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DECLARATION

This thesis is not confidential. It may be used freely by the Graduate School of Business.

I certify that except as noted above, the thesis is my own work and all references used are accurately reported in footnotes.

Signed:

Grant Rodger

ABSTRACT

This proposal builds upon and replicates the research of Brent Coker (Freedom to Surf: The Productivity Benefits of Workplace Internet Leisure Browsing, 2009) that asserts that contrary to some findings of productivity losses there are productivity gains despite employees accessing the internet for personal activities, after which productivity declines. This paper expands on the original research topic by suggesting that those respondents who exhibit Internet Addiction (IA) traits and lower productivity also interrupt incomplete work tasks more often to engage in Workplace Internet Leisure Browsing (WILB) activities than those who do not exhibit IA traits. The awareness by workers of acceptable use policies (AUP) and its impact on workplace internet leisure browsing is also explored.

KEYWORDS

Internet addiction, knowledge workers, workplace productivity, performance, efficiency, task interruption, acceptable use policies, workplace internet deviance and workplace internet leisure browsing.
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1 Introduction

Internet access has become ubiquitous in the corporate workplace environment; employees access corporate intranets and the internet to conduct work related activities daily; internet access also offers employees the opportunity to conduct non work related activities, such as personal email & banking, social networking and instant messaging, to name a few (Young, 1988; Coker, 2009). Nowadays this is a prerequisite for the efficient dissemination of information, team collaboration and employee self-service (Pyoria, 2005).

Amongst business management it is assumed that internet access by employees decreases employee productivity. Mechanisms, such as restricting access to certain web sites and services, are often employed by organisations to manage employee access to the internet.

This proposal builds upon the research of Brent Coker (Freedom to Surf: The Productivity Benefits of Workplace Internet Leisure Browsing, 2009). The study targeted 2700 randomly selected participants from a commercial database resulting in 259 completed surveys. Coker asserts that contrary to some findings of productivity losses there are productivity gains despite employees accessing the internet for personal activities, up to a point that is, after which productivity declines. This subsequent decline is attributed to employees who exhibit traits similar to gambling, i.e. they exhibit signs of internet addiction (IA).

Furthermore, the paper expands on the original research by suggesting that those respondents who exhibited internet addiction traits and lower productivity also interrupted incomplete work tasks more often to engage in workplace internet leisure browsing (WILB) activities than those who did not exhibit IA traits. The awareness by workers of acceptable use policies and its effect on workplace internet leisure browsing is also explored.

Workplace internet deviance (WID) has become a frequent and it is said, costly problem for organisations.

1.1 Research Area and Problem

According to Internet World Stats, there are approximately 1.596 billion users of the internet as of the 31st of March, 2009, up from 360 million from January 2001, a 342.2% growth over an 8 year period. Internet use continues to become more integrated
into our personal and work lives, no longer confined to fixed locations but with us 24 hours a day through our mobile phones and laptop computers.

Exploratory research will be conducted to determine the impact, positive or negative, that non-work related internet based activities have on work productivity during work hours amongst middle and senior management knowledge workers in South African organisations.

Snowball sampling will be used to survey the population; an initial seed of respondent targets will be selected, and they will be encouraged to invite peers in similar positions to themselves (middle to senior management within South Africa). Respondents, who submit completed surveys, are entered into a draw for an electronic gift voucher. Respondents who invite referrals (who themselves successfully complete their surveys) will also be entered into a separate gift voucher draw. Gift vouchers to the value of R250 redeemable at http://www.kalahari.net; an online books, music and gifts store will be offered.

Non-work related internet activities include personal banking, instant-messaging, browsing sites of personal interest and social networking activities (such as MySpace and Facebook). Workplace internet leisure browsing (WILB) is the term that has been used to describe this activity (Coker, 2009). The problem facing organisations in today’s knowledge based workforce is determining the extent and accurate impact on performance that workplace internet leisure browsing has on productivity (Coker, 2009; Seymour & Nadasen, 2007). By understanding more accurately the dynamics of workplace internet leisure browsing in organisations, organisations will be better equipped to deploy more appropriate tools to mitigate negative performance gains whilst maintaining the positive aspects of WILB. Quantifying the impact and being able to determine the best strategy (i.e. organisational approach to internet use management, including policies, monitoring, enforcement and even treatment) to deal with various levels of workplace internet leisure browsing in organisations, and achieving the correct balance of use, is an ongoing challenge.

1.2 Research Questions and Scope

This research comprises a replication of research conducted by Coker to determine external validity and applicability in middle to senior management settings, in South African organisations. New questions have been introduced to explore the effect (if any) of the presence and awareness of Acceptable Use Policies (AUPs) by knowledge
workers on their behaviour regarding workplace internet leisure browsing. In addition, the relationship between workplace internet leisure browsing activities and work tasks are explored.

1.2.1 Replicated Questions

The hypotheses being replicated in this study are repeated here (Coker, 2009):

**H1**: Knowledge workers who conduct workplace internet leisure browsing will have higher productivity than those who do not or cannot conduct workplace internet leisure browsing

**H2**: The frequency of workplace internet leisure browsing should have a positive effect on worker performance; controlling for duration and overall time spent workplace internet leisure browsing

**H3**: Knowledge workers who exhibit compulsive tendencies to use the internet will conduct more workplace internet leisure browsing than those knowledge workers who exhibit normal internet use tendencies

**H4**: Knowledge workers who exhibit compulsive tendencies to use the internet and conduct workplace internet leisure browsing will have decreased workplace productivity

1.2.2 New Questions

In addition, the following new hypotheses are explored.

**H5**: Knowledge workers who are aware that acceptable use policies are provided conduct workplace leisure internet browsing less often than those who are not aware

**H5a**: Knowledge workers who are aware that acceptable use policies are enforced conduct workplace leisure internet browsing less often than those who are not

**H6**: Knowledge workers who exhibit compulsive tendencies will conduct more workplace internet leisure browsing despite being aware of AUPs, monitoring and enforcement than those who are not

**H7**: Knowledge workers who exhibit compulsive tendencies will interrupt work tasks more often to conduct workplace internet leisure browsing than those without compulsive tendencies

**H8**: Knowledge workers who tend to interrupt work related tasks to conduct workplace
internet leisure browsing will tend to exhibit lower productivity scores than those who tend to conduct workplace internet leisure browsing between completed work tasks.

1.2.3 Scope & Limitations

The sample population will comprise of an initial seed of all current MBA and Executive MBA students enrolled at the University of Cape Town’s Graduate School of Business. The initial seed set will be encouraged to invite peers in similar positions to themselves to participate in the research survey by offering the chance of winning a prize.

Studies have indicated that a risk of self selection bias using snowball sampling exists (Heckathorn, 1997). Respondent Driven Sampling (RDS) is a method that has been shown to reduce selection bias in snowball sampling. RDS will not be used in this research in part due to the limitations of the survey tool used.

Respondents will be required to have access to the internet to participate and this might be viewed as further biasing the sample population, on the other hand, this study is specifically targeting those who have internet access.

The survey questions rely on honest feedback from respondents. Studies conducted concluded that there are differences between self assessed surveys in comparison with observed surveys of the same work activities; although the authors also go onto suggest that each measurement tool may have been measuring different variables (Pransky, Finkelstein, Berndt, Kyle, Mackell & Tortorice, 2006).

Two key measurement tools include the Endicott Work Productivity Scale (EWPS) and Young’s Internet Addiction Test (IAT). Both tools ask questions that may trigger unease in respondents leading to either incomplete surveys or social desirability response (Bryman, Bell, 2003, p. 235). Other limitations include; the possibility of response set bias that is especially relevant to multiple-indicator measures, and respondents understanding the questions (the problem of meaning) - (Bryman et al, p. 236).

As a result the survey is a self report survey, the results of which might not reflect accurately the activities of the respondents.

1.3 Research Assumptions

The application of snowball sampling will provide a representative sample of middle to senior level management in South African organisations.
The following assumptions are made:

- That the EWPS is relevant and an appropriate guide to determining relative productivity levels within a population sample.
- That the IAT is suitable to detect candidates who could be characterised as being addicted to the internet or show compulsive use of certain internet applications.

That a sufficient number of survey questionnaires are completed to provide a statistically meaningful sample of data. It is hoped that the initial seed and encouragement to engage in snowball sampling will help in this respect.

1.4 Research Ethics

Invasion of privacy is a concern and therefore respondents are not required to divulge personal details that can identify them. Respondents will however need to provide contact details in the form of an email address in order to qualify as a candidate for the gift voucher prize.

All results of the survey will be kept on a secure server, protected from public access and personal information will be kept confidential.

No harm to participants is envisaged although individuals may reflect on the answers of the survey questions in a manner that might cause discomfort as the survey questions relate to personal work characteristics.
2 LITERATURE REVIEW

This section introduces various dimensions related to the research area and problem.

We start by looking at knowledge workers, the definition of knowledge workers, including unpacking their relationship to information and the information economy.

The following section then places knowledge workers within context of productivity and performance, and the challenges faced by organisation today in measuring employee performance. This is in contrast to traditional non knowledge workers of the industrial age where measurable, physical output units of work per time period were the dominant measurement factor, and easily measured.

Knowledge worker tasks are then discussed; specifically task interruption and the effect of task interruptions on worker productivity and resumption of preceding primary tasks. This relationship with workplace internet leisure browsing is one of the focal areas of this paper; for example, is workplace internet leisure browsing conducted during or between tasks?

The area of Internet Addiction (IA) is discussed, including related but not always connected areas that encompass cyberloafing, non workplace internet leisure browsing, and deviant behaviour and internet abuse – to name but some of the headings used to describe deviant forms of internet behaviour.

Information technology and the role of the internet, and its relationship to IA are explored with the objective of understanding the answers to such questions as: are users addicted to the Internet or do they show compulsive behaviours with certain types of internet based applications?

Organisations continually promote information systems as tools to enhance worker productivity and performance, but information systems are also used to monitor and measure worker performance. In particular, attention is given to Acceptable Use Policies (AUP) and the effect of these policies (and enforcement thereof) on knowledge workers and knowledge worker productivity.

Finally, limitations and the current status of self report measures used in the context of IA and productivity measurement are covered, again highlighting the challenge of measuring these variables.
2.1 Knowledge Workers & Information

This section explores what a knowledge worker is and how the work-force has evolved over time to a landscape where increasing demands are placed on knowledge workers requiring increasing creative approaches to work production, including the challenges brought about by these changes.

Numerous attempts at categorising knowledge workers have been made. Patrick & Dotsika (2006) suggest that there are three significant categories of knowledge workers, namely:

1. **data workers who process and disseminate organisation’s paperwork**;
2. **information workers who primarily create and process information**; and
3. **knowledge workers who design products or services, or create new knowledge for the organisation (Laudon & Laudon, 2005, quoted in Patrick & Dotsika, 2006)**.

Davenport (2005, p. 10) defines knowledge workers as those who “have a high degree of expertise, education, or experience, and the primary purpose of their jobs involves the creation, distribution, or application of knowledge”, and goes on to suggest that they are “responsible for sparking innovation and growth” in organisations, that their primary task is to manipulate knowledge and information, provide new services, product designs and strategy creation. It is estimated that knowledge workers may comprise one quarter to one half of the U.S. workforce (Davenport, 2005).

Scott (2005) seeks to provide a more accurate definition of knowledge workers and their identity within the organisation. Scott suggests that “Job performance and work environments are no longer just about a match between the job and the skill possessed by the individual” but also that “work is viewed as an expectation for opportunities to fulfil the social needs of the individuals” (O’Reilly et al., 1980, quoted in Scott, 2005, p.260).

Scott concluded that knowledge workers “participate in not just a task network to get the job done, but in social networks as well… these knowledge workers go outside what would be traditional hierarchical boundaries to accomplish their needs”. This finding further highlights the social and external needs of the knowledge worker on which workplace internet leisure browsing is able to deliver. By requiring knowledge
workers to go beyond traditional hierarchical boundaries it could be suggested that the lines between work related and non work related internet leisure browsing are perhaps not clearly identifiable at times. Who is to know that a knowledge worker browsing what is seemingly a non work related site, for instance Wikipedia.org is not engaged in information seeking in order to perform a work related task?

Drucker (1988) suggested that “Businesses, especially large ones, have little choice but to become information based”, that the conversion from data to information requires knowledge and that organisations will require more specialists (knowledge workers) who may not always be confined to head-quarters, but spread across an organisation and its subsidiaries.

Patrick et al (2006, p.407) suggests that “growth in knowledge work and knowledge workers requires not only the ability to find and access information and knowledge, but also the ability to share this synchronously and asynchronously in terms of both time and location”. The ability to multitask can lead to productivity gains (Aral, Brynjolfsson & Van Alstyne, 2007).

However, it could also be argued that multitasking implies task interruption and resumption, an area discussed in greater depth later. Task interruption is generally considered as impacting worker performance negatively and suggests that workers multitasking between work and non work related activities are not as productive as they could be.

The migration of traditional knowledge management towards web-based knowledge management, whilst “assisting the management of the exponential growth of the web, in relation to the data, information and latent knowledge…” (Patrick et al, 2006, p.418) may also present a challenge to knowledge workers. Knowledge workers with Internet Addiction (IA) or compulsive tendencies often then utilise the same medium to perform work related activities and non-work related activities, making the switch from one activity to another seamless.

According to Davenport & Volpel (2001), the upcoming challenge is ensuring knowledge workers give the attention needed to the information available. Davenport goes on to say that knowledge management, the process of knowledge creation, capture, storage, refinement, distribution, use and monitoring needs to be understood in relation to the process that knowledge workers apply, including providing efficient tools; “A key goal of knowledge managers should be to understand knowledge work
processes and incorporate key knowledge management activities... into these processes”, that “There is only so much employee and managerial attention to go around, and even the highest-value knowledge is of little use unless someone can attend to it” (p. 218). It seems that the role of knowledge management and the tools provided to knowledge workers is likely to influence knowledge worker performance.

2.2 Performance & Productivity

This section explores worker productivity, the challenges faced in measuring productivity and worker performance and what factors may inhibit performance or lead to increased performance and hence greater productivity.

A shift from industrialisation to a knowledge society has resulted in knowledge workers displacing blue-collar workers, the resultant shift has made measuring performance during the creation process difficult and it is only at the completion of the output that the effectiveness and efficiency can often be assessed (Guy & Hitchcock, 2000, p.41).

Furthermore, productivity is usually viewed as the relationship between input variables and output variables, typically in the form of hours put into an activity and resulting number of units produced (Escorpizo, 2008, p. 291). A conceptual link was made in 2000 between increased productivity and increased human performance, together with the with the link between increased human performance and increased physical and emotional ability to work (O'Donnell, 2000, quoted in Escorpizo, p. 292). It seems logical that working whilst ill (presenteeism) is likely to reduce human performance and therefore productivity.

Age is another factor, as employees age, work productivity and output in general decreases, at least for work that requires physical effort. Worker productivity decline and age can be offset through accumulated experience and the individuals' own characteristics, such as self motivation. Decline in productivity can also be a result of employees being outpaced by technological advances (Shephard, 2000). The last point is relevant for this study as worker productivity decline due to age may be confounded with non work related internet activities.

Another factor affecting productivity is individual ability. Studies have demonstrated the differences in task performance between individuals; in some cases individual computer programmers can be up to 10 times faster than the worst performing programmer for a given task (Buzacott, 2000). This discrepancy in task performance
could mask non-work related behaviours in individuals. For example, high performance individuals may conduct more non-work related internet browsing activities than poorer performing individuals, yet their productivity may be higher. Buzacott goes on to say that individual differences are not normally accounted for when measuring overall task performance.

Related to individual ability is the ability of individuals to absorb and utilise new knowledge. Deng, Doll & Cao (2008) explored the absorptive capacity of engineers in an IT environment to adapt to and acquire new analytical skills, computer skills and knowledge, to assimilate and apply them to their work. This scenario is an emergent phenomenon in many knowledge based organisations today. Their hypothesis centred around linking absorptive capacity, and innovation and productivity. Central to their findings was the efficient use of IT systems correlated with increased innovation and productivity.

It could therefore be said that the inefficient use of IT systems would have a negative impact on innovation and productivity. If this is the case; one could argue that those engaged in non-work related internet leisure browsing may have higher IT skill levels and therefore productivity levels may match those who don’t engage in non-work related internet leisure browsing as much, and who may not be as efficient in using IT systems and therefore are less productive per unit of time.

Drucker (1998) suggested then that knowledge workers “cannot be told how to do their work” but rather should be measured on their performance in meeting organisational goals and goals within their specialisation. The challenge of measuring performance is argued by Davenport who suggests that “in the world of knowledge work, evaluating performance is… difficult. How can a manager determine whether enough of a knowledge worker’s brain cells are being devoted to a task?” (Davenport T, 2005, p.48, quoted in Jackson et al, 2007, p.228).

Even so, if productivity of knowledge workers is based on a measure of their performance ratings, then one must question the decoupling taking place between performance rating and merit increases. In a study conducted by Smith & Rupp (2003, p.120), merit increases were not in step with performance ratings given to the knowledge workers amongst those surveyed. The authors go on to conclude that “decoupling of performance ratings and merit increases is a common practice today in modern knowledge-based environments” (p.122).
Despite the challenges, factors influencing knowledge worker performance are becoming understood. Such factors include management, organisation information technology and workplace design (Davenport, Thomas & Cantrell, 2000, p.24). The authors suggest that the level of individual choice and degree of segmentation affect the performance of the knowledge worker. For example, these two factors would have a negative impact if all employees were to have a low individual choice of workstation configuration and had to work in the same identical environment. They conclude that higher degrees of individual choice and degrees of segmentation does payoff in increased performance despite higher management overheads, implying that liberal access to the internet might be more beneficial than strictly enforced access control to the internet. Does the choice of conducting non workplace internet leisure browsing fall into this category as long as worker productivity remains at acceptable levels?

In another study, a counter-intuitive finding highlighted that the elimination of routine communication tends to increase knowledge worker productivity. Pyoria (2005, p. 108) goes on to emphasise that with routine communication overhead reduced, more time is available for collaboration between knowledge workers on problem solving tasks resulting in increased productivity. “… especially in knowledge-intensive organisations cutting the transactions costs involved in all communicative acts is the only way to win more time for collaborative problem solving”. Pyoria specifically states the role of Information Systems / Technology (IS / IT) in reducing routine communication overhead.

Although tenuous, it is worthwhile considering that knowledge workers who are more familiar with the IT systems than their office peers are likely to be more productive than those who are not. Those who are not as proficient have to rely on additional ‘manual’ communication methods for the completion of tasks.

Patrick et al (2006, p.407) suggests that “growth in knowledge work and knowledge workers requires not only the ability to find and access information and knowledge, but also the ability to share this synchronously and asynchronously in terms of both time and location”. The ability to multitask (asynchronously) is a trademark of knowledge workers, a study by Aral et al draws attention to the productivity gains – to a point - through multi-tasking.

Knowledge Worker performance is also shaped by regulation, namely regulation through surveillance and regulation of the self (Jackson, Gharavi & Klobas, 2007, p.
221). The authors suggest that the possibility of being observed as in “the all seeing eye of the ‘panopticon’”, originally conceived for control of prisons, is applicable to knowledge workers as well and have acknowledged the role of technology in managerial and control strategies, “effective use of technology enables and necessitates the deployment of the mechanisms of surveillance techniques for social management, planning and administration” (p.238). Despite the possibility of web based activities being monitored, it appears, through the authors own observations that knowledge workers still resort to non-work related internet activities.

Sousa-Poza & Ziegler (2003) suggested that organisations use long working hours to sort workers into non-productive and productive workers, even going so far as to screen new employees tendencies to work long hours. However, they assert that long hours are not necessarily a predictor of productive workers and found that productive workers who worked long hours tended to do so inefficiently during those hours. Taking that logic one step further, one may question if workers conduct non workplace internet leisure browsing is a sufficient proxy of worker productivity.

This study is not focused on the productivity output as measured by tasks and although this study employs one of the methods mentioned by Ramirez & Nembard, namely interviews and surveys, this study focuses on determining the relative productivity of an individual correlated with time spent on workplace internet leisure browsing and internet addiction scoring.

2.3 Tasks & Task Interruption

The section explores tasks, specifically the impact on task performance caused through task interruptions. Whilst some items in this section would have been suitable in the previous section on Performance and Productivity these items are primarily focused on task interruption. This paper intends to explore the relationship between work productivity, internet addiction and task interruption.

An area this research explores is the role of tasks and the timing of the breaks when it comes to conducting leisure based internet browsing. Li (2003) provides task classifications through the introduction of facets “different aspects, properties or characteristics of a task”, while too numerous to list here the relevant task facet of interest in these studies is the completion of a given task.

An analysis conducted by Aral et al in researching information technology and information worker productivity at an executive recruitment firm, task level evidence
was utilised in their analysis. They concluded:

1. IT use is positively correlated with non linear drivers of productivity
2. the structure and size of workers communication networks are highly correlated with performance
3. an inverted U-shaped relationship exists between multitasking and productivity
4. asynchronous information seeking such as email and database use promotes multitasking while synchronous information seeking over the phone shows a negative correlation.

These findings suggest that whilst multi-tasking increases productivity, a point is reached where further multitasking decreases productivity. This might be a likely scenario where knowledge workers interrupt tasks to conduct non-work related internet leisure browsing, or indeed are interrupted for other reasons. However, the study also hints that networking (amongst colleagues) is important, and in this instance enhances productivity. They also go on to claim that “on average, workers using more asynchronous e-mail and database tools handle substantially more projects simultaneously” (p.28). This supports the assertion by Aral et al (discussed earlier) that multi-tasking is beneficial for productivity. This may suggest that despite knowledge workers spending more time conducting non workplace internet leisure browsing, the time spent on these activities is off-set by the efficient use of IT workplace tools resulting in productivity levels being maintained or even improved.

A factor of knowledge work productivity is tasks; Drucker (1999) suggests that besides determining the nature of the task by answering the question “What is the task?”; by reassigning unproductive “chores” from knowledge workers to lesser paid clerks, productivity is significantly improved.

With the emergence of increasingly efficient tools and knowledge worker ability, productivity ‘inflation’ could be said to be taking place. Are tasks that were once considered “difficult” and are now “easier”, due to be relegated to “lesser paid clerks”? Whilst I do not explore this aspect in this paper, it might be interesting to explore further, especially with respect to workers conducting non workplace internet leisure browsing. For instance, they can afford to do so as their productive output is maintained through increasingly powerful information systems, leaving them more time to indulge themselves. This is purely speculation on the author’s behalf.
An article by Criswell (2008) suggests that turning off emails and checking them periodically (i.e. once in the morning and again in the afternoon) is one strategy of several to reduce task interruptions; the ongoing arrival of emails requires that current tasks are interrupted. Should personal email be relegated to a lower priority where they are delivered less frequently than work based emails?

A recent study on time management suggests that workers will spend more time on interruptions that occur earlier rather than later whilst conducting a given task (i.e. the interruption occurs further away from the deadline) and that tasks that lead to sooner outcomes are prioritised (Konig, Kleinmann, 2007). The authors suggest that time discounting on tasks is occurring and conclude that “because of time discounting, people do not pay as much attention to tasks with a deadline in the distant future or with delayed benefits” (p. 330). This may explain a part of the tendency of employees to conduct non workplace internet leisure browsing.

There are studies that suggest that productivity increases are experienced by employees when teleworking for repetitive tasks (Dubrin, 1991 & Geisler, 1985, quoted by Hunton, 2005). Huntons’ own study suggests that task interruptions were highest amongst home only teleworkers, and that the duration of home teleworkers interruptions were longer than non-home teleworkers (i.e. in satellite offices) and surmise as a result home only teleworkers had the lowest task performance.

It should be highlighted that task interruption is a common occurrence and a part of everyone’s daily life. Real world settings require that tasks are interrupted in order to execute other tasks such as passing on a message to a work colleague who has just returned from lunch, however delays also occur in executing these tasks (the colleague is conversing with somebody else). An experiment by McDaniel, Einstein & Rall (2004) explored delayed execute prospective memory tasks, as such task interruptions are known, they concluded that further interruptions significantly reduced the rate of execution of the delayed tasks. Similar phenomena are reported elsewhere in this literature review.

A review of collaborative knowledge work environments by Heerwagen, Kampschroer, Powell & Loftness (2004) summarise succinctly what knowledge workers do and react to, such as initiating or responding to task interruptions:

- They have small blocks of uninterrupted time interrupted by frequent brief conversations; for example, uninterrupted duration for software developers
averaged approximately 10 minutes (quoting Reder & Schwab, 1990), and similarly for software engineers the uninterrupted duration was approximately 30 minutes (quoting Perlow, 1999)

- Task switching is common and in most instances is a result of interruptions from ongoing work
- Interactive time is mostly spent face to face
- Face to face interaction at work is mostly opportunistic and not planned
- Many workers prefer paper documents over electronic documents
- Interactive activities with colleagues drop off significantly if they are seated more than 30m away

A study on task interruption, task complexity and decision making performance concluded that for complex symbolic tasks, decision making performance declines, whilst for simpler symbolic tasks requiring less intellective input, even though the difference was not great, decision making performance improved and occurred in a short time frame (Speier, Vessey & Valacich, 2003). One might consider that in complex knowledge worker environments decision making accuracy is likely to decrease when knowledge workers experience task interruptions, knowledge workers multi-tasking and conducting non work place internet leisure browsers may then exhibit decreased decision making accuracy.

A research paper measuring the effects of interruption on task performance and error rate by comparing task interruptions between and during activities, Bailey & Konstan (2006) concluded that primary tasks were performed slower when interrupted, with time degrading with increasing task difficulty (suggesting more time by the user is required to re-orient onto the primary task). Peripheral tasks presented between primary tasks resulted in no degradation of primary task completion time, interestingly; peripheral tasks were completed about 15% faster when interrupting primary tasks. The authors suggest that the user has increased motivation to return to the primary task. Error rates for users whose primary task was interrupted showed an overall increase in errors in comparison with users who conducted peripheral tasks between primary tasks. This is important and task interruption in relation to workplace productivity and internet addiction scores will be explored in this research.

The authors also concluded that users, whether or not peripheral task interruptions occur during or between primary tasks, demonstrated increased annoyance levels
However anxiety levels increased more when interruptions occurred during primary tasks as opposed to in-between them. This suggests that those who are, or who choose to interrupt their primary tasks to conduct non-work related internet leisure browsing more than others are likely to exhibit increased annoyance traits, such as those measured by the IAT.

In another study by Eyrolle & Cellier (2000) conducted in a laboratory and field setting measuring the effects of interruptions in the workplace concluded that organisations need to take into account the consequence of interruptions, namely lower performance, increased errors and stress. They propose that task difficulty and task familiarity also influence the overall performance, error rate and stress levels; high task difficulty is associated with increased error rates and stress levels and decreased performance with interruptions. Increased task familiarity mitigate against the negative effects of task interruptions.

The relationship between communication delays and task interruptions is explored by Rennecker & Godwin (2005). They also explore the nature of the communication with respect to task interruption (i.e. email is dealt with as it arrives being synchronous and email dealt with later as being asynchronous). Their study is interesting as it also explored the nature of the relationship between the sender and receiver, the nature of the task interruption and who is the benefactor between the sender and receiver. They conclude that “communication technology use may not result in either more or less organised work overall but, rather, may simply shift the locus of control over the flow of work”.

Given the importance and increasing volume of email, for both business and personal use, email management strategies are a focus of research. An explorative study was conducted to determine the strategies used by people to manage email interruptions by Russell, Purvis & Banks (2007). Some of their findings suggest a close relationship to this research paper’s topic and could also be applicable to non-work related email, and other applications with similar interruption modes, for example; Instant Messaging (IM). Email interruptions are generally not enforced interruptions and the recipient can often choose to either interrupt their primary task to attend to the email, or choose not to. The study also noted that 68% of email sent was not job related, that 70% setup their computer to alert them to newly arrived email, and most (64%) continually check their email or attend to their email when alerted. However, the nature of the email or the
current task determined whether they responded to the email immediately or not. Deadlines and task difficulties resulted in fewer emails being attended to immediately. If the same approach is adopted for responding to IM and message updates, for example, on social networking sites (i.e. Facebook) then task interruption (and possibly increased switching from primary to secondary tasks) is likely to occur frequently with detrimental effect on work performance.

In support of the previous study, Zeldes, Sward & Loucheim (2007) suggest that many knowledge workers suffer from information overload or Attention Deficit Trait (ADT), resulting in reduced productivity. Results of their study with Intel indicated that “Intel employees spend an average of some three hours per day processing email”, and those interruptions, on average occur every 11 minutes, and the time to return to an interrupted task is 25 minutes. Email management is another factor, on average taking up 20 hours per week. As suggested by Russell et al, choosing to interrupt the current task to attend to emails is a decision the recipient makes, however, Zeldes et al highlight that within the workplace there is an expectation that messages are dealt with promptly. This expectation carries over for personal and social messages, although not explored in this paper; this would be an interesting topic to explore further.

What is the outcome when interruptions are not permitted? A focus group study of 11 library staff on the benefits of dedicated self directed professional time (SDPT); described as quiet time to work on work related activities with no interruptions permitted was conducted by Sheridan (2009). She found that most staff commented on the advantage of the quiet time (3 hour session, 4 sessions every 6 months). However some staff still found it very difficult not to respond to telephone calls or check for emails. This difficulty experienced by some of the staff members may indicate compulsive disorder tendency that are perhaps not so different from the compulsive tendencies experienced by those with high IAT scores. An interesting outcome was that some staff found it difficult to define tasks appropriate for the 3 hours of allocated, uninterrupted time.

The workplace environment influences knowledge worker behaviour, current open plan offices make it easy to observe others at their computers, yet if the trend back towards more personal private spaces continues, knowledge workers will no longer have to take into consideration passing colleagues observing their computer habits (and non work related internet browsing activities). A study of the contrasting requirement
of concentration and collaboration in the workplace at a given time was carried out by Roper & Juneja (2008). They explored the extent and scope of existing literature on the type of distractions studied, they concluded that strong consideration should be given in designing workplaces for knowledge workers, and that the cost of negative performance be included in the material and construction costs. They provided examples of companies such as Google & Microsoft reversing the trend of open plan offices and moving back to conventional enclosed spaces. One wonders with the move towards more privacy in the workplace what effect this would have on Internet Abuse, especially when colleagues can not longer easily peer over your shoulder and observe what work is being conducted.

Another study of the effect of email interruptions conducted by Jackson, Dawson & Wilson (2003) found that employees reacted to 70% of emails within 6 seconds; most employees had their mail client configured to check for new email every 5 minutes. Employees took on average just over a minute to resume at their work rate at the pre interruption rate. To ensure that the employee’s activities were normal the remote screen monitoring was conducted without the employee being aware such monitoring was taking place. Methods of email access varied, resulting in varied access times. They concluded that email work interruption compares well with studies conducted by DeMarco & Lister (1999) on telephone call interruptions. The authors also suggested several ‘good practice’ approaches to reducing the impact of email interruptions on employees, i.e. changing the setting on the mail client to check for new email less frequently.

Leroy (2009) explored the impact on task performance of cognitive attention residue carried over from a previous task to a newly engaged task. Leroy provides the following description of attention residue: “When people experience attention residue, part of their attention is focused on a prior task, and, as a result, their attentional focus and psychological presence are likely to be reduced.” (p. 169). Task completion and time pressure on tasks and task switching formed part of the study. Leroy concluded that the act of transitioning between tasks impacts successive tasks, incomplete tasks and time pressure (i.e. having finished a task under low time pressure) decreases successive task performance. It is suggested completing tasks under low as opposed to high time pressure make task transitioning more difficult as the attention residue is more pronounced.
An earlier study into attention residue supports Leroy’s assertion, referred to as ‘resumption lag’ - the time to revert to a previous action of a primary task after completing a secondary task after an interruption - Altmann & Trafton (2003) study indicates resumption lag being approximately twice as long as the time it took to complete a series of actions within a given task frame (inter action interval) – 3.8 seconds against 1.9 seconds. They also tested the effect that visible cues had on the resumption of tasks and concluded cues were beneficial (i.e. the resumption lag was reduced). Whilst this study focused on a quick succession of actions and intermittent interruptions at time intervals measured in tens of seconds, it does indicate that the total time wasted can accumulate and that this can be reduced by introducing visual cues, such as computer interface designs.

In organisations such interface designs offering cues could lead to reduced resumption lag as workers multi-task and conduct work and non-work related activities and therefore mitigating the effects of time wastage and reduced work performance.

When are opportune moments for interruption? In today’s workplace interruption sources are ongoing and occur from various sources such as telephone calls, emails, instant messages and colleagues walking over to ask a question.

Research conducted by Iqbal & Bailey (2005) tested opportune moments for task interruption that minimised resumption lag and annoyance. The authors concluded that interruptions are less disruptive during low workload moments versus high workload moments and that secondary task interruption timing relative to the primary task was as important, and finally, “Mental workload is an effective predictor of opportune moments for interruption” (p. 1492). They suggest that for critical tasks or a more pleasing office experience task interruption timing could be achieved through systems that monitor eye-movement (eye and pupil trackers) and time interruptions appropriately (i.e. the timing of email notifications). This paper explores the habits of internet users by asking respondents when they chose to conduct non-work related internet leisure browsing (during or between primary tasks).

2.4 Internet Addiction & Abuse

This section provides insight into internet abuse and other deviant forms of internet use, and explores the various research methods and the efficacy of such tools in determining internet addiction levels and traits. Young’s internet addiction test is one of the tools deployed in this papers research.
As far back as 1996, evidence of users being addicted to internet use emerged. The IAT is a test developed by Young that “measures the presence and severity of Internet dependency among adults”.

There is considerable debate on whether Internet Addiction merits its own psychiatric classification and some who suggest that individuals have problematic internet use in relation to specific online activities (Yellowlees P, Marks S, 2005). Yellowlees et al suggest the evidence is in favour of the latter. They conclude of those who develop problematic behaviour, they “are probably premorbidly vulnerable people who often have a history of impulse control and addictive disorders… whose abnormal behaviour is a response to specific online content and activities”.

Young (1998) was one of the first to identify the emergence of internet addiction, she conducted a study utilising an adapted criteria of tests used for assessing pathological gambling. The results of a comparative study between a control group and internet users suggested “significant behavioural and functional usage differences between the two groups” (p. 237).

However, other researchers tend not to consider internet addiction as a basis for deviant internet use whilst at work. Blanchard & Henle (2008) suggest that there are different classes of cyberloafing; principally minor and serious cyberloafing, for example, personal email and online gambling respectively. In their research they hypothesised that co-worker and supervisor norms regarding cyberloafing influenced their minor cyberloafing habits, but not serious cyberloafing habits, furthermore they hypothesised that those with strong external locus of control (specifically the belief in chance) exhibited greater cyberloafing tendencies, (both minor and serious).

Their research supported their hypothesis. The authors go on to warn that the typology of cyberloafing behaviour is evolving rapidly along with technology and associated normative behaviours too. Employees view minor cyberloafing as non deviant and suggest that attempts at introducing policies to manage cyberloafing should “focus on changing employees’ perceptions that checking email and surfing mainstream web sites are appropriate behaviour while at work” (p. 1080) – using email and surfing as examples as they are the predominant forms of cyberloafing.

Despite this, internet addiction is considered serious enough to warrant treatment. A recent news article reported on the death of a 16 year old whilst he was receiving treatment for “Internet Addiction”, this incident occurred in a Chinese clinic and
highlights the severity and seriousness in which “Internet Addiction” is viewed and taken in China. The article goes on to say that many such clinics have become prolific around China. Just a month before it was reported that another clinic in China was ordered to stop using electroshock treatment on patients being treated for internet addiction as it was considered “inappropriate” (Canaves & Ye, 2009).

A survey conducted amongst university students found that 50% of the respondents cited internet overuse as a reason for family conflicts. The results of the study indicated that increasing internet overuse (i.e. staying online for several hours) negatively affected learning, work and family duties. Kwiatkowska, Ziolko, Krysta & Muc-Wierzgon (2007) suggested that internet in excess of 5 hours a day “may be followed by an increased risk of addiction”.

One of the challenges in determining levels of internet addiction is that the surveys tend to be self report surveys and adapted from other related but not connected conditions (i.e. addiction to gambling). The Chen Internet Addiction Scale (CIAS) is used to diagnose internet addiction amongst adolescents; it is a 26 item self-report measure with good reliability and validity (Ko, Yen JY, Yen CF, Chen CC, Yen CN & Chen SH, 2005). The authors suggest that in contrast to Young’s IAT, the CIAS is able to provide important diagnostic profiles such as sensitivity and specificity mainly because the IAT uses a “cut-off point modified from the diagnostic criteria of pathologic gambling in DSM-IV” whereas the CIAS has reliable cut-off points “consolidated by psychiatrists’ diagnostic interview”.

Much like CIAS, the Compulsive Internet Use Scale (CIUS) was developed to assess the severity of compulsive Internet use (also referred to as Internet Addiction) and is believed to be a better tool than Young’s Internet Addiction Test (IAT) (Meerkerk, Van Den Eijnden, Vermulst & Garretsen, 2009). Meerkerk et al suggest that “one is not addicted to the Internet itself but rather to certain online activities, resulting in compulsive Internet use”.

A subsequent study to determine the optimal cut-off point for CIAS among college students was conducted by Ko C, Yen JY, Chen SH, Yang MJ, Lin HC & Yen CF (2009). The results of the study indicated that 43.1% (n=216) of the respondents were classified as belonging to the addictive group. The study also highlighted general characteristics of those belonging to the addictive group, for example (in relation to this specific study); they are likely to be male, and have a higher frequency of internet and...
online games use than the others.

Similarly, a study to determine risk factors amongst university freshmen at a Taiwanese university related to personality traits, mental health and internet addiction, concluded that the IA prevalence varies depending on the population group (in comparison to an Italian and separate Indian study), more likely to be associated with male gender, minor mental health morbidity, skipping breakfast, poor social support functions and neurotic personality characteristics (Tsai HF, Cheng, SH, Yeh TL, Shih CC, Chen KC, Uang YC, Yang YK, 2009).

An empirical study by Chen J, Chen C & Yang (2008) suggests that a person’s orientation towards an external or internal locus of control is an important predictive variable; i.e. their research results showed a positive relation between those with strong external locus of control and internet addiction, as opposed to those who were found to have a strong internal locus of control. They also concluded that there is a negative correlation between self-esteem and internet addiction, and also a positive correlation between internet addiction and resultant internet abuse. They also suggest that “companies aiming to lower internet addiction behaviour should not only address policies and technical aspects of the work environment, but also should see if it is possible to hire employees with the personality traits of internal local control…” (p. 101). These findings are also supported by Blanchard et al discussed earlier in this section, at least in respect to those with strong external locus of control.

Anandarajan (2002) in an article on Internet Abuse puts forward the question of “where is the line drawn between non-productive surfing and experimentation with new technology?” Experimentation can lead to learning that has value to the organisation. Anandarajan goes on to discuss internet abuse from a social contract position; that the employer / employee relationship is changing as the work environment becomes increasingly abstract. This results in social contracts becoming less clear with a corresponding increase in unmet expectations (due to the increasing complexity of social contracts) resulting in negative outcomes and lower productivity.

It is generally believed that young people are increasingly constituting the majority of internet users and as the number of internet users increases (through fixed lines and increasingly through mobile phone) the impact of internet addiction or a lesser form of IA (such as cyberloafing) are likely to have a significant impact on peoples lives.
2.5 Acceptable Use Policies

This section explores the role of IT Systems; both as a tool to monitor and control internet access and as a tool increasingly required by knowledge workers to perform their jobs but also as tools to conduct non workplace internet leisure browsing, sometimes referred to as ‘misuse’ of IT systems.

Weatherbee (2009) cites several examples of Information and Communication Technology (ICT) misuse in the workplace, noting that the misuse trend is upwards and that there is substantial evidence that the misuse of ICT systems are costly to organisations. Examples mentioned by Weatherbee include “disciplinary actions, terminations, or loss of employees, breaches of corporate confidentiality and reputation loss, or personal privacy, personal and organizational liability and the associated legal costs”, and loss of productivity. Weatherbee outlines four forms of cyberdeviance; Production Deviance (i.e. personal emails, online banking), Property Deviance (i.e. software piracy, pornography and online gambling), Personal Aggression (E-Harassment, Identity theft) and Political Deviance (E-politics, blame shifting and selective information). Weatherbee concludes that ICT access at work and at home will present opportunities to continue activities that are counter productive to the organisation.

This study does not include cyberdeviancy but it is worth noting that there are other forms of productivity loss other than non work related internet leisure browsing.

Ojedokun (2005) provides a succinct summary of types of internet abuses, such as Privacy Infringement and Dysfunctional e-Behaviour. Ojedokun specifically focuses on how the Internet is used as a tool for abuse, such as email scams originating from Nigeria. Ojedokun goes onto suggest that international laws should “incorporate measures that would prevent internet abuses”. This example nicely illustrates the difference between internet abuse and internet addiction. Internet abuse is not explored in this research.

Social Networking Web sites (SNW) are “not only for leisure and personal socialization but also serve as a platform for meaningful and serious deliberation”. This is the conclusion of a study conducted among Indian university students (Agarwal, Mital, 2009, p.107). The authors suggest that in an ever increasing complex global market (and culturally diverse) the use of SNW is applicable to “virtual organizations working with Indian partners”. Roberts & Roach (2009) suggest the growing
importance of SNW and social networking, and the increasing role SNW play in business networking and recruitment.

Email is another internet application that is becoming pervasive in our everyday life to the point that it is for some one of the first activities performed after getting up in the morning (Cheng, 2009).

A report released earlier this year highlights the recent trend in Smartphone sales. It has been reported that in Quarter 2 of 2009, over 40 million Smartphones were sold worldwide (Forseman, 2009). These new breed of Smartphones are used to access the internet; Apple actively markets the iPhone’s internet capability. Through the use of mobile phones and laptops, access to the internet is becoming available anytime and anywhere, for both leisure and business use. Another aspect of Smartphones is their ability to completely bypass (discreetly if needed) corporate firewalls for users who wish to access sites prohibited by corporate firewalls or circumvent AUPs. It might be suggested that users who exhibit internet addiction traits will find Smartphones appealing, or that the increasing ease in which to connect to the internet may lead to increased IA users.

Acceptable Use Policies (AUP) should be implemented by all organisations, including being written into employment contracts says Corbitt (2005) and that only in exceptional circumstances should covert surveillance and monitoring take place. Employers often conduct personal chores over lunch breaks, such as email and banking, and are entitled to expect that their personal lives remain private.

Acceptable Use Policies (AUP) are an effective tool within organisations, especially when organisations specify possible sanctions to employees, implement methods of detection or monitoring and the policies are actively enforced (Ugrin J & Pearson J, 2008, pp. 29). There is a possibility of reduced workplace satisfaction and trust when introducing AUPs, especially as employees may conduct short personal tasks on the Internet that would have otherwise been an acceptable form of some other non-work related activity (Urbaczewski and Jessup, 2002, quoted by Ugrin et al, 2008).

A study to investigate the outcome of electronic monitoring (EM) on students in the classroom was conducted by Ubazewki & Jessup (2002). Their test was designed to either provide feedback (monitoring for feedback), or provide control (monitoring for control). They found that the group being monitored for control had higher task focus but lower overall satisfaction; whilst those groups receiving feedback had lower task
focus but higher overall satisfaction. Both groups were aware of the internet use monitoring taking place. They conclude the EM is a double edged sword; improvement in productivity by control through monitoring is likely to be offset by lower overall satisfaction. They also found that high performance individuals were less affected by monitoring than lower performance individuals and benefited more from feedback whereas lower performing individuals benefitted more from control through monitoring.

Genova (2009) explores the rights of employees to conduct lawful activities online, specifically within or at online social networking sites (OSNs) and with a view to the expectation to privacy, and suggests that employers should refrain from using OSNs as a source of information on which to base work related decisions on.

Further studies were conducted to determine the perceptions of employees to behavioural restrictions and behavioural monitoring. Cohen & Cohen (2007) explored the types of monitoring and restrictions within the workplace that take place today, such as GPS tracking, weight restrictions, grooming, smoking, email and internet usage. They also pointed out that advancements in technology made monitoring easier and more widespread, possibly transgressing employee rights. They concluded that, with respect to monitoring in general, "Key to acceptance for a number of these policies included how the policy was communicated, how the policy was implemented, and the legitimate interests of the employer in the behaviour in question", and that employees need to be made aware in advance of monitoring taking place, and a rational and reasonable explanation is provided, including not infringing on employee privacy rights.

What about the law and work place monitoring? A discussion by Nord, McCubbins, Nord (2006) conclude that employees, who are the users of the employers equipment and services, and who should be conducting legitimate business have very little protection, at least under state and federal laws in the US, against monitoring and recording of computer, internet, email and telephone activities, despite employees expectations of privacy. Nord et al provide a brief summary of the types of computer monitoring software on the market, in many cases employees are not aware that such software is running on their computer, and even if they were, are often powerless in turning off such software.

The EU has passed a directive to provide privacy rights and protection to individuals;
an example of its implementation is the UK Data Protection Act which offers clear guidelines and expectations recording work place monitoring.

What might this mean for employees of South African organisations, despite being aware of being monitored, are employee understandings of their privacy rights influencing their behaviour regarding workplace internet leisure browsing?

The relationship between fear of punishment (FOP) and workplace internet deviance (WID) as explored by de Lara (2006), including the mediating effect of perceived fairness or unfairness of the supervisor; the findings indicated a positive relationship between FOP and WID. deLara does not fully explain why there is a positive relationship (and suggests this as a possible future research interest), but goes on to suggest organisations should employ FOP as a last resort due to FOP’s usefulness as a coercion tool against cyberloafing (p. 587). A similar recommendation is made by Pee, Woon & Kankanhalli discussed later in this section.

Employee organisational trust was assessed in relation to electronic internet monitoring. Alder, Noel & Ambrose (2006) tested the impact of perceived organisational support (POS), advanced notification and justification for the implementation of monitoring, against the trust levels of employees. In all cases, advanced notification results were positively correlated with trust, as was the case for POS, however, providing justification for monitoring did not seem to influence organisational trust post implementation. The authors pointed out that employee trust and electronic monitoring of internet use is not always straightforward and is often blurred.

“who use the Internet for legitimate business reasons may use search engines and do a considerable amount of surfing with the intent of finding information relevant to their task. In the process, the worker may “call” up a number of web sites with little or no relevance to the problem at hand. As a result, the line between personal and business activity may be blurred for Internet monitoring”

The author suggests that employees may from time to time become side-tracked during the course of legitimate information search and conduct non-work related browsing (i.e. reading interesting articles not relevant to the primary task).

Another study conducted by de Lara, Tacoronte & Ting Ding (2006) explore the relationships between perceived organisational control (POC), fear of formal punishment (FFP) and leader physical proximity (LPP). Their findings suggest that
POC and LPP are positively correlated with reduced non-work related internet activities whilst FFP was negatively correlated (increased FFP resulted in increased non-work related activities). They suggest that punishment should be a last resort measure with an emphasis on POC and LPP. Emphasising POC could, for example be achieved through improved monitoring and control mechanisms. The authors show that POC is related to LPP and suggest that “LPP of supervisors makes a real contribution to the control of cyberloafing, but through perceived control, and not directly” (p.460). This last point suggests that a purely mechanistic approach to dealing with non work related internet activities may not be sufficient.

A longitudinal study conducted by Daune & Finnegan (2004) across four companies found that the approach followed in providing employees with email access was often inconsistent. Policies were often inconsistent and contradictory, especially in dealing with personal email communication and monitoring, and not updated along with changes to email use and monitoring tools. Acceptable use policies did not reflect normative use and companies failed to provide training on the proper and acceptable use of emails within the organisation. With little or no training and inconsistent policies (including disciplinary procedures) they suggest disciplining employees is questionable.

Stanton (2002) profiled company employees and compared those who considered themselves frequent internet users and those who did not; this comparison was conducted along several dimensions that included variables such as job satisfaction, satisfaction with manager, co-workers etc. The results indicated a higher level of satisfaction amongst frequent internet users despite there being no statistical variance in salary, promotion opportunities etc between the two groups. The author goes on to suggest that possible reasons for this might be; frequent users may possibly have higher productivity levels than those who use the internet less, they may identify more closely with the organisational goals, or they may consider internet access a prerequisite of the job as they might consider chatting to colleagues around the water dispenser or running errands at lunch.

It is suggested by Alder (2001) that the culture of an organisation is a determinant of the sort of electronic monitoring systems to employ and policies to implement. Alder identified three organisational traits deemed relevant based on Wallach (1993) work, Bureaucratic cultures, innovative cultures and supportive cultures. Alder proposes each
type will respond to EMS and suggested a number of propositions to be tested. The author suggests that bureaucratic organisations would respond most favourably to being monitored, whilst innovative and supportive organisations less so, and that restricting monitoring to performance related activities and involving employees in the design of the monitoring system improves attitudes towards monitoring systems in supportive cultures.

A study comparing the relevance of Triandis’ theory of interpersonal behaviour (TIB, analysing habit, intention and facilitating conditions) and the theory of planned behaviour (TPB; analysing attitude, subjective norm, perceived behavioural control) in assessing non-work related computing (NWRC) conducted by Pee, Woon & Kankanahalli (2008) found that whilst both were relevant, TIB was a better predictor than TPB for NWRC activities and that several indicators had significant correlations. Importantly they suggested that organisations should take steps to “prevent NWRC behaviour from becoming habitual by reducing the opportunity of employees abusing their Internet access” (pp. 127). They also concluded that: the “existence of productivity measurement had significant negative impact on employees’ NWRC behaviour”, that “warnings or reprimands were significant deterrents against NWRC” and should be backed up with warnings and those organisations “enforce these disciplinary actions in a consistent manner.” (p. 127). Organisations should provide a clear message to new employees and attempt to reduce the intention to conduct NWRC from the start.

2.6 Measuring work performance - Self Report Measures

There are a number of knowledge worker productivity measurement methods and dimensions, many summarised in Ramirez & Nembard’s 2004 paper comparing 21 measurement methods. They conclude “there is agreement that no generalised methods exist to measure knowledge worker productivity efficiently, partly because knowledge work is intangible and difficult to categorize in sub-groups”, they go on to note “that there is a general belief that the knowledge worker should be included in the efforts of deciding how to measure their productivity” (p.625).

One recent comparative analysis highlighted the limitations of self-reporting performance measures versus objective measures of work performance (Pransky et al, 2006). Whilst the study concentrated on medical bill auditors in a specific company where work performance could be accurately assessed, the study does indicate that one
should be weary of self report surveys. However, the same authors go on to say that “each appear to be measuring different aspects of work performance.”, and conclude “that both types of measures may be necessary”.

A review of the methods available to determine health-related productivity loss in the workplace concluded that (of the instruments reviewed, including the Endicott Work Productivity Scale) “the biggest gap remains the lack of an established and validated method to derive monetary estimates of the cost of lost productivity” (Mattke, Balakrishnan, Bergamo, Newberry, 2007). Furthermore, they state that this is particularly difficult to establish especially with knowledge workers and that measuring presenteeism is more difficult than measuring absenteeism.

Preliminary research by Coker (2009) suggests there are employee productivity gains despite internet use for personal activities. However, there appears to be a correlation between those who scored highly on the IAT test (i.e. are considered to show excessive compulsion towards internet use) and those who exhibited declines in productivity.

Dr Jean Endicott, the author of the EWPS describes the scale as “a brief self-report questionnaire designed to enable investigators to obtain a sensitive measure of work productivity”, and that “the total score is based on the degree to which behaviours and subjective feelings or attitudes [that] are likely to reduce productivity and efficiency in work activities” (1997).

2.7 Conclusion

The term “Knowledge Workers” was explored, descriptions of the sort of roles they play in business today was covered. Knowledge workers typically have a high level of education and experience and are required to manipulate data into information for the organisation and act on it (Drucker, 2005). Knowledge workers also participate in social networks and often step outside traditional hierarchical boundaries of traditional organisations to get their work done (Scott, 2005), business today has little choice but to become information based (Drucker, 1998). The migration to web based knowledge management (Patrick, 2006) suggests that the very tools that are used to be productive are the same used for work based internet (web) leisure browsing. Multi-tasking as an attribute required by knowledge workers was explored including both the benefits of multitasking in enhancing productivity but also the downside of multi-tasking leading to reduced productivity (Aral et al, 2007).

Knowledge Worker productivity was then addressed, identifying the challenges
organisations face in measuring productivity. This challenge came about as a shift away from hours and units produced in manufacturing (Escorpizo, 2008) to being measured by workers’ performance in meeting organisational goals (Drucker, 1998). However, the challenge of measuring performance of knowledge workers remains, and is still very difficult to measure accurately (Davenport, 2005). Attention to knowledge worker performance and the link to increased productivity was discussed (Escorpizo, 1998) and that presenteeism would likely reduce human performance and therefore productivity. Aspects of the work environment and its impact on performance were addressed as the levels of individual choice and degree of segmentation impact the performance of knowledge workers (Davenport, Thomas & Cantrell, 2000). The implication is liberal access to the internet (through higher degrees of freedom) might be beneficial to the organisation despite increased management overhead. The role of IT in eliminating routine communication leading to increased knowledge worker productivity was highlighted (Pyoria, 2005). Knowledge worker performance and its relationship to being monitored was also covered (Jackson et al., 2007). The age of individuals (Shepard, 2000) and their relative productivity levels in comparison to younger workers was discussed, whilst probably more relevant to work requiring physical ability it was suggested that experience however offsets decline in productivity brought on by decline in cognitive and physical abilities. Individuals’ ability and capacity to absorb and act on new knowledge can vary between individuals (Buzacott, 2000, and Deng et al., 2008), sometimes by as much as 10 times in terms of productivity output as mentioned in the computer programmers’ instance. Working hours and its use as a proxy of productivity levels was discussed; the main implication is that highly productive employees may have long hours of inefficient work just so that they are meeting the normative views of the expected working hours of work (Sousa-Poza et al., 2003). The efficient use of IT systems was discussed; efficient use leads to increased innovation and productivity (Deng et al., 2008).

Several facets of tasks and multi-tasking were discussed, specifically with a view on the impact on performance; multi-tasking increased productivity, to a point, and IT enhances knowledge workers’ ability to multi-task (Aral et al., 2007), however others suggested that multi-tasking decreased overall performance. I suggested that productivity inflation may be taking place where highly skilled knowledge workers are performing jobs that can be outsourced to office clerks and administrative personnel. The impact of task interruption on performance, accuracy, decision making and
annoyance level was addressed (Li, 2003, Bailey et al, 2006, and Speier et al, 2003); generally task interruption leads to reduced performance, increased error rates, poorer decision making and increased annoyance factors. Email and the impact of email on task interruption were explored in greater detail, given its prominence in today's workplace (Russell et al, 2007). Some authors suggest that email clients should be configured to check for email less regularly than currently is the norm, lowering the level of task interruption (Jackson et al, 2003). Studies indicated that a high volume of emails are not job related, however individuals often adapted their strategy in responding to emails depending on their workload at the time. Studies also show that knowledge workers suffer from information overload and spend a considerable amount of time per day attending to emails (Zeldes et al, 2007)). The phenomena of attention residue and resumption lag were explored (Altmann et al, 2003, and Leroy, 2009); workers returning to a task or moving onto the next task may still be cognitively engaged in the previous task thus impacting performance negatively. Studies have indicated that there are opportune moments to interrupt tasks, typically at task or action boundaries and that technology such as eye cameras could monitor individuals and trigger and pending email notification at such a task boundary (Iqbal et al, 2005).

Internet Addiction and the impact on family, work and academic pursuits was discussed. Despite debate regarding whether a person is addicted to the internet, or has compulsive tendencies to use specific internet based applications (Yellowlees, Marks, 2005), there is broad agreement that those ‘addicted’ often have associated co-morbidity conditions (Yellowlees et al, 2005, Young, 1998). Several measurement scales were described; the IAT being one measure to be used in this research. Anandarajan (2002) suggested that experimentation with new technology enhances learning and has value to the organisation.

It was suggested that the fair enforcement of Acceptable Use Polices in organisations was required (Ugrin et al, 2008), however, there is a risk of reduced workplace satisfaction when introducing AUPs that inhibit employee activities that otherwise would have been an acceptable form of some other non-work related activity (Urbaczewski and Jessup, 2002, quoted by Ugrin et al, 2008). This view further complicates the measurement of workplace internet leisure browsing activities and knowledge worker productivity.

IT systems misuse is costly to organisations but are also used in various forms of cyber-
deviance (Weatherbee, 2009). Internet applications and the role played in organisations, (Agaral et al, 2009) suggest for example that social networking sites are beneficial to work too. This is asserted by Roberts & Roach (2009), further blurring activities of workplace internet leisure browsing and work related activities.

Fear of punishment and workplace internet deviance was covered (de Lara, 2006) who suggested that FOP should be deployed by organisations as a last resort. Employee trust and the impact of electronic monitoring was discussed (Alder et al, 2006), perceived organisation support, advanced notification (to employees) and justification were positively correlated with higher levels of employee trust. Perceived organisation control, fear of formal punishment and leader physical proximity was the focus of a study by de Lara et al (2006) – they suggested that LPP influences cyberloafing and that POC should be through indirect means and not direct means. The culture of an organisation was also discussed (Alder, 2001), and this culture needs to be taken into account when formulating acceptable use policies.

Limitations on reporting of tasks and activities was conducted, the observational measures deviate from the self report measures supposedly for the same tasks (Pransky et al, 2006). This highlights the difficulty of determining accurate performance levels in a study never mind in a normal work environment.

The section concludes with preliminary results of Coker’s (2009) research and the use of Young’s IAT and Endicott’s EWPS.
3 RESEARCH METHODOLOGY

This section expands on the research approach and strategy, the design and data collection methods, followed by research instruments to be used, and sampling technique and overall research criteria. The section concludes with the data analysis methods to be used and limitations of the study.

3.1 Research Approach and Strategy

A quantitative approach has been selected for this study; information will be collected by web based self report surveys. The survey is based largely on existing literature and recent studies in the area of workplace internet leisure browsing (Coker, 2009), workplace productivity and internet addiction, therefore a deductive strategy is being followed on the premise of this existing research.

No preliminary surveys are planned for this research as most variables used are based on established instruments.

With respect to the epistemological orientation, a natural science model is incorporated, specifically with respect to positivism.

Whilst the quantitative nature of the study suggests that the ontological orientation should largely be defined by objective reality (Bryman & Bell, 2003. p. 28), much of this study focuses on social phenomena and categories that are not independent from actors suggesting constructionism plays a more significant role.

Finally, the purpose or output of this study could be used to formulate approaches by organisations in assessing and managing workplace internet leisure browsing that provides a balance between maintaining its benefits and addressing instances of excessive use.

3.2 Research Design

Several research designs were considered as possible candidates, such as cross-sectional, longitudinal, case study and comparative design. The cross-sectional design was selected as the most appropriate as much of the review literature comprised of cross-sectional design, however, there were also studies that employed experimental designs. More specifically, survey research better describes the research design. “Survey research comprises a cross sectional design in relation to which data is collected predominantly by questionnaire or by structured interview on more than one
case… and at a single point in time…” (Bryman et al, 2003).

3.3 Data Collection

Data collection will be conducted via self-complete questionnaires administered only online, no postal questionnaires will be used.

The following is the URL location through which the survey can be accessed: (http://www.uctmba.dyndns.biz/survey/index.php?sid=59686&lang=en). Prospective respondents will be invited via email to visit the survey website where the questionnaire will be available for completion. There are no practical limits imposed by the software that limits the number of questions or participants. The survey tools are also very flexible, provide many template and question types, question piping and several export features for popular statistical packages such as SPSS and R, CSV data exports are also available for importing into Excel.

The tool used to administer the survey comprises of Open Source software available from http://www.limesurvey.org, the version used for this research is 1.85+. From the perspective of the respondents some useful features are available, they are not required to register, they are able to save an incomplete questionnaire and return to complete the questionnaire later (this will require registration) and the ability to print out the questionnaire for off-line reading or completion.

Two notable sampling limitations regarding on-line surveys are that “internet users are a biased sample of the population”, and “few sampling frames exist of the general online population” (Bryman et al, 2003). However, these may not be limitations in this study as the sample frame is intended to be internet users.

3.4 Research Instruments

The survey questionnaire is a composite of several instruments, two of which have been used extensively in numerous other studies (IAT and EWPS). It is anticipated that the survey will require 20 minutes to complete online. The instruments are described in the following sections.

3.4.1 Email Invites

The initial sample frame will comprise all MBA (modular and full-time) and Executive MBA students currently enrolled at the University of Cape Town’s Graduate School of Business.
Invitations will be sent out to respondents inviting them to complete an online survey at the following URL:

The covering email will also:

- describe the purpose of the survey, time expected to complete the survey and assurance of confidentiality
- encourage respondents to complete the survey by offering to enter them into a draw with the chance of winning a gift voucher redeemable at http://www.kalahari.net (respondents will be required to enter their email address in the survey to be eligible for entry into the draw)
- encourage respondents to invite peers to participate in the survey (respondents will be entered into a second draw). Respondents will have the option of forwarding the email or entering up to 5 email addresses in the online survey.

3.4.2 Online survey questions

The following sections outline the research instruments employed in the online survey.

3.4.2.1 Demographic questions

Demographic questions will be collected from respondents to determine amongst other things; their gender, age, management level and education level. An optional email address field is provided if the respondent would like to be included in the gift voucher draw.

3.4.2.2 Snowball Questions

The respondent will be asked to provide, on a voluntary basis, the names and email addresses of up to 5 new candidates who the respondent thinks would be willing to participate in the survey. An alternative suggestion will be given to the respondent of forwarding the email inviting peers to participate in the online survey. Respondents will be made aware that they will be entered into a random draw to receive a gift voucher prize for providing references to new respondents and for completing the online survey.

3.4.2.3 Endicott Workplace Productivity Scale (EWPS)

The Endicott Workplace Productivity Scale (EWPS) is a self report questionnaire consisting of 25 questions; with a maximum score of 100, each item is rated on a 5
point scale (0-Never, 1-Rarely, 2-Sometimes, 3-Often and 4-Almost always). According to Endicott (1997), the questionnaire is “designed to assess the degree to which a medical condition, such as a depressive disorder, affects the work functioning of a subject”. In this survey the affect of Internet Addiction is being assessed by correlating IA scores with the scores obtained in the EWPS.

Permission with instructions to use the EWPS has been obtained (Endicott J, 2009, 8 June, email).

3.4.2.4 Internet Addiction Test (IAT)

The Internet Addiction Test (Young, 1998) is a self report questionnaire and was developed by Dr. Kimberly Young, “it is a 20 item scale that measures the presence and severity of Internet dependency among adults” (Young, 2007). Each question requires the respondent to select a response from a 5 point Likert scale (Appendix 8.1.3). The total score indicates the level of internet compulsivity and addiction; scores ranging from 0 to 30 are considered to reflect normal levels of internet usage, 31 to 49 indicate mild levels of internet addiction, 50 to 79 reflects a moderate level and 80 to 100 indicate severe levels of internet addiction and compulsivity (Young, 2007, pp.3-4). Young provides question groups where high scores in each grouping indicate co-morbid symptoms that may elevate the scores. They are:

- **Salience** - questions 10, 12, 13, 15 and 19.
- **Excessive Use** – questions 1, 2, 14, 18 and 20
- **Neglect Work** – questions 6, 8 and 9
- **Lack of Control** – questions 5, 16 and 17
- **Neglect Social Life** – questions 3 and 4

Permissions and instructions to use the IAT have been obtained from the Center for Internet Addiction and Recovery (Netaddiction.com, 2009, 29 May, email).

3.4.2.5 Workplace Internet Leisure Browsing questions

This study is a replication and extension of Coker’s Workplace Internet Leisure Browsing research and therefore includes questions to calculate more accurately the amount of time respondents spend on performing workplace internet leisure browsing. The activities are listed in Appendix 8.1.4.
3.4.2.6 Task & Awareness questions

The following questions will be asked to determine:

- the overall level of awareness respondents have regarding Acceptable Use Policies, monitoring and policy enforcement
- workplace internet leisure browsing and its relation to inter-task interruptions or intra-tasks interruptions

The complete questionnaire can be found in section 8.1.5

3.5 Sampling

The target population comprises knowledge workers in South African organisations.

For this report we define knowledge workers as those who “have a high degree of expertise, education, or experience” (Davenport, 2005) and those who are in middle to senior management positions and work with computers and information in their day to days tasks.

The sample is intended to cover middle to senior management working in South African organisations.

The survey includes questions to be used, if required, as a filter to determine whether the respondents fit within the definition of a knowledge worker (see sections 8.1.1 and 8.2).

The sampling frame will comprise three seeds:

- students currently registered on the modular MBA and Executive MBA courses at the University Of Cape Town’s Graduate School of Business
- alumni of the University Of Cape Town’s Graduate School of Business
- leads generated from the respondents themselves

As snowball sampling is being used, it is intended that the sampling frame will remain representative based on respondents selecting peers in similar management positions to themselves in organisations. It is assumed that the sample is representative of a wide range of organisations and management positions within South African organisations.

As the initial sample frame will be selected from registered students and alumni - a non-probabilistic sampling strategy is adopted, more specifically a convenience sampling. As discussed in Bryman (2003, p. 198), convenience sampling of part-time
MBA students may not be representative of all managers by the virtue of them standing out by having taken the MBA course in the first place, however, by employing a Snowball sampling strategy, it is hoped a more representative sample is obtained. Bryman et al also suggest that convenience sampling “probably plays a more prominent role than is sometimes supposed” (p.198), especially in business and management. Bryman et al also point out that although snowball sampling is predominantly used for qualitative research, this does not rule out its uses in quantitative research. This as illustrated by the example provided of a questionnaire survey comprising respondents garnered from a snowball sample approach (Venter, Boshoff & Maas, 2005, quoted in Bryman et al, p. 200).

The initial sample size will be:

- approximately 300 students assuming an enrolment class size of 80 students for each of the 1st & 2nd Modular MBA courses and Executive MBA class (multiple)
- approximately 1917 alumni selected based on the following key criteria; middle to senior management, working within South Africa and for non governmental organisations
- It is expected the sample size will increase beyond this number due to the Snowball sampling strategy and incentives to enrol additional candidates.

Assuming a response rate of 10%, this survey approach could yield at least 221 respondents. Due to the nature of the survey design, it is not possible to determine up front the final sample size, or even the final response rate.

There are approximately 12,8750 registered close corporations, 33,754 private companies and 211 public companies as at 31st October 2009 (CIPRO, 2009). Approximately 9.5m of the population are employed.

3.6 Research Criteria

One of the objectives of this study is to replicate a study conducted in Australia partly to determine if it is applicable to the selected population. Additional areas for the research are to determine (a) if awareness and enforcement of acceptable use policies are independent variables and (b) the point at which workplace internet browsing takes place, namely during a work task activity or at the completion of a work task activity.

A brief discussion on the key research validity and reliability areas relating to this study
are addressed in the following sections. It is expected that Validity and Reliability will be good largely as a result of using tested tools, however the specifics of the reliability of the newly introduced measures will need to be assessed at a later stage of this research.

3.7 Research Validity

- **Causality (internal validity):** See section 3.8
- **Generalisation (external validity):** The research is intended to test the external validity of Coker’s study. New areas explored by this study are expected to be generalisable with respect to task interruption and acceptable use policy awareness in relation to workplace productivity and workplace internet leisure browsing.
- **Replication:** The study is intended to be replicable in other settings and is also in part testing the replicability of an existing study (Coker, 2009)
- **Ecological:** It is assumed that the study is applicable and relevant to people in their natural settings

3.8 Measurement Reliability

3.8.1 Stability

The stability of the IAT scores given to an individual may vary over time as a result of the individual’s characteristics changing; Chang & Law (2008) suggest further studies to establish stability. Young (1996) noted that “the length of time using the Internet differed substantially between Dependents and Non-Dependent”, this suggests that the scores of individuals are likely to vary over time as their exposure to the internet changes. It is felt that despite this the measure in the context of this study is relevant.

Endicott & Nee (1997) conducted studies on EWPS to determine test related reliability. Their result indicated a correlation coefficient of 0.92 for reliability of the total score (p. 14).

3.8.2 Internal Reliability

Chang & Law’s (2008) research indicated that Young’s IAT demonstrated Chronbach’s alpha of between 0.54 and 0.82 (citing Widyanto & McMurran 2004). In another study (Khazaal, Billieux, Thorens, Khan, Louati, Scarlatti, Theintz, Lederrey, Van Der Linden & Zullino, 2008) to determine the reliability coefficient high internet reliability was determined with a Chronbach alpha of 0.93.
Endicott & Nee’s (1997) internal consistency reliability coefficient also turned out to be 0.92 (Chronbach alpha).

3.8.3 Inter-observer consistency

No reliability issues are expected as the web survey is a self report survey.

3.9 Measurement Validity

- **Face Validity**: The new AUP and Task measures have common sense validity.
- **Concurrent Validity**: It is assumed that concurrent validity between the different measures such as the IAT, EWPS, AUP and Task related scores exists; this will be determined by the outcome of the study.
- **Predictive Validity**: The nature of the tests should indicate what measures might be useful in predicting user behaviour. For example, future tests regarding workplace internet leisure browsing might be a good measure from which new measures will be validated against.
- **Construct Validity**: Construct validity is covered in the section 1.2
- **Convergent Validity**: No convergent validity is planned. The literature review covers specific challenges related to conducting convergent validity, specifically in the area of productivity.

3.10 Data Analysis Methods

There are no open ended questions in the survey questionnaire so no qualitative content analysis will be required.

There are several variable types; they are listed in the appropriate sections (sections 8.1.1 to 8.1.5), most comprise ordinal, interval / ratio and dichotomous variables.

Guidelines have already been provided to calculate secondary statistics regarding IAT, EWPS and WILB time. For IAT and EWPS, the variables are calculated by totalling up the score of the respondent’s responses to the Likert scale. These variables are interval / ratio variables that will be used in further analysis.

3.10.1 Workplace Internet Leisure Browsing time

Calculating WILB is more complicated and is summarised in this section (Coker B, 2009, p.11)

*Equation 1- Calculating Workplace Internet Leisure Browsing in hours per week*
\[
WILB_h = \frac{1}{60}(wilbdur_n \cdot wilbfreq_n)
\]

Where:

- \(WILB_h\) is the total time in hours spent conducting workplace internet leisure browsing per week.
- \(wilbdur_n\) is the average duration of each activity
- \(wilbfreq_n\) is the average frequency of each activity

Equation 2- Calculation of percentage of time spent conducting Workplace Internet Leisure Browsing as a percentage of work hours

\[
\%WILB = \frac{WILB_h}{\text{WORK}_h} \cdot 100
\]

3.10.2 Methods

Several methods will be employed in the analysis and testing of the hypothesis.

3.10.2.1 Univariate Analysis

Frequency tables (and diagrams) will be used to gain an overall view of the categories and percentages of respondents in each of the categories. For example, this will be useful to determine gender and age profiles and internet leisure browsing categories. Measures of central tendency and dispersions will be calculated; this is especially applicable to the results of IAT, EWPS and demographic data collected, but limited to them.

3.10.2.2 Bivariate & Multivariate Analysis

Contingency tables will form the main basis in assessing relationships between variables. The strength of the relationships will be calculated using Pearson’s \(r\) (where applicable), for example, in determining the strength of the relationships between:

<table>
<thead>
<tr>
<th></th>
<th>IAT</th>
<th>EWPS</th>
<th>WILB</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAT</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EWPS</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>WILB</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 1-Exploring relationships between variables

Additionally, in some instances, contingency tables and tests will be drawn up where there are the three or more variables; candidate variables include IAT score, EWPS scores and WILB percentage.
3.10.2.3 Statistical Significance Testing

In order to answer the hypothesis questions (posed in sections 1.2.1 & 1.2.2) a number of tests will be conducted to determine the degree of confidence in the relationships between variables.

3.11 Expected Limitations of the Study

Whilst Respondent Driven Sampling (RDS) was considered as a method to reduce self selection bias in snowball sampling, it is decided that there is no easy way to collect the parameters required by RDS (http://www.respondentdrivensampling.org/).

There are a number of benefits to using select completion questionnaires, especially over the internet, such as being more affordable than traditional methods, and quicker to administer, reduced absence of interviewer effects, no interviewer variability and convenience for respondents. However, there are some limitations such as respondents are not able to probe, not knowing answers to questions, limited ability to collect additional data and lower response rates (Bryman & Bell, 2003, pp. 243-244).
4 RESEARCH FINDINGS, ANALYSIS AND DISCUSSION

The following section reports on the findings of the data collected.

4.1 Research Findings

Several groups were targeted to act as the seed groups with each group being provided a unique survey id to facilitate in determining the response rate from each of the groups. 8 of the completed responses were discarded due to their results being significant outliers; hours reported per day exceeded in some cases the number of hours in the day. The resulting dataset numbered 202.

<table>
<thead>
<tr>
<th>Target Group</th>
<th>Estimated Target Population</th>
<th>Complete Responses</th>
<th>Response Rate (based on completed responses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>300</td>
<td>35</td>
<td>12%</td>
</tr>
<tr>
<td>Alumni</td>
<td>1917</td>
<td>159</td>
<td>8%</td>
</tr>
<tr>
<td>Leads</td>
<td>50</td>
<td>16</td>
<td>32%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2267</strong></td>
<td><strong>210</strong></td>
<td><strong>9%</strong></td>
</tr>
</tbody>
</table>

Table 2 - Summary of target groups, External leads capture contacts provided by respondent’s in-line with the snowball sampling method

4.1.1 Demographic Profile

Graphs detailing the demographic data are included in Section 8.2 of the appendices, the summary of the respondent demographic data is provided below (Detailed graphical breakdown included in section 8.2 – Appendix 2 – Demographic & Work Graphs):

- **Working**: 89% are currently in full-time employment, the remainder are likely to comprise full-time students or those currently unemployed
- **Gender**: Males comprised 73%, females 27%.
- **Internet access**: 99% had access to the internet at work, and 100% had a computer at work to perform work related tasks. *Internet access is available for everyone in this study*
- **Age**: 37% of respondents fell into the 30-39 age band, followed by 29% in the 40-49 age band, third highest was the 50-59 age band at 16%, 10% comprised 20-29 year olds and the remainder at 60 and over was 7%.
- **Qualification**: Almost half the respondents (48%) indicated they had a master’s degree, followed by a degree (17%), honours degree (16%) and a diploma (10%) with the remainder having an assortment of qualifications. *The majority of respondents are highly qualified, a prerequisite for*
categorisation as a knowledge worker

- **Position**: 48% reported that they were “Professionally qualified; experienced specialists; middle management”, 37% in senior management and 14% in top management.

*These results align with the study’s target audience of middle to senior level management*

- **Historic internet access**: Most of the respondents have had access to the internet for 5 or more years, the bulk of whom have had access for “at least 10 years” (18%) and “more than 10 years” (53%).

*One can conclude that internet access is not a new novelty to the majority of respondents – Young suggested that IAT traits reduced as the novelty of internet access wears off*

- **Work days**: 82% of respondents are expected to work a 5 day week, 12% a 6 day week and 5% claimed they are expected to work a 7 day week

- **Work hours per day**: 42% of respondents are expected to work 8 hours a day, 24% and 21% a 9 and 10 hour day respectively followed by 3% and 5% who are expected to work an 11 and 12 hour day respectively
4.1.2 Summary Statistics

Section 8.2 (Appendix 2 – Demographic & Work Graphs) contains several graphs depicting the demographics, IAT, EWPS, WILB, AUP and task interruption results).

The following table provides summary statistics of the survey data (n=202):

<table>
<thead>
<tr>
<th></th>
<th>IAT</th>
<th>EWPS</th>
<th>Inverted EWPS *</th>
<th>WILB %</th>
<th>Task interruption **</th>
<th>Days / Week</th>
<th>Hours / Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>20.38</td>
<td>24.10</td>
<td>75.90</td>
<td>11.99%</td>
<td>2.02</td>
<td>5.21</td>
<td>8.87</td>
</tr>
<tr>
<td>SD</td>
<td>9.88</td>
<td>11.87</td>
<td>11.87</td>
<td>0.82</td>
<td>0.88</td>
<td>0.55</td>
<td>1.30</td>
</tr>
<tr>
<td>Min</td>
<td>1.00</td>
<td>0.00</td>
<td>35.00</td>
<td>0.00%</td>
<td>1.00</td>
<td>3.00</td>
<td>4.00</td>
</tr>
<tr>
<td>25% Q</td>
<td>13.25</td>
<td>15.25</td>
<td>68.00</td>
<td>2.65%</td>
<td>1.00</td>
<td>5.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Medium</td>
<td>21.00</td>
<td>25.00</td>
<td>75.00</td>
<td>6.27%</td>
<td>2.00</td>
<td>5.00</td>
<td>9.00</td>
</tr>
<tr>
<td>75% Q</td>
<td>26.00</td>
<td>32.00</td>
<td>84.75</td>
<td>16.42%</td>
<td>3.00</td>
<td>5.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Max</td>
<td>73.00</td>
<td>65.00</td>
<td>100.00</td>
<td>68.37%</td>
<td>4.00</td>
<td>7.00</td>
<td>12.00</td>
</tr>
</tbody>
</table>

Table 3 - Summary of Scores

* Inverted EWPS is easier to understand, the higher the score the higher the reported productivity is supposedly taking place

** Based on a 5 point scale (1-Never, 2-Rarely, 3-Sometimes, 4-Often, 5-Almost Always)

EWPS scores are presented throughout this section as scores that are inverted so that higher scores represent higher productivity levels, making its interpretation more intuitive.

The follow table provides summary statistics for a few variables of WILB (n=202):

<table>
<thead>
<tr>
<th></th>
<th>WILB as a percentage of total work time available per day</th>
<th>Total Minutes / Day of WILB activity per respondent</th>
<th>Frequency / Day per respondent conducting WILB activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>11.99%</td>
<td>63.13</td>
<td>5.73</td>
</tr>
<tr>
<td>SD</td>
<td>13.72%</td>
<td>72.21</td>
<td>6.93</td>
</tr>
<tr>
<td>Min</td>
<td>0.00%</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>25% Quartile</td>
<td>2.65%</td>
<td>14.22</td>
<td>1.48</td>
</tr>
<tr>
<td>Medium</td>
<td>6.27%</td>
<td>31.23</td>
<td>3.33</td>
</tr>
<tr>
<td>75% Quartile</td>
<td>16.42%</td>
<td>87.79</td>
<td>7.43</td>
</tr>
<tr>
<td>Max</td>
<td>68.37%</td>
<td>369.18</td>
<td>42.51</td>
</tr>
</tbody>
</table>

Table 4 - WILB Breakdown

To recap, the following combinations of tests were planned.

<table>
<thead>
<tr>
<th></th>
<th>IAT</th>
<th>EWPS</th>
<th>WILB</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAT</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>EWPS</td>
<td>0.43, 0.19, -0.52*</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>WILB</td>
<td>0.31, 0.09, 0.42*</td>
<td>0.27, 0.08, -0.31*</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 5 – Correlation, R-Squared and slope between main variables

*p < 0.001
4.2 Research Analysis and Discussion

This section looks at both the replicated hypothesis and new hypothesis introduced in this study; each hypothesis is tested and discussed.

4.2.1 Replications Questions

The following section tests H1 to H4, comparing Coker’s findings to the findings of this research report.

**H1:** Knowledge workers who conduct workplace internet leisure browsing will have higher productivity than those who do not or cannot conduct workplace internet leisure browsing

*Methods:* The sample was separated into two groups. Group 1 are those who did not, or reported less than or equal to spending 1% of their work time on internet leisure browsing activities. Group 2 are those who conducted workplace internet leisure browsing (reported to be greater than 1%).

A preliminary test for the equality of variances indicates that the variances of the two groups are not significantly different F=1.25, p=0.20. Therefore, a two-sample t-test was performed that assumes equal variances.

*Results:* The mean score for group 1 (M=83.67, SD=12.77, N=24) was significantly greater than the scores for group 2 (M=74.85, SD=11.39, N=178) using the two-sample t-test for equal variances, t(200)=3.5, p<0.001. The result is the opposite of the findings by Coker. See table below. For instance; group 1, with the low levels of workplace internet leisure browsing tended to have higher productivities, those who conducted higher levels of workplace internet leisure browsing tended to have lower levels of productivity (group 2).

A post hoc regression analysis was carried out to corroborate the findings of this paper’s research. The results indicate a slope of -0.23 and a value p<0.001, indicating that there is a decrease of the EWPS score for every percentage increase in workplace internet leisure browsing.

The quadratic relation depicted in Graph 1 – Scatter graph showing linear relationship (black), quadratic relationship (red) and observed values. The curvilinear results are the inverse of the shape reported by Coker. In both instances the curve depicted further out should be treated with caution due to the low number of measurements.
This Study (EWPS) | Coker  
| Mean | SD | Mean | SD  
| Group 1 | 83.67 | 12.77 | 64.66 | 15.14  
| Group 2 | 74.85 * | 11.39 * | 70.3 | 11.90  
| t-test | | t-test |  
| t-test | F = 1.56, p = 0.2 | F = 12.23, p < .01  
| t-test | t(200) = 3.5, p <= 0.001 | -  

Table 6 – H1 Hypothesis Rejected

* A cut off point of 1% (of percentage of work time spent on workplace internet leisure browsing, representing 25 of the 202 respondents was used, if 0% was used, that would represent only 5 of 202 respondents with the results even more strongly against the findings of Coker). The EWPS was inverted so that high scores represented higher productivity levels.

The difference may be attributed to the differences in the sample population; senior to top managers as supported by the demographic breakdown of this report. One might expect that respondents in senior positions would conduct less workplace internet leisure browsing than less senior workers. The results may also vary as a side effect of differences indicated in the collection and calculation of the data. However, the results of this study regarding H1 appear to be intuitively correct.

Conclusion: H1 is not supported
**H2**: *The frequency of workplace internet leisure browsing should have a positive effect on worker performance; controlling for duration and overall time spent workplace internet leisure browsing*

Two sub samples were separated from the data using a dummy variable, however, the criteria in creating the dummy variable used in the original study by Coker (those who spent less than 40 minutes a day conducting workplace internet leisure browsing with a frequency higher than 8 times per day) would have yielded only 3 sample points, insufficient to draw any meaningful conclusion. Instead, the median value for duration and frequency were chosen (31.23 minutes and 3.33 times a day respectively).

A single factor ANOVA test was performed on the resulting data to determine if there was a difference in the groups.

<table>
<thead>
<tr>
<th>Condition</th>
<th>This Study (EWPS)</th>
<th>Coker*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>&lt; 31.23 min, &gt; 3.33 times (n=19)</td>
<td>75.11</td>
<td>14.28</td>
</tr>
<tr>
<td>!(&lt; 31.23 min, &gt; 3.33 times) (n=183)</td>
<td>75.98</td>
<td>11.63</td>
</tr>
</tbody>
</table>

ANOVA 
\[ F(201)=3.88 \quad P=0.76 \quad F(1249)=3.86 \quad P<0.05 \]

*The frequency cut-off for Coker’s was set at 8 times per day and 40 minutes.*

The null hypotheses cannot be rejected as there does not appear to be any statistical significance between the productivity of the two groups. Although the same cut-off point as used by Coker could not be used as explained previously, it is likely that even if the same cut-off point could have been used the results would not have supported Coker’s findings for H2.

**Conclusion**: H2 is not supported.
**H3:** Knowledge workers who exhibit compulsive tendencies to use the internet will conduct more workplace internet leisure browsing than those knowledge workers who exhibit normal internet use tendencies

A regression test was performed using the results of Young’s IAT, along with the results of workplace internet leisure browsing (WILB). With a level of significance set at $\alpha = 0.05$, this hypothesis holds true and the null hypotheses can be rejected.

<table>
<thead>
<tr>
<th></th>
<th>This Study (IAT vs. WILB Time)</th>
<th>Coker (IAT vs. WILB Time)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta$</td>
<td>0.42</td>
<td>-0.19*</td>
</tr>
<tr>
<td>$P$</td>
<td>&lt;0.01</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

* Coker describes the relationship as positive and yet the slope is indicated as negative. I have assumed this is a typing error regarding the negative value of the slope.

This result confirms Coker’s finding.

**Conclusion:** H3 is supported.
**H4:** Knowledge workers who exhibit compulsive tendencies to use the internet and conduct workplace internet leisure browsing will have decreased workplace productivity

According to Young the scores of the IAT should be interpreted in the following manner; scores from 0 to 30 are considered to reflect a normal level of internet usage, 31 to 49 indicate a mild level of internet addiction, 50 to 79 reflect a moderate level and 80 to 100 indicates a severe dependence.

Coker’s study split the sample into two groups using an IAT score of 50 as the cut-off point, and then excluded those who spent more than 15% of their time conducting workplace internet leisure browsing per day. Whether as a result of a different sample (middle to senior management) or other factors, if the same criteria were to be used there would be no group consisting of IAT scores above 50 with less than 15% of their time spent internet leisure browsing, instead, 30 was chosen as the IAT cut-off point.

<table>
<thead>
<tr>
<th>IAT Scores</th>
<th>EWPS Scores</th>
<th>WILB %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td><strong>Group 1, n=133</strong>&lt;br&gt;IAT &lt; 31</td>
<td>17.51</td>
<td>7.40</td>
</tr>
<tr>
<td><strong>Group 2, n=9</strong>&lt;br&gt;IAT &gt; 30</td>
<td>35.56</td>
<td>4.42</td>
</tr>
</tbody>
</table>

*Table 9 - H4 - Group 2 exhibits mild internet addiction traits*

<table>
<thead>
<tr>
<th></th>
<th>This Study</th>
<th>Coker *</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAT &lt; 31</td>
<td>Slope</td>
<td>P, α = 0.1</td>
</tr>
<tr>
<td>β = 0.62</td>
<td>P=0.02</td>
<td>β = 0.14</td>
</tr>
<tr>
<td>IAT &gt; 30</td>
<td>β = 0.46</td>
<td>P=0.70</td>
</tr>
</tbody>
</table>

*Table 10 –H4 – the results are the opposite to that of Cokers’ findings (note, the group categorisation criteria are different between the two studies), *Coker used a cut-off point of 50

The results of this study suggest that there is a negative relationship between work productivity and the amount of time spent conducting workplace internet leisure browsing for group 1 (the “non-addicts”) i.e. work productivity declines as the percentage of time spent on workplace internet leisure browsing activities increases, whereas there is a positive relationship for the second group (the “mild addicts”). The results are the opposite to that of Cokers’ findings, this may be the result of several factors: (a) The population sample is different; middle to senior management versus a more diverse target population, (b) the selection criteria for the two groups differed for
the reasons already given in the previous paragraph (c) Group 2 does not contain sufficient observations; based on the p-value (p=0.70), there is a strong possibility that there is no relationship between EWPS scores and WILB within the second group and given a larger sample, the trend is likely to be similar to that of the first group.

Conclusion: H4 is not supported.

However, given the differences in the sample from Coker’s original study, the mean value of the IAT scores was selected as the cut-off point, 20 as opposed to 30; the reasoning behind this was to ensure that each group had a sufficient sample size and that the test would be similar in that it was testing for decreased work productivity for those with higher IAT scores but not exceeding the 15% cut-off of time spent conducting workplace internet leisure browsing.

<table>
<thead>
<tr>
<th>IAT Scores</th>
<th>EWPS Scores</th>
<th>WILB %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Group 1, n=73 IAT &lt;= 20</td>
<td>11.95</td>
<td>5.24</td>
</tr>
<tr>
<td>Group 2, n=70 IAT &gt; 20</td>
<td>25.63</td>
<td>4.70</td>
</tr>
</tbody>
</table>

Table 11 - H4a- Group 2 exhibits mild internet addiction traits

<table>
<thead>
<tr>
<th>This Study</th>
<th>Slope</th>
<th>P, α = 0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1, n=73, IAT &lt;= 20</td>
<td>β = - 0.49</td>
<td>P=0.12</td>
</tr>
<tr>
<td>Group 2, n=70, IAT &gt; 20</td>
<td>β = - 0.64</td>
<td>P=0.12</td>
</tr>
</tbody>
</table>

Table 12 –H4a – the results are the opposite to that of Cokers’ findings (note, the group categorisation criteria are different between the two studies), *Coker used a cut-off point of 30

Both regression tests on the groups suggest that there is a negative correlation between time spent conducting workplace internet leisure browsing and IAT, and that there is a very weak correlation between the two variables (r² for group 1 and group 2 was 0.032 and 0.035 respectively, very similar to the previous test results of 0.039 and 0.02 (cut-off for IAT score at 30).

This suggests that having eliminated those who spend more than 15% of their time conducting workplace internet leisure browsing there is very little difference between the two groups to suggest that there is any significant change in the relationship between the two groups.
4.2.2 New Questions

In addition, the following new hypotheses are explored.

**H5**: Knowledge workers who are aware that acceptable use policies are provided conduct workplace internet leisure browsing less often than those who are not aware

*Methods*: The respondents were asked if they were aware of the existence of an acceptable use policy (AUP); those who answered ‘no’ were assigned to group 1, those who answered ‘yes’ were assigned to group 2. The percentage of time conducting workplace internet leisure browsing (WILB time) was used.

A preliminary test for the equality of variances indicates that the variances of the two groups were significantly different, F=1.74, p<0.01. Therefore, a two-sample t-test was performed that does not assume equal variances.

*Results*: The mean score for group 1 (M=0.18 SD=0.17, N=30) was significantly greater than the scores for group 2 (M=0.11, SD=0.13, N=172) using the two-sample t-test for unequal variances, t(35)=2.06, p<0.05

*Conclusion*: H5 is supported.

This finding supports the view that AUPs should be implemented in all organisations (Corbitt, 2005) although Ugrin et al (2008) suggest that this may result in reduced workplace satisfaction.
**H5a:** Knowledge workers who are aware that acceptable use policies are enforced conduct workplace internet leisure browsing less often than those who are not

**Methods:** The respondents were asked if the company they worked for had communicated their intent to enforce the companies AUP by disciplining those employees who disregarded the companies AUP. Those who answered ‘no’ were assigned to group 1, those who answered ‘yes’ were assigned to group 2. The percentage of time conducting workplace internet leisure browsing (WILB time) was used.

A preliminary test for the equality of variances indicates that the variances of the two groups were significantly different, $F=2.45$, $p<0.01$. Therefore, a two-sample t-test was performed that does not assume equal variances.

**Results:** The mean score for group 1 ($M=0.18$ SD=0.17, $N=63$) was significantly greater than the scores for group 2 ($M=0.09$, SD=0.11, $N=139$) using the two-sample t-test for unequal variances, $t(86)=3.89$, $p<0.01$

**Conclusion:** H5a is supported.
H6: Knowledge workers who exhibit compulsive tendencies will conduct more workplace internet leisure browsing despite being aware of AUPs, monitoring and enforcement than those who are not aware

Methods: The respondents were asked if the company they worked for had communicated their intent to enforce the companies AUP by disciplining those employees who disregarded the companies AUP, were aware of the existence of an AUP and were aware that their internet activities were being monitored.

Those who answered ‘no’ to any one of the three questions were assigned to group 1, those who answered ‘yes’ to all three questions were assigned to group 2. Those with IAT scores less than or equal to 30 were removed from both groups. WILB % time was used.

A preliminary test for the equality of variances indicates that the variances of the two groups were significantly different, $F=4.17$, $p<0.05$. Therefore, a two-sample t-test was performed that does not assume equal variances.

Results: The mean score for group 1 ($M=0.21$, $SD=0.18$, $N=8$) was not significantly less than the scores for group 2 ($M=0.19$, $SD=0.09$, $N=12$) using the two-sample t-test for unequal variances, $t(9)=0.48$, $p=0.31$.

Conclusion: H6 is not supported; there were no significant differences between the two groups who exhibited mild internet addiction and their awareness of any of the three factors.

A further analysis was conducted to gain further insight by carrying out the same analysis but with the groups having those with less than 31 for their IAT score. It is expected that there is a difference between these two groups and WILB time i.e. the group that answered ‘yes’ to all of the three questions will have lower workplace internet leisure browsing times.

A preliminary test for the equality of variances indicates that the variances of the two groups were significantly different, $F=0.35$, $p<0.01$. Therefore, a two-sample t-test was performed that does not assume equal variances.

Results: The mean score for group 1 ($M=0.076$, $SD=0.092$, $N=73$) was significantly greater than the scores for group 2 ($M=0.136$, $SD=0.155$, $N=109$) using the two-sample t-test for unequal variances, $t(178)=-3.28$, $p<0.01$.

This result suggests that those with mild internet addiction traits, regardless of their
awareness of AUPs, company enforcement or not, will engage in workplace leisure browsing to the same extent that those who are not aware of these factors. Those with IAT scores less than 31 appeared to report less workplace internet leisure browsing if they were aware of the three factors mentioned versus those who were not aware of at least one of the factors.
**H7**: Knowledge workers who exhibit compulsive tendencies will interrupt work tasks more often to conduct workplace internet leisure browsing than those without compulsive tendencies

A 5-point Likert scale was used when surveying respondents on how often they interrupted work activities during work tasks, and also between work tasks to conduct workplace internet leisure browsing (Never =1, Rarely = 2, Sometimes = 3, Often = 4, Almost always = 5).

Methods: The respondents were grouped according to IAT scores into group 1 (<=30) and group 2 (>30). A preliminary test for the equality of variances of the ‘interrupt during incomplete work tasks’ variable indicates that the variances of the two groups are not insignificantly different, F=0.85, p=0.28. Therefore, a two-sample t-test was performed that assumes equal variances.

Results: The mean score for group 1 (M=1.99, SD=0.81, N=182) was not significantly less than the scores for group 2 (M=2.35, SD=0.88, N=20) using the two-sample t-test for equal variances, t(200)=-1.88, p<0.05

Conclusion: H7 is supported.

A further analysis was conducted to gain further insight by carrying out the same analysis but with the ‘interrupt between work tasks’ variable.

A preliminary test for the equality of variances of the ‘interrupt between work tasks’ variable indicates that the variances of the two groups are insignificantly different, F=0.69, p=0.11. Therefore, a two-sample t-test was performed that assumes equal variances.

Results: The mean score for group 1 (M=2.60, SD=0.85, N=182) was significantly less than the scores for group 2 (M=3.10, SD=1.02, N=20) using the two-sample t-test for equal variances, t(200)=2.42, p<0.01

<table>
<thead>
<tr>
<th>Task interruption *</th>
<th>Overall (n=202)</th>
<th>IAT &lt; 31 (n=182)</th>
<th>IAT &gt;30 (n=20)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Mean</td>
<td>Mean</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>SD</td>
<td>SD</td>
</tr>
<tr>
<td>During</td>
<td>2.02</td>
<td>1.99</td>
<td>2.35</td>
</tr>
<tr>
<td></td>
<td>0.82</td>
<td>0.81</td>
<td>0.88</td>
</tr>
<tr>
<td>Between</td>
<td>2.65</td>
<td>2.60</td>
<td>3.10</td>
</tr>
<tr>
<td></td>
<td>0.88</td>
<td>0.85</td>
<td>1.02</td>
</tr>
</tbody>
</table>

*Maximum score value = 4

Table 13 – Summary Statistics of Task Interruption
H8: Knowledge workers who tend to interrupt work related tasks to conduct workplace internet leisure browsing will tend to exhibit lower productivity scores than those who tend to conduct workplace internet leisure browsing between completed work tasks.

Methods: The respondents were grouped according to their EWPS (productivity scores). The mean value was selected as the mid-point separating the group. Those who scored 75 or more were placed into group 1, those less than 75 into group 2. Four separate equality of variance and t-tests’ were conducted, they were for; interruptions occurring during work tasks (ID), interruptions between completed work tasks (IB), the composite average score of the two for each sample (CS), and the difference between ID and CS (DF).

A preliminary test for the equality of variances indicates that the variances of each variable of the two groups are not insignificantly different; therefore, a two-sample t-test was performed that assumes equal variances for each of the groups (ID, IB, CS and DF).

<table>
<thead>
<tr>
<th></th>
<th>F</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID</td>
<td>0.90</td>
<td>0.31</td>
</tr>
<tr>
<td>IB</td>
<td>0.92</td>
<td>0.35</td>
</tr>
<tr>
<td>CS</td>
<td>0.91</td>
<td>0.33</td>
</tr>
<tr>
<td>DF</td>
<td>0.92</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Table 14 – Preliminary tests for equality of variance – two sample t-test for equal variance was selected

Results:

Group 1 had a mean EWPS score of 85.57 (SD=7.08, N=99) versus group 2’s mean EWPS score of 66.06 (SD=7.20, N=103).

- Those who interrupted incomplete work activities to conduct workplace internet leisure browsing. The mean score for group 1 (M=1.74 SD=0.79, N=99) was significantly less than the scores for group 2 (M=2.30, SD=0.75, N=103) using the two-sample t-test for equal variances, t(200)=5.19,p<0.001
- Those who conducted workplace internet leisure browsing between completed work tasks: The mean score for group 1 (M=2.49 SD=0.88, N=99) was significantly less than the scores for group 2 (M=2.81, SD=0.85, N=103) using the two-sample t-test for equal variances, t(200)=2.54,p<0.001
- Composite average score of the two groups: The mean score for group 1 (M=2.12 SD=0.72, N=99) was significantly less than the scores for group 2 (M=2.55, SD=0.69, N=103) using the two-sample t-test for equal variances,
t(200)=4.83, p<0.001

- **Difference in scores between the two groups (ID – IB):** The mean score for group 1 (M= -0.76, SD=0.85, N=99) was significantly less than the scores for group 2 (M= -0.51, SD=0.82, N=103) using the two-sample t-test for equal variances, t(200)=2.16, p<0.05

A further analysis was conducted to gain further insight into the difference between ID and IB scores. A paired t-test was performed to determine if workplace internet leisure browsing indeed occurred more often between work tasks than during work tasks.

The mean difference in scores (M= 0.63, SD=0.83, N=202) was significantly greater than zero, t(7)=-10.66, p<0.001, providing evidence in support of knowledge workers conducting workplace internet leisure browsing between work tasks more frequently than during work tasks.

**Conclusion:** H8 is supported.
4.3 Limitations

Several limitations were encountered during this research. Accurate replication of Cokers study in some cases was not possible, especially with respect to the selection of cut-off points when splitting the data set into two or more groups. This is probably the result of the sample population simply being different to that of Cokers. Despite this, the testing for the hypothesis was still possible; although there were areas in which the hypotheses of the two studies did not agree.

The survey questionnaire was long and detailed, there is a good chance that many potential respondents failed to complete the survey due to its length. Future research in this area will need to take note of the volume of data that is required to be captured and factor this into their research design.

The snowball sampling strategy did not result in a significant number of new respondents as originally hoped for, the bulk of the respondents eventually comprised alumni, possibly introducing a bias in the results. However, the demographic information indicates that within the sample frame there appeared to be sufficient variety, although this was not tested for.

Whilst not intended, the study did not include an extensive analysis of demographics, nor the areas identified by Young regarding question groups within the IAT test (salience, excessive use, neglect work, lack of control and neglect social life), neither was there analysis of the breakdown of the type of leisure based internet activities conducted as illustrated in section 8.2.9 (Appendix, Internet browsing habits).
5 RESEARCH CONCLUSION

The mean IAT score was 20.38, the median 21 and sd at 9.88 indicates that most respondents were either considered normal or exhibited mild symptoms of internet addiction according to Young’s criteria, only 2 respondents scored higher than 50. The low scores may be attributable to the maturity of the respondents with respect to duration of internet access (more than half had access to the internet for at least 10 years), or their seniority within their company (most were middle to senior managers).

Despite the low IAT scores obtained in this research, suggesting ‘normal’ behaviour, IAT scores were negatively correlated with EWPS; higher IAT scores, indicating increased internet addiction traits, correlated with lower EWPS scores indicating lower productivity. The mean EWPS score stood at 75.90, the median 75.00 and standard deviation at 11.87. This suggests that, in conjunction with H3 (IAT is positively correlated with WILB activities), those with relatively higher IAT tendencies than their peers are likely to conduct higher levels of WILB activity and have lower relative levels of productivity. This research seems to support findings by Young and Kwiatkowska et al.

With an average of 63.13 minutes of workplace internet leisure browsing per day; WILB activity showed a negative correlation with EWPS scores indicating that increased WILB activity resulted in reduced productivity. This is supported by Coker although there is some doubt as to the shape of the curvilinear relationship between the two studies. My findings seem to suggest, and I am inclined to support this position, that there is a clear negative correlation between WILB activity and productivity. WILB activity needs to be monitored and carefully controlled within organisations as suggested by Corbitt (2005), Ubazewki et al (2002) and Cohen et al (2007). However, the low r-squares of these variables should be taken suggesting that there are other factors not covered in this study that influence productivity (Table 5 – Correlation, R-Squared and slope between main variables).

IAT and WILB scores appeared to be positively correlated; those who exhibited internet addiction traits tended to have higher values of WILB activity. Whilst it is tempting to suggest causality, no tests were conducted to determine causality.

The replication of Coker’s findings showed mixed results:

H1 could not be faithfully replicated and was rejected. Productivity scores declined
with increased WILB activity regardless of WILB cut-off points suggesting that there are no productivity benefits to be derived even for those conducting moderate levels of WILB activity, at least not in this sample group. This despite the assertion by Coker that moderate levels of WILB activity can be likened to studies that suggest frequent breaks increase productivity. The implication for organisations is that productivity declines with increased WILB activity, and this decline should be offset against the benefits WILB activity brings with respect to workplace satisfaction; research by Stanton (2002) suggests that there is a higher level of workplace satisfaction amongst frequent internet users (i.e. those conducting WILB activities).

Neither could H2 be faithfully replicated and was rejected; similar to H1, this tested the frequency of WILB activity in relation to work productivity controlling for overall time spent conducting workplace internet leisure browsing i.e. those who conducted more frequent WILB activities should have higher productivity levels than those who conduct WILB activities less frequently (controlling for overall time). This suggests that the frequency of WILB activity is less important than the duration of WILB activities on the impact of productivity. For organisations then, encouraging employees to reduce overall WILB ‘time’ activity should be prioritised over controlling for frequency (i.e. it is better for employees to conduct WILB activities less frequently as long as the total time spent conducting WILB activities is kept to a minimum). Organisation could restrict WILB activity to certain times of the day (i.e. lunch break) or to specific sites. Organisations that use electronic monitoring systems to monitor internet abuse often use access logs that report on the frequency of access of WILB activities but not the actual time spent by individuals on WILB activities, thus providing an inaccurate view of WILB activity; Ubazewki et al (2002) provide caution of implementing electronic monitoring without careful consideration.

H3 was supported and was faithfully replicated; there is a positive correlation between higher IAT scores and increased WILB activity. Organisations could utilise IAT scores as a proxy or in conjunction with WILB activity. The IAT test is simpler and easier to administer in comparison to collecting WILB data.

H4 was not supported and the null hypothesis was not rejected; workplace productivity was not highly correlated with IAT scores when adjusted for WILB activity. There was no significant difference between the productivity levels of the two groups. This suggests that despite the IAT scores, as long as WILB activity is kept within reasonable
limits, productivity differences are negligible. In light of this, using IAT as a proxy as suggested in the previous paragraph should be treated with caution and perhaps deployed in conjunction with a limited WILB survey to calibrate the results.

H5 was supported; employees aware of AUP conducted significantly less workplace internet leisure browsing than those who were not aware (means of 11% versus 18% of those who were aware and those who were not aware respectively). Organisations should at the very least communicate to employees on a regular basis the existence of AUPs, as suggested by Corbitt (2005), Ubazewki & Jessup (2002) and Cohen & Cohen (2007). Those who were aware that AUPs were enforced (as opposed to simply being aware of their existence) spent, on average, even less time on workplace based activities (means of 9% versus 11% for those merely aware). Organisations should make clear their intent to enforce policies and discipline those who deviate from them (Ugrin et al, 2008), de Lara (2006), Kankanhalli (2008) and Alder et al (2006), but should be cautious as to the approach taken (Alder, 2001).

H6 was not support and the null hypothesis was not rejected. However, further analysis suggests that those with mild internet addiction traits, regardless of their awareness of AUPs, company enforcement or not, will engage in workplace leisure browsing to the same extent as those who are not aware of these factors. Whilst communicating and enforcing AUPs tends to influence the majority of employees, these individuals appeared not to have moderated their WILB behaviour accordingly. The implications for this is that organisations should go beyond merely communicating and enforcing AUPs but try and identify these individuals and manage their WILB tendencies through other means, i.e. de Lara et al (2006) suggest leader physical proximity i.e. close management proximity as this was found to influence employee WILB behaviour. Organisations cannot rely on technology alone and should also take into account company culture Alder et al (2006).

H7 was supported. Those with higher IAT score results tended to exhibit a higher frequency of task interruptions during work related tasks to conduct workplace leisure browsing than those with lower IAT scores. Whilst Aral et al (2007) suggest that multi-tasking may increase productivity, they may not have had in mind that the interrupting tasks were workplace leisure browsing tasks (whereas in fact we have demonstrated that there is a negative correlation between IAT scores and productivity). According to McDaniel et al (2004) task switching due to interruptions can result in reduced rates of
execution of the delayed task (i.e. the primary work related task) and therefore impacts productivity negatively. Speier et al (2003) suggest that task switching can lead to reduced accuracy, and Eyrolle et al (2000) demonstrated that interruptions lead to lower performance, increased errors and stress levels. Overall, organisations need to encourage employees to minimise interruptions taking place during incomplete tasks. Perhaps this could be achieved through better communication and training, or technology such as eye trackers used to determine opportune moments for interruption (Iqbal et al, 2005). Jackson et al recommend changing the setting on the mail client to check for new email less frequently.

H8 was supported. Those with higher productivity scores tended to conduct their workplace internet leisure browsing tasks between rather than during work tasks. The benefits of conducting workplace internet leisure browsing between tasks include reduced decline in task performance as supported by Bailey et al (2006) in their research that measures the effects of interruption on task performance and error rate by comparing task interruptions between and during activities. They suggested higher anxiety levels are also experienced when interruptions occur during primary tasks rather than between. These findings suggest that organisations should also encourage employees to complete their current work tasks before conducting any workplace internet leisure browsing. Suggestions for organisations are similar to those proposed in the previous paragraph.

In conclusion; increased WILB activity is correlated with reduced productivity, as are IAT scores. This research was not able to replicate Coker’s findings of increased productivity, up to a point. Organisations should focus on keeping WILB activities at acceptable levels keeping in mind the risk of decreased workplace satisfaction in response to more stringent policies as this may lead to decreased employee performance. Organisations should encourage employees to manage their interruptions where they are able to (i.e. email settings) and to conduct WILB activities between completed work tasks as opposed to during work tasks. The importance of AUPs role in reducing WILB activity was a surprising outcome of this research. Organisations should approach WILB activities by ensuring that AUPs, employment contracts and performance measures include relevant, meaningful and culturally acceptable policies and approaches in dealing with WILB activity, and are revised periodically.
6 FUTURE RESEARCH DIRECTIONS

There are several areas that offer potential future research areas that have come out of this study:

- It would be interesting to determine if there are any differences between groups in the sample population with respect to the tests carried out; such as gender, age and education level achieved

- Further research into the breakdown of work habits (this data formed part of the WILB data but not analysed in detail) and the relationship between it, EWPS, WILB and IAT may indicate to organisations where to target their efforts in reducing WILB activities more precisely (a preliminary glance at the data suggests that reading online news websites, checking online sports results, checking personal emails from non-work related email accounts and organising personal financial affairs make up the bulk of the workplace internet leisure browsing activities)

- Further research into the effect that Acceptable Use Policies (including the policing and enforcement of them) has on the behavioural characteristics of employees (and the approach taken by employers). This research indicated that awareness of AUPs was significant enough to moderate employee behaviour with respect to workplace internet leisure browsing

- Further research into workplace interruptions to identify approaches that may reduce work task interruptions and encourage employees to conduct their workplace internet leisure browsing activities between work tasks rather than during
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8 APPENDICES

8.1 Appendix 1 – Research Instruments

The following section outlines the questions to be used in the online survey. The types of variables are provided in brackets.

8.1.1 Demographic Questions

The following demographic questions will be used;

1. Age – (Interval / Ratio)
2. Gender – (Dichotomous)
3. Education Level – (Ordinal)
4. Profession – (Nominal / Categorical)
5. Industry (include SIC code, Bryman, p. 189) – (Nominal / Categorical)
6. Management Level – (Ordinal)
7. Years online – (Interval / Ratio)
8. Salary band – (Ordinal)
9. Contact email address (for gift voucher draw) - informational
10. South African organisation? – (Dichotomous)

8.1.2 Endicott Work Productivity Scale

The following questions will be used to determine the level of productivity. The scale values indicate the following: 0 - Never, 1 – Rarely, 2 – Sometimes, 3 – Frequently, 4 – Often and 5 – Almost Always.

These questions are all of ordinal variable types, each type is represented by a score from 0 to 5 and these scores are then totalled and used in the assessment, the totalled scores are considered as ratio / interval variables.

How many hours do you usually work or would you usually be expected to work? (in hours)

How many hours did you work last week? (in hours)

During the past week, how frequently did you:

1. Arrive at work late or leave work early?
2. Take longer lunch hours or coffee breaks?
3. Just do no work at times when you would be expected to be working?
4. Find yourself daydreaming, worrying or staring into space when you should be working?
5. Have to do a job over because you made a mistake or your supervisor told you to do a job over?
6. Waste time looking for misplaced supplies, materials, papers, phone numbers, etc?
7. Find you have forgotten to call someone?
8. Find you have forgotten to respond to a request?
9. Become annoyed with or irritated by co-workers boss/supervisor, clients/customers/vendors or others?
10. Become impatient with others at work?
11. Avoid attending meetings?
12. Avoid interaction with co-workers, clients, vendors or supervisors?
13. Have a co-worker redo something you had completed?
14. Find it difficult to concentrate on the task at hand?
15. Fall asleep unexpectedly or become very sleepy while at work?
16. Become restless while at work?
17. Notice that your productivity for the time spent is lower than expected?
18. Notice that your efficiency for the time spent is lower than expected?
19. Lose interest or become bored with your work?
20. Work more slowly or take longer to complete tasks than expected?
21. Have your boss/co-workers remind you to do things?
22. Not want to return phone calls or put off returning calls?
23. Have trouble organising work or setting priorities?
24. Fail to finish assigned tasks?
25. Feel too exhausted to do your work?

8.1.3 Internet Addiction Test (IAT)

The following 20 questions comprising the IA Test use a 5 point Likert scale (Young, 2007). The scale values indicate the following: 0 – not applicable to the respondent, 1 – the respondent rarely engages in, 2 – the respondent occasionally engages in, 3 – respondent frequently engages in, 4 – respondent often engages in and 5 – the respondent always engages in.

These questions are all of ordinal variable types, each type is represented by a score from 0 to 5 and these scores are then totalled and used in the assessment, the totalled
scores are considered as ratio / interval variables.

1. How often do you find that you stay online longer than you intended?
2. How often do you neglect household chores to spend more time online?
3. How often do you prefer the excitement of the Internet to intimacy with your partner?
4. How often do you form new relationships with fellow online users?
5. How often do others in your life complain to you about the amount of time you spend online?
6. How often do your grades or school work suffer because of the amount of time you spend online?
7. How often do you check your email before something else that you need to do?
8. How often does your job performance or productivity suffer because of the Internet?
9. How often do you become defensive or secretive when anyone asks you what you do online?
10. How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?
11. How often do you find yourself anticipating when you will go online again?
12. How often do you fear that life without the Internet would be boring, empty, and joyless?
13. How often do you snap, yell, or act annoyed if someone bothers you while you are online?
14. How often do you lose sleep due to late-night log-ins?
15. How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?
16. How often do you find yourself saying "just a few more minutes" when online?
17. How often do you try to cut down the amount of time you spend online and fail?
18. How often do you try to hide how long you've been online?
19. How often do you choose to spend more time online over going out with others?
20. How often do you feel depressed, moody or nervous when you are off-line, which goes away once you are back online?

8.1.4 Workplace Internet Leisure Browsing

Respondents are asked to select what forms of internet browsing activities they partake
in; these are the options as per Coker’s paper (2009):

1. Reading online news websites
2. Checking online sports results
3. Checking lottery results
4. Reading non-work blogs
5. Writing personal blogs
6. Reading newsgroup/discussion forum messages
7. Writing newsgroup/discussion forum messages
8. Shopping (browsing with an intention to purchase products and services)
9. Browsing websites and online catalogues for products or services of interest (no goal of specific purchase)
10. Browsing or participating in online auction websites
11. Watching on-line media (e.g., YouTube)
12. Playing online games
13. Checking/writing personal emails from a non-work related email account
14. Searching for information about hobbies
15. Participating in online gambling activities
16. Viewing adult websites
17. Organising personal financial affairs (e.g., online banking, stock trading)

For each form of activity selected by the respondent the following information is requested:

Frequency and average duration per day the activity takes place, if less than a day, the frequency and average duration per week the activity takes place, and if less than a week, the frequency and average duration per month, and if less than a month, the frequency and average duration per year.

Each selection is a nominal variable; each selected nominal variable will lead to interval / ratio variables for frequency and average duration for each of the additional categories of days, weeks, month and year.

8.1.5 Task & Awareness questions

8.1.5.1 Tasks

Respondents will be questioned about task interruptions when conducting workplace internet leisure browsing using a 5 point Likert scale. The scale values indicate the
following: Never =0, Rarely = 1, Sometimes = 2, Often = 3, Almost always = 4.

1 How often do you interrupt incomplete work tasks to conduct workplace internet leisure browsing?

2 How often do you conduct workplace internet leisure browsing in-between completed work tasks?

These questions are all of ordinal variable types, each type is represented by a score from 0 to 4 and these scores are then totalled and used in the assessment, the totalled scores are considered as ratio / interval variables.

8.1.5.2 Acceptable Use Policy

Respondents are asked about their awareness level of; Acceptable Use Policies, Internet Activity Monitoring and if the company they work for has enforced Acceptable Use Policies.

1 Are you aware of the existence of a company Acceptable Use Policy describing acceptable internet use and behaviour? – (Dichotomous)

2 Have you ever read the companies Acceptable Use Policy? – (Dichotomous)

3 Are you aware that internet activity can be monitored? – (Dichotomous)

4 Are you aware if your company monitors internet use activity? – (Dichotomous)

5 Has your company communicated its intent to enforce Acceptable Use Policies by punishing employees who disregard them? – (Dichotomous)

6 Do you know of a work colleague who has been disciplined for exceeding the terms of the companies Acceptable Use Policies? – (Dichotomous)
8.2 Appendix 2 – Demographic & Work Graphs

8.2.1 Age Analysis

Graph 2 – Age distribution of respondents

8.2.2 Education Level

Graph 3 – Education Level distribution of respondents
8.2.3 Occupation Level

Graph 4 – Occupation level distribution of respondents

8.2.4 Access to the internet

Graph 5 – Access to the internet, in years
8.2.5 Work Days

How many days per week do you usually work or would you usually be expected to work?

Graph 6 – Number of days respondents are expected to work

8.2.6 Work Hours per Day

How many hours do you usually work or would you usually be expected to work, per day?

Graph 7 – Number of hours respondents are expected to work per day
8.2.7 Internet Addiction Test results

Please consider carefully and select the response which best describes you (IAT) - Part 1

Graph 8- IAT Summary Results – Part 1
Please consider carefully and select the response which best describes you (IAT) - Part 2

Graph 9 - IAT Summary Results – Part 2
8.2.8 Endicott Work Productivity Scale Results

During the past week, how frequently did you ... (EWPS) - Part 1

Graph 10- EWPS Summary Results – Part 1

Never | Rarely | Sometimes | Often | Almost Always
During the past week, how frequently did you … (EWPS) - Part 2

Graph 11 - EWPS Summary Results – Part 2
8.2.9 Internet Browsing Habits

Please select the type and frequency of internet activities you perform during work hours that are not part of your normal work activities (Habits) - Part 1

Graph 12- Internet Browsing Habits – Part 1
Please select the type and frequency of internet activities you perform during work hours that are not part of your normal work activities (Habits) - Part 2

Graph 13- Internet Browsing Habits – Part 2

Blanchard et al research results were similar with respect to the distribution of internet activities recorded. (pp. 1074-1075)
8.2.10 Acceptable Use Policy

AUP

- Are you aware of the existence of an Acceptable Use Policy at work, that describes acceptable internet use and behaviour?  
  - Yes: 85% 
  - No: 15%

- Have you ever read the company’s Acceptable Use Policy?  
  - Yes: 71% 
  - No: 29%

- Are you aware that your internet activity can be monitored by the company?  
  - Yes: 97% 
  - No: 3%

- Do you know if your company actively monitors internet use activity?  
  - Yes: 80% 
  - No: 20%

- Has your company ever communicated its intent to enforce Acceptable Use Policies by punishing employees who disregard them?  
  - Yes: 69% 
  - No: 31%

- Do you know of a work colleague who has been disciplined for exceeding the terms of the company’s Acceptable Use Policy?  
  - Yes: 47% 
  - No: 53%

8.2.11 Task Interruption

Task Interruption

- How often do you interrupt incomplete work tasks to conduct work based internet leisure browsing?  
  - Almost Always: 24% 
  - Often: 44% 
  - Sometimes: 29% 
  - Rarely: 3% 
  - Never: 3%

- How often do you conduct work based internet leisure browsing in-between completed work tasks?  
  - Almost Always: 13% 
  - Often: 47% 
  - Sometimes: 28% 
  - Rarely: 11% 
  - Never: 0%