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Awareness and health impacts of Information Overload and ICT usage in South Africa

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Awareness and health impacts of **Information Overload and ICT usage in South Africa**

ABSTRACT

Purpose:- This study examined information overload experiences of a group of individuals who are in the social media contact list of the researchers. This covers their perceptions, experiences and impact on their health.

Design:- A survey of randomly selected individuals in the social media contact network of the researchers has been made. This has been done by administering a closed structured questionnaire which cover information ranging from demographic characteristics, time spent on ICT usage, to their experiences of information overload and the health effects of such experience.

Findings:- Male respondents, who are largely unemployed are active ICT users, but are unable to use the irrelevant information received. Aged 31-35 and above, half of men and all women participants spend more than 5 hours per day on the internet. Male respondents suffer head ache, have eye-strains or are addicted to the internet and more significantly overloaded than women. They also suffer from unspecified ailments. Half of female participants are also active ICT users, and suffering from back pain. Other women suffer from multiple effects of eye-strain, internet addiction, and upper limb pain. Educated respondents with Honours qualifications all suffer from eye strain.

Social implications:- Race is significant in explaining composite stress among blacks. This could be due to the demands placed on South African blacks to meet social commitments. Education also contributes to stress.

Originality/value:- There are very few studies that have examined information overload in South Africa using the approach adopted in this study.

1.0 Introduction

There are limited studies that focus on information overload in South Africa. Those focusing on health related aspects of this phenomenon are even rarer. This stimulates the interests of these researchers on this important aspect in a developing country that is confronted with serious challenges in the area of health.

South Africa is undergoing socio-economic transformation from its racially divisive and social segregation policy of apartheid to an all-inclusive society. The challenges of growing the economy have also emerged in the recent past. Government has laid strong emphasis on tackling unemployment, which currently stands at 29.1% (Statsa 2019), achieving economic growth and social transformation through emphasizing inclusive growth.

Social integration has been difficult; and it is particularly challenging in the workplace. Employees having tight deadlines to meet could be affected by stress. Those who get jobs in the country work very hard. Workers put in a lot of hours (8.6 hours per day), but have very low productivity, about \$98 per hours worked (OECD, 2019). Work related distractions cost South African businesses up to R89 billion a year. This occurs even when employees, though present at workplace, are unproductive due to distractions (Fin24. 2018). Some businesses lose up to 5% of gross operating profits.

Differences existing between information processing demands of different employment situations have also been studied previously (Haase et al, 2014). The focus was also on the processing demands of information overload on the personnel of such organizations. This is due to the fact that the phenomenon impacts on people's abilities to make right decisions. There is a prevalent acceptance that information overload leads to poor decisions; understanding this phenomenon is hence imperative (Haase et al, 2014: chapters 2-6).

The overwhelming body of opinion is that too much of bad and/or irrelevant information is not good for the individual. When an ICT user obtains relevant and interesting information, the likelihood of facing overload is low; irrelevant information is the one that

increases the chances of information overload (Ayyagari et al., 2011). This is what this study tries to uncover when determining the health effects of information overload on survey participants as a result of ICT usage.

Stress suffered by individuals is identified as a contributory factor to reductions in organizational performance. This is largely due to the fact that individuals suffering from stress make a lot of errors leading to poor quality of work, absenteeism, emotional disorder and difficulties with balancing work and daily life commitments. The literature also highlights that stress could lead individuals to suffer from frequent headache; obesity and cardiac arrests, and others (Ajayi, 2018).

This paper consists of five sections. Section one is introductory; while the second section reviews salient literature on the topic. Section three is the research methodology section. In section four, data collected from the online survey are analysed; results are also interpreted and presented. The last section concludes the study and makes some recommendations.

1.1 What information overload is!

The notion of information overload has a long history (Rosenberg, 2003; Benselin and Ragsdell, 2016: 284). Some authors traced IO back to Conrad Gesner in 1550s, Samuel Johnson in the 1750s and Vannevar Bush in the 1950s, others see it as being influenced by technological advancements (Tibor, 2017). A discussion was conducted, of the nature and causes of information overload. This is contained in Bawden et al (1999).

Users of the Internet would appreciate the enormous amounts of a variety of information available online. Users may hence experience serious difficulty to evaluate and select the ones that are relevant as more and more diverse sources and content are available. Information overload may be the consequence.

In the field of psychology, overload is defined as a situation where the input of information is greater than the capacity of the human recipient to process it (Eppler & Mengis, 2004). This is mainly due to the lack of control and ability to manage information by the information and communication technology (ICT) user. In this regard, information becomes in-effective, resulting in difficulties to process the message and confusion in the mind of the recipient. This results in psychological stress (Eppler, 2015; Eppler & Mengis, 2004; Thorson et al, 1985).

Mbaye et al (1998) find that the problem encountered by computer users is mostly related to muscles and the skeleton. Child ICT users experience discomfort while using laptops (Harris and Straker, 2000). The most common health-related complaints involve the neck, shoulders and back.

Information overload is explained in various ways and means, with numerous research having a general inclination to expound on the two words (information and overload) used within the term.

Overall, information overload as a result of ICT usage has brought health related dimensions like stress, back pain, upper limb pain, fatigue, continuous headache, sleep loss, and other related issues. This study will examine these psychological and physical

health effect of information overload (hereafter referred to as IO) on individuals, resulting from their use of ICT devices, in South Africa.

1.2 Rationale for the study.

Concerns about what is happening in the public space is growing and there are difficulties with knowing the difference between the truth and fake information (Schlesinger, 2017). Therefore, policy makers and opinion leaders are increasingly concerned about how distributed information imparts and impacts on their constituents. This is due to the fact that secondary information could be distorted. Stories could be retold and circulated, by appealing to the emotions unsuspecting listeners (Nakamura, 2013) in an attempt to shape opinion (Newman, 2017).

There are also concerns about the impact of IO on the behaviour, emotion and health of ICT user both from the theoretical and methodological perspectives (Stokols et al, 2009). These ICT users fall into different demographic categories which highlight different areas of concern to different interest groups.

The primary objective of this research is to assess the level of awareness of the phenomenon of information overload on the researchers' contact group of friends and relatives, colleagues and on social media. Later, the health effects of information technology are assessed on the survey participants.

It is hypothesized that higher levels of ICT usage by survey participants will be associated with increased IO experience; and that there are identifiable health effects of IO on individual survey participants which are attributable to ICT usage.

2.0 Review of information overload Literature

There is in no universal acceptance of a single definition of IO in the literature. The term is quite complex and is the subject of a wide range of discussions across several scientific disciplines and circles. Authors such as Rudd and Rudd (1986: 305) define information load as ‘that amount of information actually acquired by a processing system’. It goes without saying that, the corollary that IO, is the remainder of information available but which the recipient is unable to process. This forms the early understanding of the term ‘information overload’. Authors such as Jacoby (1977) and Malhotra et al. (1982) perceive this when they focused on humans having too much information but having only a limited ability to process it.

Bawden et al. (1999: 250) summed up our understanding of IO as occurring when the information that is potentially useful becomes a hindrance rather than a help to the recipient. Other authors such as Jackson and Farzaneh (2012: 524) have reviewed the literature over the years and come to similar conclusions.

Many researchers are also trying to gain clearer understanding of the term and discussing it across the various fields of psychology, stress science, decision making, biology, accounting, organization science, marketing and management information systems, among others.

It is therefore not surprising that many vocabularies are used to describe IO. These include information flood, information smog, sensory overload, information explosion, cognitive overload, information load, information glut, knowledge overload, information fatigue syndrome, data overload, data explosion, cognitive load, etc.

According to Rosenberg (2003) it is tricky to define the term “information overload” itself whilst the term seems elusive and not imperative to numerous people (Kwon et al. 2015). In trying to familiarize ourselves with the concept of IO, it is appropriate to build a basic foundation as the point of departure. Rosenberg (2003) further explain that the utilization of “information” was not concretely measured until the earlier part of the twentieth century. The use of the term “information overload” even came later. According to Uhegbu (2007:

35, 53), information utilization takes place when we make appropriate use of acquired information; even then it is subjective to the nature of a job, occupation or function one performs (Alegbeleye 1987).

Information overload (IO) is hence described as a situation where we receive too much information to sensibly deal with it all in our available time frame (Eppler, 2015: 217). Swar et al. (2017) also see information overload as a phenomenon whereby more information is presented to information seekers and they are unable to process and handle it. It can also be thought of as the inability to adequately process the quantity of information provided (Eppler, 2015). IO transpires when individuals are exposed to extra information than they can take in, or is within their ability for information handling (Eppler & Mengis, 2004). It is apparent that “information overload” indeed has different valences, for others it might principally refer to an “explosion”; while to others it refers to a “flood” of descriptive facts (Rosenberg, 2003).

In today’s digital revolution, anyone using any kind of a gadget is likely to be exposed to some kind of IO. Therefore, this study will adopt an all-encompassing definition of information overload as a phenomenon where a user is presented with too much information, at that particular point in time, that the user is unable to handle and/or process such information (Swar et al. 2017; Eppler, 2015).

2.1 What are Information and Communication Technologies (ICTs)?

According to Alabi (2003), ICT represents essential tools used for collecting, processing, storing, transmitting and dissemination of information whilst Ducatel et al. (2000) suggests that ICT is the platform where computing and communications combine; but it can also be explained as any “platforms contributing to the display, processing, storing, and transmission of information through electronic means (Bruneau & Lacroix, 2001:4; Akintunde, 2004). The preceding definitions clearly highlight the meaning and usage of ICT. For the purpose of this study, ICT will refer to any gadget which can process, store, manipulate, view and distribute data.

2.2 ICT related factors contributing to IO

Undeniably, ICT offers an innovative way for creativity and linking (Jang et al, 2013) and encourage flexibility that helps individuals to effectively adjust to modifications. However, information overload has a tendency to overwhelm recipients especially when they receive multiple communication and information inputs (Misra and Stokols, 2012).

Low-cost internet access makes it easier to achieve information retrieval (Carlson, 2013) yet the internet offers enormous amounts of numerous information which some people may perceive as challenging. The explosion of internet, emails, e-marketing introduce new phenomenon such as receiving too much information, involuntary extensions of social networking, and rapid changes in technological features. These are individually different aspects of IO (Carlson, 2013). As the message recipient battles with determining and selecting suitable information, emerging from many additional and supplementary sources and content, easy accessibility of these information become Information overload to the recipient (Lee, et al. 2015).

Studies focusing on perceptions of information overload by individuals and its effect on them suggest that rapid advances in digital communication technologies have impact on human health (Edmunds & Morris, 2000; Eppler & Mengis, 2004) and have identified strains as some type of negative health effect on the individual.

Table 1: ICT User population in South Africa by type of platform 2019

ICT Platform type	ICT Platform description	ICT_User_Population (%)
Mobile Phones	Mobile phone types	85
	Types of smartphone	60
Television	Any kind of TV	82
	Streaming TV	3
	TV with Internet content	
Computers	Notebook or desktop	24
	Portable Tablet	12
Other electronic gadgets	electronic-reader device	1
	wearable technology device	2

Source: We Are Social, 2018 as cited in Digital Global, 2019.

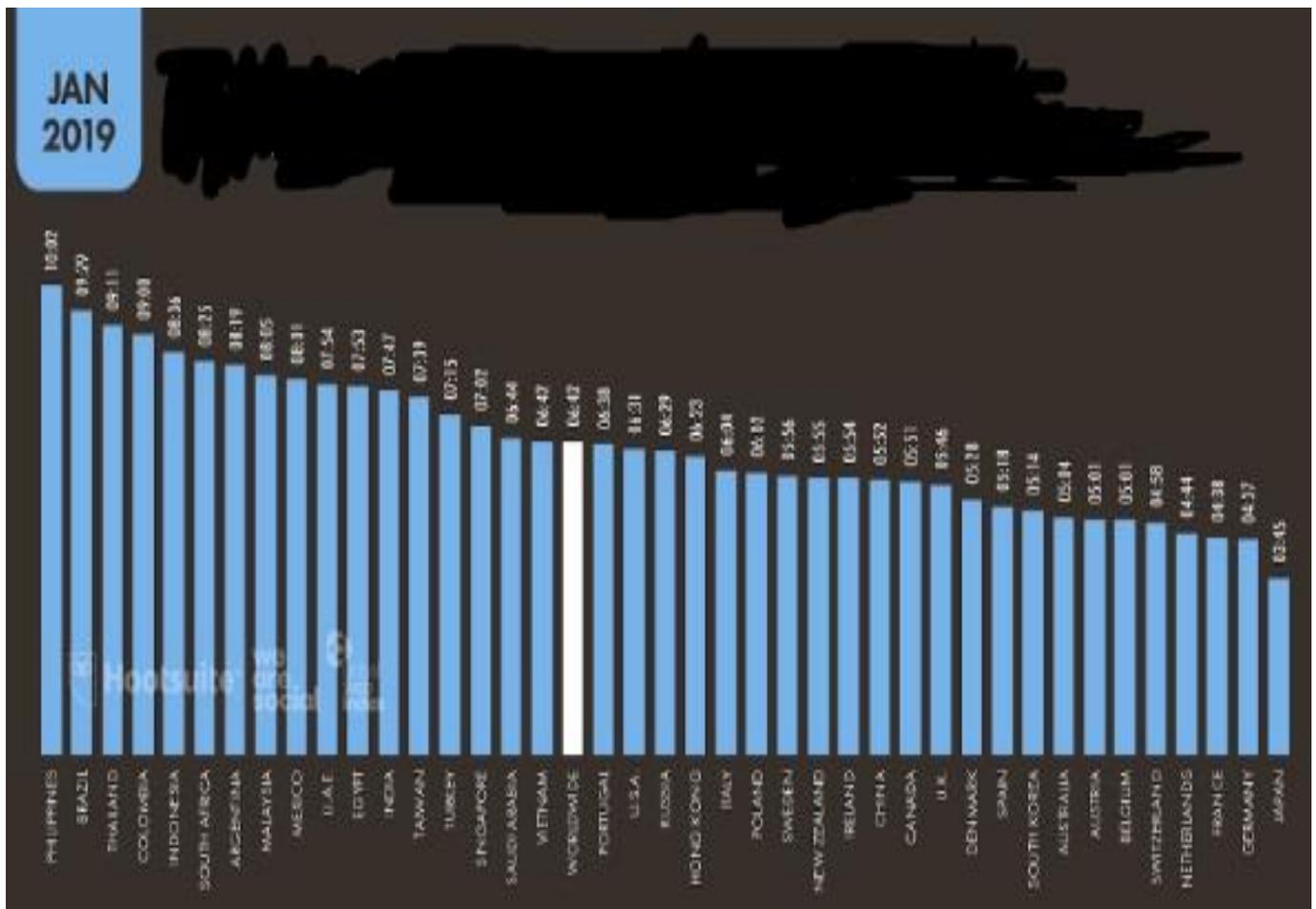
The South African population is generally well connected as shown in Table 1. A substantial proportion (85%) uses any type of mobile phone. This has become the most widely used communication tool in the country where 60% of the population uses smartphone, and 61% of internet users prefer to complete tasks digitally whenever possible (We Are Social, 2018, cited in Digital Global, 2019).

Results by Holton and Chyi (2012) reveal that of the 15 platforms they studied, only the use of 5 media outlets respectively substantively predicted IO. These are print newspapers, news magazine, computer, netbook, iPhone, other smartphones, e-reader, iPod Touch, iPad, and news portals, Facebook, Twitter, YouTube, Blogs and TV). TV and iPhone usage negatively predicted IO; on the other hand, computer usage, usage of e-reader, and Facebook technologies positively predicted IO (Schmitt et al, 2018: 1154).

2.3 Social media could be a problem in South Africa

Opportunities presented by access to the internet are substantial! There were 31.18 million active internet users in South Africa in 2018; of these 28.99 million were active mobile internet users (Clement, 2019). South Africans with access to the internet do so for personal reasons on any device as follows: daily (65%), at least once weekly (22%), at least once monthly (8%) and less than once monthly (4%) According to Figure 1, on average South Africans spend approximately 9 hours per day on the internet using any ICT device (Kemp, 2019). (We Are Social, 2018 in Digital Global, 2019). These are highlighted in Figure 1.

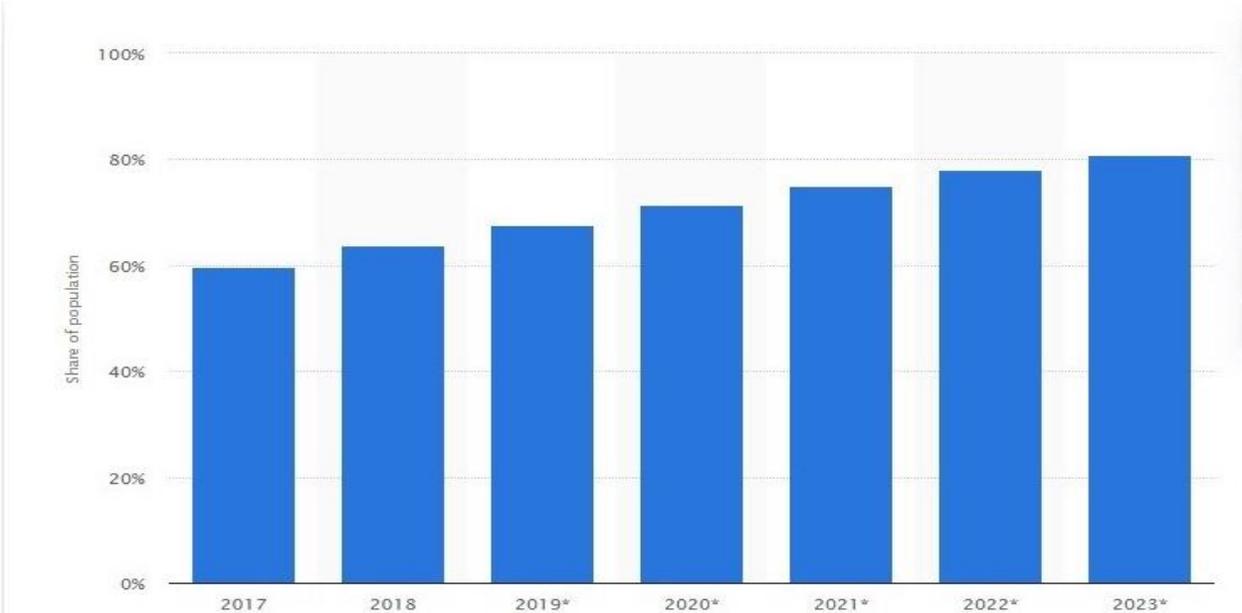
Figure 1: Time spent using internet per day



Source: Kemp (2019).

Figure 2 shows South Africa’s internet penetration 2017-2023 as projected. It has been growing noticeably; and in 2018 by 7% year on year. Facebook and google search engine are the most popular. The social media penetration rate is 40% of the population. Facebook is by far the biggest platform, with a penetration rate of 53% (We Are Social, 2018, in Digital Global, 2019).

Figure 2: South African internet user penetration from 2017-2023



Source: Clement (2019).

2.4 Health effects of IO on the individual

There are concerns about the health impact of information overload on information seekers (Swar et al., 2017). As a result of this, a number of scholars are examining issues on the potentially disruptive effects of digital communications on individuals’ mental habits and their capacities for concentration and contemplation (Carr, 2008).

Information overload is sometimes referred to as “technostress” which is a term well-known in cognitive psychology (Sahin & Coklar, 2009). This is usually in the context associated with ICT users losing control of the situation such that ICT now controls users, instead of empowering them (Swar, et al. 2017) resulting in reduced intellectual presentation and deprived judgment. Additionally, stress can have dysfunctional consequences, diverting users from their everyday life imperatives (Eppler & Mengis, 2004). These destructive effects are substantial growing at the rate of advances in ICT. Swar et al. (2017) find that information overload influences information seekers' psychological ill-being, by manipulating their behavioral purpose to cease the use of online health information search. Additionally, a study by Misra and Stokols (2012) reveals that higher levels of IO predict higher levels of perceived stress.

According to studies already conducted on extreme technology usage, “overload” is a primary reason for concerns about undesirable consequences of ICT usage (Ahuja et al, 2007). In many instances, compacting overloads consumes a lot of energy and might be related to experiences of tiredness (Ravindran et al., 2014). Too much information may possibly speedily drive lead to consumers developing a feeling of being flabbergasted (Karr-Wisniewski & Lu, 2010) with advanced ICT burdening people socially and psychologically (Misra and Stokols, 2012).

Explicitly, Karr-Wisniewski and Lu (2010) explain that when the use of technology goes beyond the optimum level, the overall outcome might become negative in a curvilinear manner. Misra and Stokols (2012) also suggest that there are certain opportunity costs associated with IO resulting from their adverse impacts on individuals' capacity to pay attention to issues and their overall well-being.

Winkle (1998) cited in Ifijeh (2010) identify damaged health and bad judgment as some problems associated with information overload. According to him, studies have linked both decreased vision and cardiovascular stress to information overload. In brief, ICTs have the full potential to result in information overload, which undesirably distresses human conduct, frame of mind, and well-being (Stokols & Montero, 2002).

3.0 Research Methodology

A survey of randomly selected friends, relatives and colleagues in the social media contact network of the researchers, has been made. This has been done by administering a closed structured questionnaire, covering information from participants' demographic characteristics, duration of time spent on ICT usage, to their experiences of information overload and the health effects thereof.

Demographic details are captured as follows: Age is stated in cohorts of age groups with intervals of 5 years, falling between 20 and 40 years of age; Home language stands for the mother tongue of the participant and is one of the 11 official languages, other than English. There are no uneducated participants. Education attainment is measured starting at the undergraduate level. Employment consists of part-time or full-time employment, otherwise the participant is unemployed. There are 4 racial categories and gender is either male or female, otherwise it is unspecified.

Perceived information overload, refers to participants own evaluation of experiences of information overload and is scaled from 1-5, 1 being the lowest and 5 being the highest. Since this variable is not dis-aggregated, information overload being measured is thus its composite form. Health impact of information overload is, however, first measured in its composite form and later disaggregated into individual components, this being the main focus of this study.

4.0 Data analysis and results presentation

The survey was carried out during the second half of 2019. In all, 48 completed questionnaires were received and 8 were discarded for being incomplete and lacking in crucial information. Typically, online survey response rates are low! A similar study by Benselin and Ragsdell (2016: 286) obtained 45 completed responses.

Also, a series of hierarchical regression analyses (incorporating key covariates) were conducted to test the hypothesized relationships among independent/predictor,

moderator, and predicted/dependent variables. The standardized path coefficients, path significances, and explained variances (R^2) of each path are examined.

4.1 Discussion of results obtained

Following Rachfall *et al* (2014) who report that participants' age range from 29 to 55, and the median age being 34.5, this study reports that the participants age ranges from 23 to over 40 years; the median age being 38. There were 80% male and 20% female participants included in this study, just like Rachfall *et al* (2014) who find that respondents are more likely to be male (85%). However, Misra and Stokols (2012) had 84% female and 16% male in their sample. Other studies suggest that females have a tendency to suffer more information overload than males by having more exposure to news (Holton & Chyi, 2012; Ji *et al.*, 2014; York, 2013).

There are mixed results concerning how the perception of information overload is influenced by age. Although York (2013) report that the amount of news available overload older people more; Ji *et al.* (2014) as well as Beaudoin (2008) have shown that it is the younger recipients that are more susceptible to news overload.

In this study, none of the survey respondents is younger than 30 years, much in line with the findings of Ojo (2016); all pre-coded to have academic backgrounds. This is similar to the approach of Rachfall *et al* (2014).

4.2 Level of activity on individual's daily and monthly life activities

The research sought to know whether IO experience is occasional, or increases with frequency of ICT usage, or is perhaps proportional to time spent on the machine. Figure 1, shows that on average South Africans spend approximately 9 hours per day on the internet using any ICT device (we are social, 2018). This study finds that half of men and all of the women participants spend more than 5 hours per day on the internet. They are aged 31-35 and above. They speak Northern Sotho, Zulu and Tsonga. They are highly educated with Honours degrees and above. Two-thirds of the unemployed spend more than 5 hours on the internet per day. Half of part-time and full time workers do the same.

4.3 The meaning and awareness of Information Overload

The study sought to know participants understanding of the meaning and aware of IO. This is because, in South Africa, there's an increasing desire to know more about current affairs and to participate in trending discussions. Tweets, texts and even WhatsApp voice notes from the public are now being broadcast on air to express opinions or drive content (Global Digital, 2019). The level of modernization of South Africa is also very high. Receipt of unwanted messages, advertisements, promotions, emails etc., is substantial. There are enormous difficulties unsubscribing to some sites leading to the receipt of numerous messages over a prolonged period of time and stressful consequences.

It is hence possible that some participants might have different opinions about IO and its impacts. Benselin and Ragsdell (2016) report that level of information literacy influences young people's perception of IO. Male participants are in general unable to use the information received, female participants, on the other hand, receive too much information from multiple sources, just as people who are older than 40 years and individuals whose home language is Afrikaans.

Educated people, such as those in possession of Honours qualifications and above are unable to extract relevant information they receive. This might not be unconnected with the cost of access to the internet. Cost of data is expensive in South Africa, compared to neighboring countries. Regulators in South Africa are recently concerned about expanding access to the internet and are advocating lowering of data costs. Facebook Lite was introduced in South Africa 2015 and some network operators allow it to be used free of data charges. South Africa's Competition Commission, late in 2019 also ordered Vodacom and MTN, the main network service providers, to reduce the cost of connectivity and make available free access to the poorer segment of the society. Government is also prioritizing access to free public Wi-Fi, as a way of providing an alternative to broad-band access especially among underserved communities (Freedom House, 2018).

As alluded to earlier, unemployment rate in South Africa is high. The unemployed group of survey participants are unable to use the information received, perhaps because they are irrelevant to job search.

4.4 Receipt of information overload by survey participants

More than a quarter (28.5%) of male respondents receive IO on daily basis or once a week; but forty-three percent receive IO more than once a week. While the majority feel that this extent is reasonable (50%) about 12% find it excessive. These are primarily part-time workers and undergraduates. Two-thirds of people with graduate qualifications receive information overload on daily basis, the rest receiving it more than once a week. Two-thirds of participants with higher qualifications receive it roughly once a week or a bit more than that. Due to the prevalence of IO, researchers are now focusing on its negative impact, in relation to recipients' avoiding potentially unwanted information, even those that those that are not necessarily undesirable (Sweeny et al., 2010).

4.5 Psychological Health effects of Information Overload on individuals

Social media usage is high in South Africa. Message overload is a situation where engagement in social messaging exceeds users communicative and cooperative capacities (Laumer et al., 2013). For example, users may have many friends on social media and hence may receive many messages, news feeds, notifications and announcements from their friends at any time anywhere. In social messaging activities or communication are not easy to ignore. In its two-way framework, users' friends might be waiting for responses. Messages from intimate friends and family members are highly important and users have to deal with them. Nevertheless, in a number of situations, e.g., driving car, or meeting with others, it may not be convenient for users to communicate with friends and family members; hence incoming social messages would make them anxious. Authors suggest that a lack of social connection or the absence of family or other social support or social capital (Tomita & Burns 2013) can negatively affect mental state.

One-third of male respondents suffer from stress/depression; All suffer from fatigue though half from tiredness. Half of women participants are depressed, fatigued, stressed

up and suffer from sleep problems several times a week. Two-third of old people (i.e., older than 40 years) are depressed and experience sleeping problems several times a week.

The study examines the following hypothesis:

H1.Composite Information overload impacts a negative psychological health effect on users (anxiety, depression, fatigue, internet addiction, sleeplessness)

Hughes (2018: 40) finds significant evidence that participants using a high number of social media platforms, can experience all three negative emotional states of depression, anxiety and stress. In this study, IO is positively correlated with perceived unspecified psychological condition (1.14), internet addiction (0.83), fatigue (0.56), and monthly sleep loss (0.29). It is negatively correlated with depression (-0.48). However, only the effect of internet addiction (1.7) is significant at the 10 percent level. None of the survey participants suffers from information anxiety. This can partly be explained in the context of the African cultural background of most of the survey participants in which men are not encouraged to express emotions. (Mosotho, 2018:39).

4.6 Composite IO, ICT usage and physical health of participants

The study examines the following hypothesis:

H1.Composite Information overload impacts a negative physical health effect on users (eye strain, headache, backache, upper limb ache, unspecified physical ailments)

Table 2: Composite IO and physical health of participants

Dependent variable is Composite Information Overload

Hypothesis	Path Estimate	t-value	Hypothesis (supported or not)
H1. Information overload → Eye Strain	-2.5	-3.69***	Yes
H1. Information overload → Head Ache	-2.3	-3.27***	Yes
H1. Information overload → Back Pain	n/a	n/a	n/a
H1. Information overload → Upper Limb ache	n/a	n/a	n/a
H1. Information overload → Unspecified Physical ailments	-4.0	-4.17***	Yes

***, **, * denote significance at 1%, 5%, and 10% levels respectively

Following the approach used by Misra and Stokols (2012), the study finds that composite Information overload and Individual Perceived Stress Scales to be significantly correlated for eye strain ($r = -2.5$, $p < 0.01$); Head ache ($r = -2.3$, $p < 0.01$) and unspecified perceived stress types ($r = -4$, $p < 0.01$). The results indicate that structural model accounted for 67% of the variance in physical health of participants occasioned by IO. It also has a good overall model fit.

4.7 Models of the Psychological Health effects of Time of ICT Use

Hughes (2018: 40) also finds that total time spent, using all ICT platforms, on social media, does not show a significant negative emotional effect on participants. In a country where about 85% of the people have mobile phones, about two thirds of internet users do so on daily basis, survey participants that spend a little longer than two hours experience diminishing fatigue ($r = -0.63$) and perceive negative sleep loss ($r = -0.24$). As shown in Table 2, these results are only weakly significant at the 10% level. This perhaps leads participants to further encouragement to use ICT leading to potential internet addiction. It has been reported that on average South Africans spend approximately 9 hours per day on the internet using any ICT device (Kemp, 2019). Hence, survey

participants appear to perceive experiencing monthly sleep loss only after spending more than 5 hours using information and communication technology ($r=0.28$). The overall model is however not significant.

4.8 Models of the physical effects of ICT usage and information overload.

Intense ICT usage has the potential to impact musculoskeletal and vision problems on users. The literature suggests that the neck and shoulder pain (NSP) symptoms are very common among intensive computer users. Among computer users, the most common health-related complaints involve the neck, shoulders and back. Sitting at a desk and working on a computer for extended periods of time can stress the trapezius muscle, causing soreness and even headaches. Intensive mouse and keyboard use have been associated with increased risk of upper limb pain. Ming et al (2004) find that health disorder is usually multidimensional. Occupational, personal and social factors are among contributing factors. Harris and Straker (2000) report that about 60% of child ICT users complain of discomfort while using laptops. They also experience discomfort while carrying them. Mbaye et al (1998) find that the problem encountered by computer users is mostly related to muscles and the skeleton. These problems were reported mostly to be back-ache and pain in the neck and shoulders. Bugün et. al (2006) find that 94% of those who reported long-term unhealthy use of computer suffer from pain in the neck and from defect in vision and that 77% had head-ache.

A number of structural equation models have been estimated consisting of one single indicator measured exogenous variable per model (stress type, extent of IO, monthly sleep loss) and eight single indicator endogenous variables or explanatory variables are included (these are age, gender, race, language, education, employment, monthly ICT use and daily time spent on ICT). In this scenario, monthly sleep loss captures sleep related stress previously unspecified. These primary analytic tool used are in line with Kline (2005, Chapters 5-6).

Our results do not produce any significant impact of ICT usage on the upper limb or back pain for the survey participants. This might be due to the fact that, unlike Harris and Straker (2000), none of the survey participants can be categorized as a child, because

none of them is below the age of 20. Being adults, they most probably are accustomed to dealing with the physical problems associated with ICT usage and as such don't consider it as a problem.

4.9 Model of the determinants of health impacts of information overload on individuals in South Africa

H1. Composite Information overload is positively associated with demographic characteristics of survey participants such as race, age, gender, educational status, employment, home language.

Data used was first filtered by composite stress experiences of participants. This enabled the researchers to correlate relevant demographic variables with information overload. Then the study estimated a number of models to determine the relation between health (composite IO, composite stress types, individual stress types, etc.), information overload, survey participants' demographic variables and ICT usage. Information overload as well as demographic characteristics are the predictor variables explaining composite stress types.

The original model accounted for about 21% of the variance of IO (adjusted $R^2 = 0.91$; $F(37, 2) = 15.3$, $p < 0.06$). Information overload experience weakly and significantly explains composite stress type at the 10 percent level of significance. Only the educational attainment of survey participants explain composite stress level better, at the 5 percent level of significance. As mentioned earlier, IO is least correlated with monthly ICT use at 22%. This estimate is lower than the 0.3 threshold. It therefore seems like a candidate for deletion using the rule proposed by Hair et al (2006). Similar methods were used in reducing the form of the estimated equation to arrive at the preferred model.

Table 3: Determinants of psychological health of individuals in relation to experiences of information overload

Dependent variable is Composite Information Overload

Adjusted R² = 0.91***;		F(37,2) =15.3*	
Hypothesis	Path Estimate	t-value	Support for Hypothesis (Yes or No)
H1. Composite Psychological Health → Extent of IO	0.14	3.01*	Yes
H1. Composite Psychological Health → Race	0.44	3.63*	Yes
H1. . Composite Psychological Health → Gender	-0.90	-4.65**	No
H1. Composite Psychological Health → Home Language	0.06	1.37	Yes
H1. . Composite Psychological Health → Employment	-0.28	-2.82*	No
H1. Composite Psychological Health → Age	-0.16	-3.52*	No
H1. Composite Psychological Health → Education	0.39	6.65**	Yes

***, **, * denote significance at 1%, 5%, and 10% levels respectively

As shown in Table 3, the exclusion of monthly ICT use in the reduced form model produces improved overall model performance. Information overload, race, gender, employment situation, age and educational attainment of participants significantly influence composite stress level. Information overload experience, though positive, is weakly significant at the 10% level, in explaining composite stress.

Mosotho et al (2008) emphasize the importance of home language as a determinant of health incidence. They find that although in some cases, depression sufferers could not offer an explanation for their disorder, it is apparent that various stress factors played a role. We originally postulated that information overload will be associated with being female. It appears that this is not the case. Half of male survey participants, who are predominantly South African blacks, and all of the women participants spend more than

5 hours per day on the internet. They are aged 31-35 and above. They speak Northern Sotho, Zulu and Tsonga as home languages. They are highly educated with Honours degrees and above. They are also mostly unemployed. Being unemployed, they are unable to meet the role imposed on them as bread winners. Little wonder then that men appear to be significantly suffering more from stress compared to women.

There has been an end to legally mandated racial segregation in South Africa. However, many citizens are still suffering from the legacy of apartheid. The sign on the coefficient of the race variable also suggests that black South Africans are more susceptible to stress in general. This could be due to the demands placed on South African blacks to meet social commitments. This is more in line with the recent social discussions around black tax, currently pre-occupying discussions among the middle class.

Black tax in South Africa is generally used to describe the cultural situation prevailing in the African community whereby those in early mid-life or recent young employed graduates take care of their immediate and extended family. This causes significant drain on their incomes and savings imposing stressful experience. Fongwa (2019: 2) see black graduate employment as a public good usually shared with the extended family members. Education level and gender variables are also significant at the 5% level in explaining the composite stress suffered by the individual participants. It appears that stress is a double edge sword in this regard, since the education variable contributes to stress just like the race variable.

Age and employment are negative but weakly significant at the 10% level, in explaining composite stress. With respect to the importance of age in relation to composite stress, our result is in line with those of Ji et al. (2014) as well as Beaudoin (2008) in that it appears that younger survey participants are the ones who are more likely to be susceptible to information overload composite stress.

The impact of gender is also negative and highly significantly correlated with composite stress at the 5% level. It is more likely that men are the ones who are significantly stressed up by information overload in South Africa.

Regarding the significance of the employment variable, it is worth mentioning that in South Africa, membership of labour unions insulates workers from labour related stress and the Congress of South African Trade Union (COSATU) is a formidable organization and a member of the tripartite alliance with the ruling party the African National Congress (ANC). Most employed South African enjoy the benefit of permanent employment with substantial benefits. This might partly explain why employment doesn't contribute to stress but reduces it.

5.0 Conclusions and Recommendations

This study is about seeking to understand information overload among survey participants in South Africa who are in the online contact list of the researchers. This group includes followers on Facebook, WhatsApp contact, email contact list and twitter contact. There are advantages in conducting a survey online as mentioned in this study.

The survey produced fairly limited response from survey participants, in line with similar previous studies conducted by other authors.

The group of unemployed survey participants report being unable to use the information received. This might suggest that they were receiving irrelevant information especially for their job search.

That race is significant in explaining composite stress is not surprising! This could be due to the demands placed on South African blacks to meet social commitments, generally referred to as black tax.

It appears that stress is a double edge sword in this regard. The education variable contributes to stress just like the race variable. There are serious challenges desegregating South African schools to accommodate all race while at the same time

meeting the constitutional right of all children to have basic education. Class overcrowding is quite common and school placement is enormously challenging to government and parents. Private schooling is expensive contributing to stressful experience for learners, parents and government.

Male participants in this study suffer from stress/depression and are generally fatigued. Women tend to be depressed, fatigued, stressed up and suffer from sleep problems several times a week. Older participants are depressed and experience sleeping problems several times a week. It must be mentioned that people with symptoms of depression have shown positive evidence of addiction to social media if disallowed from using it.

As the focus of the study is about understanding the effect of IO on the individuals, it is gratifying that while results show that information overload is significant in explaining composite stress suffered by individuals, it is only weakly significant in doing so, a good development for individuals in the researchers' social media network.

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