

*Full Length Research Paper*

# Digital divide and inequality among digital natives: A South African perspective

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**This article explored the extent of digital divide and inequality among digital natives in Gauteng, South Africa. More explicitly, social and economic forms of digital divide and inequality were investigated. The article presents innovative research in South Africa that builds on past international research on digital divide. Whereas previous research on digital divide mainly uses a one-dimensional focus on Internet access only, this research on digital inequality reflects on the quality and quantity of Internet usage. The research poses challenges to improve digital literacy in South Africa and is aimed at narrowing the economic and social disparity evident among especially Gauteng millennials. This initial research on digital inequality not only stimulates intellectual discourse on the topic matter but also serves to encourage digital natives to take full advantage of all resources on the internet as ideal communication medium to improve their well-being.**

**Key words:** Digital divide, digital inequality, digital natives, digital literacy, digital wisdom, Internet literacy, social media skills.

## INTRODUCTION

According to Internet World Stats (2011a), internet usage in South Africa increased from 2.4 million in 2000 to 6.8 million in 2010. The most recently updated Facebook user figures published by Internet World Stats (2011b) show that South Africa has approximately 3.8 million Facebook users in 2011. The latter figure translates into a Facebook penetration of 7.8% for South Africa in 2011. Against this background it is clear that many South African households, especially those with children, nowadays have access to the Internet. However, some households still lack internet access that denies, especially adolescents, the opportunity of exploiting the full potential of the internet. This implies the need for improved internet literacy that will help to defeat digital inequalities that prevail and will place the majority of

adolescents on the same level when it comes to internet usage. Equal access to and more productive usage of the internet among digital natives are destined to have a positive impact on future careers, knowledge levels and political, economic and social involvement. The latter view is echoed by Hoffman and Novak (1998; 1999), The Benton Foundation (1998), Strover (1999) and Bucy (2000), as cited in Neckerman (2004) who indicated that internet usage differs among individuals and that those with higher internet access, also have greater access to education, income and other resources that help people to advance. It is also important to note that the growing prevalence of the internet has sparked a new era of intellectual discourse about access and inequalities, the nature and quality of use, family life and social relationships and the balance between online risks and opportunities. More specifically, this article focuses on internet access and the diffusion of diverse ways in which people use this new technology and how it is embedded within and socially shapes the practices of everyday life.

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## Aim and focus

This article provides new and substantial findings on ways in which young people (the internet generation) in South Africa access and utilise the internet. Within this context, the article primarily explores digital divide and inequality among millennials in Gauteng with specific emphasis on:

1. The existence of statistically significant gender digital divide/inequality among digital natives of Gauteng.
2. The existence of statistically significant cultural digital divide/inequality among digital natives of Gauteng.
3. The existence of statistically significant economic digital divide/inequality among digital natives of Gauteng.

In exploring the above, the article aims to address the following key issues:

1. Internet diffusion and adoption/usage behaviour among digital natives in Gauteng.

A focus on Internet diffusion and usage is best motivated by the citation from Liu and Sun (2006) that 'a country's economic development serves as a good predictor of access to the internet since it provides a country with the enhanced ability to afford internet access'. However, within this context, it is also acknowledged that not only economic but also social and political developments play a critical role in driving the development of the internet's penetration within an economy. Furthermore, the issue of access to the global network is relevant and is based on a growing belief among many observers, that the internet represents a momentous shaping force of modern society in almost all aspects, ranging from education to politics (Gonzalez, 2005). Alexander in Gonzales (2005) also states that the possibility of empowering people by providing them access to the internet is seen as a positive step that must be encouraged. Moreover, the assumption that the internet is an excellent feature for society as a whole carries the inevitable consequence that those who lack access will be at a disadvantage compared to those able to connect to the Web. The latter is based on the idea that information has become the commodity of the future and those without access to it will be relegated to poverty.

2. Digital divide among digital natives in Gauteng Investigating this area requires a focus on the following critical question:

- a. Is there a digital (Internet usage) divide between gender, cultural and economic youth groups in Gauteng?

3. Digital inequality among digital natives in Gauteng Critical questions relating to this focus area include the following:

- a. How Internet literate are young people and which

skills and competencies that constitute Internet literacy are children and young people developing?

- b. Are there differences and inequalities in internet literacy by gender, cultural and economic groups?

- c. How do factors such as gender, cultural and economic status shape inequality in internet use?

- d. Does digital wisdom differ between gender, cultural and economic youth groups?

The above-mentioned focus areas bear specific relevance to the understanding of the ability of digital natives with formal access to the Internet to use this medium to enhance their access to valuable information resources. In particular the research focuses on how easily digital natives go online, how skilled they are at finding information, how effectively they can draw on social support and how productively they use the Internet to enhance their social and economic life. The growing prominence of the Internet poses a set of particular challenges to its users, requiring the rapid development and continual updating of a range of skills and competencies of which the nature and distribution is largely unknown in South Africa at present. Closing this information gap is part of the objective of this research article.

## Defining key concepts

The key concepts that bear relevance to the research topic are summarised below.

### *Digital natives*

A condensed and cohesive definition deduced from previous works by Prensky (2001a), Nimon (2007), Helsper and Enyon (2010) and Hockly (2011), describes digital natives (also referred to as the net generation, the Google generation or the millennials) as those individuals born in the late 1980s (Generation Y or often referred to as the first generation digital natives) and after 1990 (millennials or often referred to as second generation digital natives) and brought up in the digital world. Digital natives are always surrounded by or interact with new technologies and are referred to as 'digital natives' as they are all 'native speakers' of the digital language of computers, video games and the internet' (Prensky 2001b).

Besides being classified by age, digital natives are also typically characterised by high exposure and use (experience) of information communication technology such as the internet and cellphones. In fact, digital natives are inclined to use technology for communication and as part of their social life (that is playing video games; send and receive emails and instant messages and talk on digital cellphones).

### ***ICT/digital/Internet literacy***

New literacies refer to new forms of literacy made possible via digital technology developments. The new literacies are often conceptualised in different ways and a whole range of terms is used by researchers when referring to new literacies. These include internet literacies, digital literacies, information literacy, ICT literacy and computer literacy. Mostly, these concepts are used interchangeably with ICT generally taken as the umbrella term that attempts to describe a new set of literacies that have emerged as a result of a broader shift to an information society and the accompanying technologies embedded in that shift. In this context, internet literacy is described as the 'proficiency to use computers and technology to communicate in an information society at school or the workplace'. Closely related to the latter, the Educational Testing Service (ETS) in the USA defines information and communication technology literacy as 'the ability to use digital technologies to function in a knowledge society' (ETS, 2011). ICT literacy is often defined as a singular, standardised set of competencies with computers or technologies. Turning the attention to internet literacy, it is firstly necessary to acknowledge that this medium is a major part of the media mix and an important component of media literacy, especially for young people. Livingstone and Bober (2005) and Livingstone et al. (2005) broadly define internet literacy as 'the ability to access, understand and create communications in a variety of forms'. Across all domains internet literacy is increasingly important and its absence may contribute to social exclusion and inequality.

Commonly recognised examples of new literacies include practices such as instant messaging, participating in online social networking spaces, creating and sharing music videos, photoshopping images and photo sharing, online shopping, emailing and online chatting, conducting and collating online searches. For purposes of the article, a total of 19 internet literacies have been measured. The outcomes of these findings are discussed in the analysis section.

### ***Internet and social media skills***

According to James (2011), internet skills cannot be defined in some absolute sense because they will differ from one context to another. James and Azari, (2008), indicates that internet skills also differ by country. Against this background, the definition of internet skills is limited to include those capabilities required to perform a specific task. It is evident from past research that a lack of skills is the most commonly cited reason for non usage of the internet (Schmidt and Stork, 2008) and often results in digital divide.

Besides investigating internet skills, the article also

explores a selection of social media skills to investigate digital divide in the use of social media (networked digital media such as Facebook, MySpace, You Tube and Twitter). This approach supports the notion of expanding digital skills or information literacies to include social media literacies. In this regard, social media skills enable the youth to, among other things, socialise, learn and play. Consequently, the article investigates youth participation in pre-selected activities such as uploading of photos, posting of videos and downloading of ringtones, wallpaper and software. It is these skills that create a digital culture that embraces their way of living. However, there are probably certain skills gaps, as will be outlined in the analysis section.

### ***Digital wisdom***

This article elaborates on the term digital wisdom as the research population (digital natives in Gauteng) investigated in the article has grown up in an era of digital technology. Prensky (2009a) defined digital wisdom as wisdom (i) arising from the use of technology to access cognitive power beyond an individual's innate capacity (ii) in the prudent use of technology to enhance individuals' capabilities. In this context, the definition of wisdom may be expanded as the ability to find practical, creative, contextually appropriate and emotionally satisfying solutions to complicated human problems. Prensky argues that a digitally unenhanced person, however, wise, will not be able to access the tools of wisdom that will be available to even the least wise digitally enhanced human. Aspects that play an important role in determining the wisdom of individuals' decisions and judgements include, among others, the following:

- a. How and how frequently are information technology resources used by emerging digitally enhanced individuals?
- b. How does the emerging digitally enhanced individual filter through information resources/tools to find what is required?
- c. How does technology aid individuals?

In summary, homo sapiens digital accepts digital enhancement as an integral fact of human existence and he/she is digitally wise both in the considered way he/she accesses the power of digital enhancement to complement innate abilities and in the way in which he/she uses the enhancements to facilitate wider decision making.

### ***Internet diffusion***

Diffusion of technology is defined by Pohjola (2003) as the process by which new technology spreads across its

potential market over time. Different economic agents, with different preferences and abilities, are likely to adopt the new technology at different times and to use it at different levels. The internet has indisputably become a new and versatile mass media instrument and is the fastest diffusing Information and Communication Technology (ICT) innovation since 1990 (Dholakia et al., 2003). Within this context, diffusion of an innovation, such as the internet, is defined as the 'macro process concerned with the spread of the innovation from its source to the public'. Simply defined, internet diffusion refers to the spread of the internet among entities such as households, individuals or firms. These entities are considered connected to the internet if they have the capacity of communicating with each other via the physical structure of the internet. Consequently, internet diffusion relates to the rate to which entities adopt and use the internet. With ICT becoming more prevalent in the daily lives of many individuals, an investigation into the adoption and usage of emerging technologies such as the internet is substantiated. Despite the fact that the penetration rate of ICT has increased, there still seems to be social and economic disparities across a cohort of young people.

### ***Digital divide and inequality***

In the widest context, digital divide refers to the inequality of access to the internet (Castells, 2001; Gunkel, 2003). The definition of digital divide is usefully enhanced by Norris (2001) who distinguishes between the following three types of digital divide:

- a. Global divide: The diversions of internet access between industrialised and developing societies.
- b. Social divide: The gap between information rich and poor in a nation.
- c. Democratic divide: Difference between those who do and do not use the panoply of digital resources to engage, mobilise and participate in public life.

Digital divide has also been defined in a much broader sense and has been described as the space in society that exists between those who know how to and can completely use information communication technologies to their advantage and those who do not. This broader definition of digital divide initially referred to 'the gap between those who have and do not have access to technology (that is, internet or cellphone access) and related services'. Over time, this definition has been broadened by adding 'the user must have the ability to use the available resources properly' (Chauhan and Murthy, 2006). Against this background it could be argued that, if an individual has all the latest technology and information but does not know how and where to use it, it will lead to digital divide.

Until recently, most international research has focused

on inequality in access. Although acknowledging the importance of such research being likely to reinforce inequality in opportunities for economic mobility and social participation, more thorough research on digital inequality has recently started to feature more prominently internationally. Similar research approaches largely remain unexplored in a South African context. This article serves to fill this information gap. More specifically, the article favours the narrow definition of digital divide by exploring social and democratic digital divide as defined by Norris (2001).

### ***Digital competence***

ICT skills, technology skills, information technology skills, 21<sup>st</sup> century skills, information literacy, digital literacy and digital skills are all terms that have been used to describe skills and competencies in using digital technologies. Against this background, recent research conducted by Iiomäki et al. (2011) for European Schoolnet (EUN Partnership AISBL) states that digital competence in particular is an evolving concept and consists of (i) technical skills to use digital technologies, (ii) abilities to use digital technologies in a meaningful way for working, studying and for everyday life in general in various activities, (iii) abilities to critically evaluate the digital technologies and (iv) motivation to participate in the digital culture. However, these authors acknowledge that digital competence in research is not yet a standardised concept but rather regarded as a core competence in policy-related aspects. Thus, the term is used interchangeably with the ICT/digital skills defined elsewhere in the article. This broad definition aligns well with the European Commission's definition of digital competence (Punie and Cabrera, 2006) as involving the confident and critical use of Information Society Technology for work, leisure and communication. In their view, digital competence is grounded in basic skills in ICT, such as the use of computers to access, store, produce, present and exchange information, and to communicate in collaborative networks via the internet.

### **METHODOLOGY**

To explore digital divide and inequality among digital natives in Gauteng, a quantitative study was conducted among 1050 young people between the ages of 12 and 21 years (grade 8 to 12) enrolled at secondary schools across the Gauteng province in South Africa. Gauteng's selection is ascribed to the fact that this province is home to 9.5 million people, or 3 million households (Udjo, 2009), constitutes approximately a third of South Africa's income earners (34.4%) and is responsible for about a third of national household consumption expenditure (Masemola et al., 2010). Besides the relatively higher population numbers and income, the central location and presence of major internet service providers in Gauteng and the fact that the majority of internet users are concentrated in major cities such as Johannesburg and Tshwane in particular, largely motivated the selection of this area to

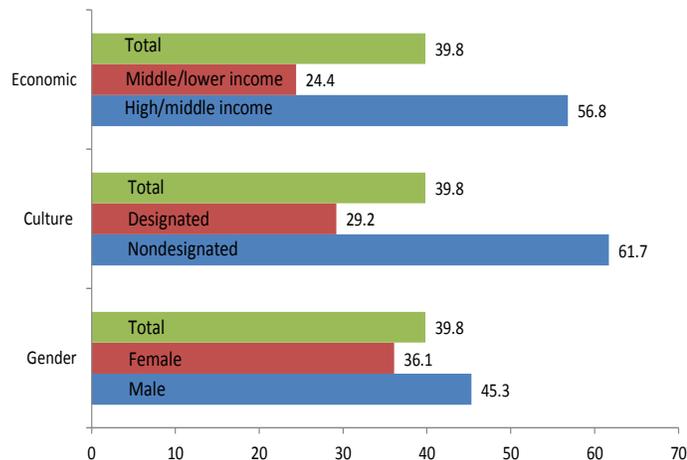


Figure 1. Internet diffusion among selected youth cohorts.

investigate digital divide and inequality. Consequently, Gauteng represents a lucrative market for information communication technology where relatively more of the youth are presumably accessing and utilising internet services. However, Gauteng households do not live in an information utopia yet, and many households still lack access to the internet. This discrepancy largely motivated the research on digital divide (internet access) among digital natives in Gauteng. However, more importantly, the assumption that relatively more youth potentially access and actively use the internet in Gauteng, finally motivated a more detailed investigation on digital inequality among selected socioeconomic groups. The latter segmented approach was adopted by the study to also acknowledge the diversity of Gauteng's population comprising of low, middle and high income households and various cultural groups.

The research universe for the study comprised learners, enrolled from grade 8 to 12 (age 12 to 21) distributed across the entire Gauteng region. The focus on the adolescent market is motivated from an economic, consumer and marketing perspective whereby it is acknowledged that the Millennium Generation (or Generation Y) has emerged as a highly informed and knowledgeable entity with increasingly more economic spending power and purchase influence abilities. Also, from a media communication and psychological perspective, the importance of new media usage among adolescents and how this contributes to formative behaviour, and personal and interpersonal relationship development has been recognised across industry.

A total of 15 schools located across 14 different districts of Gauteng were included in the sample. The composition of schools included an equal representation of ex-model C and ex-DET schools across Gauteng. This segmented sampling approach was favoured to ensure the inclusion of different socioeconomic classes where ex-model C schools largely represented middle to high income communities and ex-DET schools lower to middle income communities. Furthermore, the research population constituted representation from different cultural groups. For convenience, these groups have been classified as designated (Black, Coloured and Asian) and nondesignated (White) groups.

#### Research instrument

Aligned with the objectives outlined above, the research instrument was designed to determine:

- Personal access to the internet including Internet access via cellphones.
- Personal usage and ownership of cellphones.
- Involvement in internet activities (that is, searching for information, playing games, gambling, dating, instant messaging, receiving/sending emails, publishing on blog sites, chatting, online shopping, social network sites, researching information, online radio/television, online reading).
- Involvement in activities on social network sites (Facebook, MySpace, You Tube, Twitter, etc). For purposes of the article, these activities were limited to uploading photos, posting videos and downloading ringtones, wallpaper, software, etc.

These research topics serve to investigate internet diffusion, digital divide and inequality as well as digital skills/competencies among digital natives in Gauteng. The research findings are discussed in more detail in the research analysis section below.

#### Data collection and fieldwork

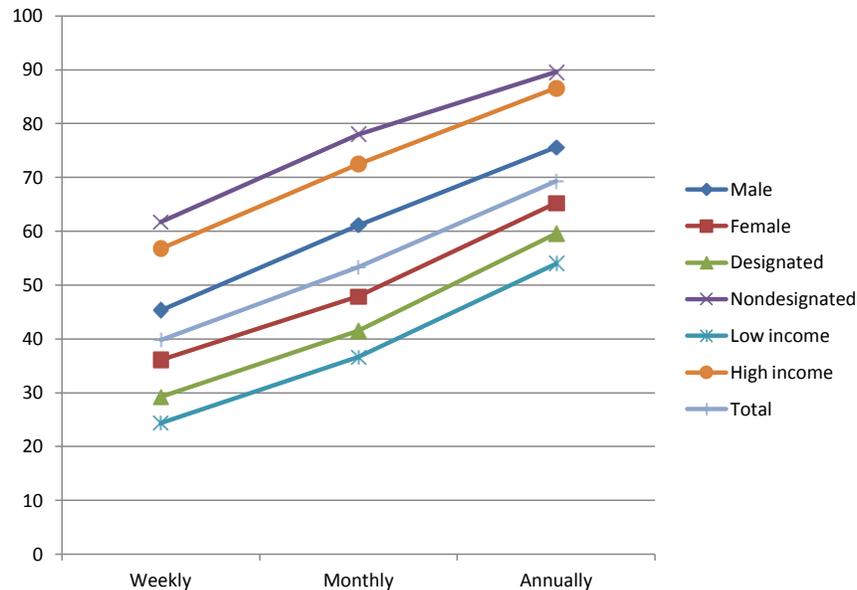
The research design used a self-administrated survey approach whereby a paper-based questionnaire was distributed among 1 050 grade 8 to 12 learners from the sampled schools. Learners self completed the questionnaires under close guidance of fieldwork managers and teachers. This process was preceded by various ethical and logistical arrangements. Firstly, to ensure that the study among 'children' was executed in line with the SAMRA Code of Conduct (based on the ICC/ESOMAR International Code of Marketing and Social Research (ICC/ESOMAR 2008)), permission was obtained from the Department of Education (DoE) and school principals to conduct research at selected schools.

Following this process, each school principal was telephonically informed about the intention of including his/her school. Once the invitation to participate was accepted, the most convenient time to conduct research during school hours was established. Once the survey questionnaires were completed, the batched questionnaires were collected for data editing, coding, capturing and storing purposes.

#### RESEARCH ANALYSIS

Figure 1 provides an overview of the selected demographic groups in terms of internet diffusion among grade 8 to 12 learners in Gauteng. In this context it is important to note that diffusion only displays access to the internet by Gauteng youths during the week preceding the survey. This approach was used to reflect on most frequent usage of the internet.

Figure 1 shows that the internet has penetrated approximately 40% of the Gauteng youth market who are regular users of the internet. As mentioned, it is important to note that Figure 1 only displays internet access by learners in the week preceding the survey. From this finding, it is clear that only one in four youngsters can indeed qualify as true digital natives in terms of the prominence that Internet, in particular, has in their lives. Although, this figure reflects relatively low Internet penetration levels, it does not account for the number of learners with less frequent access to the internet. In fact, a closer analysis of the survey data shows that Internet access figures increase to 53.3 and 69.3% of learners



**Figure 2.** Internet diffusion by incidence of use.

who accessed the internet on a monthly or annual (during the past 12 months but not during the past month preceding the survey) basis. This confirms much higher internet diffusion than reflected in Figure 1. The actual diffusion rate of the internet and regularity of use of any internet activity, are more accurately displayed in Figure 2. The overall trends reflected in Figure 2, alongside the fact that almost all of the 1 050 survey participants indicated that they have access to and use of a cellphone, probably suffice to classify the Gauteng youth market as 'truly' being digital natives. Against this background it seems that the internet has successfully penetrated approximately 70% of Gauteng households with adolescents. Furthermore, the survey showed that just over half the learners access the internet via their cellphones. Between 60 and 65% of the males (59.2%) and learners from the nondesignated (64.3%) and high income (65.5%) groups, access the internet via their cellphones. In turn, between 35 and 45% of females (44.4%) and learners from the designated (43.1%) and low income (36.6%) households access the internet via their cellphones. Reflecting on personal usage of cellphones in general, the survey results revealed that at least 90% of learners personally own and use cellphones on a weekly basis, regardless of gender, culture or income group. This generally displays equality of cellphone ownership and usage for the three demographic cohorts. As will be indicated in the discussion to follow, a different trend is notable with regard to internet usage, with notable distinctions still evident from a cohort analysis perspective.

When analysing Figures 1 and 2 in tandem, it seems

that internet diffusion is more pertinent among non designated and higher socioeconomic groups. It is clear from the analysis that males and the youth from non designated and high income groups show a greater propensity to adopt ICT media such as the internet. This showcases that these demographic factors strongly influence the adoption of internet services. This finding is particularly pertinent for market planners and policy makers who wish to understand and quantify the impact of these factors on digital divide across household types.

To measure the type of activities by selected demographic group, Table 1 displays the type of internet activities in which the Gauteng youth engage. Table 1 also serves to reflect on the digital skills/competencies of digital natives in Gauteng.

Firstly, it is important to note from Table 1 that young people are more likely to use the internet for entertainment and social networking. This finding also corresponds with some of the findings emerging in the UK recently published by Helsper and Enyon (2010). Furthermore, Table 1 displays the internet content accessed by the youth, with the following activities topping the list:

- a. Search for information
- b. Download content, for example, music, wallpaper, ringtones, etc
- c. Facebook
- d. Play games
- e. Research/obtain information for school assignments

Furthermore, Table 1 also presents an overview of the diversity and breadth of use of Internet content and

**Table 1.** Internet activities by youth cohort.

Internet activity	Gender group (%)		Cultural group (%)		Income group (%)		Total
	Male	Female	Nondesigned	Designated	Middle/high	Low/middle	
Search for information	63.8	55.4	79.3	48.9	76.4	42.8	55.4
Download content for example, music, wallpaper, ringtones etc	49.1	35.0	49.1	36.5	51.7	30.5	38.2
Facebook	40.6	39.7	61.3	29.9	58.9	23.5	37.9
Play games	46.0	29.1	39.0	34.3	39.5	33.4	34.3
Research/obtain information for school assignments	37.7	35.5	42.7	33.0	43.4	28.9	33.8
Chat	37.9	28.3	39.3	29.1	38.6	26.5	30.5
Receive/send e-mail	27.9	23.8	41.2	18.0	36.8	15.7	24.2
Research/obtain for myself (random surfing)	22.2	18.6	24.7	17.4	24.8	15.3	18.7
Read newspaper/magazine online	14.4	18.1	13.4	18.1	15.7	17.5	15.8
Instant messaging	17.1	13.4	24.1	10.5	21.9	9.0	14.2
Dating	17.4	10.4	7.9	16.1	10.1	16.1	12.6
Read/access current news on-line	14.2	12.4	12.5	13.4	13.2	12.6	12.2
Listen to the radio online	11.7	10.9	9.5	12.3	9.1	13.2	10.7
MySpace	11.0	10.4	10.1	11.1	12.6	9.4	10.3
Watch television online	11.7	8.0	7.6	10.2	8.7	10.1	8.9
Directory services	8.8	6.0	7.6	6.9	8.1	6.1	6.7
Publish opinion on blog sites	7.1	5.9	4.9	7.0	7.4	5.2	5.9
Shop online	7.3	5.5	6.1	6.1	7.9	4.5	5.7
Gambling	3.7	1.7	3.7	2.0	3.1	2.0	2.4

simultaneously displays the number of digital activities that indicate digital nativeness and competencies. The information clearly displays a high number of different activities that youngsters engage in and confirms that the internet is largely integrated into the everyday life of most learners. Table 1 not only examines the type of individuals (people) that are most likely to demonstrate digital native characteristics, but also reflects on the extent of 'digital wisdom' levels (digital competencies) among the Gauteng youth, which also contributes to their personal development. This view is supported by Johnson (2005) who argues

that new technologies associated with contemporary popular culture (from Internet to video games) are increasing individuals' capabilities in a wide variety of cognitive tasks. As Johnson (2005) puts it: 'Today's popular culture may not be showing us the righteous path, but it makes us smarter'. Engaging with different content presents individuals an ideal opportunity to access information or alternative perspectives that simultaneously improve humans' capacity to judge situations, evaluate outcomes, make practical decisions wisely and to share information across time and distance. The availability of digital tools

has clearly advanced and will continue to advance individuals' quest for knowledge and development of true digital wisdom. In fact, in judging the actual usage figures of some of the digital content displayed in Table 1, digital natives in Gauteng could probably best be described as 'digitally clever' and not truly digitally wise. In this regard, online shopping and blogging activities are rather narrow in use and have not yet been extensively investigated and evaluated to translate these tools into wisdom enhancers. It is also clear from Table 1 that males, and non designated and higher income groups engage.

**Table 2.** Chi-square analysis of digital competencies and skills by selected demographics.

Cohort	Internet access	Internet skills				Social media skills				
		Information search	Playing games	Download content	Facebook	School assignments	Uploading photos	Post videos	Downloads on social network sites	
Gender	Male (%)	45.3	63.8	46.0	49.1	41.6	37.7	45.2	37.9	41.6
	Female (%)	36.1	55.4	29.1	35.0	40.9	35.5	41.9	28.6	32.5
	Total (%)	39.8	58.7	36.0	40.8	41.2	36.1	43.2	32.4	36.2
	Sig: p-value (Pearson chi-square)	0.004*	0.008*	0.000*	0.000*	0.826	0.488	0.291	0.002*	0.003*
Culture	Nondesigned (%)	61.7	79.3	39.0	49.1	61.9	42.7	61.9	44.8	49.4
	Designated (%)	29.2	48.9	34.3	36.5	31.2	33.0	34.2	26.3	29.6
	Total (%)	39.8	58.7	36.0	40.8	41.2	36.1	43.2	32.4	36.2
	Sig: p-value (Pearson chi-square)	0.000*	0.000*	0.143	0.000*	0.000*	0.003*	0.000*	0.000*	0.000*
Economic	Low to middle income (%)	24.4	42.8	33.4	30.5	25.1	28.9	30.3	22.9	26.7
	Middle to high income (%)	56.8	76.4	39.5	51.7	59.5	43.4	58.1	43.0	46.5
	Total (%)	39.8	58.7	36.0	40.8	41.2	36.1	43.3	32.4	32.4
	Sig: p-value (Pearson chi-square)	0.000*	0.000*	0.042*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

\*Significant at the level  $p < 0.05$ .

More frequently or take up more opportunities with the top five Internet content areas listed above. An interesting finding emerging from Table 1 shows marginal gender differences for Facebook usage – boys and girls take up Facebook opportunities almost equally. This displays youths' digital wisdom in enlisting the Internet to connect with friends and family. In turn, a much higher proportion of youth in non designated and high income groups make use of the opportunity to Facebook when compared to designated and low income groups. Furthermore, a much higher proportion of boys than girls access the Internet to

play games. Gaming by designated and income groups show much smaller intergroup differences. Finally, it is evident that online shopping and gambling are the least practised activities on the Internet.

In the section to follow, statistically significant differences in the diffusion rates among selected youth cohorts are investigated. To measure statistically significant gender, cultural and economic differences in digital divide among digital natives in Gauteng, a chi-square test was applied. This statistical technique measures the statistically significant differences in digital divide at a 95%

level of confidence. The outcome of the chi-square test is presented in Table 2. It is important to note that the table displays various digital competencies (internet and online social media skills) to allow for further investigations regarding the development levels of certain ICT skills. Firstly, Table 2 displays digital divide among digital natives in Gauteng. In this regard, it is clear that only 39.8% of digital natives in Gauteng have access to the internet on a weekly basis. Although, not analysed to the same extent, similar trends across youth cohorts are noted for less frequent Internet usage (monthly/annually).

Consequently, digital inequality is evident across the selected youth cohorts, which accentuates the digital diversity that exists among the youth market and largely corresponds with previous work published by Bala and Goyal (1998) and Munshi (2004). These authors argue that information flows are weaker in heterogeneous populations, thus, preventing individuals from learning about their neighbours' experiences regarding the use of new technology. The Gauteng study shows a clear statistically significant digital divide within the cultural and economic youth cohorts. This suggests a bigger gap between Internet users and nonusers within these groups when compared with the gender cohorts.

In terms of internet skills, statistically significant differences are notable for all skills types listed in Table 2, except Facebook and using the Internet for school assignments (not statistically significant for the gender cohort) and playing games (not statistically significant for the cultural cohort). This suggests that, in most cases, gender, culture and income are major determinants of the development of Internet skills. This is also evident from the analysis on social skills where the proportion of the youth that uploads photos, posts videos or downloads content from social network sites, shows statistically significant differences for each selected cohort. The only exception to the rule relates to uploading of photos by gender group. In this regard, no statistically significant differences are notable between males (45.2%) and females (41.9%) who upload photos on social network sites. Overall, it seems that children in high income and non designated groups have more advanced internet and social media skills. This suggests that income and culture are both differentiating variables in the development of digital competencies and skills. The exception to the rule includes the development of gaming skills where gender seems to be a more prominent differentiator than culture and income. In this regard, approximately 46.0% of boys play games as opposed to only 29.1% of girls.

## INTERNATIONAL COMPARISONS

The findings emerging from the Gauteng study among 1 050 youths, resembles findings published in the UK, USA and even Germany, to cite but a few examples. A previous UK study among children and young people (Livingstone and Bober, 2004; 2005) revealed the following trends:

- a. sizable socioeconomic differences for access to the Internet with 88% of middle class and only 61% of working class children having access to the Internet from home
- b. weekly usage rates of 43% of children accessing the Internet with not many children and young people taking up the full potential of the Internet
- c. age, gender and social grade differences whereby girls, older and middle-class teens visit a much broader

range of Internet sites.

The UK study points out a new divide that is opening up between those to whom the internet is an increasingly rich, diverse, engaging and stimulating resource, and for those to whom it remains a narrow, unengaging, if occasional useful, resource of rather less significance. Finally, the UK study also emphasises the importance of internet literacy. Increasing internet skills are vital since it seems that children's and young people's level of online skills has a direct influence on the breadth of online opportunities and risks experienced.

A further set of figures is found in the USA where most relevant studies on internet access have taken place and published in Gonzáles (2005). USA figures also show a marked difference in access to the internet between racial and social groups. For example, while 46% of Whites had access to the internet, only 23.5% of Blacks and 23.6% of Hispanics were online in 2000. USA figures also indicate marked contrast in access to the information network along income lines. For example, 86% of households earning \$75 000 USD and above per annum had internet access compared to only 12.7% of households earning less than \$15 000 USD. These figures suggest that internet access is directly proportional to economic wealth. This finding corresponds with the Gauteng study, which does not explore the actual reasons for digital divide beyond gender, culture and economic status. Interesting to note from the USA study is that digital divide is ascribed to factors other than simply income. Cost of software and hardware, connection cost and actual access to telecommunication infrastructure are other reasons that explain digital divide. Some of these factors may also explain the reason why approximately 30% of Gauteng youths have no access to the Internet. Finally, Wei and Hindman (2011) show that while most Americans nowadays have access to the internet, those with a higher economic status (as defined by education level, income and some other factors) get far more out of the internet because they use it for information, while those on the lower end of the socioeconomic ladder are more likely to use the internet purely for entertainment.

Finally, previous studies in Germany (Korupp and Szydlik, 2005) present empirical evidence on gender, ethnic and regional differences for computer and internet use. In this regard the research revealed that (i) women are less likely to use the internet than males, (ii) ethnic background is negatively connected to the private use of the internet (digital divide between West Germans and Turkish minority due to racial inequalities) and (iii) huge regional differences in internet use prevail between East and West Germany due to economic inequality.

## FUTURE RESEARCH OPPORTUNITIES

The research undoubtedly adds to the understanding of the purpose for which young people are using new

technologies and how digitally wise they are. However, the research fails to measure youths' skills in dealing with and critically assessing information. This limitation calls for further research in this regard. Other key properties for future research on young people's uses of new technology, could include a focus on, among others, (i) causes and consequences of Internet exclusion, (ii) future developments in online literacy, (iii) the nature and quality of new social networks in online communication and (iv) the extent and nature of harm associated with online risks.

Finally, it should be noted that this article only explores internet digital divide. As mobile communication also plays an integral part in many South African households, it is recommended that future research also be narrowed down to a focus on mobile digital divide among the youth in South Africa.

## Conclusions

From the article it is clear that gender, cultural and economic groups adequately define digital nativeness. It appears that males, and youths from non designated and higher income households tend to access the Internet more frequently and are digitally wiser than young females and those from designated and lower income households. The research supports previous research that demonstrates that there are significant differences within cohorts of young people in terms of their use of new technologies, preferences and skills. This research expands on existing research and shows gender, cultural and economic distinctions within cohorts of young people in South Africa. This distinction is important to understand when the intention is to build equal knowledge levels in homes where clear digital inequality prevails. Clearly, the analysis presented in the article demonstrates the importance of cohort analysis, which showed that youth from non designated and higher income households are more likely to feel confident in their ICT skills and use of the Internet for social and learning development. This finding does not imply that gender is discarded as an important variable and cannot simply be ignored in the debate on digital divide in South Africa.

Although, this article propagates the development of digital competencies and skills in order to create more opportunities to impact on personal development, greater Internet access also potentially increases risks to young people through exposure to, for example, problematic or undesirable content (that is, online violence and pornography). This suggests dedicated educational and other interventions to increase young people's level of online skills and particularly, online safety skills.

The article showed that internet access remains stratified and that for, especially popular and social usage of the internet, some children are being excluded. Too little is known at present of the social, educational and other consequences of exclusion. This articulates the

importance of continuing research on inequalities and digital divide related to young people's Internet use. In this regard initiatives are required to improve equality in the range and breadth of online opportunities. However, closing digital divide will involve more than simply placing computers in locations for easy access (that is homes and schools). How to use the information effectively and efficiently probably poses greater skills development challenges that should be addressed via, for example, a public education campaign. Such skills improvement should ideally look beyond technical and information searching skills but also encompass a critical awareness of the quality, purpose and reliability of websites. Focusing on Internet literacy will undoubtedly help to eliminate digital inequalities and will put the majority of the youth on the same level when it comes to internet use. This will support the goal of becoming a knowledge-based economy, take advantage of the innovative nature of information communication technology and assist in diffusing access to ICTs in order to reap the benefits of knowledge sharing and entrepreneurship incubation.

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