Youth Web Spaces

Designing Interfaces as if Youth Mattered

Shahper Vodanovich, Max Rohde, Ching-shen Dong & David Sundaram

Youth is a period of rapid emotional, physical and intellectual change, where young people progress from being dependent children to independent adults. Young people who are unable to make this transition smoothly can face significant difficulties in both the short and long term. One way to support this transition is to create an environment that enables youth to be well supported through the provision of information and the creation of a community where youth feel empowered to collaborate with their peers as well as decision makers and legislators. This article focuses on exploring the use of the Internet by young people and how youth well-being can be improved through the design of community oriented youth-friendly web spaces. This article begins with a definition of youth well-being and what this means in the context of the web. We propose key requirements for the design of youth web spaces that may result in their well-being. These conceptual requirements then motivate us to propose interface design requirements for youth web spaces. Furthermore, we propose a framework that can guide the design and implementation of community oriented youth web spaces.

Keywords: collaboration, community, flow, framework, interface, web spaces, well-being, youth

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Youth[1] is a period of rapid emotional, physical and intellectual change, where young people progress from being dependent children to independent adults. The Australian Institute of Health and Welfare asserts that young people who are unable to make this transition smoothly can face significant difficulties in both the short and long term (AIHW 2003). The presence of an environment that enables young people to be well supported through the provision of information and the presence of a collaborative, community may enable them to make this transition smoothly (Zhang *et al.* 2004; McInnerney & Roberts 2004). The majority of literature on youth well-being and the Internet focuses on two interconnecting themes. The first theme stresses how Internet use itself could be harmful to the well-being of young people as it takes time away from other activities (Kraut *et al.* 2002; Subrahmanyam & Šmahel 2011, ch. 4) that are essential for their development and well-being such as playing outdoors, sleeping or reading books (McHale *et al.* 2001; Gardner *et al.* 2008). The second theme focuses on the activities of young people on the Internet and the potential threat they face from online predators and harmful web content (Wolak *et al.* 2003; Mitchell *et al.* 2005; Juvonen & Gross 2008). What's missing is an exploration of the potential and opportunities that lie within the Internet to make a positive impact on youth well-being.

The popularity of the Internet as an information source has grown extensively. Its sheer expanse and convenience is an ideal environment to disperse information. The youth of today are part of *the net generation* (Tapscott 1996; Tapscott 2008) which is ubiquitously connected to the world using a myriad of technologies such as mobiles, video game consoles and a whole host of other Wi-Fi capable devices, all of which are part and parcel of their everyday lives. The net generation uses informational, collaborative and community oriented systems to a level that is unprecedented (Prensky 2001a). By age 20 members of the digital generation will have spent 20 000 hours online (Palfrey & Gasser 2010). The youth of today represent the first generation to grow up surrounded by technology.

They have spent their entire lives using computers, videogames, digital music players, video cams, cell phones, and all the other toys and tools of the digital age. This ready availability of multiple forms of media regularly used by youth is increasingly central to everyday communication and is increasingly vital to youth well-being (Subrahmanyam & Lin 2007).

There are numerous frameworks for designing and implementing web spaces for organisations (Nunamaker *et al*. 1990; Adams & Courtney 2004; Hevner *et al*. 2004). There are frameworks for explaining the transition from childhood to adulthood as well as frameworks and models that explain to some degree what young people are involved with online (e.g. Turow & Nir 2000; Gross *et al*. 2002; Boyd & Ellison 2008; Koh & Dresang 2009). At this point in time the youth-oriented frameworks do not inform the technology frameworks and neither do they take into consideration technological factors. In order to design and implement a community oriented web space for youth well-being, we need to bring these diverse perspectives together in order to create a robust set of design principles for this specific area of research. As such there are not enough community based youth web spaces which provide young people with up-to-date and relevant information, and which allow young people to collaborate and participate in an online community in an interactive manner such that it may enable youth well-being. In this paper, we propose a framework that is meant to guide the development of the interface for a community based web space to support youth well-being. In the next section we discuss the motivation for the creation of youth web spaces; in particular we examine the different elements that are required to enable the design of a community oriented youth web space that facilitates well-being.

Well-being of Youth

Previous research has shown increasing concern over the effect of the Internet on the well-being of adolescents (Kraut *et al*. 1998; Turow & Nir 2000; van den Eijnden *et al*. 2008; Kim *et al*. 2009; Valkenburg &

Peter 2009). Similarly, youth workers as well as policymakers, teachers, parents and researchers have highlighted concerns about young people's well-being and the need for improvement in this area (Bourke 2003; Eckersley *et al*. 2006). However, the concept of well-being has not been clearly defined, theorised or measured (Ryff 1989; Diener *et al*. 1999), especially when applied to young people (Ben-Arieh 2005). Therefore, it is perhaps useful to provide a working definition of what we mean by 'the well-being of youth'. Scholars agree that well-being is multidimensional – the United Nations Children's Fund (Adamson *et al*. 2007) asserts six dimensions of well-being of youth: *material* well-being, *health and safety*, *education*, *peer and family relationships*, *behaviours and risks*, and young people's own *subjective sense* of well-being. In addition, the Children and Youth Well-being Index (CWI) developed at Duke University in the USA identifies seven key domains of well-being: *economic* wellbeing, *safe/risky behaviour*, *social relationships*, *emotional/spiritual* well-being, *community engagement*, *educational attainment*, and *health* (Land *et al*. 2001). Therefore any consideration of youth well-being needs to include factors or dimensions such as emotions, psychology, health, relationships, and social environment (White & Wyn 2004).

Youth Well-being in Web Spaces

Computers are an important tool in achieving the well-being of youth as they are an important aspect of youth culture (Valaitis 2005; Palfrey & Gasser 2010). Young people are not only exposed to a plethora of technological tools that allow them to connect to the Internet, but they are equally surrounded by friends and family who go online. According to a survey done by the PEW Online American Study, 83 per cent of all the adolescents surveyed stated that "most" of the people they know use the Internet while only 6 per cent say that very few or none of the people they know use the Internet (Lenhart & Madden 2005). The youth of today has variously been referred to as *the net generation* (Tapscott 1996; Rickard & Oblinger 2003), *digital natives* (Prensky 2001a) and *the millennial*

(McMahon & Pospisil 2005). This generation is said to: prefer receiving information quickly; be adept at processing information rapidly; prefer multi-tasking and non-linear access to information; have a low tolerance for lectures; prefer active rather than passive learning; and rely heavily on communications technologies to access information and to carry out social and professional interactions (Prensky 2001a; Prensky 2001b; Oblinger 2003). Prensky maintains that the digital culture and environment in which the youth of today have grown up has changed the way they think: "It is now clear that as a result of this ubiquitous environment and the sheer volume of their interaction with it, today's students think and process information fundamentally differently from their predecessors" (2001a, 1). Young people are more than just consumers of digital content; they are also active participants and creators of this new media culture, developing content themselves, designing personal websites, and launching their own online enterprises (Sharp 2000). The proliferation of youth-created web pages and message-board postings, and the popularity of instant messaging among young people all contribute to the booming use of the digital media for communication among young people (Madden 2003; Livingstone 2008; *Digital Media, Youth, and Credibility* 2008).

Cockburn (2005) asserts that the well-being of youth may be enhanced by the ability of computers and other information and communications technologies to provide better access to information, anonymity and the ability to include their views in decision making. Moreover, networked computers empower people around the world as never before to disregard the limitations of geography and time, find one another and gather together in groups based on a wide range of cultural and subcultural interests and social affiliations (Kozinets 1999; Mesch & Talmud 2010). It may be empowering for young people to know that they are in control of the information that they are receiving and a key part of this is them being aware of the tools and paths that are open to them in achieving changes to policies that affect them. A survey conducted by Valaitis (2002) about young people creating and implementing their own websites, found that

they felt that technology empowered them in three ways: sharing their views and information with the community, getting other's opinions and getting access to influential people. Furthermore, she also found that young people felt more confident, better prepared and more knowledgeable when expressing themselves to the wider community.

Figure 1 illustrates the three key modalities of interaction that young people could undertake in an online environment, that is, interaction with the computer/web space to gain or elicit information, interaction with their peers as well as legislators and decision makers. In addition, the figure also draws attention to an important issue regarding the Internet – safety or governance.

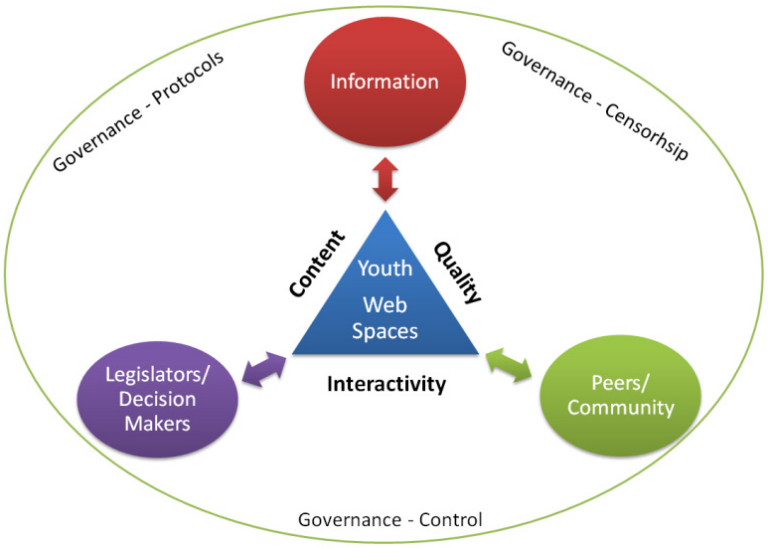

Figure 1: Youth interaction in web spaces

Gross, Juvonen and Gable (2002) note that the Internet can either undermine or foster well-being and in turn empowerment. They are referring to the importance of governance and control issues surrounding the Internet, especially web spaces that young people have access to. A report by Livingstone (2001) suggests three main concerns regarding youth

Internet use: *contact* – who are the youth interacting with; *content* – what are they viewing and being exposed to; and *commercialism* – this could include online marketing through to gambling and pornography. Therefore the aspects of governance should be given careful consideration in the design of youth web spaces. In the next section we review web spaces that enable one or more of these modalities. However, due to the limitations of space we leave out discussion of governance and control, as that in itself is an immense topic that has many facets and dimensions that cannot be adequately expressed in the limited space of this paper.

It is useful to carefully define what key elements could contribute to the well-being of youth. For the purposes of this paper we concentrate on three factors that may impact the well-being of youth in an online environment: *information*, *community* and *collaboration*. In the following sections we explore how these three modalities of information, community and collaboration could contribute to the well-being of youth in web spaces.

Information

Youth of today are facing adolescence in a digital environment. This period of their lives is dominated by many questions – questions about oneself and questions about changing relationships with the outside world. In this phase of life there is a struggle for independence from parents and an increased reliance on peers for support (Buhrmester & Furman 1987; Larson & Richards 1991). However, there are some areas of a young person's life that they may not feel comfortable sharing with even their closest friends. For these reasons the Internet is an example of an important informational source that has become increasingly popular among youth (Tapscott 1997; Prensky 2001a; Subrahmanyam & Šmahel 2011, ch. 8). The Internet accommodates the increased communication needs with existing friends and the creation of new social relationships as well as the need for anonymity when looking for information on sensitive topics (Borzekowski & Rickert 2001; Pempek *et al.* 2009).

Community

The role of young people in participating in their well-being is important to recognise. Not only are they capable of providing support for each other but also, as previously mentioned, they are more aware than policy makers and youth workers of what their concerns and issues are and thus their participation needs to be encouraged in all spheres of society and in decision-making processes at the national, regional and international levels. There are increasing calls for young people to participate in the debates and decisions made concerning their well-being, their education and their communities. These calls are fuelled partly by a growing recognition of children's rights to express themselves, participate and be heard in general and partly by the decline in civic and political participation both generally (Livingstone & Bober 2004) and, especially, among young people (Prout 2000; Kimberlee 2002; Flanagan *et al*. 2009). The Internet then, can be seen as a means of increasing young people's participation in a community environment) (Kann *et al*. 2007; Quintelier & Vissers 2008).

Collaboration

Collaboration amongst young people and between them and legislators and decision makers is a vital part of ensuring that their 'voice' is heard (Cecez-Kecmanovic *et al*. 2009). Calvert asserts that collaborative and group-based activities can promote pro-social behaviour, or "positive social interaction skills such as cooperation, sharing, kindness, helping, showing affection, and verbalizing feelings (1999, 209). Some scholars see digital technologies as a way to enable children to have more control and navigation in their learning, mostly through direct exploration of the world around them, ways to design and express their own ideas, and ways to communicate and collaborate on a global level (Huffaker 2004). This type of collaboration will improve decision making processes at national, regional and international levels and more importantly will help frame future discussions around issues that youth and children consider most important for themselves and their well-being.

Conceptual Requirements

These three modalities of information, collaboration, and community can additionally be analysed in terms of their *content*, *quality of information* and *interactivity*. Content, quality of information and interactivity all play a vital role in the design of a web space for youth (Figure 1). We discuss these in the following paragraphs.

In terms of what content should be covered by web spaces for young people, it is perhaps useful to first consider what issues are of the most importance for youth. A survey conducted by United Nations Youth Association of Australia (Heer 2008) found that young people wanted to find out information and contribute information on topics that they felt strongly about and that were central to their lives (Markow 2003).

The quality of a web space for young people is impacted strongly by the quality of the content of information within it as well as the quality of the information presented within in it. That is, there is a phenomenal amount of content available for the consumption of young people regarding a variety of issues and concerns that may be of interest to them. However in order to ensure a better quality of information available to the young people two steps could be taken, the first is some form of intelligence density, defined as measuring how quickly can you get the essence of the underlying data from the input (Dhar & Stein 1997). Intelligence density allows the user to filter data to satisfy their particular interest and also to present the data in levels of abstraction given the depth they want to focus on. Intelligence density in this form can be enhanced immensely by the voice of the youth. In another way, the more emphasis there is on listening to the 'voice' of children and young people the more the quality of the information provided regarding youth advocacy and policies will improve. As an increasing number of young people turn to the Internet as a research tool (Lenhart & Madden 2005), the quality of the information provided in terms or accuracy and relevance should be quite an important consideration in the design on a youth oriented web space.

For example, the range and quality of information provided by Epal – an interactive site to assist the provision of the Connexions service in Britain – is noted as a major factor behind its success (Livingstone *et al.* 2005). Similarly, Rizer's – a Nottingham site aimed at educating potential youth offenders – success is due in part to the fact that it fills an important gap on the web with up-to-date information and that youths find it interesting and stimulating (Livingstone *et al.* 2005). Therefore, the presentation of content is important in determining the success of a youth web space. In this regard the interactivity and ease of use is an important factor as is the kind of language used, all of which will ensure that it is appealing to young people.

In addition, interactivity is another dimension that should be considered in the design of a youth web space. Terdiman (2005) reports on a Nielsen Norman Group study that observed American and Australian youth using dozens of websites across a variety of genres. Jakob Nielsen, a principal at the Nielsen Norman group, commented that youth in this study want to be "doing something as opposed to just sitting and reading, which tends to be more boring and something they say they do enough of already in school" (Terdiman, 2005). Therefore interactivity is very important especially when it comes down to capturing youth attention.

There is much debate about the definition of interactivity; Steuer defines interactivity "as the extent to which users can participate in modifying the form and content of a mediated environment in real time" (1992, 84). However, not all observers agree about the importance of real-time. For example, Rheingold (1993) suggested that the asynchronous characteristics of tools such as e-mail, newsgroups, and listservs is one of the key benefits of these interactive media. We agree with Heeter (1989) who defines two components of interactive websites, the first being ease of adding information, meaning the degree to which users can add information for access by a mass, undifferentiated audience. And the second is interpersonal communication facilitation, which comes in at least two forms: asynchronous (allowing users to respond to messages at their

convenience) and synchronous (allowing for concurrent participation in real time). Hugh-Hassell and Miller (2003) and Ha and James (1998) echo similar sentiments; they identify that visual appeal of the site, ease of navigation, currency and accuracy of information are all key elements when it comes to creating an interactive web space for youth.

Types of Youth Web spaces

A review of web spaces that are appealing to young people can broadly be categorised into four types: *entertainment*, *information provisional*, *collaborative*, and *community*. For the purposes of this paper we will concentrate on only three types of web spaces for youth: informational, community based and collaborative.

Informational Youth Web Spaces

Horrigan (2006) asserts that 87 per cent of online users have used the Internet as a research tool. Network technologies and the popularisation of the World Wide Web further provoked the evolution of encyclopaedias. New media forms that range from the search engines and directories of the early web, through portals and campaign sites, to the wikis and social networks of today have gradually transformed the ways people search for information. At the same time, e-learning and gaming platforms blur the boundaries between education and entertainment and suggest new possibilities for enhancing teaching and knowledge acquisition. Examples of organisations in this space are Encarta, Britannica and National Geographic, all three of which provide standard text based versions of their encyclopaedias as well as interactive multimedia environments and selected web links to up-to-date information on whatever it is that they are searching for (Alevizou 2002). Although these websites are created specifically for the purpose of being information provisional, other web spaces can contain elements of information provisional. Such web spaces often have sections devoted to providing information on a wide variety of topics.

Community Youth Web Spaces

Virtual environments present an opportunity to promote the positive development of young people and their communities (Barab *et al.* 2002). Despite the growing popularity of virtual communities, there is no consensus among researchers regarding the appropriate definition or types of virtual communities (Porter 2004). The term 'virtual communities' was coined by Internet pioneer Howard Rheingold, who defined them as "social aggregations that emerge from the net when enough people carry on public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (1993, 5). 'Virtual communities' usefully refers to online groups of people who either share norms of behaviour or certain defining practices, who actively enforce certain moral standards, who intentionally attempt to found a community, or who simply coexist in close proximity to one another (Komito 1998; Rothaermel & Sugiyama 2001). For the purposes of this paper we will define virtual communities for youth as member-initiated communities (Muniz & O'Guinn 2001) with member-generated content (Kozinets 2002), which includes: listservs and newsgroups, chat rooms, linear asynchronous bulletin boards and threaded asynchronous bulletin boards.

Collaboration Youth Web Spaces

Panitz (1996) sees collaboration as a philosophy of interaction and personal lifestyle. In terms of youth learning, Garrison, Anderson and Archer (2001) and Johnstone (2010) assert that collaborative learning leads to a deeper level of learning, critical thinking, shared understanding and long term retention of the learned material. One example of a collaborative web space is wiki-enabled websites, as wikis do build on these foundations of collaborative knowledge building. Common for all of them is that they allow for open asynchronous editing of content, where incremental growth is favoured over upfront design and where all users are encouraged to become designers of the hypertext (Désilets *et al.* 2005). Another example is ThinkSpace, which is a simple web space combining computer-based

concept mapping (Novak & Canas 2006) and wikis, into a tool that can be used for structuring and clarifying thoughts about complex material. The tool is used by groups of students for creating an interlinked online knowledge repository – a mini encyclopaedia – in a wiki with a corresponding concept map. This repository is dynamic and is a means of analysing and interlinking content knowledge. Each concept-bubble on the map represents a wiki article about that concept. The two are linked to each other so that clicking on any concept on the map takes the learner directly to the article on the relevant concept. Collaborative web spaces and e-tools are popular in the education field, where the teacher is not an instructional transmitter; in fact, s/he is a facilitator to social learning whereby learners construct their own knowledge, their own world.

Youth Well Being Interface Design Requirements

In the section conceptual requirements, we have outlined three areas that should be considered for the design of a youth web space in order to enhance well-being: content, quality, and interactivity (Vodanovich *et al.* 2009). In this section we want to elaborate specific requirements for the design of interfaces for youth web spaces to enhance well-being.

The issues that are relevant in the context of designing interfaces are *presentation*, *interactivity*, and *personalisation/customisation* – these were identified in an earlier study carried out by the authors (Vodanovich *et al.* 2009). The problems related to presentation are poor navigation facilities and inappropriate structure to present information. These observations led us to the requirement that the information presented on a web space to enhance youth well-being should be presented in a way that it is easy to understand and easy to navigate through. Young people in general are attracted to what is new and innovative and not 'dusty' from their parent's cupboard. So, another requirement to ensure a 'youth-friendly' appeal is to improve the appearance and thus experience of websites so that they do not undermine young people's desire to be, and to be seen to be, 'cool' (Livingstone *et al.* 2005).

The issue of interactivity originates from limited facilities of current platforms to support interactivity. Interactivity generally leads to improved user satisfaction and acceptance along with increasing the visibility of websites (Chen & Yen 2004). Livingstone *et al.* assert that the Internet can facilitate participation in so far as "encouraging its users to 'sit forward', click on the options, find the opportunities exciting, begin to contribute content, come to feel part of a community and so, perhaps by gradual steps, shift from acting as a consumer to increasingly (or in addition) acting as a citizen" (2005, 5). Thus academics agree that creating an interactive environment is what is required to enable young people to engage with the Internet in a meaningful manner (Heeter 1989; Montgomery *et al.* 2004; Livingstone *et al.* 2005). The strong evidence in the literature suggests the importance of this aspect in designing youth web spaces.

From another perspective, young people seek to modify the web spaces so as to 'leave their mark' and receive acknowledgement and other positive feedback for their contributions. Also, young people are seeking pillars for navigation in a complex and confusing world and tend to understand knowledge in a social context (Resnick *et al.* 1993; Boyd & Ellison 2008). Therefore, we state as a further requirement that young people should directly see who has contributed which content in order to create social interactivity.

Personalisation and customisation are generally not well supported in current youth web spaces. As argued for interactivity, users should engage in the web space. Additionally, the web space should be 'fun' (Boyd & Ellison 2008) to use. This is enabled by the web space's capability to adapt to their personal needs. Therefore we state as one requirement that the web space should be personalised to the users and allow them to customise the web space according to their needs. This relates to the requirement of presenting the information in a manner that is easy to understand and navigate through. Each user will have different prior knowledge and preferences that moderate the perception of how well the information is presented,

so to accommodate for diverse needs the web space should be presented differently for each user.

Further on, the creation of a coherent identity is an important part of adolescence (Suh 2000). Online role-playing games are a good illustration of this concept where users are able to create virtual identities and are encouraged by the social dynamics of the virtual world to make their virtual identity stronger and 'more appreciated' (Calvert 1999; Subrahmanyam & Šmahel 2011, ch. 9). For the interface of a web space to enhance youth well-being, this means that identities and what they do (as described in the section *Interactivity*) should be presented as integral part of the interface.

This means that youth users do not only personalise the web space in terms of how it is presented to them but they also can contribute to how the web space appears to other users. This concept is well-illustrated by popular sites such as MySpace where it is apparent that the pages of different users differ significantly not only in content but also in terms of design.

Interface Design Principles

In order to design a user interface according to the requirements from the prior section, we refer to two influential interaction models from the human computer interaction literature, Norman's (1986) *execution-evaluation model* and Ghani's (1995) *flow model*. While an exhaustive discussion on design guidelines can be found in a number of publications (Shneiderman 1997; Nielsen 1999; U.S. Department of Health & Human Services 2006; Sklar 2008) we refer primarily to these two models as we see the influence of interfaces on youth well-being from two angles: the interface should meet the expectations of the users and, more specifically, the interface should enhance learning and creativity. Norman's execution-evaluation cycle has been a seminal model for recent work in this area (Carroll 2000; Theng *et al*. 2004; O'Neill 2008; Terblanche *et al*. 2010). Similarly Ghani's flow model has been used to understand the flow experiences of web users in recent work (Lee & LiqIang 2010; Magni *et al*. 2010).

Young people's expectations and requirements of web spaces are strongly influenced by their experience with aspects of their existing ubiquitous digital environment (Bawden & Vilar 2006). Various factors can influence these expectations, for example, young people's experience with search and transactional engines such as Google and Amazon (Griffiths & Brophy 2005), popularity of computer games (Sullivan 2005), the perceived need for immediate gratification (Stock & Tupot 2006) and the heuristic of 'satisfying', where just enough information is good enough (Agosto 2002). When young people interact with web spaces these factors influence the way they perform actions and tasks and also influence the way that they expect the web space to respond so as to accomplish their goals. To illustrate this further we refer to Norman's psychological model that can be used to describe the steps users take when interacting with a computer system or in this case a web space. In particular the model shows the way users perform actions and tasks to achieve their goals. The user first formulates a plan of action. This plan is then executed on the interface of a system. After the execution on the interface, the user observes the interface and takes further actions based on the observations. The model describes a circle with seven phases: (1) establish the goal in terms of what needs to be done; (2) form intention; (3) specify an action sequence to reach the goal; (4) execute the actions; (5) perceiving the system state; (6) interpret system state according to expectations; and (7) evaluate system state according to goals and intentions.

The effectiveness of the interaction is determined by the user in the evaluation phase (Dix 2004). The more the system meets the requirements of the user, the smaller is the gap between what the user has intended to happen on the system and what actually happens.

For an interface of a web space to support youth well-being we, of course, cannot know the exact expectations of every youth user of the web space. We have, however, already elaborated some common requirements of youth users that can guide the development of interfaces for a community oriented youth web space. A central element in youth perception of

web space is that it is 'not boring' and 'fun' to use. This requirement is reflected in the literature about 'flow'. Flow represents a state of consciousness where a person is completely absorbed in an activity. In this state, the human mind is able to work very effectively. Csikszentmihalyi (1990) describes this state as the 'flow channel' where a balance between skills and challenges must exist. According to Pilke (2004), flow experiences can occur while working with computers.

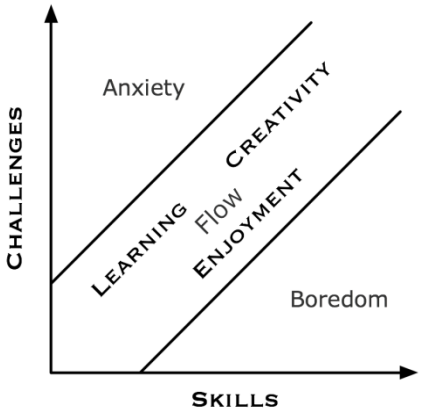

Figure 2: Model of flow (adapted from Csikszentmihalyi 1990; Ghani 1995)

We enrich our understanding of flow with a model from Ghani (1995). He has developed a model to show the factors for flow in human-computer interaction. Flow in this case is measured enjoyment and concentration. In his model, perceived task challenges, skills, and cognitive spontaneity ('playfulness') are prerequisites of flow. When the system is too difficult to use, no flow state will occur. When the system is too 'primitive' and simple for a very skilled user, boredom might prevent the flow state. Figure 2 combines the general model of flow from Csikszentmihalyi (1990) where the right combination of challenges and skills leads to a flow channel, with the findings from Ghani (1995) about flow in human computer interaction.

In a way, flow can be understood as the 'sweet spot' between challenge and boredom. For the effect on youth well-being, it is of course desirable that they enjoy the experience on the web space and even better if this experience facilitates learning and creativity.

Youth Web Spaces Application Interface Framework

In order to guide the development of the interface modules of a web space application framework to enhance youth well-being according to the requirements of the prior section, we propose a framework that consists of five interrelated dimensions: *personalised*, *interactive*, *intuitive*, *attractive*, and *social*:

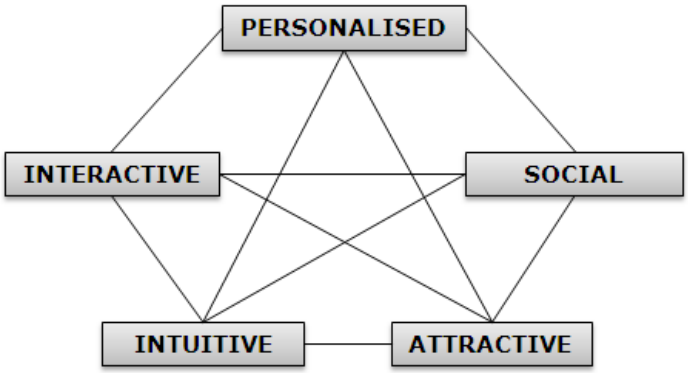

Figure 3: Youth web spaces application interface framework

The personalisation dimension primarily aims at addressing the requirements of personalisation, customisation and to give youth users ways to collaboratively change the design of the web space. As a prerequisite of being adaptive a web space must provide functionality for user management. Users must be able to 'register' and 'log in' to be able to access their personal version of the web. The web space can be personalised in two ways: by automatically adapting to the users' behaviour and by being adaptable in terms of being customisable by direct configurations of the users.

We see as an important aspect of being adaptable to give youth users the opportunity to create customised start pages or dashboards. Examples of such functionality are iGoogle or the homepage of BBC. Personalisation helps to match user expectations and perception of the web space as seen in Norman's (1986) model. In terms of the flow aspect, the personalisation allows users to adjust the difficulty of the interfaces according to their skills to enable a flow experience. Common examples for this are applications that offer an 'expert mode' that enables more complex functions. Further on, we seek to include functionality for collaborative customisation of the web space by allowing users to contribute their own designs. Examples of such functionality can be found in many blogging services such as WordPress that allow users to change the appearance of their weblogs by using templates.

The interactive dimension addresses the requirement to be interactive. The principle of interactivity is deeply rooted in the present 2.0 movement. Platforms like Facebook or Google Docs do not require the user to cope with abstract languages such as HTML but what these platforms do is immediately reflected in what is displayed. In Norman's (1986) model, the interactivity dimension can be illustrated as the desire to decrease the latency between execution and perception. But, as described in the prior section, interaction here aims higher in terms of making the system 'fun' to use. This goes in line with the 'playfulness' concept by Ghani (1995).

The intuitive dimension is rooted in the requirement to allow users to navigate easily on the platform and to understand the information. Intuitive is an attribute for interfaces that can be used 'without further explanation'. The button in Microsoft word that is indicated by a 'B' which allows making certain parts of text bold is an example of an intuitive interface element. Web spaces especially should be usable without referring to manuals or tutorials but how to use them should become obvious 'on the fly' meaning while using the platform. Yahoo mail is, for instance, a web 2.0 application that is mostly intuitive to use for users that have some

basic computer knowledge. In Norman's (1986) model the concept intuitive can be reflected in making the task of specifying actions according to user's intentions as easy as possible. For example, to create a flow experience, Ghani (1995) found that the perceived challenge of using the systems should not be too big, meaning the system should be rather intuitive to use.

The three dimensions covered so far are more of a general nature meaning they apply not just to frameworks for web spaces to enhance youth well-being but more for web spaces in general. They, however, must, of course, be considered for our framework. The following two dimensions capture more the youth-specific aspects of the web spaces. Therefore, they are not as reflected in the interface design models as the prior dimensions.

The attractive dimensions refers to the need to make the web space youth specific by incorporating 'cool' and up-to-date designs. What these designs are is, of course, difficult to specify and the 'right' design changes according to varying and unpredictable trends. It must, however, be considered that websites created for young people differ significantly from traditional websites. One way to address the challenge is to 'empower' the users to contribute to the design of the web space as they can contribute to the content. An example for this, is, as said, for instance, the popular MySpace site.

The social dimension captures the requirements to show who contributed what and to allow users to express their own virtual identity. One illustration of this concept is discussion boards in which every 'post' is attributed to a user and many platforms allow the maintenance of individual 'user pages' or custom personal messages below each post, where users summarise their contributions in terms of their most popular 'posts' or other resources they have created on the web.

Although presented independently, we understand all of these dimensions as strongly interrelated. Meaning that in the approach to design a user interface module for an application framework to support youth well-being all of these dimensions have to be considered simultaneously as they enforce but also potentially constrain each other. For instance, if a certain

interactive element such as two tables that allow drag-and-drop of items from one table to the other is enriched with functionality that allows personalising which items are displayed in the tables this could make the use of the tables more intuitive as they would only contain relevant items that the user understands. We do not, however, go so far as to speak of explicit causalities between these concepts in statistical terms. Our point is that all of these dimensions must be considered and that they are interrelated.

Conclusion and Future Work

Youth is a difficult transitory period in most people's lives. This period is often characterised by a plethora of questions along with a persona of being 'too cool' to ask the adults in their life for the answers. Moreover, young people are creating and maintaining social relationships outside of their immediate family. Aspects of the Internet such as popular web 2.0 technologies can be used as an important support tool for young people and can potentially enhance their well-being, especially given its level of ubiquity in young people's lives. There is insufficient research at present to suggest comprehensive guidelines in the design of community oriented youth web spaces that enable the well-being of youth.

This paper begins with a definition of the concept of well-being. We then propose a conceptual framework that can be used to guide the design of an appropriate community oriented youth web space that enables the well-being of youth. The framework suggests that the well-being online of youth can be achieved with three main ingredients: the provision of *information*, a sense of a *community* and an *interactive environment* which encourages young people to *collaborate* with not only their peers but also with legislators and decision makers. Key issues that were synthesised included: *relevance*, *reach*, *range*, *presentation*, *personalisation*, *customisation*, *interactivity*, and *ubiquity*. These issues helped us to identify a number of requirements, concepts, and design principles for community oriented youth well-being web spaces. These principles in turn led us to propose a

framework that would help in addressing the identified issues and requirements. The framework shows that five interrelated dimensions – *personalised*, *interactive*, *intuitive*, *attractive*, and *social* – could be considered for interfaces of youth web spaces.

In essence our paper proposes macro, meso and micro level recommendations for designers of community oriented youth web spaces. At the macro level (refer to Figure 1) we suggest that these web spaces need to balance the three elements of information, community and collaboration in a coherent and holistic manner. At the meso level (refer to Figure 2) we suggest a framework of five key dimensions that should be considered by designers of youth web spaces. Lastly, at the micro level we give explicit examples of how the macro and meso level recommendations can be implemented or have been implemented elsewhere.

Future work in this area requires a further validation of the requirements proposed in this paper. The authors suggest that this can be done through conducting a survey with a wide range of stakeholders who are involved in the well-being of youth. This could include parents, teachers, policy makers and young people themselves. Future research could also benefit from the creation of a community oriented youth web space based on the design principles and framework proposed in this paper.

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Notes

1. We define *youth* as young people aged between 13 and 19 (Gunstone 2004).

References

ADAMS, LASCHELLES A. & JAMES F. COURTNEY (2004). "Achieving relevance in IS research via the DAGS framework." *HICSS-37: Proceedings of the 37th Annual Hawaii International Conference on System Sciences*.

ADAMSON, PETER *ET AL*. (2007). *Child Poverty in Perspective: An Overview of Child Well-being in Rich Countries*. (Innocenti Report Card 7). Florence: UNICEF Innocenti Research Centre.

AGOSTO, DENISE E. (2002). "A Model of Young People's Decision-Making in Using the Web." *Library & Information Science Research* 24.4: 311–341.

AIHW (2003). *Australia's Young People 2003: Their Health and Wellbeing*. Australia, Australian Institute of Health and Welfare.

ALEVIZOU, PANAGIOTA. (2002). "To Wire or not to Wire? Encyclopaedia Britannica versus Microsoft Encarta." *Educational Technology & Society* 5.1: 163–167.

BARAB, SASHA ET AL. (2002). "Empowerment Design Work: Building Participant Structures That Transform." *ICLS 2002:* Keeping Learning Complex: The Proceedings of the Fifth International Conference of the Learning Sciences*, Seattle, WA*: 132 – 138. Eds. P. Bell, R. Stevens, & T. Satwicz. Mahwah, NJ: Lawrence Erlbaum Associates.

BAWDEN, DAVID & POLONA VILAR (2006). "Digital Libraries: To Meet or Manage User Expectations." *Aslib proceedings* 58.4: 346–354.

BEN-ARIEH, ASHER (2005). "Where are the Children? Children's Role in Measuring and Monitoring Their Well-being." *Social Indicators Research* 74.3: 573–596.

BORZEKOWSKI, DINA L. G. & VAUGHN I. RICKERT (2001). "Adolescent Cybersurfing for Health Information: A New Resource That Crosses Barriers." *Archives of Pediatric and Adolescent Medicine* 155.7: 813–817.

BOURKE, LISA (2003). "Toward Understanding Youth Suicide in an Australian Rural Community." *Social Science & Medicine* 57.12: 2355–2365.

BOYD, DANA M. & NICOLE B. ELLISON (2008). "Social Network Sites: Definition, History, and Scholarship." *Journal of Computer-Mediated Communication* 13.1: 210–230.

BUHRMESTER, DUANE & WYNDOL FURMAN (1987). "The Development of Companionship and Intimacy." *Child Development* 58.4: 1101–1113.

CALVERT, SANDRA L. (1999). "The Form of Thought." In *Theoretical Perspectives in the Concept of Representation*. Ed. Irving Sigel. Hillsdale, NJ: Erlbaum. 453–470.

CARROLL, JOHN M. (2000). *Making Use: Scenario-Based Design of Human–Computer Interactions*. Cambridge: MIT.

CECEZ-KECMANOVIC, DUBRAVKA ET AL. (2009). "Youth Participation in a Government Program: Challenges in E-democracy."

COCKBURN, TOM (2005). "New Information Communication Technologies and the Development of a Children's 'Community of Interest'." *Community Development Journal* 40.3: 329–342.

CSIKSZENTMIHALYI, MIHALY (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper & Row.

DÉSILETS, ALAIN, SEBASTIEN PAQUET & NORMAN G. VINSON (2005). "Are Wikis Usable?" *WikiSym 2005: Proceedings of the 2005 International Symposium on Wikis, Oct 16–18, San Diego, CA*. Ed. Dirk Riehle. New York: ACM. 3–15.

DHAR, VASANT & ROGER STEIN (1997). *Seven Methods for Transforming Corporate Data into Business Intelligence*. Upper Saddle River, NJ: Prentice-Hall.

DIENER, ED ET AL. (1999). "Subjective Well-being: Three Decades of Progress." *Psychological Bulletin* 125.2: 276–302.

DIGITAL MEDIA, YOUTH, AND CREDIBILITY (2008). Eds. Miriam J. Metzger & Andrew J. Flanagin. Cambridge, MA: MIT Press.

DIX, ALAN ET AL. (2004). *Human–Computer Interaction*. 3. ed. London: Prentice Hall.

ECKERSLEY, RICHARD, ANI WIERENGA & JOHANNA WYN (2006). "Success and Wellbeing: A Preview of the Australia 21 Report on Young People's Wellbeing." *Youth Studies Australia* 25.1: 10–18.

FLANAGAN, CONSTANCE, PETER LEVINE & RICHARD SETTERSTEN (2009). "Civic Engagement and the Changing Transition to Adulthood." Medford, MA: CIRCLE, Tufts University.

GARDNER, MARGO, JODIE ROTH & JEANNE BROOKS-GUNN (2008). "Adolescents' Participation in Organized Activities and Developmental Success 2 and 8 Years After High School: Do Sponsorship, Duration, and Intensity Matter?" *Developmental Psychology* 44.3: 814–830.

GARRISON, RANDY, TERRY ANDERSON & WALTER ARCHER (2000). "Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education." *The Internet and Higher Education* 2.2–3: 87–105.

GHANI, JAWAID (1995). "Flow in Human–Computer Interactions: Test of a Model." *Human Factors in Information Systems: Emerging Theoretical Bases*. Ed. Jane M. Carey. Norwood, NJ: Ablex Publishing. 291–311.

GRIFFITHS, JILLIAN R. & PETER BROPHY (2005). "Student Searching Behavior and the Web: Use of Academic Resources and Google." *Library Trends* 53.4: 539–554.

GROSS, ELISHEVA F., JAANA JUVONEN & SHELLY L. GABLE (2002). "Internet Use and Well-being in Adolescence." *Journal of Social Issues* 58.1: 75–90.

HA, LOUISA & LINCOLN JAMES (1998). "Interactivity Reexamined: A Baseline Analysis of Early Business Web Sites." *Journal of Broadcasting and Electronic Media* 42.4: 457–474.

HALL, ROZ & DARREN NEWBURY (1999). "What Makes You Switch On? Young People, the Internet and Cultural Participation." *Young People, Creativity and New*

Technologies: The Challenge of Digital Arts. Ed. Julian Sefton-Green. London: Routledge. 100–110.

HEER, NATALIE GARCIA DE & UNITED NATIONS YOUTH ASSOCIATION OF AUSTRALIA (2008). *YouthSpeak : A Conversation for the Future: Report on the Implementation and Findings of the YouthSpeak Consultation Project.* Bedford: YouthSpeak.

HEETER, CARRIE (1989). "Implications of New Interactive Technologies for Conceptualizing Communication." *Media Use in the Information Age: Emerging Patterns of Adoption and Consumer use*. Eds. Jerry Lee Salvaggio & Jennings Bryant. Hillsdale, NJ: Erlbaum. 217–235.

HEVNER, ALAN R., SALVATORE T. MARCH & JINSOO PARK (2004). "Design Science in Information Systems Research." *MIS Quarterly* 28.1: 75-105.

HORRIGAN, JOHN B. (2006). *Home Broadband Adoption 2006.* Washington, D.C.: Pew Internet & American Life Project.
<http://www.pewinternet.org/~/media/Files/Reports/2006/PIP_Broadband_trends2006.pdf.pdf>

HUFFAKER, DAVID (2004). "Spinning Yarns Around the Digital Fire: Storytelling and Dialogue Among Youth on the Internet." *First Monday* 9.1.
<http://www.firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1110/1030>

HUGHES-HASSELL, SANDRA & ERIKA THICKMAN MILLER (2003). "Public library Web Sites for Young Adults: Meeting the Needs of Today's Teens Online." *Library & Information Science Research* 25.2: 143–156.

JOHNSTONE, JULIE (2010). "Digital Kids and Digital Tools: How the Use of Emergent Technologies and Digital Tools Support Learning in the 21st Century."
<http://www.faculty.umb.edu/pjt/692-10JJ.pdf>

JUVONEN, JAANA & ELISHEVA F. GROSS (2008). "Extending the School Grounds? Bullying Experiences in Cyberspace." *Journal of School Health* 78.9: 496–505.

KANN, MARK E. ET AL. (2007). "The Internet and Youth Political Participation." *First Monday* 12.8.
<http://firstmonday.org/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/1977/1852>

KIM, JUNGHYUNG, ROBERT LAROSE, WEI PENG (2009). "Loneliness as the Cause and the Effect of Problematic Internet Use: The Relationship Between Internet use and Psychological Well-being." *CyberPsychology & Behavior* 12.4: 451–455.

KIMBERLEE, RICHARD H. (2002). "Why Don't British Young People Vote at General Elections?" *Journal of Youth Studies* 5.1: 85–98.

KOH, KYUNGWON & ELIZA DRESANG (2009). "Modeling and Assessing Radical Change Youth Information Behavior in the Digital Age: A Pilot Study." *ASIST 2009: Proceedings of the 72nd American Society for Information Science & Technology Annual Meeting: Thriving on Diversity: Information Opportunities in a Pluralistic World, November 6–11, Vancouver, Canada*. Ed. Andrew Grove. 46.1: 1–7.

KOMITO, LEE (1998). "The Net as a Foraging Society: Flexible Communities." *The Information Society* 14: 97–106.

KOZINETS, ROBERT V. (1999). "E-tribalized Marketing? The Strategic Implications of Virtual Communities of Consumption." *European Management Journal* 17: 252–264.

KOZINETS, ROBERT V. (2002). "The Field Behind the Screen: Using Netnography for Marketing Research in Online Communities." *Journal of Marketing Research* 39.1: 61–72.

KRAUT, ROBERT ET AL. (2002). "Internet Paradox Revisited." *Journal of Social Issues* 58.1: 49–74.

KRAUT, ROBERT ET AL. (1998). "Internet paradox: A Social Technology That Reduces Social Involvement and Psychological Well-being?" *The American Psychologist* 53.9: 1017–1031.

LAND, KENNETH C., VICKI L. LAMB, SARA K. MUSTILLO (2001). "Child and Youth Well-being in the United States, 1975–1998: Some Findings From a New Index." *Social Indicators Research* 56.3: 241–318.

LARSON, REED & MARYSE H. RICHARDS (1991). "Daily Companionship in Late Childhood and Early Adolescence: Changing Developmental Contexts." *Child Development* 62.2: 284–300.

LEE, SAND M. & CHAN LIQIANG (2010). "The Impact of Flow on Online Consumer Behavior." *Journal of Computer Information Systems* 50.4: 1–10.

LENHART, AMANDA & MARY MADDEN (2005). *Teen Content Creators and Consumers*. Washington, D.C.: Pew Internet & American Life Project. <http://www.pewinternet.org/~/media//Files/Reports/2005/PIP_Teens_Content_Creation.pdf.pdf>

LIVINGSTONE, SONIA (2001). *Online Freedom and Safety for Children*. (IPPR/ Citizens Online Research Publication no.3). London: LSE Research Online. <http://eprints.lse.ac.uk/416/1/IPPR.pdf>

LIVINGSTONE, SONIA (2008). "Taking Risky Opportunities in Youthful Content Creation: Teenagers' Use of Social Networking Sites for Intimacy, Privacy and Self-expression." *New Media & Society* 10.3: 393–411.

LIVINGSTONE, SONIA & MAGDALENA BOBER (2004). *Active Participation or Just More Information? Young People's Take up of Opportunities to Act and Interact on the Internet*. London: London School of Economics and Political Science. <http://www.lse.ac.uk/collections/children-go-online/UKCGOparticipation.pdf>

LIVINGSTONE, SONIA ET AL. (2005). "Active Participation or Just More Information?" *Information, Communication & Society* 8.3: 287–314.

MADDEN, MARY (2003). *The Changing Picture of Who's Online and What They Do*. Washington, D.C.: Pew Internet & American Life Project. <http://www.pewinternet.org/~/media//Files/Reports/2003/PIP_Online_Pursuits_Final.PDF.PDF>

MAGNI, MASSIMO, M. SUSAN TAYLOR & VISWANATH VENKATESH (2010). "To Play or Not to Play': A Cross-temporal Investigation Using Hedonic and Instrumental Perspectives to Explain User Intentions to Explore a Technology." *International Journal of Human–Computer Studies* 68.9: 572–588.McHale, Susan M. *et al*. (2001). "Free Time Activities in Middle Childhood: Links With Adjustment in Early Adolescence." *Child Development* 72.6: 1764–1778.

MCMAHON, MARK & ROMANA POSPISIL (2005). "Laptops for a Digital Lifestyle: Millennial Students and Wireless Mobile Technologies." *ascilite 2005: Proceedings of the Annual ascilite Conference, December 4–7, Brisbane, Australia*. 421–431.

MESCH, GUSTAVO S. & ILAN TALMUD (2010). "Internet Connectivity, Community Participation, and Place Attachment: A Longitudinal Study." *American Behavioral Scientist* 53.8: 1095–1110.

MITCHELL, KIMBERLY J., DAVID FINKELHOR & JANIS WOLAK (2005). "Protecting Youth Online: Family Use of Filtering and Blocking Software." *Child Abuse & Neglect* 29.7: 753–765.

MONTGOMERY, KATHRYN, BARBARA GOTTLIEB-ROBLES & GARY O. LARSON (2004). *Youth as E-citizens: Engaging the Digital Generation*. Washington, DC: Center for Social Media, American University.
<http://www.centerforsocialmedia.org/sites/default/files/documents/pages/youthreport.pdf>

MUNIZ, ALBERT M. AND THOMAS C. O'GUINN (2001). "Brand Community." *Journal of Consumer Research* 27.4: 412–432.

NIELSEN, JAKOB (1999). *Designing Web Usability: The Practice of Simplicity*. Thousand Oaks, CA: New Riders.

NORMAN, DONALD A. (1986). "Cognitive Engineering." *User Centered System Design: New Perspectives on Human–Computer Interaction*. Eds. Donald A. Norman & Stephen W. Draper. Hillsdale, NJ, Lawrence Erlbaum Associates**:** 31-61.

NOVAK, JOSEPH D. & ALBERTO J. CANAS (2006). "The Origins of the Concept Mapping Tool and the Continuing Evolution of the Tool." *Information Visualization* 5.3: 175–184.

NUNAMAKER, JAY F., MINDER CHEN & TITUS D.M. PURDIN (1990). "Systems Development in Information Systems Research." *Journal of Management Information Systems* 7.3: 89–106.

OBLINGER, DIANA (2003). "Boomers, Gen-Xers & Millennials: Understanding the New Students." *EDUCAUSE Review* 38.4: 37–47.

O'NEILL, SHALEPH (2008). *Interactive Media: The Semiotics of Embodied Interaction*. London: Springer.

PALFREY, JOHN & URS GASSER (2010). *Born Digital: Understanding the First Generation of Digital Natives*. New York: Basic Books.

PANITZ, TED (1996). *A definition of Collaborative vs. Cooperative Learning*. <http://www.lgu.ac.uk/deliberations/collab.learning/panitz2.html> [2009-02-24].

PEMPEK, TIFFANY A., YEVDOKIYA A. YERMOLAYEVA & SANDRA CALVERT (2009). "College Students' Social Networking Experiences on Facebook." *Journal of Applied Developmental Psychology* 30.3: 227–238.

PILKE, E.M. (2004). "Flow Experience in Information Technology Use." *International Journal of Human–Computer Studies* 61: 347–357.

PORTER, E. CONSTANCE (2004). "A Typology of Virtual Communities: A Multidisciplinary Foundation for Future Research." *Journal of Computer Mediated Communication* 10.1. <http://jcmc.indiana.edu/vol10/issue1/porter.html>

PRENSKY, MARC (2001). "Digital Natives, Digital Immigrants." *On the Horizon* 9.5: 1–2.

PRENSKY, MARC (2001). "Digital Natives, Digital Immigrants, Part II: Do They Really Think Differently?" *On the Horizon* 9.6: 1–6.

PROUT, ALAN (2000). "Children's Participation: Control and Self-Realisation in British Late Modernity." *Children & Society* 14.4: 304–315.

QUINTELIER, ELLEN & SARAH VISSERS (2008). "The effect of Internet Use on Political Participation: An Analysis of Survey Results for 16-Year-Olds in Belgium." *Social Science Computer Review* 26.4: 411–427.

RESNICK, MICHAEL D., LINDA J. HARRIS & ROBERT W. BLUM (1993). "The Impact of Caring and Connectedness on Adolescent Health and Well-being." *Journal of Paediatrics and Child Health* 29.1: 3–9.

RHEINGOLD, HOWARD (1993). *The Virtual Community: Homesteading on the Electronic Frontier*. New York: Addison-Wesley.

RICKARD, WENDY & DIANA OBLINGER (2003). *Higher Education Leaders Symposium: The Next-Generation Student*. <http://www.educause.edu/ir/library/pdf/NLI0425a.pdf> [2009-01-12].

ROTHAERMEL, FRANK T. & STEPHEN SUGIYAMA (2001). "Virtual Internet Communities and Commercial Success: Individual and Community-Level Theory Grounded in the Atypical Case of TimeZone.com." *Journal of Management* 27.3: 297–312.

RYFF, CAROL D. (1989). "Happiness Is Everything, or Is It? Explorations on the Meaning of Psychological Well-being." *Journal of Personality & Social Psychology* 57.6: 1069–1081.

SHARP, JANE (2000). "Digital Diversions: Youth Culture in the Age of Multimedia." *Gender and Education* 12.1: 138–139.

SHNEIDERMAN, BENJAMIN (1997). *Designing the User Interface: Strategies for Effective Human–Computer Interaction*. 3. ed. Reading, MA: Addison-Wesley.

SKLAR, JEFFREY (2008). *Principles of Web Design*. Boston, MA: Course Technology.

STEUER, JONATHAN (1992). "Defining Virtual Reality: Dimensions Determining Telepresence." *The Journal of Communication* 42.4: 73–93.

STOCK, TIM & MARIE LENA TUPOT (2006). "Common Denominators: What Unites Global Youth?" *Young Consumers: Insight and Ideas for Responsible Marketers* 7.2: 36–43.

SUBRAHMANYAM, KAVERI & GLORIA LIN (2007). "Adolescents on the Net: Internet Use and Well-being." *Adolescence* 42.168: 659–677.

SUBRAHMANYAM, KAVERI & DAVID ŠMAHEL (2011). *Digital Youth*: *The Role of Media in Development.* New York: Springer.

SUH, EUNKOOK M. (2000). "Self, the Hyphen Between Culture and Subjective Well-being." *Culture and Subjective Well-being*. Eds. Ed Diener & Eunkook M. Suh. Cambridge, MA: MIT Press. 63–86.

SULLIVAN, KATHLEEN (2005). "Collection Development for the 'Chip' Generation and Beyond." *Collection building* 24.2: 56–60.

TAPSCOTT, DON (1996). *The Digital Economy*. New York: McGraw-Hill.

TAPSCOTT, DON (1997). *Growing Up Digital: The Rise of the Net Generation*. New York: McGraw-Hill.

TAPSCOTT, DON (2008). *Grown up Digital: How the Net Generation is Changing Your World*. New York: McGraw-Hill.

TERBLANCHE, JUANITA T., JAN H. KROEZE & SONJA GILLILAND (2010). "Guidelines for the Design and Creation of a Web Form to Facilitate the Registration of First Time Tax Payers: An HCI Approach." *Proceedings of the 15th International Business Information Management Association (IBIMA) Conference, 6–7 November 2010, Cairo, Egypt*. Ed. Khalid S. Soliman. 1033–1043.

TERDIMAN, DANIEL (2005). "What Websites Do to Turn On Teens." *Wired*. <http://www.wired.com/culture/lifestyle/news/2005/02/66514> [2008-10-15]

THENG, YENG-LIN ET AL. (2004). "Applying Scenario-based Design and Claims Analysis to the Design of a Digital Library of Geography Examination Resources." *Information Processing & Management* 41.1: 23–40.

TUROW, JOSEPH & LILAC NIR (2000). *The Internet and the Family 2000: The View From Parents/the View From Kids*. Philadelphia, PA: University of Pennsylvania. <http://www.annenbergpublicpolicycenter.org/Downloads/Information_And_Society/20000516_Internet_and_family/20000516_Internet_and_family_report.pdf>

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES (2006). *Research-based Web Design & Usability Guidelines*. Washington, D.C.: U.S. Government Printing Office. <http://www.usability.gov/guidelines/guidelines_book.pdf>

VALAITIS, K. RUTA (2005). "Computers and the Internet: Tools for Youth Empowerment." *Journal of Medical Internet Research* 7.5. <http://www.jmir.org/2005/5/e51/>.

VALAITIS, RUTA (2002). "'They Don't Trust Us; We're Just Kids': Views About Community From Predominantly Female Inner City Youth." *Health Care For Women International* 23: 248–266.

VALKENBURG, PATTI M. & JOCHEN PETER (2009). "Social Consequences of the Internet for Adolescents." *Current Directions in Psychological Science* 18.1: 1–5.

VAN DEN EIJNDEN, REGINA ET AL. (2008). "Online Communication, Compulsive Internet Use, and Psychosocial Well-being Among Adolescents: A Longitudinal Study." *Developmental Psychology* 44.3: 655–665.

VODANOVICH, SHAHPER ET AL. (2009). "Wikis to Support Collaborative Web Spaces to Promote Youth Well-being" *WikiSym '09, 25–27 October 2009, Orlando, FL, USA.*

WHITE, ROBERT D. & JOHANNA WYN (2004). *Youth and Society: Exploring the Social Dynamics of Youth Experience*. Victoria: Oxford U.P.

WOLAK, JANIS, KIMBERLY J. MITCHELL & DAVID FINKELHOR (2003). "Escaping or Connecting? Characteristics of Youth Who Form Close Online Relationships." *Journal of Adolescence* 26.1: 105–119.