Time spent using technological devices and mental health (depression, stress and anxiety) as well as coping and addictive behaviour

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Abstract

The aim of this exploratory study was to gain a deeper understanding and to expand upon the literature of the relationship between the time spent using technological devices and mental health (depression, stress and anxiety) as well as coping and addictive behaviour. A quantitative, correlational coefficient survey approach was utilized. A convenience sample of 122 (M= 50, F=72) participants completed four self-reported questionnaires: The Bergen Facebook Addiction Scale (BFAS), The Depression, Anxiety, Stress Scale (DASS), The Brief Cope, The General Health Questionnaire (GHQ). Analysis of the data showed that there was a positive, significant correlation between time spent on tech devices and addictive behaviour. There was no significant correlation between the time spent interacting with others and mental health. There was no significant correlation between the time spent on devices and mental health. Results had shown there to be a significant correlation between coping strategies mental health and addictive behaviour.

Introduction

It is not easy to live a human life. The 21st century has come to contradict this statement as all of our conditions have been met. Surprisingly, we are not yet totally satisfied. An essential part of being human is that one must come to pay a price. One must sacrifice their pleasures and satisfactions to participate in human activity (Loose, 2007). However, with an explosive trend in the newest, high tech devices our template on human experience is rapidly changing. We have come to enjoy ourselves simply because we can, as we have all of these gadgets (I-phones, laptops, social media, internet etc...) with which to enjoy ourselves. The combination of stimulating content, low cost, visual stimulation, ease of access have all come to contribute to our pleasures.

Although some of these gadgets have existed some time before, the question is how have these modern tech devices come to bring this transformation to our culture? It is precisely because in society today our pleasures and satisfactions have by no means been curtailed. This is evident in every single contemporary advertisement campaign as nothing sells more than the promise of total enjoyment (Loose, 2007). Turner (1990) outlines that the technological developments that are associated with the latest modern conditions are a form of a disorganised capitalism, consumer society and mass cultural production. Additionally, this issue had been highlighted by Apple CEO, Tim Cook, as he had announced in October (2015) that in the free markets, tech giants thrive on data, to which we have unknowingly been providing them with, in order to bring a better target for future advertisements and products (Bielenberg, Weckler & Price, 2015).

We have come to view the world with our heads down, totally engrossed in the latest tech devices. However, these technologies affect the manner in which live, work and play. These tech devices are thus claimed to be mood altering and behaviourally impacting, as we

continuously tap away at keyboards to the rhythm of our thoughts (Greenfield, 1999). This research will investigate whether the time spent on tech devices contribute to some of the negative psychological effects, which are gradually on the increase in Ireland (Depression, stress and anxiety levels).

These latest tech devices are only the beginnings of 'improvements' to our culture, but attached to them may be a series of unintended negative effects. A recent OECD report admits ", Intense computer use in class linked to significantly poorer student performance" (Humphreys, 2015). Ireland is currently ranked fifth from the bottom. This causes alarming concerns for our future as well as the youth of today as it is difficult to imagine a modern teenager without a mobile phone or another latest tech device. Research by Dr. Emma Bond (2009), discovered that a total of 97 per cent of 11 to 16 year old children all own mobile phones. This is a worrying 8 per cent more than the percentage of adults that own their own mobile phone (Childwise, 2014/2015). Nevertheless, these gadgets are being created and modified at such a rapid pace, that research has barely had the time to investigate the effects that these latest gadgets may cause on our mental health and behaviours.

It is often debated that whether the impact of these newest gadgets on youth has been a positive or negative one. Research in the area has been contradictive to a large extent. With many researchers stating that these technologies have made the youth in our society more socially connected and better informed than previous generations. Although, technologies have been shown to be conveniently useful, it is well known that experiences of problems with new 'improvements' adapted in our society is far from new. For instance, fossil fuels, fast foods and the newest contactless payment credit/cash cards have all had unintended negative consequences.

Research in this field is often based on older technologies, leaving only a sparse amount of research on contemporary behaviours and their connection to modern tech devices (Rideout, Foehr, & Roberts, 2010). This is due to the fact that these technologies are changing at exponential rates, obtaining new users of second of every day (Greenfield, 1999). Thus, the aim of this research project is not only to draw awareness to this generation on the time that they spent using tech devices as well as the time they spend on interacting with others, but with the aim of describing the relationship between this and the consequences of the same.

1.1 The 'Addictive Solution'

The mass appeal of the latest tech devices and the services which it provides is potentially a cause for concern, particularly in relation to the gradually increasing amount of time people spend using them. Rideout, Foehr, & Roberts (2010) found that 8- to 18-year-olds consume more than seven and a half hours of media daily. This included time spent viewing television content, listening to music, using the computer and playing video games. Additionally, Ahonen (2011) quoted research by Nokia that the average person looks at their phone 150 times a day. This suggests that every 6.5 minutes while they are awake, they look at their phone. It would be true to say that these modern tech devices have become the energy that acts as the driving force that runs our everyday lives. It has brought an automation level to this generation. These technologies save all the time and energy, as human effort has been saved to a large extent. This gives reason for this research, aiming to draw awareness to these tech devices about the time spent using them. This is in support of Walsh's comments (2012), that the use of these tools should be minimized due to the negative consequences they entail. Hoffman, Novak & Venkatesh (2004) research investigates this concern further, exploring if tech devices have become indispensable for

users. The consequence is that it has become so embedded into the daily fabric of people's lives that they simply cannot live without it.

Equivalently, researchers have come to acknowledge that there is a compulsive performance in individual's behaviour with regards to the usage of these latest technologies. Some have even suggested that the excessive use of new technologies may be particularly addictive to this present generation (Echeburúa & de Corral, 2009). Research has interestingly found that for every time an individual responds to an instant message or 'ping', a small amount of dopamine is emitted in the brain as a reward. In addition to this, nearly 30 percent of internet users admit to using the internet in order to alter their mood. Therefore, they use the internet in the same way as others use drugs, relieving their negative mood (Greenfield, 1999).

However, there has been few research that has successfully examined specific behaviour related to the use of these latest tech devices, as research in this area has mainly focused on the use of the internet (Young & Rogers, 1998; Chou & Hsiao, 2000). Another example of this is the Carnegie Mellon University study (Kraut et al., 1998) which investigated internet use amongst 173 people. This study conveyed that there is some devastating effects from excessive time spent using the internet. This resulted in an increase to measures of social isolation and depression. In agreement to these findings, Shapira et al., (2003) stated that the overuse of gadgets generates disorders in all aspects of the individual. Additional, Individuals then are challenged by modern psychical and social problems. Such as sleep disturbance, back strain, eye strain, face to face relationships, academics, family issues etc. (ASAM, 2012).

However, it is important to consider what the term addiction actually defines. From the Latin word addiction meaning enslaved, it contains a fundamental ambiguity. For

centuries the term addiction was the state of being intensely involved with an activity. Referring back to its origin, it signifies "giving over" or engaging in behaviour habitually, either in a negative or a positive sense (Alexander & Schweighofer, 1988). However, in recent times this term has been used in more or less restrictive ways, linking addiction to substance abuse, illness and withdrawal symptoms (Ross, Kinciad & Spurrett, 2010). Thus, addiction has taken on many meanings over time. It can also be defined as a persistent condition, which involves a repeated powerful motivation to engage in the repetition of a behaviour or an activity. It is independent of the adverse consequences (Angres & Angres, 2008).

With regards to the excessive use of tech devices, Young (1998) argued that, it has become a habitual compulsion. Additionally, Researchers at the University of Maryland, College Park, USA led a global study, titled 'The World Unplugged' (2010), found that what students became most aware of was their absolute inability to direct their lives without media. This research had documented students' outright failure to go without technological devices and services for only 24 hours. With the recordings of shocking comments from the students "I literally didn't know what to do with myself" and "It was a difficult day …a horrible day", captured their high dependence on technological devices. This present research will attempt to investigate the relationship between the time spent on tech devices and addictive behaviours.

1.2 Mental Health

It is known that students are using a variety of technologies at higher levels than other age groups. Unfortunately, it is still unknown whether the persistent time spent using modern tech devices has a positive or negative effect on mental health. Some research has found there to be a positive, significant correlation between the dependence of these devices

and services and psychiatric disorders like depression, anxiety, obsessive-compulsive disorder, attention deficit disorder (Young, 1998).

However firstly, it should be made clear, the different terms that are commonly used in relation to mental illness. Mental health and mental ill health do not constitute the label of mental illness. Mental Health is a state of well-being. It involves an individual to come to realize and be aware of their own abilities, bringing this knowledge to allow themselves to work fruitfully and effectively. With mental health an individual can cope with the normal stresses of life and can contribute to the community (Who, 2007). Mental illness can be defined as a distressing psychological symptom that effects a person's ability to cope with and manage his or her life. This may cause a decrease in their ability to fully participate in their lives (A Vision for Change, 2006). However, every one of us can experience this. For instance, the pressure of work may cause a person to experience poor concentration, mood swings and sleep disturbance. Everybody is susceptible to mental illness, even though such problems are usually temporal.

It has been estimated that one in four people will experience a mental health problem in their lifetime (Who, 2007). Additionally, The authoritative work, initiated by WHO and The World Bank indicates that by the year 2020, depression will constitute as the second largest cause of disease burden worldwide (Murray & Lopez, 1996). From the discussions above this has led to ideas about the impact of the excessive time spent using technological devices and services on young adults' mental health.

1.3 Depression

Depression is a common mental disorder. It has been estimated to effect at least 350 million people each year, with an average of 3000 suicide deaths every day. It is a significant contributor to the worldwide burden of mental illness. Depressed or low mood, loss of interest or pleasure, feeling of guilt and self-worth, disturbed sleep or appetite and poor concentration may be present with depression (HSE, n.d). Furthermore, depression can often run parallel with symptoms of anxiety. This can be chronic for an individual, effecting their everyday responsibilities and life. This mental illness has an increasing rate each year for Ireland. With the age group becoming younger and younger, while the degree of dependency on technological devices is rocketing to such a level that their purpose have become luxury driven.

Hancock et al. (2008) discovered that, viewers and listeners had adapted a negative attitude when watching and listening to 'depressing' music and videos on technological devices. What these researchers also found was that when these participants began an instant message conversation, they used fewer words, increased the amount of sad terms used and sent messages at a slower rate to their partners. Similarly, a study by Beranuy, Obserst, Carbonell and Chamarro, (2009) aimed to investigate problematic internet and mobile phone use in 365 undergraduate students at Ramon Llull University Barcelona (Spain). What these researchers had come to find was that psychological distress correlated to maladaptive use of internet and mobile phone. Results had also indicated that on the mobile phone questionnaire, females had scored significantly higher than males.

Further research by Thomee, and others, (2011) also found there to be a relation between the heavy use of tech devices and an increase in depressive symptoms as well as sleep disorders across both genders. They results had also interestingly indicated, that

frequently using a computer without breaks had further increased the risk of stress, sleeping problems and depressive symptoms in women. They had conducted a study to examine the relationship between mobile phone use and stress, sleep disturbances and depression in young adolescents of 20-24 years olds students. They had concluded that unlimited mobile phone use was a risk factor for mental health for young adults.

1.4 Anxiety

Most people have experienced symptoms of anxiety at some stage in their lives as it can be an essential aspect for survival. For instance, a person may feel anxious when facing a specific event, such as an important exam or interview. It can lead an individual to better performance or it can help a person act on their concerns. This is a normal anxiety response, known as the "fight or flight" response. However, when cognitive, physical and behavioural symptoms of anxiety become persistent and severe, it can effect a person's overall mental health and destruct their ability in carrying out daily tasks. There are six main categories of anxiety disorders, phobias, panic disorder, generalized anxiety disorder, obsessive-compulsive disorder, acute stress disorder and post-traumatic stress disorder (APA, 2000).

Research has found symptoms of anxiety present in relation to the overuse of tech devices. For instance, a cross-national study carried out by Mieczakowski et al., (2011), reported that being overwhelmed by communications technology was negatively related to well-being. Billieux, Van Der Linden, & Rochat, (2008) found that mobile phone use had a significant relation to impulsivity. Additionally, 'Phantom vibration syndrome' has become a relatively new phenomenon. It implies perceived vibration from a mobile phone that is not actually vibrating. This has been reported to occur across a large number of people. Drouin et al. (2015) claim that, these phantom vibrations may be another contemporary symptom of social anxiety.

1.5 Stress

Stress is often described as 'a negative emotional experience accompanied by predictable biochemical, physiological, cognitive and behavioural changes that are directed either toward altering the stressful event or accommodating its effects' (Taylor, 2009, p.147). Stress is often capitalized as a mismatch between a person's demands that they must meet and their ability to cope and manage these demands. Stress can take a toll on any individual, leaving behind psychological and physical health issues (Senol- Durak et al 2006, p158). Dineen & McLeavey (1992) stated that stress can be captured as any change that an individual must adjust to. This may range from extreme physical danger to achieving long desired success. Therefore, stress can become beneficial at times. It can help individuals get through their challenges and situations in life as it produces a boost. This boost provides an individual with drive and energy (Nelson & Simons, 2003, p261). Meanwhile, an extreme amount of stress that is constant and persists over an extended period of time, can take a severe emotional toll. It can result with health consequences. This can become psychologically and physically debilitating for an individual, resulting with serious health conditions.

This generation has been brought up in a wired world, spending an average of seven hours per day on technological devices (Strasburger et al., 2010). Research has discovered that students suffer from feelings that life without the Internet would be boring. As well as feeling irritated and even upset when they could not access the services provided by technological devices (Nalwa & Anand, 2003). With these tech devices being an integral part of life, the term 'Technostress' had originated in 1980. This term defines "the inability to adapt to or cope with new computer technologies which reveals itself in one of two ways: (1) computer users struggle to accept the technologies or (2) computer users over identify themselves with the technology" (Brod, 1984). This can lead to negative physical and

psychological consequences for an individual. Clute (1998), has examined the symptoms of technostress. Angry outbursts as well as social isolation were listed as an indication of stress related to technology use.

1.6 Cope

The term 'cope' has gathered a variety of definitions for the past decade as it has been investigated from a range of different perspectives. For instance, the psychoanalytical perspective focuses on the use of defence mechanisms and impulses. The life-cycle perspective involves mastery and developmental transitions, which increases levels of self-esteem and internal control. However according to Lazarus & Folkman, coping is "the cognitive and behavioural efforts to manage specific external or internal demands (and conflicts between them) that are appraised as taxing or exceeding the resources of a person" (p.141).

There are many different types of coping strategies. However, some coping strategies are more effective than others when dealing with mental health. For instance Weinstein, Brown, & Ryan, (2009) describes problem-focused and emotion-focused coping strategies as a more efficient approach. Using these forms of coping strategies is taking an active effort in the resolution of stressful experiences which come to benefit an individuals' mental health. Costa & Pinto-Gouveia's (2013) research also conclude that emotion-focused strategies prove to be more effective for coping with distressing situations.

However, there are many other forms of coping strategies that individuals may come to use, but these may not necessarily be the best way to deal with the stressors within an individual's life. Avoidant coping strategies such as self-distraction, and behavioural disengagement come to direct an individual away from the stresses in their lives whilst is does not actually confront the problem (Green, Choi, & Kane, 2010). In support of these

statements, Eisenbarth's (2012) research claims that avoidant coping strategies are usually maladaptive and result in greater psychological outcomes. This is also supported by the work of others (Roesch & Weiner, 2001; Moskowitz et al., 2009). This present study to attempt to investigate the relationship between coping strategies and mental health.

However an interesting question which may be relevant to this research is that, is there a need to modify coping strategies in order to include using modern tech device as a way of coping in young adults? There is a gap in previous research in regards to this area. Greenfield (1999), discovered that the internet can produce clear alterations in mood. Nearly 30 % of users admit to using the internet in order to alter their mood. This media relieved negative mood states. This had acted like a coping strategy for these users. Thus, have tech devices may come to act as a way of coping for a young adults?

1.7 Media and society into the 21st century

The new wave on tech devices has enhanced user's access to various contents and services. Media analysts have pointed to the declining use of traditional media (radio, television, magazines etc.) and an increasing use in the newest tech devices by the younger generation. For instance, In Australia, Life – lounge Urban Market Research published in 2007, 16-30 year olds usage of new media. It was found that 98.5% used the Internet up to six hours a day as well as 98.6% owning a mobile phone. Additionally, The article 'Ireland has more mobile phones than people', (2013) comments that there is approximately 1.185 mobile phones for every man, woman and child in the country, regardless of their age. In the years 2005, 2010, 2013 the percentage of the world population using the internet increased from 16%, 30% & 39%. (ITU, 2013). As we are surrounded in a world where everybody is plugged into tech devices, it is extraordinary to see the world becoming closer and accessible at people's fingertips.

Although these tech devices have expanded one's horizon of the world, do they actually manage to bring us closer? The HomeNet project by Kraut et al. (1998), as well as the large scale survey reported by Nie & Erbring (2000), concluded that internet use led to negative outcomes for the user, resulting in increased depression, loneliness and the neglect of close relationships. However, there is a certain amount of ambiguity as not all research came to this conclusion including the follow up of the HomeNet project by Kraut et al. (2002). In this following investigation, it had revealed the strong association amongst the more time spent on internet and computer use with positive social and psychological outcomes. Howard et al. (2001), reported similar findings from their large random-sample survey, stating that these devices enable people to stay in touch with their friends and family. Also, suggesting that these tools actually extend social contact and not detract from it. Interestingly, research had also found that 20% of people rather communicate with devices than communicate face-to-face (Thompson, 2012). In support of this, Cardak (2009) concluded that excessive time spent using technological devices can effect one's social relations as well as social well-being, which can lead to the formation of modern symptoms like depression and anxiety. This creates overall discomfort when faced to interact in social settings for users. This research will attempt to explore this ambiguity that is found in previous research between the time spent on tech devices as well as interaction with others and the impact on mental health.

1.8 The Present Study

The aim of this exploratory study was to gain a deeper understanding and to expand upon the literature on the relationship between the time spent using technological devices and its impact on mental health (depression, stress and anxiety) and coping as well as

addictive behaviour. This had been carried out by investigating the relationship between each of these five variables, also with exploring these variables across gender difference as well as age differences.

To summarise, the present research hypothesises are the following:

1.   There will be negative significant correlation observed between the time spent on interaction with others and mental health (depression, stress and anxiety levels).

2.   There will be a positive, significant correlation observed between the time spent on tech devices and mental health (depression, stress and anxiety levels).

3.   There will be a significant correlation observed between coping strategies and mental health (depression, stress and anxiety levels).

4.   There will be a positive, significant correlation observed between the time spent using tech devices and addictive behaviour.

5. There will be a significant correlation observed between coping strategies and addictive behaviour.

2. Methodology

<u>2.1 Participants</u>

The target population for this study was both males and females students attending Dublin Business School College. In order to access this sample a convenience sampling method was used. Convenience sampling was achieved by obtaining lecturer's permission, gaining access to the students. The voluntary participants were given a questionnaire which explored the relationship between the time spent on tech devices as well as social interaction and its impact on mental health. There was no reward or incentive given for participating. The study was given approval by the Dublin Business School Psychology Research Ethics Committee and all ethical principles in the Code of Professional Ethics were adhered to.

Inclusion criteria:

Male and females over the age of 18, who were attending Dublin Business School.

Exclusion criteria:

Males and females under the age of 18 and those who were not attending this college.

The sample consisted of 122 adult students that met the inclusion criteria. There was a total of 72 female participants. This accounted for 59% of the sample, while there was a total of 50 male participants. This accounted for 41% of the sample. With regards to the age categories, 67% of the sample group were aged between 18-30, while 33% of the sample were aged 30 and above.

<u>2.2 Design and procedure</u>

A questionnaire-based study, employing a quantitative, between sample design was used. This investigated the relationship between the predictor variables: coping styles, time

spent on tech devices and time spent on social interaction and the criterion variables: depression, stress, anxiety, addictive behaviour.

Lecturers were approached from Dublin Business School College in order to gain access to the students. Permission had then been obtained from lecturers to distribute the questionnaires amongst the students prior to the start of their lecture. All willing participants who met the inclusion criteria; over 18 years of age, and are enrolled within this college, were recruited with use of an information sheet. Participants were briefly informed about the nature of the study and also emphasised about the anonymity of their responses and their right to withdrawal from the study. All questionnaires will be destroyed 1 year after collection. All of the participants were administered the questionnaire *(see appendix)* which took an average of 10 minutes to complete. After the collection of the questionnaires, participants were given time to ask any questions they may have in relation to the study.

2.3 Materials:

The questionnaire used in this study was one of structure. The first part of this questionnaire contains a short demographic profile. This was used to gather the participants age and gender. What followed after was five sections which contained four standardized questionnaires. A pen/pencil was used to fill out all questionnaires by participants.

Section A of the questionnaire contains questions regarding the time spent using the tech devices. This was displayed in tabular form. The participants were provided with the following options 1-2 hrs, 2-4 hrs, 4-6 hrs and >6 hrs against each gadget and service. The following question concerned the time spent for the purposes of using the devices and services. The last part of Section A was in regards to the amount of time spent, in hours per week by participants interacting face to face with others in certain contexts.

Section B of the questionnaire involved questions concerning the participants' dependency on the technological devices and services. The questionnaire used was the Bergen Facebook Addiction Scale (BFAS) by Dr. Cecilie Andraessen at the University of Bergen, Norway, and colleagues (2012). This was based on six basic criteria: (1) Salience, "the activity dominates thinking and behaviour". (2) Mood modification, "the activity modifies/improves mood". (3) Tolerance, "increasing amounts of the activity are required to achieve previous effects". (4) Withdrawal," the occurrence of unpleasant feelings when the activity is discontinued or suddenly reduced". (5) Conflict, "the activity causes conflicts in relationships, in work/education, and other activities". (6) Relapse, "a tendency to revert to earlier patterns of the activity after abstinence or control" (Andreassen , Torsheim , Brunborg , & Pallesen, 2012).

In this questionnaire the words "technological devices" has replaced the word "Facebook", for relevance to the hypothesis question. Participants were given the following instructions 'Please rate the following statement based on a five point scale labelled below,' as each item displayed was rated on this 5-point scale with anchors of 1, meaning very rarely and 5, meaning very often. Scoring "often" or "very often" on at least four of the six items suggests that participants are "addicted" to technological devices.

Andreassen and her colleagues (2012), found that those who are anxious have come to use Facebook more. Andreassen concluded that this may be due to the fact that those who suffer from anxiety may find it easier to communicate through social media than interacting face-to-face with others. For the reliability and validity of this questionnaire, it was reported that the factor structure of the scale of the questionnaire was effective (RMSEA = .046, CFI = .99). The coefficient alpha reported was .83. The 3-week test-retest reliability coefficient was .82 (Andreassen , Torsheim , Brunborg , & Pallesen, 2012).

Section C of the questionnaire contains the (DASS) Depression, Anxiety and Stress Scale (Lovibond & Lovibond, 1995). The scale used within this study was the 21 condensed, version which contains 7 items per scale. This had been designed measure the three related negative emotional states of depression, anxiety and tension/stress. This scale includes items such as 'I found it hard to wind down'. Participants were given the following instructions to '*Read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applies to you recently. There are no right or wrong answers. Do not spend too much time on any statement*'. Participants were then asked to give an opinion on how they feel about the statement using a Likert scale of zero '*Did not apply to me at all*', to five '*almost always*'.

In this particular questionnaire, the depression scale estimates dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest/involvement, anhedonia, and inertia. With regards to the Anxiety scale, this refers to autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. Furthermore, the Stress scale is sensitive to levels of chronic non-specific arousal. It values numerous aspects such as difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient (Lovibond & Lovibond, 1995).

In regards to scoring the DASS 21, the scale does not yield a total score but instead various dimensions of participants' responses are represented. As this is the short version scores must be multiplied by 2. After this each score can be transferred to the DASS profile sheet. This enables comparisons to be made between the three scales and also gives percentile rankings and severity labels. For example, participants who score between 21-27 on the depression scale are ranked as severe. This questionnaire possesses adequate construct validity, with reliability of the scales being .88 for Depression, .82 for Anxiety, .90 for Stress, and .93 for the Total scale (Henry & Crawford, 2005).

Section D of the study, consisted of the Brief Cope Scale devised by Carver et al (1989). This was applied in order to investigate the types of coping strategies that individuals use to deal with stressors in their lives. In this study, the short version was used which contains a 28 items. Participants were given the following instructions '*These items deal with ways you've been coping with the stress in your life. Each items ask what you've been doing to cope with present stresses'.* Participants need to consider what they usually do when under a lot of stress. The participants are then asked to rate on a Likert scale of between one and four, how much or how little they perform this behaviour. One on this scale indicates '*I haven't been doing this at all'* and four indicates '*I've been doing this a lot*'. There is no total score for this scale. However, the participants' responses reveal how much a person uses a certain coping strategy.

The questions correspond to 14 subscales; Self - distraction, Active coping, Denial, Substance Use, Use of emotional support, Use of instrumental support, Behavioural Disengagement, Venting, Positive Reframing, Planning, Humour, Acceptance, Religion and Self-blame. These 14 subscales are categorised in to two groups, adaptive and maladaptive groups. In consideration to the condensed version of the questionnaire following subscales were omitted: Self-distraction, Venting, Humour and Religion. . The main focus for this research here was to explore the correlation between these coping strategies and the time spent on tech devices. Carver et al. (1989) provide support for the validity of the COPE subscales and report internal reliability coefficients ranging from .62 to .85.

Section E of the questionnaire*,* contained The General Health Questionnaire (GHQ 12) (Goldberg, D, 1992). This is a short 12 item scale questionnaire, which is used to detect participates current mental health. The scale asks participants whether they have experienced a particular symptom or behaviour recently. For example, one statement asks respondents if they have '*been able to concentrate on whatever you're doing?*' Participants

were given the following instructions on how to complete the 12 item scale,' *Answer all the questions simply by circling the answer that you think most nearly applies to you'*. The scoring was (0011) in a likert scale with scoring from left to right. There is a validity of .76 when tested with a cronbachs alpha. A mean score of 3 or higher indicates casesness or significant distress, and the participant is at risk of a stress related illness.

2.4 Data Analysis

For the analyses of the data the statistical package for Psychology, SPSS software (version 22) was used. Data analysis. A correlational coefficient survey approach was used to examine the relationship between the time spent on tech devices as well as interacting with others and the impact on mental health. The predictor variables measured are coping styles, time spent on tech devices and time spent on interacting with others. The outcome measures are depression, stress, anxiety and addictive behaviour. Demographic variables (age and sex of participants) were also examined.

A Pearsons R correlation was carried out to investigate the correlation between the 14 different coping styles against each outcome measure (depression, stress, anxiety, addictive behaviour) as well as time spent on tech devices and time spent on interacting with others. Also correlations were carried out between the time spent on tech devices against each outcome measure. A correlation was carried out for the time spent on interacting with others against each outcome measure.

Independent T tests were carried out to look for gender as well as age differences for each of the outcome measure that are listed above. Where any significant correlations were found, the predictor variables were then entered into a multiple regression. The process

outlined by Barron and Kenny (as cited in Gibbsons. C, 2010) was then followed in order to arrive at the most parsimonious regression model.

3. Results

3.1 Descriptive Statistics

All statistics were computed on SPSS 22 for Windows. The total number of respondents was 122 of which 72 were female participants. This accounted for 59% of the sample, while there was a total of 50 male participants. This accounted for 41% of the sample. With regards to the age categories, 67% of the sample group were aged between 18-30, while 33% of the sample were aged 30 and above.

Table 3.2 illustrating Mean, SD, Minimum and Maximum values for each Predictor variable.

Predictors	Mean	SD	Minimum	Maximum
Time spent on Devices	21.99	11.027	6	50
Time spent on Interacting with Others	15.459	7.921	2	40
Coping Strategies: Self Distraction	4.484	1.787	2	8
Active Coping	4.787	1.899	2	8
Denial	2.918	1.423	2	8
Substance Use	2.975	1.572	2	8
Use of Emotional Support	3.803	1.789	2	8
Use of Instrumental Support	3.992	1.900	2	8
Behavioural Disengagement	3.057	1.479	2	8
Venting	3.762	1.686	2	8
Positive Reframing	4.557	1.768	2	8
Planning	4.787	1.984	2	8
Humour	4.000	1.814	2	8
Acceptance	4.557	2.013	2	8
Religion	3.488	1.889	2	8
Self-Blame	3.861	1.788	2	8

Table 3.3 illustrating Mean, SD, Minimum and Maximum values for each Criterion variable

Outcome Measures	Mean	SD	Minimum	Maximum
Depression	23.542	7.168	14	46
Anxiety	23.549	7.408	14	46
Stress	28.164	8.235	14	50
GHQ	24.016	6.082	12	46
Additive Behaviour	13.703	5.364	6	29

Participants were asked how many hours they spend on tech devices each day. Results show that 26.0% reported using their mobile phone for at least 4 hours per day, while 20.3% admitted to using their mobile phone for at least 6 hours and above. 46.3 % of participants reported to using their computer for at least two hours a day, while 65.0% claimed that they spent at least 2 hours a day using headsets. 61.0% of participant had claimed that they spend at least 2 hours per day watching music/videos. 82.1% had reported spending at least 2 hours a day for calling. 28.5 % reported to spend at least 4 hours a day using the internet. Also 20.3% admitted to spending 6 hours and above using the internet. 48.0% of participants reported to spend at least 2 hours on social media sites, while 30.9% reported in spending at least 2 hours per day on other tech devices and services that were not listed. An overall total of the time spent per day by participants had also been calculated with a mean of 21.99 and a standard deviation of 11.03.

Participants were then asked to indicate their purpose for their time spent on tech devices. The results had shown that 34.1% of participants that spend at least 4 hours per day using tech devices claim they use them for entertainment purposes. 28.5% of participates that spend between 2 to 4 hours per day reported to use tech devices for communication purposes. 18.7% of participants that spend at least 4 hours per day reported to use tech devices for study purposes while 66.7% of participants that spend at least 2 hours a day claim to use tech devices for studying also.

Participants were also asked to report the amount of time, in hours per week that they had spent interacting with others. 35% of participants had reported to spend 6 hours and above with their family each week. 40.7 % of participants had claimed to spend 4 to 6 hours per week interacting with their friends. 25.2% of participants had reported in spending up to 4 hours per week interacting with their hobbies.

3.4 Independent Samples T-Tests for gender differences against all criterion variables

An independent T-test had been carried out to explore participants' gender against all of the predictor variables. The results had shown there to be no correlation between sex of participants' and the outcome measures. The only significant correlation here was between females scoring higher than males on the GHQ.

3.5 Independent Samples T-Tests for age differences against all criterion variables

An independent T-test had been carried out on participants' age against all the outcome measures. The results had shown there to be a difference between the two age groups (18-30 years, 30 and above) as 18 to 30 year old participants' scored higher in levels of addictive behaviour, anxiety, depression and stress and on the time spent on tech devices than participants that were 30 years and above. These results that were found to be significant were entered into a regression.

3.6 Independent Samples T-Tests for Interacting with others against all criterion variables

Within this present research it had been hypothesized that there will be negative, significant correlation observed between the time spent on interaction with others and

mental health (depression, stress and anxiety levels). An independent T-test had been carried out to investigate the relationship between the time spent interacting with others against all criterion variables. The results had shown there to be no significance between this predictor variable against the criterion variables. Therefore, the hypothesis can be rejected.

Correlations table 3.7 for time spent on devices against all criterion variables

An independent T-test had been carried out to explore the correlation between the time spent on tech devices against all outcome measures. The results had indicated there to be all positive, significant correlation between this predictor variable and the criterion variables. All significant results were entered into a regression. This is shown below in table 3.7.

Correlations table 3.7 for time spent on devices against all criterion measures.

	Depression	Anxiety	Stress	GHQ	Addictive Behaviour
Time spent on Devices	R=.231* Sig=.001	R=.304** Sig=.001	R=.179* Sig=.049	R=.264** Sig=.003	R=.519** Sig=.003

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Correlation table 3.8 for 14 coping strategies against all criterion variables

Pearson R correlation was used to explore the correlations between the 14 coping strategies against all the criterion variables, also including time spent on tech devices and time spent interacting with others. All of the coping strategies that had correlated with the criterion variables were put into a multiple regression. This correlations table 3.8 can be seen below.

Correlation table 3.8 for 14 coping strategies against all criterion variables.

Coping Strategies:	Depression	Anxiety	Stress	Addictive Behaviour	GHQ	Time spent on Devices	Time spent Interacting with Others
Self-Distraction	R=.545** Sig=.001	R=.523** Sig=.001	R=.436** Sig=.001	R=.282** Sig=.002	R=.459** Sig=.001	R=.287** Sig=.001	R=.049 Sig=.592
Active Coping	R=.068 Sig=.456	R=.144 Sig=.133	R=.177 Sig=.052	R=.078 Sig=.394	R=.161 Sig=.077	R=.168 Sig=.456	R=-.032 Sig=.727
Denial	R=.247** Sig=.007	R=.217* Sig=.017	R=.114 Sig=.211	R=.044 Sig=.635	R=.381** Sig=.001	R=.149 Sig=.102	R=-.104 Sig=.256
Substance Use	R=.259** Sig=.005	R=.152 Sig=.094	R=.184* Sig=.042	R=.170 Sig=.062	R=.123 Sig=.178	R=-.030 Sig=.746	R=.141 Sig=.121
Use of Emotional Support	R=.060 Sig=.519	R=.088 Sig=.335	R=.105 Sig=.248	R=.053 Sig=.561	R=.089* Sig=.037	R=.076 Sig=.404	R=.029 Sig=.755
Use of Instrumental Support	R=.092 Sig=.321	R=.134 Sig=.141	R=.134 Sig=.140	R=.132 Sig=.148	R=.212 Sig=.019	R=.105 Sig=.252	R=-.069 Sig=.451
Behavioural Disengagement	R=.546** Sig=.001	R=.457** Sig=.001	R=.458** Sig=.001	R=.306** Sig=.001	R=.476** Sig=.001	R=.145 Sig=.110	R=-.096 Sig=.292
Venting	R=.192* Sig=.037	R=.154 Sig=.090	R=.237** Sig=.008	R=.123 Sig=.176	R=.257** Sig=.004	R=.055 Sig=.544	R=.003 Sig=.977
Positive Reframing	R=.243** Sig=.008	R=.284** Sig=.001	R=.133 Sig=.143	R=.148 Sig=.103	R=.172 Sig=.058	R=.172 Sig=.058	R=.100 Sig=.275
Planning	R=.241** Sig=.009	R=.217** Sig=.003	R=.262** Sig=.004	R=.217* Sig=.016	R=.238** Sig=.008	R=.162 Sig=.075	R=-.039 Sig=.666
Humour	R=.317** Sig=.001	R=.275** Sig=.002	R=.299** Sig=.001	R=.226* Sig=-.012	R=.150 Sig=.099	R=.017 Sig=.857	R=-.049 Sig=.588
Acceptance	R=.209* Sig=.023	R=.215* Sig=.017	R=.208* Sig=.022	R=.145 Sig=.122	R=.150 Sig=.100	R=.014 Sig=.878	R=-.33 Sig=.716
Religion	R=.013 Sig=.890	R=.093 Sig=.310	R=.039 Sig=.670	R=-.120 Sig=.189	R=.055 Sig=.551	R=.032 Sig=.727	R=.057 Sig=.537
Self-Blame	R=.590** Sig=.001	R=.557** Sig=.001	R=.571** Sig=.001	R=.427** Sig=.001	R=.474** Sig=.001	R=.201* Sig=.026	R=.028 Sig=.760

**. Correlation is significant at the 0.01 level (2-tailed).

 *. Correlation is significant at the 0.05 level (2-tailed).

Inferential Statistics

Regression coefficient table 3.9 for GHQ

Model		Unstandardized Coefficients		Standardized Coefficients		
1		B	Std. Error	Beta	t	Sig
	(constant)	8.511	2.087		4.078	.001
	Denial	.583	.361	.137	1.614	.109
	Venting	.223	.352	.062	.635	.527
	Self-Distraction	.907	.307	.266	2.956	.004
	Behavioural Disengagement	1.069	.354	.260	3.023	.003
	Planning	-.405	.309	-.132	-1.311	.193
	Gender	2.273	.870	.185	2.612	.010
	Time spent on devices	.049	.041	.089	1.196	.234
	Self-Blame	.745	.335	.219	2.227	.028

It had been hypothesised that there will be a positive, significant correlation observed between the time spent on tech devices and its impact on mental health (depression, stress and anxiety levels). The relationship between the time spent on tech devices and GHQ scores was investigated. A Multiple Regression had been carried out to test whether the time spent on tech devices, gender of participants and coping strategies such as self-blame, denial, planning, venting, behavioural disengagement, and self- distraction were predictors of GHQ. Preliminary analyses was conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The results of the regression had indicated that these predictors had explained 44% of the variance (R^2=.44, $F_{(8, 113)}$ = 11.23, p<.001). It was found that the coping strategy, self-distraction, significantly predicted the GHQ. (β=.27, p = .004, 95% CI= .30, 1.52), as did behavioural disengagement (β= .26, p= .003, 95% CI= .37, 1.78).

Regression coefficient table 3.10 for Depression

Model		Unstandardized Coefficients		Standardized Coefficients			
2		B	Std. Error	Beta			
						t	Sig
	(constant)	10.314	1.602			6.439	.001
	Denial	-.457	.358	-.092		-1.275	.205
	Positive Reframing	-.135	.358	-.033		-.377	.707
	Self-Distraction	1.738	.310	.436		5.600	.001
	Behavioural Disengagement	1.731	.360	.361		4.810	.001
	Planning	-.485	.376	-.135		-1.289	.200
	Acceptance	-.331	.338	-.093		-.984	-1.002
	Self-Blame	1.499	.328	.376		4.573	.001

In support of the above hypothesis, a Multiple Regression was used to test whether the time spent on tech devices and the coping strategies such as denial, self-distraction, behavioural disengagement, positive reframing, planning, acceptance, and self-blame were predictors of depression levels. Preliminary analyses was conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The results of the regression had shown that these predictors explained 57% of the variance (R^2= .57, $F(7,110)$ = 21.11, p<.001). It was found that the coping strategy, self- distraction significantly predicted depression levels. (β= .44, p= .001, 95% CI=1/12, 2.35) as did self-blame (β=.38, p=.001, 95% CI= .85, 2.15).

Regression coefficient table 3.11 for Anxiety.

Model		Unstandardized Coefficients		Standardized Coefficients		
3		B	Std. Error	Beta	t	Sig
	(constant)	15.934	2.440		6.529	.001
	Denial	-.363	.398	-.070	-.911	.364
	Positive Reframing	.188	.393	.045	.478	.633
	Self-Distraction	1.567	.342	.378	4.589	.001
	Behavioural Disengagement	1.296	.399	.259	3.250	.002
	Planning	-.457	.409	-.122	-1.117	.266
	Acceptance	-.432	.368	-.117	-1.175	.243
	Self-Blame	1.389	.368	.335	3.808	.001
	Age	-3.296	1.070	-.210	-3.082	.003

A Multiple Regression had been used to test whether participants' age, as well as coping strategies such denial, self-distraction, behavioural disengagement, positive reframing, planning, acceptance, and self-blame as were predictors of anxiety levels. Preliminary analyses was conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. The results had indicated that the predictors explained 51% of the variance (R^2= .15, F (8, 113) = 14.8, p<.001). This was after the removal of the time spent on tech devices and the coping strategy of humour, achieving a parsimonious result. It was found that self-distraction had been the most influential predictor on anxiety levels (β= .38, p< .001, 95% CI= .89, 2.24) as was self-blame (β=.34, p<.001, 95% CI= .67, 2.11).

Regression coefficient table 3.12 for Stress

Model		Unstandardized Coefficients		Standardized Coefficients		
4		B	Std. Error	Beta	t	Sig
	(constant)	16.546	2.137		7.742	.001
	Denial	-1.165	.472	-.201	-2.468	.015
	Planning	-.289	.450	-.070	-.642	.522
	Self-Distraction	1.503	.407	.326	3.691	.001
	Behavioural Disengagement	1.756	.476	.315	3.687	.001
	Substance Abuse	-.366	.397	-.070	-.922	.359
	Acceptance	-.503	.420	-.123	-1.198	.233
	Self-Blame	1.987	.426	.431	4.661	.001

A multiple Regression had been carried out to test whether the time spent on devices and the various coping strategies such as denial, self-distraction, substance abuse, behavioural disengagement, planning, acceptance and self-blame were predictors of stress levels. Preliminary analyses was conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. After the removal of the time spent on devices, venting and humour, the results indicated that the predictors had explained 45% of the variance ($R^2 = .45$, $F(7, 114) = 13.51$, $p < .001$). Self-blame had significantly predicted stress scores ($\beta = .43$, $p < .001$, 95% CI= 1.14, 2.83).

3.13 Regression Models for Coping Strategies

It had been hypothesised that there will be a significant correlation observed between coping strategies and its impact on mental health (depression, stress and anxiety levels). From the above multiple regression models, this hypothesis can be accepted.

Regression coefficient table 3.14 for Addictive Behaviour

Model		Unstandardized Coefficients		Standardized Coefficients		
5		B	Std. Error	Beta	t	Sig
	(constant)	4.781	2.358		2.027	.045
	Denial	-.303	.342	-.072	-.887	.377
	Time spent on Devices	.194	.045	.360	4.303	.001
	Behavioural Disengagement	.583	.359	.145	1.625	.107
	Age	-1.536	1.054	-.121	-1.457	.148
	Self-Blame	.924	.283	.277	3.261	.001

Another hypothesis predicted that there will be a positive, significant correlation observed between the time spent on tech devices and addictive behaviour. A Multiple Regression was used to test whether participants' age, the time spent on devices and the coping strategies such as self-distraction, behavioural disengagement, planning, humour and self-blame were predictors of addictive behaviour. Preliminary analyses was conducted to ensure no violation of the assumptions of normality, linearity, and homoscedasticity. Results had shown that the predictors explained 37% of the variance ($R^2 = .37$, $F(6, 115) = 11.38$, $p < .001$). Results had indicated that the time spent on devices significantly predicted addiction behaviour scores, as this was the most influential ($\beta = .36$, $p < .001$, 95% CI= .11, .29).

3.15 Regression Model for Coping Strategies and Addictive Behaviour

It had been hypothesised that there will be a significant correlation observed between coping strategies and addictive behaviour. From the Multiple Regression table above, the results had indicated that the time spent on devices significantly predicted addiction behaviour scores, as this was the most influential ($\beta = .36$, $p < .001$, 95% CI= .11, .29).

4.   **Discussion**

The aim of this exploratory study was to gain a deeper understanding and to expand upon the literature on the relationship between the time spent using technological devices and its impact on mental health (depression, stress and anxiety) and coping as well as addictive behaviour. This had been carried out by investigating the relationship between each of these five variables, also with exploring these variables across gender difference as well as age differences.

<u>4.1. Time spent interacting with others and mental health</u>

Previous research has suggested that individuals are challenged by modern psychical and social problems including face to face relationships, academics, family issues etc. due to the persistent use of tech devices (ASAM, 201). In agreement with this research, Clute (1998), had found that social isolation was listed as an indication of stress related to technology use. Past research had also found that 20% of people rather communicate with devices than communicate face-to-face (Thompson, 2012).In contradiction to this, the present study had hypothesised that the time spent interacting with others would negatively correlate with mental health. Participants were asked to report the amount of time, in hours per week that they had spent interacting with others. 35% of participants had reported to spend 6 hours and above with their family each week. 40.7 % of participants had claimed to spend 4 to 6 hours per week interacting with their friends. 25.2% of participants had reported in spending up to 4 hours per week interacting with their hobbies. However, the results had shown there to be no significant correlation. Thus, the 1st hypotheses (H1) can be rejected. The result of this present study indicates that the time participants had spent interacting with others had no negative impact on their mental health. Future research would be encouraged

to investigate into this area further for a more comparative analysis as tech devices are changing the way we interact with one another.

4.2. Time spent using tech devices and mental health

Some research has found there to be a positive, significant correlation between the dependence of these devices and services and psychiatric disorders like depression, anxiety, obsessive-compulsive disorder, attention deficit disorder (Young, 1998). Carbonell and Chamarro, (2009) supported this finding as they had come to find that psychological distress correlated to maladaptive use of internet and mobile phone. With regards to this, they had also found that females had scored particularly higher than males. In this present study, females had scored higher than male participants on the GHQ questionnaire. This may be due to females being more in tune with their emotions, therefore scoring higher than males. However, there was an unequal gender distribution in this present study and future research would be encouraged to investigate an even distribution to obtain a more realistic finding. Thomee, and others, (2011) also found there to be a relation between the heavy use of tech devices and an increase in depressive symptoms for both males and females. These results had also interestingly indicated, that frequently using a computer without breaks had further increased the risk of stress, sleeping problems and depressive symptoms in women. They had concluded that unlimited mobile phone use was a risk factor for mental health for young adults. However, in this present study it had found there to be no significant correlation between the time spent on tech devices and the impact on mental health. This hypothesis (H2) can be rejected. The results come to contradict what had been previously found.

Future research would be encouraged to investigate into the relationship between the time spent on tech devices and the positive aspects on mental health. This would support the follow up of the HomeNet project by Kraut et al. (2002). It had revealed the strong

association amongst the more time spent on internet and computer use with positive social and psychological outcomes. Howard et al. (2001), reported similar findings from their large random-sample survey, stating that these devices enable people to stay in touch with their friends and family. Also, suggesting that these tools actually extend social contact and not detract from it. It may be useful to use qualitative methods in future studies in an attempt to understand the role of the time spent using tech devices and that positive psychological impacts it may bring to mental health in order to resolve this ambiguity in pervious literature.

4.3 Coping strategies and mental health

Who (2007) defined mental health as a state of well-being which involves an individual to come to realize and be aware of their own abilities, bringing this knowledge to allow themselves to work fruitfully and effectively. With mental health an individual can cope with the normal stresses of life and can contribute to the community. Findings from this study indicate that coping strategies such as self-blame, denial, venting, behavioural disengagement, and self- distraction all positively and significantly correlated with GHQ scores, as well as planning negatively correlating with GHQ scores. Thus, the 3rd hypotheses (H3) can be accepted. More specifically, self- distraction as well as behavioural disengagement was found to be the most influential on GHQ scores in the present study. Self- distraction and behavioural disengagement have been said to be avoidant coping strategies. These results may come to support what Eisenbarth (2012) suggests, that a higher use of emotional- focused coping strategies alongside a lower level of avoidant strategies has a greater effect in decreasing psychological distress.

Similarly, denial, positive reframing, planning, acceptance had all negatively correlated with depression levels. While self-distraction, behavioural disengagement and

self-blame positively correlated with depression levels. This finding had brought more support for the 3rd hypothesis (H3). This provides further support for Eisenbarth's (2012) statements and also supports others previous research, which states that avoidant coping strategies are usually maladaptive and result in greater psychological outcomes (Roesch & Weiner, 2001; Moskowitz et al., 2009).

In addition to this hypothesis (H3), denial, planning and acceptance had negatively predicted anxiety levels. Whereas self-distraction, behavioural disengagement, positive reframing, and self-blame had positively predicted anxiety levels. As for stress levels denial, planning, acceptance and substance use had all negatively correlated, while the avoidant strategies such as, self-distraction, behavioural disengagement and self-blame had positively correlated with stress levels. The findings from this present study give strong support to Costa & Pinto-Gouveia's (2013) finding which states that instead of meeting distressing experiences with judgement and avoidant strategies, emotion- focused strategies prove to be more effective for coping with these certain events and experiences. All the above findings within this present study greatly support the hypothesis (H3).

4.4 Time spent using tech devices and addictive behaviour.

Previous research had suggested that the excessive use of new technologies may be particularly addictive to this present generation (Echeburúa & de Corral, 2009). The results from this present study have come to support what had been previously found. The 4th hypotheses had been accepted in this present research as the results indicated that the time spent using devices had significantly and positively correlated with addictive behaviour. Young (1998) stated that the time spent on tech devices has become a habitual compulsion for this generation.

Researchers at the University of Maryland, College Park, USA led a global study, titled 'The World Unplugged' (2010), found that what students became most aware of was their absolute inability to direct their lives without media. This research had documented students' outright failure to go without technological devices and services for only 24 hours. Although the results give support to previous findings that the time spent using tech devices correlates with addictive behaviour, however this time participants gave to using tech devices did not result in any relationship with the impact on mental health. Future research would be encouraged to investigate into the role of these tech devices in order to gain a better understanding of what this addictive behaviour entails for an individual's mental health. Alexander & Schweighofer, (1988) states that addictive behaviour signifies "giving over" or engaging habitually, either in a negative or a positive sense. This present study partially supports this statement as the findings would suggest that although the time spent on devices correlates to addictive behaviour, it is neither necessarily good nor bad for mental health. Future research would be encouraged to investigate into this finding more closely to gain an insight to what effect it may bring.

<u>4.5 coping strategies and addictive behaviour</u>

Within the present study denial had negatively correlated with addictive behaviour, while self-blame and behavioural disengagement were more influential and had positively correlated with addictive behaviour. Thus, the 5th hypotheses can be accepted. This finding in itself had laid down an area for future research to investigate. This result had led to the discovery of another research question, is youth using these devices as a way of coping with the stresses within their lives? Future research would be encouraged to investigate further into this relationship as there were only a small number of studies that has explored this relationship.

4.5 Limitations of the present research

There are a number of limitations in regards to this present study. Firstly, the sample size of this study is not a representative one. Further research may incorporate a larger representative sample. Paucity of time as well as limited resources led to restrict this research to focus only on one college. However, future research may expand this investigation to a variety of colleges within Ireland.

The present study involved structured questionnaires which in itself contains limitations. Participants were limited to choose an answer on a Likert scale which may not accurately reflect their thoughts, thus refining their answers overall. Future research might investigate these areas with establishing a better layout, allowing for a greater variety of participants answers. Another limitation of this research was that there may have been other factors that might have influenced participants' mental health that could not have been controlled for.

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6. **Appendices**

Dear Participant,

My name is Sarah Traynor. I am currently a third year student of Dublin Business School, seeking your willingness and cooperation in this questionnaire that I will use as part of my thesis project. In this questionnaire you will be asked questions regarding the use of technical devices and questions on health.

In order to take part, you must be over the age of 18. There are a number of questionnaires attached, each with instructions to be followed at the top. Please follow these instructions carefully and answer all the questions. This questionnaire should take no more than 10 minutes to complete.

The information given in this questionnaire will be kept confidential and will in no way be identifiable. The information will be treated sensitively by the researcher and can only be accessed by the researcher and project supervisor. If at any point of time you feel like not continuing with the questionnaire, you may do so without assigning any reason.

Thank you in advance for taking the time to help me in my research. If you have any questions about the research, please do not hesitate to contact me by email, sarahtraynor@live.ie . Helpline numbers for SAMARITANS as well as GROW are provided below.

(Feel free to take this sheet with you).

Helpline numbers:

Grow: 1890474474

Samaritans: 01 116123

Age:

18-30 years old ___

30 and above___

Sex:

Male___ Female___

Section A

How much time do you spend on the following devices and services per day?

Services and devices:	0-2 hours	2-4 hours	4-6 hours	6 hours and above
Mobile phone				
Computers/ Laptops/IPads				
Ear phones/ headsets (listening to music, use with apps)				
Calling				

Messaging				
Internet				
Music/Videos				
Social networking (Facebook, snap chat, Instagram etc.)				
Other				

Purpose of using the devises and services?

Purpose:	0-2 hours	2-4 hours	4-6 hours	6 hours and above
Communication				
Entertainment				
Study				

Please estimate the amount of time, in hours per week, spent interacting with others in the following contexts?

	0-2 hours	2-4 hours	4-6 hours	6 hours and above
Interests and hobbies				

Meeting up with friends				
Time spent with family				
Meeting with work or college friends				
Other				

Section B

Please rate the following statements based on a five point scale labelled below.

	Very Rarely (1)	Rarely (2)	Sometimes (3)	Often (4)	Very Often (5)
You spend a lot of time thinking about technological devices or plan use of technological devices.					
You feel an urge to use technological devices more and more.					
You use technological devices in order to forget about personal problems.					
You have tried to cut down on the use of technological devices without success.					

You become restless or troubled if you are prohibited from using technological devices.				
You use technological devices so much that it has had a negative impact on your job/studies.				

Section C

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you recently.

There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0. Did not apply to me at all. (Never)

1. Applied to me to some degree, or some of the time. (Sometimes)

2. Applied to me to a considerable degree, or a good part of time. (Often)

3. Applied to me very much, or most of the time. (Almost Always)

		N	S	O	AA
1.	I found it hard to wind down	0	1	2	3
2.	I was aware of dryness of my mouth	0	1	2	3
3.	I couldn't seem to experience any positive feeling at all	0	1	2	3

4.	I have experienced breathing difficulties (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5.	I found it difficult to work up the initiative to do things	0	1	2	3
6.	I have a tendency to over-react to situations	0	1	2	3
7.	I experienced trembling (e.g. in the hands)	0	1	2	3
8.	I felt that I was using a lot of nervous energy	0	1	2	3
9.	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10.	I felt that I had nothing to look forward to	0	1	2	3
11.	I found myself getting agitated	0	1	2	3
12.	I found it difficult to relax	0	1	2	3
13.	I felt down-hearted and blue	0	1	2	3
14.	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15.	I felt I was close to panic	0	1	2	3
16.	I was unable to become enthusiastic about anything	0	1	2	3
17.	I felt I wasn't worth much as a person	0	1	2	3
18.	I felt that I was rather touchy	0	1	2	3
19.	I was aware of the actions of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)	0	1	2	3
20.	I felt scared without any good reason	0	1	2	3

21.	I felt that life was meaningless	0	1	2	3

Section D

You have done really well – thank you. These next items deal with ways you've been coping with the stress in your life. The stress issue is the 'it' in some of the items! There are many ways to try to deal with problems. These items ask what you've been doing to cope with present stresses. Each item says something about a particular way of coping and please avoid answering on the basis of whether how you've been coping seems to be working or not—just whether or not you're doing it. Use these response choices and try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can.

Coding categories:

1 = I haven't been doing this at all

2 = I've been doing this a little bit

3 = I've been doing this a medium amount

4 = I've been doing this a lot

1. I've been turning to work or other activities to take my mind off things. _____

2. I've been concentrating my efforts on doing something about the situation I'm

in. _____

3. I've been saying to myself "this isn't real." _____

4. I've been using alcohol or other drugs to make myself feel better. _____

5. I've been getting emotional support from others. _____

6. I've been giving up trying to deal with it. _____

7. I've been taking action to try to make the situation better. _____

8. I've been refusing to believe that it has happened. _____

9. I've been saying things to let my unpleasant feelings escape. _____

10. I've been getting help and advice from other people. _____

11. I've been using alcohol or other drugs to help me get through it. _____

12. I've been trying to see it in a different light, to make it seem more positive.

_____

13. I've been criticizing myself. _____

14. I've been trying to come up with a strategy about what to do. _____

15. I've been getting comfort and understanding from someone. _____

16. I've been giving up the attempt to cope. _____

17. I've been looking for something good in what is happening. _____

18. I've been making jokes about it. _____

19. I've been doing something to think about it less, such as going to movies,

    watching TV, reading, daydreaming, sleeping, or shopping. _____

20. I've been accepting the reality of the fact that it has happened. _____

21. I've been expressing my negative feelings. _____

22. I've been trying to find comfort in my religion or spiritual beliefs. _____

23. I've been trying to get advice or help from other people about what to do. _____

24. I've been learning to live with it. _____

25. I've been thinking hard about what steps to take. _____

26. I've been blaming myself for things that happened. _____

27. I've been praying or meditating. _____

28. I've been making fun of the situation.____

Section E

The following items ask about your general health *over the past few weeks*. Please answer all the questions simply by circling the answer that you think most nearly applies to you. Remember that we want to know about your present and recent complaints, not those you had in the past. It is important that you try to answer all the questions.

Have you recently:

1. been able to concentrate on whatever you're doing?	Better than usual	Same as usual	Less than usual	Much less than usual
2. lost much sleep over worry?	Not at all	No more than usual	Rather more than usual	Much more than usual
3. felt that you are playing a useful part in things?	More so than usual	Same as usual	Less useful than usual	Much less useful
4. felt capable of making decisions about things?	More so than usual	Same as usual	Less so than usual	Much less capable
5. felt constantly under strain?	Not at all	No more than usual	Rather more than usual	Much more than usual
6. felt you couldn't overcome your difficulties?	Not at all	No more than usual	Rather more than usual	Much more than usual

7. been able to enjoy your normal day-to-day activities?	More so than usual	Same as usual	Less so than usual	Much less than usual
8. been able to face up to your problems?	More so than usual	Same as usual	Less able than usual	Much less able
9. been feeling unhappy and depressed?	Not at all	No more than usual	Rather more than usual	Much more than usual
10. been losing confidence in yourself?	Not at all	No more than usual	Rather more than usual	Much more than usual
11. been thinking of yourself as a worthless person?	Not at all	No more than usual	Rather more than usual	Much more than usual
12. been feeling reasonably happy, all things considered?	More so than usual	About same as usual	Less so than usual	Much less than usual

Thank you for taking the time to complete this survey.