



UNIVERSITY
OF WOLLONGONG
AUSTRALIA

University of Wollongong
Research Online

University of Wollongong in Dubai - Papers

University of Wollongong in Dubai

2014

Youth web spaces: design requirements, framework, and architecture of wikis to promote youth well being

Shahper Vodanovich

University of Wollongong in Dubai

D Sundaram

University of Auckland

Max Rohde

University of Auckland

J Dong

University of Auckland

Publication Details

Vodanovich, S., Sundaram, D., Rohde, M. & Dong, J. 2014, 'Youth web spaces: design requirements, framework, and architecture of wikis to promote youth well being', ECIS 2014 Proceedings - 22nd European Conference on Information Systems, Paragon Group, Israel, pp. 1-18.

Research Online is the open access institutional repository for the University of Wollongong. For further information contact the UOW Library:
research-pubs@uow.edu.au

Youth Web Spaces: Design Requirements, Framework, and Architecture of Wikis to Promote Youth Well Being

Complete Research

Vodanovich, Shahper, University of Wollongong Dubai, UAE,
ShahperVodanovich@uowdubai.ac.ae

Sundaram, David, University of Auckland, New Zealand, d.sundaram@auckland.ac.nz

Rohde, Max, University of Auckland, New Zealand, m.rohde@auckland.ac.nz

Dong, James, University of Auckland, j.dong@auckland.ac.nz

Abstract

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. Although the vast majority of young people are able to find all the resources they need for their health, well-being and development within their families and living environments, some young people have difficulty in locating resources that can help them and moreover, difficulty in integrating into society. 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 the exploring the use of the Internet by youth and how youth well-being can be improved through the design of a youth-friendly web space. 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 will result in their well-being. We use these requirements to analyse existing web spaces and conclude with the problems and issues that need to be addressed. These problems, issues and requirements then motivate us to propose a framework and architecture for the design and implementation of Wikis for enhancing youth well-being.

Keywords: Youth - Well-being, Wikis, framework, architecture

1 Introduction

Youth 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 youth to be well supported through the provision of information and the presence of a collaborative, community may enable youth to make this transition smoothly. 'Adolescence', 'Youth', 'Young person' is difficult to define because it is not universally but culturally defined. For these reasons, the term 'youth' rather than 'adolescence' is now commonly used to refer to the period of transition to adulthood. In the context of this article we use the United Nations definition of teenagers who are aged between 13 and 19. Similarly, young people from a range of backgrounds have different experiences with web spaces, therefore for the purposes of this paper we use the term youth interchangeably with a digital native. The digital natives of today represent the first generation to grow up surrounded by information and communications technology (Tapscott 2008). They have spent their entire lives surrounded by computers, videogames, digital music players, video cams, cell phones, and so forth (Prensky 2001).

The popularity of the Internet as an information source has grown extensively. Its sheer expanse and convenience is ideal to disperse information. This makes the Internet a potentially powerful tool to enable youth to gain access to resources and information they need. Our interest lies with web spaces for youth that enhance their well-being and empowerment. Web spaces open up a whole range of possibilities for using web technology (for example Web 2.0) to interact with youth and provide them with knowledge in an interactive manner. In addition they are also able to provide a community environment which allows the youth of today to voice their opinions on issues that matter most to them and thus foster a collaborative space. These three key ingredients enable youth to be empowered and in turn enable their well-being in some regard.

There are few frameworks or guidelines available for the design of web spaces to cater for the well-being of youth. As such there are not enough youth web spaces which provide youth with up-to-date and relevant information, and which allow youth to collaborate and participate in an online community in an interactive manner such that it enables youth well-being. In the next section we discuss the motivation for the creation of such a web space; in particular we examine the different elements that are required to enable the design of a youth web space that facilitates well-being.

2 Well-being of Youth

Youth workers as well as policymakers, teachers, parents and researchers have highlighted concerns about young people's wellbeing and the need for improvement in this area (Bourke, 2003, Eckersley et al., 2006). However, the concept of wellbeing has not been clearly defined, theorised or measured (Diener et al., 1999, Ryff, 1989), especially when applied to young people (Ben-Arieh, 2005). Therefore, before we turn to an exploration of existing youth web spaces which allow youth to contribute in some form to their wider community, it is perhaps useful to further define what we mean by "the well-being of youth". According to Action for Children and Youth Aotearoa (ACYA) New Zealand this means that "the rights of every child and young person in New Zealand are recognised and each enjoys good health, education, safety and economic wellbeing" (www.acya.org.nz). Moreover, a report by United Nations Children's Fund (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. Family and friends dominate the social environments of youth. Consequently, loneliness and perceived social support from family and close friends (Subrahmanyam and Lin, 2007), a socially supportive network (Argyle, 1992, Henderson and Argyle, 1985), the level of emotional support (Caplan and Turner, 2007), relationships and friendships (Argyle, 1992) as well as feeling close and connected to others on a daily basis have all been found to contribute to youth well-being (Hartup et al., 2001). Moreover, feeling understood and appreciated and sharing pleasant

interactions with friends and family are especially strong predictors of well-being (Reis et al., 2000). The importance of having friends, and more significantly having good quality friendships is an important developmental element for adolescents (Hartup et al., 2001). These findings underscore the importance of schools as a primary source of connectedness with adults, and with the broader community as perceived and experienced by the adolescent (Resnick et al., 1993). Resnick et al (1993) assert that family connectedness still plays an important part of youth's well-being.

3 Web Spaces

The ubiquity of digital media such as the Internet prompts a discussion and exploration of how the web spaces can enhance the well-being of young people. However before an exploration of youth well-being and web spaces, it is perhaps useful to first discuss these web spaces in general terms.

The World Wide Web is a powerful tool that provides a wealth of opportunities and information; it is also used to connect individuals across the globe, as well as providing the ability to collaborate with your peers and colleagues without ever seeing each other face to face. The high use of e-mail—80% to 90% of users—affirms Michael Strangelove's statement that "the Internet is not about technology, it is not about information, it is about communication—people talking to each other, people exchanging e-mail . . . the Internet is a community of chronic communicators" (quoted in Putnam, 2000, p. 171). Users rank e-mail as the number one reason for being online (Katz and Aspden, 1997). The Internet's other main use is for seeking information, for example, hobby, medical, travel, or product information (Katz et al., 2001, Nie et al., 2002). Long-time users, new users, nonusers, and former users all rank this activity as number one or two as a reason for being online (Katz and Aspden, 1997). People readily employ the Internet as a tool for information retrieval because it can provide fast access to vast amounts of information from a multitude of sources (Sears et al., 1997).

Haythornthwaite (2001) found that the types of use, time spent online, and connectivity to others all increase with the amount of time people have had access to and used Internet applications. Kavanaugh and Patterson (2001) noted an increase in "social capital building activities" with more years of access, including communication with close and distant friends, relatives, co-workers, and volunteer groups. Howard et al. (2001) distinguished the more experienced netizens from others in the way they incorporate the Internet into both home and work life, their comfort level in spending and managing their money online, and using e-mail to enhance social relationships. Kazmer and Haythornthwaite (2001) described how synergy between individuals' work, home, and school worlds develops with experience in an online environment and how more experienced users seek ways to integrate Internet applications such as e-mail into their personal, work, and volunteer environments. The next section looks more in depth on how young people are interacting and engaging within these web spaces.

4 Youth Well-being in Web Spaces

Computers are an important tool in achieving this environment as they are an important aspect of youth culture (Valaitis, 2005). Youth 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 (2005), 83% of all the youth surveyed stated that "most" of the people they know use the Internet while only 6% say that very few or none of the people they know use the Internet (Lenhart and Madden, 2005). The youth of today has variously been referred to Net Generation (Tapscott, 1996, Rickard and Oblinger, 2003) Digital Natives (Prensky, 2001a) and the Millennials (McMahon and Pospisil, 2005). This generation are 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 (Gros, 2003, Prensky, 2001a, Prensky, 2001b, Oblinger, 2003). Prensky (2001a) 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." (p.g. 1). Youth 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).

One of the major turning points in the Internet's growth has been its emergence as a social arena. Contemporary ubiquitous spaces such as the Internet have many social components that encourage users to build and maintain a significant social network in cyberspace. These include e-mail chat-rooms, instant message newsgroups, forums, and community and support groups. It has been suggested that many people fulfil their most important social needs, those of affiliation, support, and affirmation over the net (Sproull and Faraj, 1997, Leung, 2007, Larose et al., 2001). This section discusses impact that these spaces have on individuals' well-being and development.

However, to say that ubiquitous spaces impacts negatively or positively on youth or any other group of people is a generalisation. There are numerous other factors that could be considered both within the context of ubiquitous spaces themselves as well as considering the individual who is using it and how they are using it. Ubiquitous spaces then can have both positive and negative effects on a person's well-being. Recently, there has been much concern shown over the psychological effects of Internet use on digital natives. This concern has been mainly motivated by a study performed by Kraut and colleagues (1998) which suggested that loneliness, depression and daily stress was positively linked with greater Internet usage. In contrast other studies have that personal characteristics and social variables can influence a person's use of the Internet (Hamburger and Ben-Artzi, 2000), for example, extraverts are less inclined to solicit social services offered on the Internet presumably because their need for social exchange is sufficiently met off-line (Engelberg and Sjöberg, 2004). Contrary to the idea that the Internet is a socially isolating technology, recent studies have shown that the Internet can be related positively to measures of social involvement (Larose et al., 2001, Tomai et al., 2010, Kalpidou et al., 2011). Most recently studies carried out by Shaw and Gant (2002) and (Svendson et al., 2011) rebut Kraut et al's claim and found that Internet usage not only saw a marked decrease in loneliness and depression, but also saw an increase in perceived social support and self-esteem. Barak (2007) demonstrated how the Internet can provide an environment where depressed people feel supported. Similarly, Caplan and Turner (2007) discussed how the unique features of the Internet can help alleviate emotional distress.

Moreover, The sense of empowerment and in turn the well-being of youth comes from 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 (Cockburn, 2005). 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 sub cultural interests and social affiliations (Kozinets, 1999). It is empowering for youth 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 youths 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 youth felt more confident, better prepared and more knowledgeable when expressing themselves to the wider community.

Figure 1 demonstrates the three modalities of interaction that youth can 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 – governance. Gross, Juvonen & 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 youth have access to. A report by Livingstone (2001) suggest three main concerns regarding youth use of Internet; contact – who are the youth interacting with, content – what are they viewing and being exposed to as well as 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 elements contribute to the well-being and empowerment of youth. As shown in Figure 1, the well-being and empowerment of youth online is impacted by three factors relating to the efficiency and effectiveness of information exchange, Information, Community and Collaboration. In the following sections we explore how these three modalities of Information, Community and Collaboration contribute to the well-being of Youth in web spaces.

4.1 Information

Enhancing youth knowledge about how issues in the media, changes to government policy at the local, national and international levels affect them is crucial to their understanding of themselves. The exponential growth of the web and the growing availability of collaborative tools and services on the Internet have facilitated innovated knowledge creation / dissemination infrastructures, such as: electronic libraries, digital journals, resource discovery environments, distributed co-authoring systems and virtual scientific communities (Chen and Gaines, 1996). The transformation (filtering, aggregation or visualisation) of such a rich information base is vital for youth. This transformation can facilitate the explanation of issues impacting youth to the youth community. This in turn is an important step towards ensuring that youth understand how local, regional and international issues impact them and as a result ensure the well-being and empowerment of youth through knowledge acquisition.

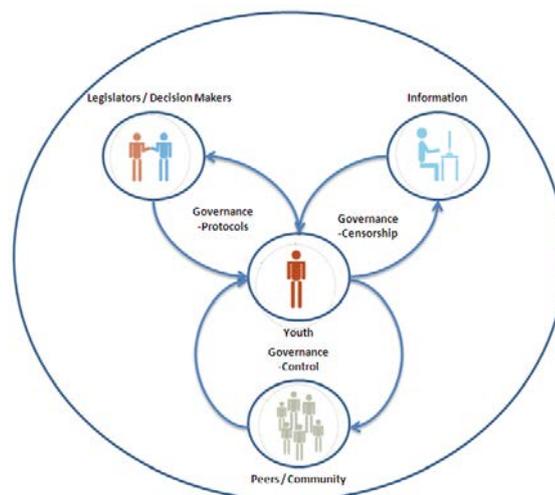


Figure 1: Youth interaction in web spaces

4.2 Community

The role of youth 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 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 and Bober, 2004) and, especially, among young people (Prout, 2000, Kimberlee, 2002). The Internet can be seen as a means of increasing young people's participation in a community environment (Hall and Newbury, 1999).

4.3 Collaboration

Collaboration amongst youth, between them and legislators and decision makers is a vital part of ensuring that their “voice” is heard. Calvert (1999) 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 (p. 209, Calvert, 1999). 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.

5 Types of Youth Web Spaces

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

5.1 Information provision oriented Youth Web Spaces

Horrigan (2006) asserts that 87% 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 search engines to portals and web directories 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 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.

5.2 Community oriented 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 community,’ was coined by Internet pioneer Howard Rheingold (1993), 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. The term 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). For the purposes of this paper we will refer to virtual communities for youth as member-initiated communities (Muniz and 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.

5.3 Collaboration oriented 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), assert that collaborative learning leads to a deeper level

of earning, critical thinking, shared understanding and long term retention of the learned material. One example of a collaborative web space is wiki enabled websites. Wikis 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 and 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, she is a facilitator to social learning whereby learners construct their own knowledge, their own world.

6 Conceptual and Design Requirements of Youth Web Spaces

6.1 Conceptual requirements

This field of research is dominated by three distinct areas of research, therefore it is difficult to locate models and frameworks that will enable the design and implementation of a web space for youth well-being. There are numerous frameworks for designing and implementing web spaces for organisations (Hevner et al., 2004, Nunamaker et al., 1990, Adams and Courtney, 2004), frameworks for explaining the transition of youth from childhood to adulthood as well as frameworks and models that explain to some degree what young people are involved with online (e.g. Boyd and Ellison, 2008, Turow and Nir, 2000, Gross et al., 2002) However, in order to design and implement a web space for youth well-being, we need to bring these diverse perspectives together in order to create a robust framework and model for this specific area of research.

The 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. In terms of what content should be covered by web spaces for youth, it is perhaps useful to first consider what issues are of the most importance for youth. Recent surveys conducted by, Harris Interactive (Markow, 2003) and United Nations Youth Association of Australia (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 the web space for youth is impacted strongly by the quality of the content of information within in 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 youth 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 youth 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 and 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 youth the more the quality of the information provided regarding youth advocacy and policies will improve. As an increasing number of youth turn to the Internet as a research tool (Lenhart and 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 - which is a Nottingham site aimed at educating potential youth offenders about the Criminal Justice System and the consequences of crime - success is due in part to the

fact that it fills an important information 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 youth.

In addition, interactivity is another dimension that should be considered in the design of a youth web space. Terdimen (2005) reports on a study that observed American and Australian youth using dozens of websites across a variety of genres. They found that the participants 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." Therefore interactivity is very important especially when it comes down to capturing youth attention.

There is much debate about the definition of interactivity; Steuer (1992) defines interactivity "as the extent to which users can participate in modifying the form and content of a mediated environment in real time. 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 is 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).

Furthermore, Ha and James (1998) identified five dimensions of Internet interactivity that fulfil different communication needs: 1) Playfulness - measured by the presence of such curiosity-arousing devices as Q and A formats and games 2) Choice - measured by the number of alternatives for colour, speed, language, and other non-informational aspects 3) Connectedness - measured by the presence of information about the product, company, third-parties, and other content of interest to visitors 4) Information collection - measured by the presence of such monitoring mechanisms as registration forms and counters 5) Reciprocal communication -measured by the presence of response mechanisms, including the Webmaster's e-mail address, surveys, and purchase orders. Hugh-Hassell & Miller (2003) echo similar sentiments, their research identifies 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.

6.2 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. In this section we want to elaborate specific requirements for the design of interfaces for youth web spaces to enhance well-being that address the issues raised in the prior sections. The requirements are as follows: web spaces to enhance youth well-being should a) present information in such a way that dense information can easily be navigated through b) use up-to-date designs c) be interactive d) show who contributed what e) be customisable and easy to personalise, ultimately allow youth to contribute to the overall design of the web space f) allow users to express their virtual identity.

The issues that are relevant in the context of designing interfaces are presentation, interactivity, and personalisation/ customisation. The problems related to presentation are poor navigation facilities and inappropriate structure to present information. These observations lead us 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.

Youth 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 and Yen, 2004). Livingstone et al. (2005) assert that 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.” Thus the emphasis among academics is clear that creating an interactive environment is what is required to enable Youth to engage with the Internet in a meaningful manner (Livingstone et al., 2005, Heeter, 1989, Montgomery et al., 2004). The strong evidence in the literature suggests, however, the importance of this aspect in designing youth web spaces and therefore we propose that interactivity should be considered.

From another perspective, youth seek to modify the web spaces so as to 'leave their mark' and receive acknowledgement and other positive feedback for their contributions. Also, youth is seeking for pillars for navigation in a complex and confusing world and tend to understand knowledge in a social context (Resnick et al., 1993). Therefore, we state as a further requirement that youth 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 and Ellison, 2008) to use. This is enabled by the web spaces 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 and 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 play 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). For the interface of a web space to enhance youth well-being, this means that identities and what they do (as described under 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 how the web space appears to other users. This concept is well-illustrated by popular sites as MySpace where it is apparent that the pages of different users differ significantly not only in content but also in terms of design.

The opportunities and potential this technology holds for the design and implementation of web spaces for youth well-being are discussed in more depth in the next section.

7 Framework of Web Spaces to enhance Youth Well-Being

We propose a conceptual framework (Figure 2) for wikis to support Youth-Well Being by meeting the design principles mentioned earlier. Wikis should provide mechanisms for enriched, appealing and personalised presentation, enable social collaboration using distributed social identities, support the integration of various elements such as data, objects, knowledge, and processes and allow the governance of the whole. In the following subsections we explore these three dimensions and governance issues in greater detail.

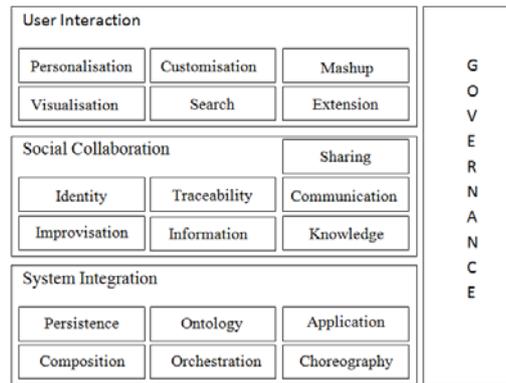


Figure 2: Conceptual Framework to guide the design of Wikis for Youth Well-being

7.1 User Interaction Dimension

One of the key design requirements for youth web spaces is creating an environment that is rich and visually attractive. The Wiki is one such technology that enables the visualisation of the content using multiple media and technologies. Youth spend a lot of their time searching for information on the Internet and are attracted to web spaces that make this process 'fun' (Boyd, 2006). A Wiki for the youth could provide this information in a visualised manner with a focus on pictures, interactive content and other media. The information can further be made more accessible by using knowledge maps or symbols to support the meaning of text content following the principles of concept maps, mind maps, conceptual diagrams and visual metaphors (Eppler, 2006).

Wikis are web based technologies that the creation of links to any web resource that is identified by an URL. Young users of Wikis, though, do not want to click on 'boring' links but rather see the linked content directly integrated in to the site. An example of a webspace that does this is MySpace, which enables young people to represent themselves using a 'MashUp' of different media.

Youth are not just consumers of content they are also motivated to contribute to web spaces (Sharp, 2000), therefore popularising technologies such as Wikis which make it easy for them to add and edit content. An editor for Wikis that is 'fun' to use could be an opportunity for youth to create their own web spaces or contribute to existing ones.

7.2 Social Collaboration Dimension

Youth is seeking for pillars for navigation in a complex and confusing world and tend to understand knowledge in a social context (Perrett-Clermont, Foundation and Resnick, 2004). Consequently, youth seek to modify the web spaces so as to 'leave their mark' and receive acknowledgement and other positive feedback for their contributions (reference). For Wikis, this has two implications: youth should directly see who has contributed which content and they should be able to create their own identity in the Wiki. Most wikis allow traceability of which user has contributed which content; it is, though, mostly hidden in special 'version' pages that are often not easy to understand. Some wikis allow direct contributions to pages by leaving comments rather than editing the page directly and the comments are directly attributed with the user who made that comment. Most wikis allow users to create their own pages.

In addition the creation of a coherent identity is an important part of adolescence (Suh, 2000). Online role play 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). By allowing the content to be enriched with the meta-data of the author of the content adds a social dimension to collaboration with Wikis. As a result rather than collaborating on topics and content with anonymous users, it becomes more a communication process between virtual identities that present themselves through their contributions and personally designed pages.

Youth regularly make use of many different communication channels: such as chat clients, email, discussion forums, shout boxes, YouTube and VoIP (Tapscott, 1996, Prensky, 2001b, Chu, 1997). A Wiki for youth can strengthen the youth user community by offering as many communication channels as possible. Most wikis provide basic discussion abilities and extensions for other communication channels, such as chat for improvising ideas or information and knowledge sharing, are available (Auer et al., 2006)

7.3 System Integration Dimension

To enable the creation of mashups using different resources from the Internet, the Wiki could be a suitable platform to integrate content from different sources. Therefore, rather than the Wiki becoming a central repository for various bits of information, it would become an information source for a 'digital native' (Prensky, 2001a) where they can become a 'spider in the net' rather than trying to containing the whole net. The Internet and its uses evolve faster than any single platform will ever be able to. Today, the favorite way for youth to express their virtual identity is a MySpace page, tomorrow it can be a blog and maybe the day after tomorrow it is a video cast. A youth webspace must enable youth to composite components such as adding extensions or to orchestrate services or to use choreography from different sources in various organisations to enable them to say what they want to say using the most recent technologies and to integrate their social identity in the wiki with social identities they have developed on other platforms. The facilities provided by the Wiki would focus on providing standardised means to link to contents in other sources rather than means to store content in the wiki. Currently, many wikis allow the integration of content from other web resources such as Google maps or social networking sites by using extensions.

7.4 Governance Issues

A requirement that has come up with the growing, not only of Wikipedia, but also other wikis is the governance of the user contributions (Camille, 2007). This is of special importance in the context of youth web spaces as their well-being depends on how well they are protected (Ybarra and Mitchell, 2004, Mitchell et al., 2005, Wolak et al., 2003). The governance should lie on two pillars: The peer control of the youth and control from adults. This requires at least two different processes and roles for government. Most wikis differentiate between system administrator users (e.g. Sysops in MediaWiki) and normal users. A wiki specifically designed for youth would require a finer differentiation of user rights and roles: For instance, youth supervisors, youth users and adult supervisors.

8 Architecture for Wikis to Enhance Youth Well-Being

Based on the framework discussed in the prior section, we propose a conceptual architecture (Figures 3 and 4) that is inspired by Service-Oriented Architecture (SOA) concepts and build upon the Semantic Web Stack. We see the architecture from two dimensions (Figure 3). The first dimension, the application view, is based on ideas from SOA and application centric. The second dimension, the infrastructure dimension, is based on the semantic web stack. Both dimensions can be divided into different levels of abstractions or layers. These layers, however, are not entirely distinct from each other and the transition between these layers is fluid (Figure 4).

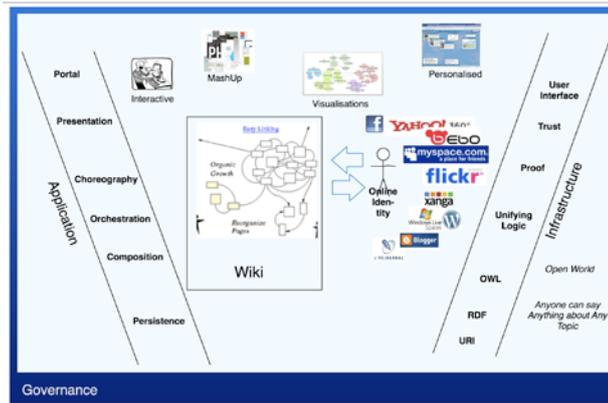


Figure 3: A Wiki Architecture for the Well-being of Youth: Application and Infrastructural Dimensions

Our proposed architecture for a Wiki is not a specialisation of a service-oriented architecture. We just adapt the taxonomy and ideas introduced in the SOA field for an architecture for a Wiki for Youth. The central objects of the architecture are not services but the content that the user contributes to the platform.

From an application point of view, we propose a portal layer and a presentation layer for the User Interaction Dimension. In a service-oriented architecture, the portal layer is on the topmost level of the architecture and allows interaction with the user. In Kalakota and Robinson's (2003) SOA architecture the user interacts with the systems through a "multi-channel portal layer". In our proposed architecture for Wikis, we use the term "portal" to indicate that what is presented for the individual users is a mashup of the content of the platform that is personalised on the user's needs. Customised start pages are one way to implement such portals. In MediaWiki, portals (<http://en.wikipedia.org/wiki/Portal:Contents/Portals>) that are custom-made for specific users could be leveraged to provide such functionality.

The functionality of the portal layer is based on the presentation layer. In SOA, the presentation layer is the link of the business user with the system where a user interface is provided (Emig et al., 2006, Heidasch, 2007). In a Wiki for youth, this layer should support the rendering of appealing visualisations of the Wiki content as well as the rendering of the basic Wiki content itself. Current research has shown that Wikipedia content can automatically be visualised as a graph using link analysis techniques (Nakayama et al., 2008). Other Wikis have shown that the interface to present and edit the content can be presented user friendly by using Web 2.0 technologies (see as one example http://www.mindtouch.com/Products/Deki_Express). Further, the wiki should be interactive, for instance, by providing features like polls which can be implemented easily using, for example, the MediaWiki poll extension (<http://www.mediawiki.org/wiki/Extension:Poll>).

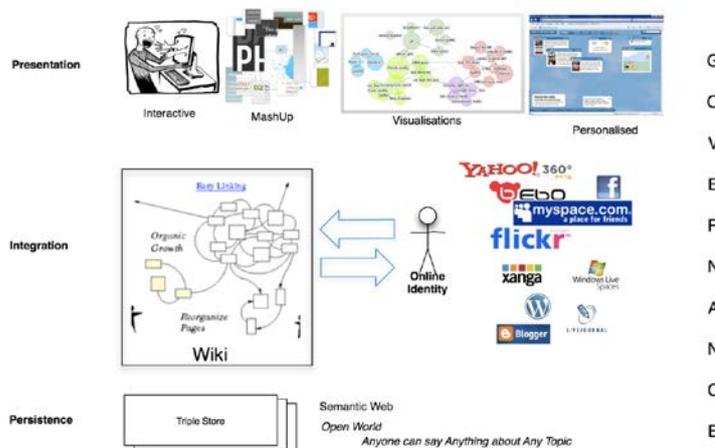


Figure 4: A Wiki Architecture for the Well-being of Youth: A Layered View

The presentation layers are supported by a number of integration layers. We follow the ideas of the proposed architecture of Emig et al. (2006) that differentiates between choreography, orchestration and composition of services. We adapt this differentiation for designing of services for different ways to create or contribute content (Figure 5). Following the requirements from the Social Collaboration Dimension, users create content by recombining content from other sources or from within the platform. If users create new content by exclusively recombining content that is hosted at the current Wiki or platform, we speak of composition of content. If the users creates content as recombination of content from the Wiki platform and/or content from other web sources (such as social networking sites), we speak of orchestration of content. As a more general concept, we see content orchestration as expression for the fact that the meaning of content that is provided on one platform depends on content that is contributed to other platforms. If a user wants to express his/her ideas, he/she can do so by “posting” content to different platforms with or without explicitly linking the individual contributions.

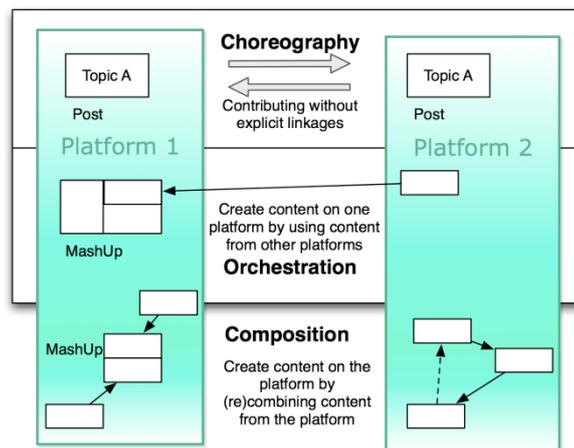


Figure 5: Choreography, Orchestration, Composition

Wikis support these layers by allowing easy linkage between pages and linkage of pages with external contents as a central functionality. By altering or deleting these links, the structure of the Wiki can be reorganised. These links are, however, most of the time, simple hyperlinks. Some Wiki extensions go in the direction of creating more sophisticated linkages by including the content from another web page in the Wiki page as kind of mashups. One example for this is the Google Maps extension for MediaWiki (http://www.mediawiki.org/wiki/Extension:Google_Maps). As youth users contribute a great share of content on social networking sites, these sites shall be integrated in the Wiki environment as well. Allowing easy integration of the Wiki with the various social networking sites or other web resources allows users to link their online identity with the Wiki. Examples for possible implementations are, for instance, various MediaWiki extensions (<http://www.mediawiki.org/wiki/Extension:FBConnect>, http://www.mediawiki.org/wiki/Extension:WordPress_Comments) or the MindTouch Deki Express Wiki that also provides extensions to connect the wiki to socially-enabled sites such as Digg.com. (<http://wikipedia-lab.org:8080/WikiVisSL.Web/Visualizer.aspx>)

A technology that is suitable to tackle the requirement of capturing data from different sources in different formats is the Semantic Web. Using Semantic Web technologies is a common approach to integrate data (Zhou et al., 2005, Gruber, 1995, Suwanmanee et al., 2005, Chung et al., 2003). The semantic web principles of the “open world assumption” meaning it is always assumed that more perspectives are added to a certain set of data and the principle “Anyone can say Anything about Any Topic” meaning that there is no “ownership” of information and that everybody can contribute to any topic go in line with youth' desire to freely express themselves in ways that, due to the rapidly evolving nature of the Internet, cannot be anticipated. Researchers have made various attempts to use Semantic Web technologies for Wikis (among others Haller et al., 2006, Schaffert, 2006, Auer et al., 2006). A Wiki for youth must develop these concepts further for not just to “semantically enable” the content stored in the Wiki but be prepared to provide a common platform to “meaningful” integrate content from other web sources.

All of these layers are based on the persistence layer. This layer is derived from Heidasch's (2007) Enterprise SOA stack, where business objects are based on persistence layer that encompassed a distributed data repository. Given that the users of a Wiki for youth use content from different web platforms, the data for the Wiki cannot be seen as stored in a central repository. Following the requirements of the Systems Integration Dimension, the Wiki platform should provide means to integrate content from different platforms (see Bao et al., 2008).

The Uniform Resource Identifiers (URI) (IETF, 2005) from the Semantic Web Stack provide a technology to uniquely identify resources. They can be used to identify external content and content that is used within the platform. The Resource Description Framework (RDF) (W3C, 2004b) allows to model basic statements about the identified resources. This can be used to link different content, to give content meaning, and to store content in a structured way (Vdovjak and Houben, 2001). The integration of different content can be facilitated using the Web Ontology Language (OWL) (W3C, 2004a) as defining integrating ontologies has proven to be a good way to integrate heterogeneous data from heterogeneous data sources (Zhou et al., 2005, Suwanmanee et al., 2005). This can be used to address the issue that youth are likely to change their preferences of which web platforms they use. The Semantic Web stack provides on top of that functionalities of logic, proofs and trust that can be used to support the application logic of the Wiki. As topmost component the Semantic Web Stack, user interfaces and standardised applications are considered; these can be used to support the presentation and portal layer.

The architecture is surrounded by governance mechanisms that guide the technology as well as the content. According to the architecture, youth users contribute content by composition, orchestration, and choreography. Governance must address all of these to create a youth space to enhance well-being. Whereas composition is relatively easy to govern as all of the content resides in the Wiki. Orchestration is more problematic as the content created by the users is dynamically generated from content that is stored somewhere else and therefore can change dynamically. Even greater challenges come with the choreography of content where the meaning of content on the Wiki may depend on what youth users have contributed to other platforms. We see that, whereas the other components of our architecture can be well-supported by current or emerging technologies surrounding Wikis, the special governance issues that we have raised in the framework section are difficult to support with current Wiki technology.

9 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. The Internet can be used as an important support tool for youth given its ubiquity in their lives. The Internet then, can be used to empower youth and ensure their well-being. There is insufficient research at present to suggest comprehensive guidelines in the design of youth web spaces that enable the well-being of youth.

This paper has provided, through the examination of a popular web spaces, a conceptual framework that can be used to guide the design of an appropriate youth web space that enables empowerment and thus 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 youth to collaborate with not only their peers but also with legislators and decision makers. The framework is also accompanied by a list of requirements that would be useful for consideration in the design of a youth web space.

This paper has also provided an architectural framework that can be used to examine how Wiki technology can be used to implement a web space for the enhancement of youth well-being. This framework raises interesting questions regarding the governance of such a web space, this will be explored further in future research. In addition future research will also consider the implementation of a youth web space based on the conceptual and architectural frameworks purposed in this paper and using Wiki technologies.

References

- ADAMS, L. & COURTNEY, J. Year. Achieving relevance in IS research via the DAGS framework. *In: System Sciences, 2004. Proceedings of the 37th Annual Hawaii International Conference on, 2004.* 10 pp.
- AIHW 2003. Australia's young people 2003: Their health and wellbeing. Australia: Australian Institute of Health and Welfare.
- ALEVIZOU, P. 2002. To wire or not to wire? Encyclopaedia Britannica versus Microsoft Encarta. *Educational Technology & Society, 5.*
- ARGYLE, M. 1992. *The social psychology of everyday life*, New York, Routledge.
- AUER, S., DIETZOLD, S. & RIECHERT, T. 2006. OntoWiki A Tool for Social, Semantic Collaboration. *The Semantic Web - ISWC 2006.*
- BAO, J., DING, L., MCGUINNESS, D. & HENDLER, J. Year. Towards Social Webtops Using Semantic Wiki. *In: International Semantic Web Conference (ISWC), 2008.*
- BARAB, S., THOMAS, M., DODGE, T., CARTEAUX, R. & TUZUN, H. Year. Empowerment design work: Building participant structures that transform. *In: Proceedings of the CSCL, 2002 Seattle, WA.*
- BARAK, A. 2007. Emotional support and suicide prevention through the Internet: A field project report. *Computers in Human Behavior, 23*, 971-984.
- BEN-ARIEH, A. 2005. Where are the Children? Children's Role in Measuring and Monitoring Their Well-Being. *Social Indicators Research, 74*, 573-596.
- BOURKE, L. 2003. Toward understanding youth suicide in an Australian rural community. *Social Science & Medicine, 57*, 2355-2365.
- BOYD, D. M. & ELLISON, N. B. 2008. Social Network Sites: Definition, History, and Scholarship. *Journal of Computer-Mediated Communication, 13*, 210-230.
- CALVERT, S. 1999. The form of thought. *In: SIGEL, I. (ed.) Theoretical perspectives in the concept of representation.* Hillsdale: Erlbaum.
- CAMILLE, R. 2007. Viable wikis: struggle for life in the wikisphere. *Proceedings of the 2007 international symposium on Wikis.* Montreal, Quebec, Canada: ACM.
- CAPLAN, S. E. & TURNER, J. S. 2007. Online emotional support: Bringing theory to research on computer-mediated supportive and comforting communication. *Computers in Human Behavior, 23.*
- CHEN, K. & YEN, D. C. 2004. Improving the quality of online presence through interactivity. *Information & Management, 42*, 217-226.
- CHEN, L. L. J. & GAINES, B. R. Year. Knowledge Acquisition Processes in Internet Communities. *In: Proceedings of Tenth Knowledge Acquisition Workshop, 1996.*
- CHU, J. 1997. Navigating the Media Environment: How Youth Claim a Place through Zines. *Social Justice, 24.*
- CHUNG, P. W. H., CHEUNG, L., STADER, J., JARVIS, P., MOORE, J. & MACINTOSH, A. 2003. Knowledge-based process management--an approach to handling adaptive workflow. *Knowledge-Based Systems, 16*, 149-160.
- COCKBURN, T. 2005. New information communication technologies and the development of a children's 'community of interest'. *Community Dev J, 40*, 329-342.
- DÉSILETS, A., PAQUET, S. & VINSON, N. Year. Are Wikis Usable? *In: The 2005 International Symposium on Wikis, 2005 San Diego.*
- DHAR, V. & STEIN, R. 1997. *Seven Methods for Transforming Corporate Data into Business Intelligence*, Prentice-Hall.
- DIENER, E., LUCAS, R. E., SUH, E. M. & SMITH, H. 1999. Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*, 276.
- ECKERSLEY, R., WIERENGA, A. & WYN, J. 2006. Success and wellbeing: a preview of the Australia 21 report on young people's wellbeing. *Youth Studies Australia, 25*, 10(9).
- EMIG, C., LANGER, K., KRUTZ, K., LINK, S., MOMM, C. & ABECK, S. 2006. The SOA's Layers. *Cooperation & Management, Universitaet Karlsruhe.* Karlsruhe: Universitaet Karlsruhe.
- ENGELBERG, E. & SJÖBERG, L. 2004. Internet Use, Social Skills, and Adjustment. *CyberPsychology & Behavior, 7*, 41-47.
- EPPLER, M. J. 2006. A comparison between concept maps, mind maps, conceptual diagrams, and visual metaphors as complementary tools for knowledge construction and sharing. *Inf Visualization, 5*, 202-210.
- GARRISON, R., ANDERSON, T. & ARCHER, W. 2001. Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2.*
- GROS, B. 2003. The impact of digital games in education. *First Monday, 8.*
- GROSS, E. F., JUVONEN, J. & GABLE, S. L. 2002. Internet Use and Well-Being in Adolescence. *Journal of Social Issues, 58*, 75.
- GRUBER, T. 1995. Toward principles for the design of ontologies used for knowledge sharing. *International Journal of Human-Computer Studies, 43*, 907-928.

- HA, L. & JAMES, L. 1998. Interactivity reexamined: a baseline analysis of early business web sites. *Journal of Broadcasting and Electronic Media*, 42, 457-474.
- HALL, R. & NEWBURY, D. 1999. What Makes You Switch On?: Young people, the Internet and cultural participation. In: SEFTON-GREEN, J. (ed.) *Young People, Creativity and New Technologies*. London: Routledge.
- HALLER, H., KRÖTZSCH, M., VÖLKE, M. & VRANDECIC, D. Year. Semantic Wikipedia. In: Proceedings of the 2006 international symposium on Wikis, 2006. 137-138.
- HAMBURGER, Y. A. & BEN-ARTZI, E. 2000. The relationship between extraversion and neuroticism and the different uses of the Internet. *Computers in Human Behavior*, 16, 441-449.
- HARTUP, W. W., NEIL, J. S. & PAUL, B. B. 2001. Friendship: Development in Childhood and Adolescence. *International Encyclopedia of the Social & Behavioral Sciences*. Oxford: Pergamon.
- HAYTHORNTHWAITE, C. 2001. Introduction: The Internet in Everyday Life. *American Behavioral Scientist*, 45, 363-382.
- HEETER, C. 1989. Implications of new interactive technologies for conceptualizing communication. In: SALVAGGIO, J. & BRYANT, J. (eds.) *Media use in the information age: emerging patterns of adoption and consumer use*. Hillsdale, NJ: Lawrence Erlbaum.
- HEIDASCH, R. 2007. Get ready for the next generation of SAP business applications based on the Enterprise Service-Oriented Architecture (Enterprise SOA). *SAP Professional Journal*.
- HENDERSON, M. & ARGYLE, M. 1985. Social Support by Four Categories of Work Colleagues: Relationships Between Activities, Stress and Satisfaction. *Journal of Occupational Behaviour*, 6, 229-239.
- HEVNER, A. R., MARCH, S. T. & PARK, J. 2004. Design Science in Information Systems Research. *MIS Quarterly*, 28, 75-105.
- HORRIGAN, J. 2006. Home broadband adoption In: PROJECT, P. I. A. A. L. (ed.).
- HOWARD, P. E. N., RAINIE, L. & JONES, S. 2001. Days and nights on the Internet. *American Behavioral Scientist*, 45, 383.
- HUFFAKER, D. 2004. *Spinning yarns around the digital fire: Storytelling and dialogue among youth on the Internet*.
- HUGHES-HASSELL, S. & MILLER, E. T. 2003. Public library Web sites for young adults: Meeting the needs of today's teens online. *Library & Information Science Research*, 25, 143-156.
- IETF 2005. RFC 3968 - Uniform Resource Identifier (URI): Generic Syntax. IETF.
- KALAKOTA, R. & ROBINSON, M. 2003. *Services Blueprint: Roadmap for Execution (Addison-Wesley Information Technology Series)*, Addison-Wesley Professional.
- KALPIDOU, M., COSTIN, D. & MORRIS, J. 2011. The relationship between Facebook and the well-being of undergraduate college students. *CyberPsychology, Behavior and Social Networking*, 14, 183-189.
- KATZ, J. & ASPDEN, P. 1997. Motivations for and barriers to Internet usage: Results of a national public opinion survey. *Internet Research*, 7, 170-188.
- KATZ, J. E., RICE, R. E. & ASPDEN, P. 2001. The Internet, 1995-2000. *American Behavioral Scientist*, 45, 405-419.
- KAVANAUGH, A. L. & PATTERSON, S. J. 2001. The impact of community computer networks on social capital and community involvement. *American Behavioral Scientist*, 45, 496.
- KAZMER, M. M. & HAYTHORNTHWAITE, C. 2001. Juggling multiple social worlds. *American Behavioral Scientist*, 45, 510-529.
- KIMBERLEE, R. H. 2002. Why Don't British Young People Vote at General Elections? *Journal of Youth Studies*, 5, 85-98.
- KOMITO, L. 1998. The Net as a Foraging Society: Flexible Communities. *The Information Society*, 14, 97-106.
- KOZINETS, R. V. 1999. E-tribalized marketing?: the strategic implications of virtual communities of consumption. *European Management Journal*, 17, 252-264.
- KOZINETS, R. V. 2002. The Field behind the Screen: Using Netnography for Marketing Research in Online Communities. *Journal of Marketing Research*, 39, 61-72.
- KRAUT, R., PATTERSON, M., VICKI, L., SARAH, K., TRIDAS, M. & WILLIAM, S. 1998. Internet paradox. A social technology that reduces social involvement and psychological well-being? *The American Psychologist*, 53.
- LAROSE, R., MASTRO, D. & EASTIN, M. S. 2001. Understanding Internet Usage: A Social-Cognitive Approach to Uses and Gratifications. *Social Science Computer Review*, 19, 395-413.
- LENHART, A. & MADDEN, M. 2005. Teen content creators and consumers. Washington, DC: Pew Internet and American Life Project.
- LEUNG, L. 2007. Stressful life events, motives for Internet use, and social support Among Digital Kids. *CyberPsychology & Behavior*, 10.
- LIVINGSTONE, S. 2001. Online Freedom and Safety for Children: research report no. 3. London: Institute of Public Policy Research/Citizens Online Research Publication.

- LIVINGSTONE, S. & BOBER, M. 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.
- LIVINGSTONE, S., BOBER, M. & HELSPER, E. J. 2005. Active participation or just more information? *Information, Communication & Society*, 8, 287-314.
- MADDEN, M. 2003. The changing picture of who's online and what they do. *Pew Internet & American Life Project America's Online Pursuits*: .
- MARKOW, D. 2003. Editorial: Our Take on It. *Trends and Tudes*.
- MCMAHON, M. & POSPISIL, R. Year. Laptops for a digital lifestyle: millennial students and wireless mobile technologies. In: asilite conference, 2005 brisbane.
- MITCHELL, K. J., FINKELHOR, D. & WOLAK, J. 2005. Protecting youth online: Family use of filtering and blocking software. *Child Abuse & Neglect*, 29, 753-765.
- MONTGOMERY, K., GOTTLIEB-ROBLES, B. & LARSON, G. O. 2004. Youth as e-citizens: Engaging the Digital Generation. Washington, DC: American University.
- MUNIZ, A. M. & O'GUINN, T. C. 2001. Brand Community. *Journal of Consumer Research*, 27, 412-432.
- NAKAYAMA, K., HARA, T. & NISHIO, S. Year. Wikipedia Mining - Wikipedia as a Corpus for Knowledge Extraction. In: Proceedings of Annual Wikipedia Conference (Wikimania), 2008.
- NIE, N. H., HILLYGUS, D. S. & ERBRING, L. 2002. Internet use, interpersonal relations, and sociability: A time diary study. *The Internet in everyday life*, 213-243.
- NOVAK, J. D. & CANAS, A. J. 2006. The origins of the concept mapping tool and the continuing evolution of the tool[star]. *Information Visualization*, 5, 175-184.
- NUNAMAKER, J. F., CHEN, M. & PURDIN, T. D. M. 1990. Systems Development in Information Systems Research. *Journal of Management Information Systems*, 7, 89-106.
- OBLINGER, D. 2003. Boomers, Gen-Xers & Millennials. Understanding the new students. . *EDUCAUSE Review*, 38, 37-47.
- PANITZ, T. 1996. *A definition of collaborative vs cooperative learning* [Online]. Available: <http://www.lgu.ac.uk/deliberations/collab.learning/panitz2.html> [Accessed 24th February 2009].
- PORTER, C. 2004. A typology of virtual communities: A multi-disciplinary foundation for future research. *Journal of Computer Mediated Communication*, 10.
- PRENSKY, M. 2001a. Digital natives, digital immigrants. *On the Horizon*, 9, 1-2.
- PRENSKY, M. 2001b. Digital Natives, Digital Immigrants, Part II. Do they really think differently? *On the Horizon*, 9.
- PROUT, A. 2000. Children's participation: control and self-realisation in British late modernity. *Children & Society*, 14, 304-315.
- REIS, H. T., SHELDON, K. M., GABLE, S. L., ROSCOE, J. & RYAN, R. M. 2000. Daily Well-Being: The Role of Autonomy, Competence, and Relatedness. *Pers Soc Psychol Bull*, 26, 419-435.
- RESNICK, M. D., HARRIS, L. J. & BLUM, R. W. 1993. The impact of caring and connectedness on adolescent health and well-being. *Journal of Paediatrics and Child Health*, 29, S3-S9.
- RHEINGOLD, H. 1993. *The Virtual Community: Homesteading on the Electronic Frontier*, New York, Addison-Wesley.
- RICKARD, W. & OBLINGER, D. 2003. *Higher education leaders symposium: The next-generation student* [Online]. Redmond, Washington. Available: <http://www.educause.edu/ir/library/pdf/NLI0425a.pdf> [Accessed 12th January 2009].
- RYFF, C. D. 1989. Happiness Is Everything, or Is It? Explorations on the Meaning of Psychological Well-Being. *Journal of Personality & Social Psychology*, 57, 1069-1081.
- SCHAFFERT, S. Year. IkeWiki: A Semantic Wiki for Collaborative Knowledge Management. In: WETICE '06: Proceedings of the 15th IEEE International Workshops on Enabling Technologies: Infrastructure for Collaborative Enterprises, 2006. IEEE Computer Society, 388-396.
- SEARS, A., JACKO, J. A. & BORELLA, M. S. Year. Internet delay effects: how users perceive quality, organization, and ease of use of information. In, 1997. ACM, 353-354.
- SHARP, J. 2000. Digital Diversions: youth culture in the age of multimedia *Gender and Education*, 12, 138-139.
- SHAW, L. & GANT, L. 2002. In defense of the Internet: the relationship between Internet communication and depression, loneliness, self-esteem, and perceived social support. *CyberPsychology & Behavior*, 5.
- SPROULL, L. & FARAJ, S. 1997. Atheism, sex, and databases: The net as a social technology. In: KAHIN, B. & KELLER, J. (eds.) *Public access to the Internet*. Cambridge, MA MIT Press.
- STEUER, J. 1992. Defining Virtual Reality: Dimensions Determining Telepresence. *The Journal of Communication*, 42, 73-93.
- SUBRAHMANYAM, K. & LIN, G. 2007. Adolescents on the net: Internet use and well-being. *Adolescence*, 42, 659-677.

- SUH, E. M. 2000. Self, the hyphen between culture and subjective well-being. *In: DIENER, E. & SUH, E. M. (eds.) Culture and subjective well-being* Cambridge, MA: MIT Press.
- SUWANMANEE, S., BENSLIMANE, D. & THIRAN, P. Year. OWL-based approach for semantic interoperability. *In: Advanced Information Networking and Applications, 2005. AINA 2005. 19th International Conference on, 2005. 145-150 vol.1.*
- SVENDSEN, G. B., JOHNSEN, J.-A. K., ALMÅS-SØRENSEN, L. & VITTERSØ, J. 2011. Personality and technology acceptance: the influence of personality factors on the core constructs of the Technology Acceptance Model. *Behaviour & Information Technology*, 1-12.
- TAPSCOTT, D. 1996. *The digital economy*, New York, McGraw-Hill.
- TERDIMAN, D. 2005. *What Websites Do to Turn On Teens* [Online]. Available: <http://www.wired.com/culture/lifestyle/news/2005/02/66514> [Accessed October 2008].
- TOMAI, M., ROSA, V., MEBANE, M. E., D'ACUNTI, A., BENEDETTI, M. & FRANCESCATO, D. 2010. Virtual communities in schools as tools to promote social capital with high schools students. *Computers & Education*, 54, 265-274.
- TUROW, J. & NIR, L. 2000. The Internet and the family 2000: the view from parents/the view from kids. *In: CENTER, A. P. P. (ed.). Philadelphia: University of Pennsylvania.*
- UN 2007. Child poverty in perspective: An overview of child well-being in rich countries. *In: FUND, U. N. S. C. (ed.). Florence, Italy: UNICEF Innocenti Research Centre.*
- UNYAA. 2008. *Youth Speak a Conversation for the Future* [Online]. Available: http://www.unya.asn.au/youthspeak/download/YouthSpeak_Major_Concerns.pdf [Accessed 26th October 2008].
- VALAITIS, K. R. 2005. Computers and the Internet: Tools for Youth Empowerment. *J Med Internet Res*, 7, e51.
- VALAITIS, R. 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.
- VDOVJAK, R. & HOUBEN, G.-J. Year. RDF-Based Architecture for Semantic Integration of Heterogeneous Information Sources. *In: In Workshop on Information Integration on the Web, 2001. 51-57.*
- W3C 2004a. OWL Web Ontology Language Overview, W3C Recommendation 10 February 2004. W3C.
- W3C 2004b. RDF Primer, W3C Recommendation 10 February 2004. W3C.
- WOLAK, J., MITCHELL, K. J. & FINKELHOR, D. 2003. Escaping or connecting? Characteristics of youth who form close online relationships. *Journal of Adolescence*, 26, 105-119.
- YBARRA, M. L. & MITCHELL, K. J. 2004. Online aggressor/targets, aggressors, and targets: a comparison of associated youth characteristics. *Journal of Child Psychology and Psychiatry*, 45, 1308-1316.
- ZHOU, J., ZHANG, S., ZHAO, H. & WANG, M. 2005. SGII: Towards Semantic Grid-Based Enterprise Information Integration. *Grid and Cooperative Computing - GCC 2005.*