornographic material, the last few years have shown a significant increase in the number of adolescents who intentionally or accidentally have been confronted with pornographic material online (Mitchell et al., 2007), with age and excessive Internet use being predictors of exposure to online sexually explicit material (Ševčíková et al., 2013). Research trying to detect the consequences of this has found that more frequent exposure to sexually explicit Internet material is associated with greater sexual uncertainty and more positive attitudes toward uncommitted sexual exploration (Peter and Valkenburg, 2008). From a cross-sectional study, those who report intentional exposure to pornography, online as well as offline, are significantly more likely to report delinquent behaviour and substance use in the previous year, and show symptoms of depression (Ybarra and Mitchell, 2005), though, of course, it is impossible to determine what is cause and what is effect.

Due to the hesitation of parents and teachers to provide teenagers with relevant and appropriate sex education, many of them search for information on readily available pornographic web-pages. As new research has shown (Wilson, 2014), this is a problematic development. The messages conveyed on these pages are sexist and often violently aggressive, and portray unrealistic pictures of romantic and sexual relationships. For example, exposure to pornographic material increases the likelihood that both young men and young women view women simply as sex-objects (Peter and Valkenburg, 2007).

More alarming are the latest results from brain research, showing that regular consumption of pornography influences structures in the brain, for example by wearing out the reward system. That means, that the more pornography one consumes, the more de-sensitization occurs in the brain, and the need for greater stimulation increases (Kühn and Gallinat, 2014). Brain activity in persons with a porn-addiction mirrors that of drug addiction. Younger brains are more vulnerable to addiction and sexual conditioning, and repeated exposure to increasingly stimulating pornographic material can

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lead to a growing insensitivity towards real life experiences with an eventual partner. Voon et al. (2014) found that 60% of their young subjects had difficulties achieving erections with real partners, but not when watching pornography. Young men need longer than older ones to recover from erectile dysfunction caused by excessive use of pornographic material (Wilson, 2014). However, not all young people are overly interested in pornography. As with many other behavioural problems, it is the vulnerable ones, those who have little social interaction in their daily lives, who are most likely to turn to pornographic material (Mesch, 2009).

As they pass through puberty and grow up, young people become concerned about their appearance and body-image and this is reinforced by fashion models and the media. Some time ago Featherstone (1991: 186) wrote that 'appearance is taken as a reflex of the self within consumer culture and the penalties of bodily neglect are a lowering of one's acceptability as a person, as well as an indication of laziness, low self-esteem and even moral failure'. In such a societal climate adolescents are confronted by cultural standards of beauty and attractiveness. As one girl in the Shucksmith and Hendry's (1998) investigation said: 'You look in these magazines and you see all these super-models… They're all about 7 stones (i.e. 48 kg.) I mean you don't see any at 9 stones (i. e. 64 kg.) - like me!'

In their extreme forms, these attitudes can contribute to the development of anorexia or the use of drugs for body sculpting. Young people of both genders can find all the necessary information about weight loss, hiding their condition, support groups and drug retailers on the Internet. Chesley et al. (2003) estimated that there are over 500 Pro-Ana websites. Borzekovski et al. (2010) analysed pro-anorectic web pages, finding they often contain dangerous tips of how to lose weight and/or how to purge. Those who follow such regimes tend to relate to eating disorders as a conscious lifestyle choice but not as a pathological illness that demands treatment. Again, it seems not to be the web contents that make young people anorectic, but those who already have pre-morbid personal conditions, who are attracted to these pages, are then reinforced in their behaviour.

However, there also may be a therapeutic component within these websites. In the therapeutic community it is acknowledged that there are different stages of readiness for change. Before individuals with anorexia are ready to accept help, treatment is not usually successful. Generally this results in individuals not receiving support until they are forced into treatment or until they discuss their condition with a professional. With Pro-Ana websites, individuals with anorexia can access less intimidating support before they are ready to seek face-to-face professional help (Boniel-Nissim and Latzer, 2011). Individuals feel that these websites provide them with 'free-from-judgment space' to meet and where they can support each other and decrease the isolation that they feel (Dias, 2003). This may be equally true for web-sites promoting the use of anabolic-steroids to enhance muscular development, directing adolescents to sports and fitness clubs as an adjunct to body-sculpting via drugs.

CONCLUDING REMARKS: CAN WE ESTABLISH A GENUINE 'LEARNING SYSTEM' TO ASSIST YOUTH'S TRANSITIONS TO TECHNOLOGICAL SOCIETY?

Just by being made available to the general population, new technologies will not lead to developmental growth. They are basically tools, which both young and older members of society need to learn how to use in order to benefit from them. As we have shown in this paper, modern technologies offer both challenges and risks for young people. Whether we look at computer games, social-networking sites, the Internet as a source of information and the possibilities it offers, there are

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visible and hidden dangers as well as challenges and opportunities for development. If any pursuit becomes addictive and leads to the exclusion of other activities, there may be unhealthy side effects and this is self-evidently true for new information technologies. Similarly, if used responsibly, and in moderation, the new technology has much to offer. In other words, the electronic medium does not necessarily turn young people into 'Internet addicts', rather certain adolescents are predisposed to such addictions, for example when they have few personal relationships or pastimes to occupy them. As we have shown, it is often lonely and socially isolated young people, lacking in self-esteem and social skills, who tend to use the Internet excessively, are attracted by violent games and pornographic material, putting themselves at risk in chat-rooms and involving themselves in cyber-mobbing. Restricting their access to information technology would not help them with their underlying problems. As a systemic approach allows us to examine (see *Figure 1*), even in problematic cases it is not the technology *per se* that causes the problem, but rather it exacerbates already existing ones within the system.

Figure 1: The young person's relationship to IT within a wider dynamic system
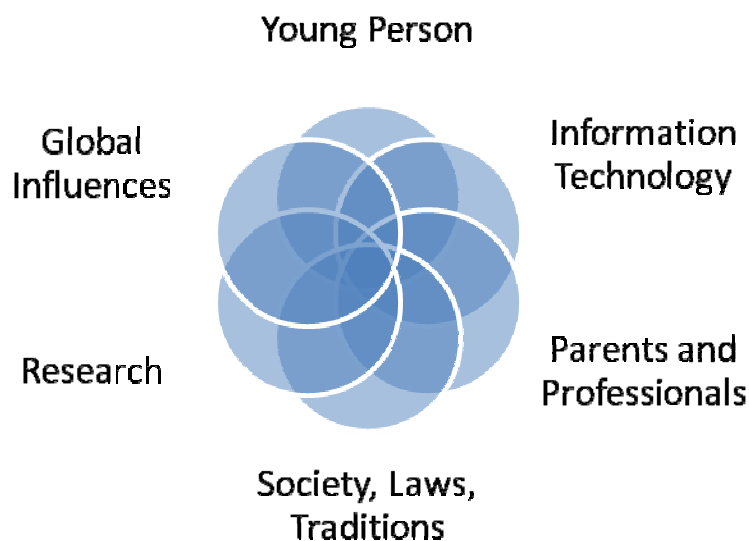
In order to avoid exploitation and other IT-related problems, young people need to learn to use these facilities responsibly. It is obvious that this learning can only occur within young people's developmental system, which includes parents, family members and educational professionals, peers, other adults (both benign and dangerous ones), and is placed within a global situation, including laws, traditions, values and knowledge (see also Bronfenbrenner, 1979). For educational praxis, that means two things: There is no element within this system that is good or bad *per se* for young people's developmental outcomes, they only become so by interaction with the other elements in the system. Playing aggressive video games, for example, can teach valuable social skills to one teenager, elicit anti-social behaviours in another, and have no effect whatsoever on a third.

The second implication of a systemic view is that interventions need to be directed at several elements in the system, not only at one. The 'one-variable-explanations' that are so cherished in the media, very seldom work. For instance, on their own, laws against pornographic material on the Internet will hardly make the Internet 'safer' for young people.

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It becomes clear that both adults and young people need more education in dealing with IT. Young people need to learn about the risks involved when using IT, how to guard their privacy, how to fend off cyber attacks. They need help and guidance to 'see through' manipulative consumer-marketing and dangerously fashionable images, promising bodies that 'can be shaped to match' current cultural stereotypes, so that they learn to evaluate such "messages" objectively. As an analogy, in helping a child to journey alone from home to the town centre or school, no sensible parent would simply order the child not to do anything foolish or give written instructions on how to travel and avoid risks such as crossing busy roads. No, the parent would set out a graded programme of trips from home via local streets, then perhaps by bus to the desired destination, accompanying the child and only gradually, on seeing appropriately sensible travel behaviour, would the child slowly be allowed to travel alone – and safely.

As we have already stated, Kerr et al. (2010) demonstrated that a better strategy than control and constant supervision in dealing with adolescents is creating a relaxed family ethos which enables young people to discuss social events with parents and 'self-disclose' to their parents about their leisure activities, peers and venues. But, how can parents, youth workers and teachers discuss with young people the risks and values of the electronic highway, if they hardly know how to switch the parental controls on? As responsible adults would do, exploring their children's school route with them first, before they send them off alone, they should actively go out and learn the secrets, functions and risks of modern technology, and every so often share their offspring's surfing, networking and gaming.

A non-judgemental learning strategy would need to be devised with parents becoming much more IT-literate, mutually sharing the pros and cons of Internet pages with openness with their children. Such a systemic 'shift' demands that parents and youth professionals need to learn to accept role-exchanges with young people. Remember the story of Chloe and her Grand-father: Maybe particularly in the area of information technology and communication, adults need to accept that many young people are much more skilful than many adults. As Prensky (2012) has said, youths are the natives of the global communication web, adults are only visitors!

Thus, what has been said so far about parents applies similarly to those professionals who work with young people in various leisure venues and settings. They also need to be truly computer-literate if they are to communicate with and aid young people to navigate through these technological innovations that are, and will be, much more accessible in the future. Only by being knowledgeable about these media and all their potential possibilities and risks will adult professionals be able to work openly and non-judgementally with young people. Then the latter will be empowered to demonstrate their skills in areas where they can truly excel. Two-way dialogue on relatively equal terms between young people and youth agents can enable the possibilities and dangers of these social networks to be discussed and responsible strategies devised so that vulnerable, socially unskilled young people can be helped to avoid risks and early rescue techniques can be put in place. In one interesting intervention, a school in England brought in a local youth worker to 'sign in' to the school's chat room as an adolescent, 'grooming' some of the pupils to accept him as a friend and agreeing to meet him in a local park, and then – before any actual meetings took place - he debriefed the pupils in an open classroom discussion about the dangers of trusting strangers on the Internet.

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If we consider cyber-bullying for a moment, a number of roles associated with that of perpetrator was outlined by James (2010). Without going into detail, would it not be possible to prepare a cohort of age-peers to act as technology-monitors to both seek out and educate potential and actual bullies? Such interventions at a local level would be worthwhile 'experiments', provided they are independently evaluated before they are offered as national or international panaceas. Furthermore, adolescents and adults together need to seek ways of providing legitimate alternatives to problematic IT-use. We need to help adolescents find activities and pursuits that offer them motivation, companionship, challenges, skills, achievement in lawful ways that closely match the excitement, emotions, concentration, rewards that certain social networks provide in a less than legitimate, risk-free manner. For instance, some young people 'need' social rewards or adult approval to prevent a tendency to seek peer-approval in less wholesome activities. Recognisable, public roles in school or youth club (prefect, captain, team leader) may fulfil this desire for social recognition and in learning the necessary skills for such social roles can lead to pro-social behaviour and personal development. Or another example: Sex education could use more attractive material, and address questions and concerns young people actually have, so that they do not see the need to access pornographic material, and have the knowledge to identify false information on these sites. One such attempt has recently been made with the publication of a manual addressed to young people with the title "Sex & Lovers: a practical guide" (Henning and Bremmer-Olszewski, 2014), but we have yet to discover whether it stands up to competition from the Internet. On a societal level, policies and laws need to be constantly revised to keep up with technological development. Even now, in some countries the unauthorised distribution of intimate pictures via social networks as in 'cyber-revenge' is being made a criminal offense, authors of 'shit-storms' can be prosecuted, a special 'opt-in' function for the viewing of pornographic material is being discussed, the easy installation of parental controls could be made obligatory, and so on. It is important to note that these measures are not sufficient on their own. They are just one step on the way to facilitate adult engagement. Furthermore, as with all interventions, they should be evaluated scientifically and be based on empirical evidence. It is a big task for youth researchers to both deliver the necessary facts and to communicate them to policy makers. Media panics, indiscriminate condemnation of new technology and judgemental diatribes do more harm than good.

Finally, we should turn our interest to the possibilities IT is offering as a tool to help young people's empowerment and positive development. Health professionals have already begun to develop Internet sites and even computer games in order to get their messages across to young people. A meta-analysis concluded that games can make important advances in the educational reforms necessary to deal with the learning issues of the next century (Vogel et al., 2006). However, not many of these innovations are evaluated as yet and it seems that the designers have some difficulties in making them fun. Though it is early days yet, a fantasy role-playing game based on Cognitive Behaviour Therapy for depression was recently developed (SPARX) to change thinking patterns and explicitly increase engagement, and a randomized controlled trial showed it to be as effective in treating depression as a therapist-administered Cognitive Behaviour Therapy programme (Merry et al., 2012).

Furthermore, as particularly young people from deprived communities have stated that they desperately wished to 'be good at something – music, art, drama, sport, school – anything!' as was documented in a qualitative study (Kloep et al., 2010), there is a chance to use young people's

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impressive digital skills and allow them to use them in a meaningful way. One such approach was piloted in an intergenerational programme in Wales, where young people were given the task of teaching pensioners to use the computer. However, controlled studies and evaluations of such interventions are rare, and there is still a lot of work to do for researchers and practitioners.

In this article, we have considered young people and information technology. However, we would like to stress that IT is only one aspect of the complex transition to adulthood, and as such can serve as an example for other challenges young people have to navigate. Let us consider the various players in this systemic 'game' of development-via-interactions. If Figure 1 is examined it can be noted that parents, teachers, youth workers, mentors, other members of adult society including press, media, government, and young people themselves, all interact in various forms with each other, and with new technologies. Thus, it is vital that a 'communications technology-learning partnership' is forged between young people and adult professionals of all kinds.

Finally, adults who work in partnership with young people need to see and understand the whole, complex, linked-up, psycho-social-environmental picture of the varied, individualistic transformations youths will make towards adult society, so that the interactions, forces and factors that influence these social, occupational, educational, psychological trajectories and, in turn, are affected by them, can be taken into consideration when designing, in partnership with young people, the optimal ways of helping them to find their own pathway to adulthood in a society where the only constant is continuing change and within which there will be the introduction of newer and more sophisticated contexts and networks of information technology.

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