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Studying the relationship between online behaviour and learning preferences, using the Internet Addiction Test and the Index of Learning Styles.

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Abstract

With the internet and digital platforms becoming increasingly integrated into our work, social and academic lives it is of interest to research its impact, such as on the way we process and learn information. This study analyses literature regarding excessive internet use, different learning preferences and the relationship between them.

Analysis of this relationship is a significantly understudied field which this thesis aims to evaluate using the Internet Addiction Test and the Index of Learning Styles. Demographics such as age and gender have also been incorporated into this study to investigate whether they are influential factors. Awareness of these kinds of measurements and the benefits they bring is also of interest for investigation. Data from this study has been collected from University of Leeds students and staff members.

The findings within this study have shown that no significant relationship between internet addiction test scores and learning preferences is present. Age has been found to be correlated with the sensing/intuitive and sequential/global dimension, as inter-relationships have also been found between those dimensions directly. Age was found to be negatively correlated with internet use while gender showed no signs of significance throughout the study. Awareness of and participation with tests that measure internet use and identify learning preferences have shown to be lacking. Participants did not feel their learning preferences have changed over the past few years nor did they understand whether a relationship between internet use and learning preferences exist.

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Chapter 1 Introduction

With digital and online platforms becoming ever more integrated into our daily lives, excessive use of the internet and digital devices is becoming an increasing concern, especially in regard to the affects it has on the way we go about our daily lives. This is especially interesting in respect to our learning preferences, which are the ways we effectively process and understand information. It is of growing interest to further research this field and explore the relationship between digital use and our learning preferences. Research within this area is valuable in order to understand whether relationships exist and how this can be used to effectively promote improved learning within education, organisations and our daily lives.

Therefore, this study analyses the relationship between different levels of internet use and learning preferences, as measured by the Internet Addiction Test and Index of Learning Styles respectively.

A set of research questions have been derived:

  i.   Are there relationships between Internet Addiction Test scores and learning preferences?

  ii.   Does age and gender have an influence on this relationship and/or the measurements individually?

  iii. Are inter-relationships between learning preferences present?

  iv.   Are people aware of their own learning preferences, level of internet use and existence of measurements?

<center>Chapter 2 Literature Review</center>

The first section of this literature review will examine the background around internet addiction and learning preferences. It will then go on to examine current literature that explores the known relationships between online behaviour and learning preferences, highlighting prominent themes and findings.

2.1 Internet Addiction

2.1.1 Internet Addiction Background

Internet addiction was primarily brought to light by the work of Kimberley Young who noticed maladaptive patterns between excessive internet use and behavioural symptoms within drug and alcohol addiction (Young, 1998). Varying in form, internet addiction can range from 'cyber relationship addiction' an addiction to making relationships over digital platforms to 'information overload' an addiction to web surfing or endless scrolling (Kandell, 1998; Texas State University, cited in Kennedy, 2013). Negative consequences of such behaviour have been identified by researchers such as depression, a breakdown in relationships and performance reductions within the workplace (Block, 2008; Young, 1998).

With the rise of social media platforms like Facebook and Twitter and advancements in portable digital technological like mobile phones, connecting to the digital world has become quicker and easier than ever as well as the opportunity for excessive digital use (Chen & Nath, 2016). Watson notes most internet users do not meet clinical internet addiction standards but a large number of users will be vulnerable to various forms of problematic use which can result in a reduction in productivity for example (Watson, 2014). Alongside Griffith and Kassiani et al., they call for more research on the affects excessive internet use can have on an individual (Griffith, 2004; Kassiani et al., 2018).

2.1.2 Awareness of Digital Use

Literature indicates a lack of awareness individuals have for problematic digital use and the effects caused. 38% of students within one study were either 'some what' or 'very much' aware of internet addiction with the majority not having an awareness (Oh, 2003). This is supported by Okeke, who found the majority of college students were unaware of problematic internet use and knew little of the affects (Okeke, 2007). Various studies validate and recommend measurements to effectively identify specific levels of internet use, which is vital in self-assessment and reducing the opportunity for harmful effects (Qiaolei & Louis, 2012; Pawlikowski et al., 2013).

2.1.3 Measurements of Internet Addiction

Laconi et al. note 45 different tools used to assess digital use and internet addiction, discussing the lack of rigour and consensus for a 'gold standard' within them (Laconi et al., 2014). The Korean Internet Addiction Self-Assessment Tool is one which is used as an official diagnosis for internet addiction in Korea, which has one of the highest risk rates (Kim et al., 2005). However, the Internet Addiction Test (IAT) developed by Young has been considered one of the most commonly used and validated assessments using a 20 question, 6 point linkert scale to classify individuals between no signs of internet addiction, an average user that may spend slightly too long online, to severe where negative outcomes are affecting an individual's life (Young, 1998). This test shall be used within this study as a way of specifically identifying varying levels of digital use, which shall be discussed further in chapter 3.

Various studies validate that levels of internet addiction within the European population is between 1.0% and 18.3% (Ferraro et al., 2007; Johansson & Gotestam, 2004; Tsitsika et al., 2011) and 13.7% to 18.4% within Asian countries (Nalwa & Anand, 2003; Kim et al., 2005). However, some of these studies are limited to adolescents and do not show a varied analysis between generations, which this thesis aims to improve upon.

Gender and age are certainly areas of interest to researchers in relation to digital use to understand if they are influential factors. Evidence supports a negative correlation

between age and internet use, for example Ferraro et al. found over 236 participants that older users had much lower signs of problematic use (Ferraro et al., 2007). This is agreed in more recent studies showing that 18-29 year olds have the highest percentage of internet use compared to older generations (Perrin & Duggan, 2015). Comparatively, results lack consensus as to whether gender is related to internet use. Some studies indicate that males are more likely to become addicted to the internet (Chou et al., 2005; Liang, 2003), some suggest the same for females (Leung, 2004; Young, 1998) and some illustrate no significant relationship (Chang & Law, 2008). However, studies such as Leung and Chang & Law are also limited in age ranges within their sampling, restricting to participants under 30. Therefore, this study shall take an approach similar to Liang and sample a variety of age ranges, which will consequently add further clarity to this body of research.

2.2 Learning Preferences

Learning preferences have been described by scholars as a method of effectively using stimuli to improve learning outcomes (Claxton & Rolston, 1978). Kharb described it as a person's way of understanding, processing and retaining information (Kharb et al., 2013). Research into learning preferences has been of continued interest in order to further understand how individuals can maximise effective learning.

2.2.1 Learning Preferences can be Adapted

Kirby notes the difference between cognitive styles, which we have no control over and learning styles which are types of individual preferences that can change and develop over one's lifetime (Kirby, 1979). This is in agreement with how Kolb discusses learning styles and the idea that they can be affected by factors such as personal characteristics, social environment and even experiences (Kolb, 1984). This is illustrated when Chinese students changed their learning styles when studying in Australia from reflective to active learners (Barron & Arcodia, 2002). This firstly gives the insight that there are cultural differences in learning preferences, however the key point understood from this, that lends itself to the motivation for this study, is the idea that learning preferences can change due to various factors, such as our

environment. Therefore, it is of interest to further explore whether other factors within our environment, such as digital engagement, have an effect on learning preferences.

2.2.2 Methods of Assessing Learning Styles

Various methods of assessing an individual's learning style have been developed to indicate tailored learning preferences that people can adopt to maximise the understanding and processing of information (Pashler et al., 2009). The Myers-Briggs Type Indicator is a commonly known model (Myers and Myers, 1980) which identifies learning preferences theorised under Jung's Theory of Psychological Types (Jung, 1971). However, the Felder-Silverman model is a widely used and validated model which will be used within this study, indicating individuals amongst four learning dimensions as shown below.

Procession Dimension	Active learners	*like to try things out and work collaboratively*
	Reflective learners	*think things through first and work independently*
Perception Dimension	Sensing learners	*like practical, fact based work*
	Intuitive learners	*like concepts and innovation*
Input Dimension	Visual learners	*prefer learning through visual representations such as pictures and diagrams*
	Verbal learners	*prefer words, written and spoken explanations*
Comprehension Dimension	Sequential learners	*work in orderly, logical, linear steps*
	Global learners	*like to learn in large leaps and grasp the bigger picture first*

 (Felder, 1996)

Richard Felder and Barbara Solomon then developed a 44-question survey, known as the Index of Learning Styles (ILS), which has been widely used as an indicative scale to direct people towards their learning preferences amongst the 4 learning dimensions shown above. Over the four dimensions, an individual can be balanced between the two or have a moderate or dominant preference for one (Felder & Brent, 2016). Awareness of one's learning style can be extremely beneficial in communicating their processing needs and effectively retaining information (Mestre, 2010). Johnson notes that college students are generally aware of their learning styles and understand how best they learn (Johnson, 2007), however Williams et al. note many are unaware and encourages taking tests to benefit from learning outcomes (Williams et al., 2013). Statistical research that investigates the proportion of individuals that have heard or taken these kinds of tests is an understudied area that needs further exploration.

Application of these kinds of tests have been proven to be of great benefit. For example, after a professor at Vanderbilt University used the Kolb Experiential Learning Model she found that students learned course material quicker and even developed their interpersonal skills (Felder, 1996). In the context of management Wong et al. found that identifying learning preferences of employees significantly improved development programmes and maximised the returns on training programmes (Wong et al, 2013).

2.2.3 Learning Preference Relationships

Like the IAT, gender and age are both areas of interest to analyse in relation to learning preferences to understand if they are significant predictors. Some studies have found no significant relationship between gender and learning preferences (Yang & Lynch, 2014). This study was limited however to engineering students but similar results have been proven by other studies that found no significant differences between learning preferences and gender (Wang & Mendori, 2015; Demirkan & Demirbaş, 2010). Alternatively, variance has been indicated within age, particularly between the 20-30 and 31-40 range, for learning preferences in the context of online courses. Older age ranges preferred visual representations while younger ages preferred interactive learning styles (Simonds & Brock, 2014). Conversely Kriegel

found in her study on learning styles in corporate web-based learning that there were no significant differences in learning preferences between generations amongst 230 participants (Kriegel, 2013). Therefore, this lack of consensus inspires further research to provide clarity within the relationship between age and learning preference.

Literature indicates common learning preferences amongst different samples, such as the study by Graf et al. testing the ILS on 200 students from various subject areas, where active accounted for 57%, sensing 58%, visual 87% and global 56% (Graf et al., 2007). This is similar to Felder and Spurlin's overview of 2000 students from different nations showing that active accounted for 61%, sensing 63%, visual 82% and sequential 59% (Felder & Spurlin, 2005). Therefore, literature does indicate a common direction within learning preferences amongst students. This study however shall improve on these by testing both students and staff members.

Hosford & Siders indicate an interesting inter-relationship between learning dimensions showing significant positive correlation between sensing/intuitive and sequential/global. They also report a weaker, but still significant, correlation between the active/reflective and visual/verbal dimension (Hosford & Siders, 2010). This was supported by Felder and Spurlin (Felder & Spurlin, 2005), however these studies focused solely on medical and engineering students respectively which is to be improved upon by sampling a variety of subject areas.

2.3 Interaction Between Digital Engagement and Learning Preferences

With the digital world becoming increasingly integrated into modern day life and the knowledge that our learning preferences can change due to our environments it is of interest to research relationships between digital use and learning preferences (Manal, 2015). Various studies analyse learning preferences against different kinds of digital platforms, however there are clear gaps within research that analyses learning preferences and specific levels of digital use.

2.3.1 Relationships Between Digital Use and Learning Preferences

On a study which evaluated the relationship between learning styles and social network use on tertiary level students, it found that active learners were most likely to use online messaging platforms and online discussion forums as were sequential learners but to a less degree. However, no inter-relationships were found between the two dimensions directly (Wanpen, 2013). Similarly, the relationship between learning preferences and Second Life, an online alternate reality programme, found that active learners were more engaged with the online platform showing more exploration and interaction (Cheng & Wong, 2013). This provides insights that active, compared to reflective learners, show more engagement with digital platforms, such as social media and online virtual reality games, both of which are key influencers of internet addiction (Young, 2017). However, these studies are limited in terms of digital use as they focus solely on individual online platforms, rather than general internet use.

Greenberg's study on the relationship between learning styles and synchronous online environments provides a more in-depth insight into this relationship. Interestingly, throughout the online course 90% altered their learning preference however had reverted back. Three students changed indefinitely from sequential to global, one changed from active to reflective and one changed from reflective to active (Greenberg, 2009). Compared to Wanpen this study found that intuitive learners showed more amicability with usage of online platforms and remained unchanged for all participants. Therefore, insight is gained that learning styles can indeed change when engaging with online platforms, particularly the procession and comprehension dimension and that the perception dimension is the most resilient to change. Similarly, Beadles & Lowery found that intuitive learners chose more online based courses at University, compared to sensing learners as they prefer innovation which is present in online courses as they contain technological advancements (Beadles & Lowery, 2007). These studies give insights that intuitive learners are more likely to engage with online platforms, however highlights the hypothesis that is the amount we choose to access the digital world dependent on our learning styles or do we adapt our learning styles because of our level of digital involvement?

Comparatively one study analysing the relationship between technological devices and learning preferences found that digital users were predominantly visual, active, sequential and sensing (Chernbumroong et al., 2017). However, this study was limited as the participants were defined as everyday users of digital devices, primarily smartphones. Therefore, this thesis shall improve on this by retrieving more precise measurements of internet use, through the IAT. Regardless of this, the results agree with Wanpen and Cheng & Wong that active learners are more predominant in online use. Huang et al. found similar findings that sensory learners engaged more frequently with online platforms and for longer durations in regard to e-learning. These studies suggest a contrasting insight to Greenberg illustrating that sensory learners are more likely to engage with online platforms compared to intuitive learners as they prefer the step by step procedural structure of digital platforms (Huang et al., 2012).

Various studies have provided observations that relationships are present between different learning dimensions and a variety of digital platforms, however this area is still very understudied and needs further investigation.

2.4 Summary

After reviewing the literature there are a number of key themes prevalent as well as gaps that need further investigation. Age and gender, both in regard to internet addiction levels and learning preferences show variance amongst various studies, but clear indications show that older generations are less prone to higher levels of digital addiction. Understanding of problematic digital use and awareness of measurements is shown to be lacking while scholars promote the use of tests to gain beneficial self-awareness (Pawlikowski et al., 2013). This is similar for learning preferences, as identification of these can be significant in effectively improving learning capability, speed and effectiveness (Biggs, 2001). Literature has also given insights into an inter-relationship between learning preferences that is of interest to explore further.

Various research investigates whether there are relationships between learning preferences and digital platforms, such as social media, virtual reality games and web-based learning. The active dimension has been highlighted to have predominant

engagement with digital use (Wanpen, 2013; Cheng & Wong, 2013), however other studies have suggested that sensing learners show the most significant relationship (Greenberg, 2009; Chernbumroong et al., 2017). Research within this relationship is significantly lacking and current studies show limitations in terms of the ages and degree types of participants, which has inspired further research on a more varied sample. Furthermore, current studies only analyse particular digital platforms, which motivates this study to improve on these by testing general internet use.

As literature has suggested it is not yet known whether digital use causes a change in learning preferences or vice versa. The scope of this study does not aim to answer a causality hypothesis but primarily analysing whether relationships are present. It is also concerned with exploring whether gender and age may have an effect on this relationship and whether inter-relationships between dimensions exist.

Therefore, a set of research questions have been derived:

i. Are there relationships between Internet Addiction Test scores and learning preferences?

ii. Does age and gender have an influence on this relationship and/or the measurements individually?

iii. Are inter-relationships between learning preferences present?

iv. Are people aware of their own learning preferences, level of internet use and existence of measurements?

Chapter 3 Methodology

3.1 Introduction

By reviewing current literature, it is clear research within this field of study is lacking and/or limited, which inspires further exploration into relationships between digital use and learning preferences as well as influential variables.

3.2 Data Collection Method

A questionnaire form of data collection has been used using the software Qualtrics in order to gain primarily quantitative responses from participants. Predominantly closed questions were used to gain a large amount of data results in order to conduct an effective correlation and regression analysis. Further open-ended question were used to gain qualitative data to understand reasons behind why people answered questions in a certain way (Mathers et al., 2009). An advantage of using Qualtrics within this study is to make use of the advanced features such as the scoring system and anonymous email approach which has allowed both the student and non-student population to take part.

The Internet Addiction Test has been used within this study as it is one of the most widely used and validated measurements in internet addiction research (Laconi et al., 2014). The Index of Learning Styles test has been used, not only because of its wide use amongst validated research, but also because the 4-dimensional scale allows sufficient variation amongst preferences and effective means for analysis (Felder & Spurlin, 2005). This use of standardised tests therefore provides strength to this study and validation for accurate testing. The Internet Addiction Test contains 20 questions relating to internet use where participants can answer 'not applicable' (zero points) to 'always' (5 points). Once totalled an Internet Addiction Test score is calculated ranging from no level of internet addiction to severe (Young, 1998). This test has been modified from the original publication by Bridgette Bewick, Barbara Summers and Gergana Genova at the University of Leeds to incorporate modern day terminology. For example 'how often do you check your emails' was modified to

'…check social media, email on-line and/or on your phone'. Appendix A details a full transcript of the IAT.

The Index of Learning Styles test contains 44 questions relating to learning preferences where the participant can answer a) or b). 11 questions are allocated to each of the four-learning style dimensions and whether you answer a) or b) will determine which side of the learning dimension you prefer, as illustrated in 2.2.2. These scores are totalled and the learning preference with the lower score is subtracted from the larger score, to convey a balanced, moderate or dominant preference amongst the dimensions (Felder & Spurlin, 2005). Appendix B details a full transcript of the ILS.

Due to the scoring systems of the two scales a more sophisticated coding practice has been required which has been accommodated by the advanced features of Qualtrics. For example, each learning dimension has been grouped into its own scoring system; if a respondent answered a) to questions 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, 41 then points would be allocated to the active dimension. Therefore, answers a) and b) for all 44 questions required specific scorings. Another unique feature of this questionnaire is the participants are presented with their scores to the two tests once completed. This again required specific coding to calculate and present as shown in appendix C, but also allows the opportunity for respondents to answer reflective question based on this. This tackles the problem, as previously highlighted, the lack of awareness and understanding people have for these kinds of measurements. As Biggs noted identification of learning preferences is recommended to maximise the effectiveness of learning (Biggs, 2001). Therefore, addressing these problems and benefitting the participant is a unique feature incorporated within this study.

3.3 Research Sampling

An advantage of quantitative research is that a larger sample size can be examined compared to qualitative research (Fernando et al., 2017). Therefore, all University of Leeds students and staff members of both genders were invited to participate, as one of the aims found from the literature review was to analyse the differences between

age and gender. Students were invited by an anonymous link emailed out by myself. Dissertation supervisor Barbara Summers contacted Business School staff members, both academic and non-academic, via email which contained the same anonymous link.

3.4 Ethical Considerations

The first ethical consideration addressed was to ensure information about participants complied with the data protection act as well as University of Leeds ethical guidelines. Therefore, no questions about the participant that would identify them, such as name or email were asked. The only demographical questions were age, gender, area and level of study which all uphold the anonymity of the participants.

Before completing the questionnaire, participants must agree to a consent form as shown in appendix D which outlines that they understand why they have been invited to take part, what will be asked of them and that participation is voluntary.

Another ethical consideration relates to some of the questions within the IAT, which could be interpreted as personal or intrusive. This raised concern and was discussed with my supervisor and academic colleagues to ensure that distress would not be provoked. As a result, the survey states that if participants do not feel comfortable answering certain questions, they are free to leave them blank. This upholds ethical guidelines without decreasing the validity of the test if they were to be taken out completely. Appendix E contains the ethics approval and risk assessment forms required for this study.

3.5 Data Analysis

Quantitative data is effective when quantifiable measurements are used and sophisticated statistical analyses can take place (Fernando et al., 2017). Upon completion of the data collection the statistical software IBM SPSS shall be used as it is widely validated within academic research and allows advanced features such as correlation and regression analysis that will allow effective interpretation of the results (Paura & Arhipova, 2015).

Chapter 4 Results

This chapter shall present the findings from the data allowing insights to be found in relation to the research questions. The results will outline descriptive statistics of participants as well as correlation and regression analyses between IAT and ILS scores.

4.1 Descriptive Statistics of Participants

78 participants attempted the questionnaire with 15 only part completing it and then withdrawing. These responses were removed within the cleaning process of the data in order to remove inaccuracies and outliers within the results. Of the valid 63, 20 of which were male *(31.7%)* and 43 female *(68.3%).* The age of participants ranged from 18 to 63 *(M=32.50, SD= 7.95)* and are illustrated in table 1.

Table 1 – Age Range Frequencies

Age Range	Frequency
18 – 24	29
25 – 34	11
35 – 44	8
45 - 54	11
55 +	4

29 students took part (21 undergraduate and 8 postgraduate) and 34 staff members (18 academic and 16 non-academic). The student/staff split within participants is approximately half however the ages show a majority within the 18-24 range. Arts, humanities and social science participants accounted for 49.4%, science, mathematics and engineering accounted for 18.3%, other subject areas accounted for 11.2% and not applicable accounted for 21.1%.

4.2 Test Score Distributions

4.2.1 Internet Addiction Test Distributions

The IAT scores ranged from 11 to 48 *(M=31.70, S.D=8.00)* and illustrated a normal distribution. Variances were present however the majority of participants were within the average user category (93.7%). Table 2 displays the frequencies within each internet usage classification.

Table 2 – Frequencies of IAT Classifications

Score	Frequency
0 – 19 no sign of internet addiction	4
20 – 49 average online user	59
50 – 79 experiences frequent problems due to internet use	0
80 – 100 severe user, digital use has significant negative impacts on one's life	0

4.2.2 Index of Learning Styles Distributions

Table 3 illustrates the frequency of participants within each learning dimensions. The results indicate that the procession dimension is almost equally split, with the active dimension having a marginal majority by 1 participant. This is similar within the perceptive dimension. Within the input dimension visual was largely the majority as was sequential within the comprehension dimension.

Table 3 – Learning Preferences Frequencies

Learning Dimension	No. of participants n=63	Percentage of responses
Procession		
• Active	32	50.8
• Reflective	31	49.2
Perceptive		
• Sensing	33	52.4
• Intuitive	30	47.6
Input		
• Visual	43	68.3
• Verbal	20	31.7
Comprehension		
• Sequential	38	60.3
• Global	25	39.7

Normally this model calculates scores by subtracting the smaller value from the larger, for each of the four dimensions, leaving all values positive. This is adequate when calculating individual scores but does not lend itself to effective statistical analysis. Therefore, a bi-directional scoring system was used to allocate each side of the dimension with either a positive or a negative sign. In this case the sign does not convey a good or bad indication, but simply which side of the learning dimension an individual is. This can be seen in table 4 which indicates specifically whether participants had a balanced, moderate or strong preference for each dimension.

Table 4 – Scale of Preferences Amongst Participants

	Strong (-11 to -9)	Moderate (-7 to -5)	Balanced (-3 to -1)	Balanced (1 to 3)	Moderate (5 to 7)	Strong (9 to 11)	
Reflective	1	11	19	16	15	1	Active
	1.6%	17.5%	30.1%	25.4%	23.8%	1.6%	
Intuitive	4	9	17	14	15	4	Sensing
	6.3%	14.3%	27.0%	22.2%	23.9%	6.3%	
Verbal	2	6	12	9	15	19	Visual
	3.2%	9.5%	19.0%	14.3%	23.9%	30.1%	
Global	0	9	16	24	9	5	Sequential
	-	14.3%	25.4%	38.1%	14.3%	7.9%	

The largest range in test scores were within the visual/verbal and sensing/intuitive dimensions (-11 to +11) and the smallest within the sequential/global dimension (-7 to +11). The sensing/intuitive and sequential/global dimensions were normally distributed, however the active/reflective and visual/verbal were not, the latter skewed towards visual. Mean scores between the dimensions showed variance; active/reflective *(M=.21, S.D. = 4.70)*, sensing/intuitive *(M=.24, S.D.=5.46)*, visual/verbal had the largest mean and variance *(M=3.76, S.D.=6.00)* and sequential/global *(M=1.06, S.D.=4.34)*.

4.3 Correlation and Regression Analysis

4.3.1 Internet Addiction Test Analysis

The first correlation analysis was to test relationships between IAT scores and the variables age and gender. The results indicated negative correlation and that older individuals were related with lower IAT scores, *(r(63) = -.42, p < .01)*. This was investigated further within a regression analysis where age was considered a significant predictor of IAT scores β = *-.42, t(61) = -3.62, p<.01* and $R^2 = .18$. Gender

showed no relationship with IAT scores illustrating a non-significant relationship (*p* > .05).

4.3.2 Index of Learning Styles Analysis

Table 5 presents the Pearson correlation coefficients between the learning dimensions and the variables age and gender. Results show negative correlation between age and the sensing/intuitive dimension *(r(63) = -.26, p< .05)* as well as the sequential/global dimension *(r(63) = -.32, p< .05).* This indicates that higher ages were more correlated with individuals who were intuitive and global learners. Interestingly the two dimensions that age was most correlated with also had correlation with each other. As the results indicate the sensing/intuitive and sequential/global dimensions were positively correlated (*r(63) = .41, p < .01*). Correlation between visual/verbal and active/reflective was also present but this was a weaker relationship (*r(63) = .29, p < .05).* This was investigated further within a regression analysis finding that age did not have significance with the sensing/intuitive and sequential/global dimensions, but they were found to be significant predictors of each other β = *.41, t(61) = 3.46, p<.01* and $R^2 = .16$. Less significance was found between the active/reflective and visual/verbal dimension but still present β = *.29, t(61) = 2.39, p<.05* and $R^2 = .09$. Gender showed no significance between any of the learning style dimensions *(p>.05).*

Table 5 – Learning Preferences Correlation Matrix

	Active/ Reflective	Sensing/ Intuitive	Visual/ Verbal	Sequential/ Global	Age	Gender
Active/ Reflective	-	-.02	**.29***	.06	-.12	-.07
Sensing/ Intuitive		-	-.07	**.41****	**-.26***	.06
Visual/ Verbal			-	-.16	-.17	.09
Sequential/ Global				-	**-.32***	.09
Age					-	-.18
Gender						-

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

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

When checking for multicollinearity between the four different learning dimensions, none was present. The variance inflation factor (VIF) when iterating with different dimensions as the dependant variable, ranged from 1.01 to 1.22, which is below any valuation for concern.

4.3.3 Correlation and Regression Analysis Between IAT and ILS

Table 6 illustrates the Pearson correlation coefficients between IAT scores and each of the four learning style dimensions, however no significance was found *(p=.47, p=.84, p=.25, p=.79 respectively)*.

Table 6 – Correlation coefficients between IAT and ILS

	IAT	Active/ Reflective	Sensing/ Intuitive	Visual/ Verbal	Sequential/ Global
IAT	-	.09	-.03	.15	.04

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

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

A multiple regression analysis was performed to investigate further, adding demographic variables in to test the impact ILS had on predictive power. R^2 values increased from .03 to .20 to .26 when age and gender variables were added.

4.4 Reflective Results from Participants

When the results of the tests were presented to the participants, reflective questions were asked to gain further insights. When asked whether they were aware that learning style tests existed the majority of those that answered said yes (*Y = 46 = 80.7%, N = 11 = 19.3%*). Then when asked whether they had previously taken one, of the 46 that had heard of the tests, 28 had (60.9%) and 18 had not (39.1%). Therefore, the results indicate that within this sample, the proportion of participants that were aware of learning style tests and taken one is 49.1% and the proportion that were not aware of these tests or aware of them but not taken one is 50.9%.

Similarly with the IAT, when asked whether they were aware that measurements existed that could test your level of internet use the majority said yes however a lower majority than for learning preference tests *(Y = 32 = 55.2%, N = 26 = 44.8%).* Then when asked if they had taken a test already, of the 32 that said yes to the first question, 12 had (37.5%) and 20 had not (62.5%). Therefore, from this sample, participants that were aware of tests that measure internet use and have taken one is 20.7% and the proportion of participants that were not aware of these tests or aware of them but not taken one is 79.3%.

When asked whether they felt their learning preferences had changed over the past 5 years 60.3% answered 'probably not' or 'definitely not', 19% answered 'probably' or 'definitely' and 20.7% were unsure. When asked whether they felt the IAT score they received reflected their own view of their internet use 77.6% answered 'probably' or 'definitely', 12.1% answered 'probably not' or 'definitely not' and 10.3% were unsure.

Qualitative results indicated individuals did not have an understanding whether or not a relationship existed between internet use and learning preferences and provided no insights.

Chapter 5 Discussion

This chapter will interpret the results illustrated within chapter 4 and make a critical analysis in comparison to current research and highlight what new insights have been found.

5.1 Evaluation of Findings

In regard to the main hypothesis, whether there is a relationship between Internet Addiction Test scores and learning preferences, this study has shown no significant relationship is present. Although this is contributed by limitations which will be discussed in 5.2, many insights can be understood from various parts of this study that can add to the body of research within this understudied area.

The results indicate the vast majority of individuals were within the average user category and no individuals were within the moderate or severe categories within the IAT. Upon critical reflection, this is not entirely unpredicted as studies have suggested only a small proportion of the population show severe signs of internet addiction with results ranging from 1.00% to 18.3% (Ferraro et al., 2007; Johansson & Gotestam, 2004). However this study has indicated amongst a sample of 63 student and staff members that 0% meet moderate or severe internet addiction levels, much lower than current research. This is a similar limitation found within another study where all participants were identified as regular digital users (Chernbumroong et al., 2017). This could be because of the small sample size compared to studies like Ferraro et al. that sampled 236 participants. However, it is still insightful to conduct this test amongst University students and staff members, as various studies like Johansson & Gotestam limit the sample to 12-18 year olds (Johansson & Gotestam, 2004).

The results affirm scholarly research that indicates age is negatively correlated with digital use. Therefore, agreement can be found with Perrin & Duggan and Ferraro et al., that higher ages of participants relate to lower levels of internet use (Perrin & Duggan, 2015; Ferraro et al., 2007). However, this study can only support this theory to an extent. As all participants were primarily in the average user category, correlations were found within this, but as no participants reached moderate or

severe use this study cannot affirm whether younger participants are of higher risk. This lack of variance between classifications of internet use is a primary limitation restricting significant relationships to be found which highlight various improvements in 5.2.

This study indicates contrary results to scholarly research that has highlighted gender as an influencer of higher levels of digital use, either within females (Leung, 2004) or within males (Liang, 2003). Therefore, the results support studies that found no significant relationship (Chang & Law, 2008). Again, the strength of this argument is only to an extent as correlation was analysed within marginal changes in IAT scores and to validate this further, more variance within classifications will need to be found. This study did find that the majority of participants (77.6%) did feel that their IAT score was reflective of their view of their own level of internet use, which provides further validation to the accuracy of the IAT. However no participant received a score that was unfavourable, such as severe internet user, therefore this result is predictable as participants are less likely to disagree with receiving a score that indicates they are not addicted to the internet. Perhaps if more variance within IAT scores were present, the percentage of agreement to this question would be lower, therefore this would be of interest to study further.

In terms of learning preferences, the results indicate that visual and sequential were the majority learning preferences, as were active and sensing but very marginally and almost equally split. This agrees with primary literature that indicates these four being the dominant learning preferences, as agreed by Felder & Spurlin who evaluated over 2000 student scores (Felder & Spurlin, 2005). Although this is in agreement, further clarity is found as the majority of Felder & Spurlin's analyses were on engineering students, therefore the results from this study provides further validation of this hypothesis but upon a wider variation of subject areas and student/non-student status. Furthermore, very similar results highlighting the inter-relationship between the sensing/intuitive and sequential/global dimensions were found that strongly support the study by Hosford & Siders. With their Pearson correlation value indicating *r=.44 (p<.01),* the correlation within this study indicated *r=.40 (p<.01),* which strongly supports the hypothesis on inter-relationships between learning dimensions, particularly sensing/intuitive and global/sequential (Hosford & Siders, 2010). A

similar, but weaker, relationship was found between the active/reflective and visual/verbal dimension that also supports this theory. This provides inspiration to understand further influential factors of this, perhaps a third dimension like personality types is a predictor.

The results from this study also add further clarity highlighting not just majority learning preferences but where on the index of learning scale participants were placed. This highlights a limitation within various studies such as Cheng & Wong and Wanpen which only indicate majority preferences. This study shows that moderate and dominant preference for visual learning is the majority on the visual/verbal dimension. Although the majority of participants were on the sequential side, 63.5% of these were within the balanced category and no participants showed global dominance. Similarly, amongst the active/reflective and sensing/intuitive dimensions the majority of participants were balanced. In comparison to other studies, these results are similar to Hosford & Siders, but significantly differ amongst the sensing/intuitive dimension which showed significant dominance for sensing (Hosford & Siders, 2010). This insight can be used within academia in understanding what the majority learning preferences are and how they can be used to tailor effective learning.

This study agrees with current literature that there is no significant relationship between gender and learning preferences (Wang & Mendori, 2015; Demirkan & Demirbaş, 2010). This argument can be more strongly supported within this study compared to the relationship between gender and internet use as variations within learning preferences were present resulting in more validated correlation and regression analysis. Similarly, no significant relationship was found between age, except amongst the sensing/intuitive and sequential/global dimension, which is a new insight not seen within current literature. Although this relationship was not strong it was still significant which calls for further investigation into understanding why older participants preferred intuitive and global learning. A qualitative study on this could highlight why they answered certain questions on the ILS the way they did.

Although no significant relationship was found between IAT scores and learning preferences within the correlation analysis a multiple linear regression was still

performed to further investigate whether influential variables such as age and gender were present. Although they were not found to be significant predictors within this study, further insight can be found if internet scores varied. This study aimed to validate the lack of consensus within research as to which learning preference was most related to internet use; as researchers like Wanpen suggest active is most related and Greenberg suggesting intuitive learners are (Wanpen, 2013; Greenberg, 2009). Although this could not be found, this study calls for additional investigation into this relationship, which could further analyse which one causes changes within the other.

This study indicated that individuals do have an awareness that tests such as the IAT and ILS exist, especially for learning preferences, however the proportion that had taken them was much lower especially for internet addiction tests with only 20.7%. With the benefits of such tests laid out by researchers, such as reflective awareness, understanding of negative impacts and improved learning, it is prevalent that awareness and participation of these kinds of tests and the benefits they bring is still an issue (Pashler et al., 2009; Pawlikowski et al., 2013). These new insights will hopefully encourage promotion of these tests within education and organisation to gain benefits such as quicker learning and returns on programme investments (Felder, 1996; Wong et al., 2000).

When asked whether participants felt their learning preferences might have changed over the past 5 years, the majority answered either 'definitely not' or 'probably not' (60.3%). Various literature indicates that learning preferences can change and is affected by environmental circumstances and experiences (Kolb, 1984). Other research has proven this noticing changes in preferences when participating in online courses or even a change in cultural environment (Greenberg, 2009; Barron & Arcodia, 2002). Although the scope of this study could not measure changes within learning preferences it has provided insights that people either are not aware of their preferences changing or that the learning preferences amongst this sample were more stable than other studies have indicated. This could be explored further in a methodology similar to Greenberg where participants take the ILS various times over a particular time scale controlling a specific variable such as digital access.

5.2 Limitations and Further Research

A significant limitation within this study was due to the lack of variance between categories within the internet addiction test. This did not lend itself to the investigation of a relationship between internet use and learning preferences. Further research within this field would require a stratified sampling method to ensure varying groups of internet levels were present, ranging from none to severe, in order to accurately analyse this relationship.

As literature has noted digital use can have various effects on the way we go about our lives and as scholarly research has noted learning preferences can be changed due to environmental factors (Kolb, 1984). This study could not address a causality hypothesis, however if a relationship was to be found between levels of internet use and learning preferences, further investigation would require testing a change within one to see the effect on the other and vice versa. This could highlight whether levels of digital use influence an individual's learning preference or whether learning preferences influence how much an individual chooses to engage with the internet.

Current issues within this area are certainly highlighted by the lack of awareness of tests like the IAT and ILS as well as the lack of participation of these tests. The results of this study conveyed this, however is limited in understanding the reasons behind it. This could be due to not knowing the benefits taking a learning preference test can bring, such as effective tailor made learning (Pashler et al, 2009). Or possibly because individuals are unaware of the negative consequences internet addiction can bring, such as productivity reduction or relationship breakdown (Young, 1998). Therefore, this study calls for further qualitative investigation into reasons behind the lack of awareness and lack of participation of such tests, that this study has highlighted.

Chapter 6 Conclusion

The results from this study in regard to whether there is a relationship between levels of internet use and learning preferences is inconclusive, showing no significant relationship. This is primarily due to the lack of variance between classifications of internet use as measured by the Internet Addiction Test. However, amongst the sample this study indicates that higher risk levels of internet use are well below results from current literature, with 0% of participants being moderate or severe users. Insight was found that age was negatively correlated to internet scores, but primarily within the average user category. This study found no relationship between gender and internet use, which adds further clarity to the lack of consensus amongst current studies on this hypothesis.

Results from the Index of Learning Styles test were analogous with key literature conveying active, sensing, visual and sequential were the prominent learning preferences. However, this study shines light where other studies lack in regard to the moderation of preference. Visual was shown to be primarily dominant, the active/reflective and sensing/intuitive dimensions were majorly balanced in preference while sequential slightly outweighed global. The sensing/intuitive and sequential/global dimensions showed positive correlation with one another which validates current studies. Age was also correlated with these two inter-related dimensions, which provides new insights not previously noted. Gender showed no correlation with any learning preference.

Awareness of and participation with tests that measure internet use and identify learning preferences is lacking as most had not taken them, especially internet use tests. Results from this calls for further investigation as to why this might be, whether it is a lack of knowledge of the benefits or a lack of motivation to participate. Literature has highlighted there could be relationships between internet use and learning preferences, however further exploration needs to be taken that solves limitations within this study, such as lack of variance within internet use.

Insights and validations from this study can be used within academic, organisational and everyday environments to improve effective learning as well as further promote

tests that measure digital use and identify learning preferences in order to gain self-awareness and acquire the benefits.

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Appendix A

Internet Addiction Test

Answer the following using this scale:

0 –Does not apply

1 – Rarely

2 – Occasionally

3 – Frequently

4 – Often

5 – Always

1. How often do you find that you stay online longer than you intended?
2. How often do you neglect household chores (e.g. washing the dishes, vacuuming) to spend more time on-line?
3. How often do you prefer the excitement of being online to intimacy with your partner?
4. How often do you form new relationships (e.g. friendship, romance, an acquaintance) 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 academic studies suffer because of the amount of time you spend online?
7. How often do you check social media (e.g. Facebook, Messenger, WhatsApp, Snapchat, Viber), e-mail online and/or on your phone before doing something else that you need to do?
8. How often does your job performance or productivity suffer because of online activity?
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 related to your activity online?
11. How often do you find yourself anticipating when you will go online again?
12. How often do you fear that life without the online world would be boring, empty, and joyless?
13. How often do you snap, yell, or act annoyed if someone bothers you while you are on-line?
14. How often does your online activity interfere with your sleep?
15. When offline, how often do you feel preoccupied with the online world, 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?

Scoring System
0 – 19: No signs of internet addictions
20 – 49 points: You are an average on-line user. You may surf the Web a bit too long at times, but you have control over your usage.
50 – 79 points: You are experiencing occasional or frequent problems because of the Internet. You should consider their full impact on your life.
80 – 100 points: Your Internet usage is causing significant problems in your life. You should elevate the impact of the Internet on your life and address the problems directly caused by you Internet usage.
(Young, 2017).

Appendix B
Index of Learning Styles Test
Answers every question choosing only one answer for each question. If both "a" and "b" seem to apply to you, choose the one that applies more frequently.

1. I understand something better after I

- try it out.
- think it through.

2. I would rather be considered

- realistic.
- innovative.

3. When I think about what I did yesterday, I am most likely to get

- a picture.
- words.

4. I tend to

- understand details of a subject but may be fuzzy about its overall structure.
- understand the overall structure but may be fuzzy about details.

5. When I am learning something new, it helps me to

- talk about it.
- think about it.

6. If I were a teacher, I would rather teach a course

- that deals with facts and real life situations.
- that deals with ideas and theories.

7. I prefer to get new information in

- pictures, diagrams, graphs, or maps.
- written directions or verbal information.

8. Once I understand

- all the parts, I understand the whole thing.
- the whole thing, I see how the parts fit.

9. In a study group working on difficult material, I am more likely to

- jump in and contribute ideas.
- sit back and listen.

10. I find it easier

- to learn facts.
- to learn concepts.

11. In a book with lots of pictures and charts, I am likely to

- look over the pictures and charts carefully.
- focus on the written text.

12. When I solve math problems

- I usually work my way to the solutions one step at a time.
- I often just see the solutions but then have to struggle to figure out the steps to get to them.

13. In classes I have taken

- I have usually gotten to know many of the students.
- I have rarely gotten to know many of the students.

14. In reading nonfiction, I prefer

- something that teaches me new facts or tells me how to do something.
- something that gives me new ideas to think about.

15. I like teachers

- who put a lot of diagrams on the board.
- who spend a lot of time explaining.

16. When I'm analysing a story or a novel

- I think of the incidents and try to put them together to figure out the themes.
- I just know what the themes are when I finish reading and then I have to go back and find the incidents that demonstrate them.

17. When I start a homework problem, I am more likely to

- start working on the solution immediately.
- try to fully understand the problem first.

18. I prefer the idea of

- certainty.
- theory.

19. I remember best

- what I see.
- what I hear.

20. It is more important to me that an instructor

- lay out the material in clear sequential steps.
- give me an overall picture and relate the material to other subjects.

21. I prefer to study

- in a study group.
- alone.

22. I am more likely to be considered

- careful about the details of my work.
- creative about how to do my work.

23. When I get directions to a new place, I prefer

- a map.
- written directions.

24. I learn

- at a fairly regular pace. If I study hard, I'll "get it."
- in fits and starts. I'll be totally confused and then suddenly it all "clicks."

25. I would rather first

- try things out.

* think about how I'm going to do it.

26. When I am reading for enjoyment, I like writers to

* clearly say what they mean.
* say things in creative, interesting ways.

27. When I see a diagram or sketch in class, I am most likely to remember

* the picture.
* what the instructor said about it.

28. When considering a body of information, I am more likely to

* focus on details and miss the big picture.
* try to understand the big picture before getting into the details.

29. I more easily remember

* something I have done.
* something I have thought a lot about.

30. When I have to perform a task, I prefer to

* master one way of doing it.
* come up with new ways of doing it.

31. When someone is showing me data, I prefer

* charts or graphs.
* text summarizing the results.

32. When writing a paper, I am more likely to

* work on (think about or write) the beginning of the paper and progress forward.
* work on (think about or write) different parts of the paper and then order them.

33. When I have to work on a group project, I first want to

* have "group brainstorming" where everyone contributes ideas.
* brainstorm individually and then come together as a group to compare ideas.

34. I consider it higher praise to call someone

* sensible.
* imaginative.

35. When I meet people at a party, I am more likely to remember

- what they looked like.
- what they said about themselves.

36. When I am learning a new subject, I prefer to

- stay focused on that subject, learning as much about it as I can.
- try to make connections between that subject and related subjects.

37. I am more likely to be considered

- outgoing.
- reserved.

38. I prefer courses that emphasize

- concrete material (facts, data).
- abstract material (concepts, theories).

39. For entertainment, I would rather

- watch television.
- read a book.

40. Some teachers start their lectures with an outline of what they will cover. Such outlines are

- somewhat helpful to me.
- very helpful to me.

41. The idea of doing homework in groups, with one grade for the entire group,

- appeals to me.
- does not appeal to me.

42. When I am doing long calculations,

- I tend to repeat all my steps and check my work carefully.
- I find checking my work tiresome and have to force myself to do it.

43. I tend to picture places I have been

- easily and fairly accurately.
- with difficulty and without much detail.

44. When solving problems in a group, I would be more likely to

- think of the steps in the solutions process.
- think of possible consequences or applications of the solution in a wide range of areas.

<u>Scoring Sheet</u>

ACT/REF			SNS/INT			VIS/VRB			SEQ/GLO		
Q	a	b	Q	a	b	Q	a	b	Q	a	b
1	—	—	2	—	—	3	—	—	4	—	—
5	—	—	6	—	—	7	—	—	8	—	—
9	—	—	10	—	—	11	—	—	12	—	—
13	—	—	14	—	—	15	—	—	16	—	—
17	—	—	18	—	—	19	—	—	20	—	—
21	—	—	22	—	—	23	—	—	24	—	—
25	—	—	26	—	—	27	—	—	28	—	—
29	—	—	30	—	—	31	—	—	32	—	—
33	—	—	34	—	—	35	—	—	36	—	—
37	—	—	38	—	—	39	—	—	40	—	—
41	—	—	42	—	—	43	—	—	44	—	—

Total (sum X's in each column)

ACT/REF		SNS/INT		VIS/VRB		SEQ/GLO	
a	b	a	b	a	b	a	b
—	—	—	—	—	—	—	—

(Larger – Smaller) + Letter of Larger (see below*)

——	——	——	——

ACT _____|_____ REF
    11a   9a   7a   5a   3a   1a | 1b   3b   5b   7b   9b   11b

SEN _____|_____ INT
    11a   9a   7a   5a   3a   1a | 1b   3b   5b   7b   9b   11b

VIS _____|_____ VRB
    11a   9a   7a   5a   3a   1a | 1b   3b   5b   7b   9b   11b

SEQ _____|_____ GLO
    11a   9a   7a   5a   3a   1a | 1b   3b   5b   7b   9b   11b

(Felder & Brent, 2016)

Appendix C
Questionnaire Results Page and Coding

Online Behaviour Test Results
Your online behaviour results have been outlined below as well as information regarding what your score means.

Your score: ${gr://SC_d4pvAGfBRlOj7Zr/Score}

What does this mean?
The higher the score, the greater the level of problematic use resultant from such Internet/online usage. The severity impairment index is as follows:

None: 0 – 30 points
You have no signs of compulsive or problematic internet/online usage.
Mild: 31- 49 points
You are an average online user. You may surf the Web a bit too long at times, but you have control over your usage.
Moderate: 50 -79 points
You are experiencing occasional or frequent problems because of the Internet. You should consider their full impact on your life.
Severe: 80 – 100 points
Your Internet usage is having significant problems in your life. You should try evaluate the impact of the Internet on your life and address the problems directly caused by your Internet usage.

Results of the Index of Learning Questionnaire
Your answers to the questionnaire have been reflected within 4 key areas of learning style preferences. Each area has two categories that you could be balanced between or have a preference for one more than the other.
The four areas
are **(Active/Reflective)**, **(Sensing/Intuitive)**, **(Visual/Verbal)** and **(Sequential/Global)**.
Your scores for each have been displayed below.

What do the Scores Mean?
• If the difference between the scores is between 1 and 3 (e.g. active: 6   reflective:
5) then you are **fairly well balanced** over those two dimensions.
• If the difference between the scores is between 5 and 7 (e.g. sensing: 8 intuitive: 3) then you have a **moderate preference** for the dimension with the **higher score**.
• If the difference between the scores is between 9 and 11 (e.g. visual: 10   verbal: 1) then you have a **very strong preference** for the dimension with the **higher score**.

Active and Reflective Learners
Your
Score: Active: ${gr://SC_emVhoNVtwoZAcWV/Score} Reflective: ${gr://SC_of7mSsJ84 BwNUNf/Score}
• **Active learners** tend to understand information best by doing something active with

it, such as discussing it with others. They like group work and would usually think "lets try it out and see how it works".
• **Reflective learners** prefer to think about it quietly first and work on something independently.

Sensing and Intuitive Learners
Your Score: Sensing: ${gr://SC_8jGyGG6iYQaqvAx/Score} Intuitive: ${gr://SC_9peHjWeaki2Ri8R/Score}
• **Sensing learners** tend to like learning facts and solve problems through well-established methods. They tend to be more practical and are patient with details.
• **Intuitive learners** often like innovation, concepts and discovering possibilities. They dislike repetition and tend to work at a faster pace than sensors.

Visual and Verbal Learners
Your Score: Visual: ${gr://SC_6ePp8B2bvjUhP8h/Score}   Verbal: ${gr://SC_0pmjU2UYE28sSe9/Score}
• **Visual learners** remember best what they see - pictures, diagrams, flow charts, films and demonstrations.
• **Verbal learners** get more out of words - written and spoken explanations.

Sequential and Global Learners
Your Score: Sequential: ${gr://SC_4NnCVD8OLqxutmZ/Score} Global: ${gr://SC_5dqcRfSD ZJRjkLr/Score}
• **Sequential learners** tend to gain understanding following logical linear steps and use stepwise procedures to find solutions.
• **Global learners** tend to learn in large jumps, absorbing lots of material and then suddenly "getting it." They put things together in novel ways once they have grasped the big picture.

Appendix D

Consent Form

Dear Participants
Thank you for agreeing to take part in this survey. Please take the time to read the information below to understand what will be asked of you and why this research is being done.

The aim of this study is to **analyse the relationship between online behaviour and individuals learning styles**.

You will be asked for **brief details about yourself** (such as demographics), then you will be asked a series of short questions relating to your **usage of digital devices and online behaviour**. You will then be asked questions relating to your **preferences of learning,** as well as some reflective questions.

This study is **voluntary, anonymous** and open to all University of Leeds students and staff members.

Any data obtained in this study will be treated as confidential and stored securely as is required under the Data Protection Act.

→

Consent Form
I confirm that I have read and understood the information sheet for the study. I understand that my responses are anonymous. I understand that my participation is voluntary and that I am free to withdraw from the study at any time.

If you understand the information provided and agree to take part please continue.

→

Appendix E
Ethics Approval and Risk Assessment Forms

Leeds University Business School

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Internal research ethics application form for taught student modules (where University ethical approval is in place for the module)

For modules LUBS3305 and LUBS3345 covered by University of Leeds ethical approval

Student ID	██████████
Your name	██████████
Degree Programme	*Management and Mathematics.*
Provisional title/ topic area	*Relationship between learning styles and online behaviour.*
Name of dissertation supervisor	██████████

Are you planning to conduct fieldwork with (data on) human participants for your dissertation?	Please tick the relevant box
Yes (This includes online research methods and secondary data analysis of social media or internet data).	✓
No, I am conducting library based research.	

If you ticked 'no' you do not need to take further action in respect of ethical approval. Please proceed to the declarations on page 8 and 9.

If you ticked 'yes' you need to complete the rest of this form.

You MUST submit discuss your research design and the ethical issues it raises with your dissertation supervisor and receive their signed approval **before you approach any participants or collect any data**.

You MUST attach a copy of your research proposal to this form.

You MUST include a copy of your ethics form (signed by your supervisor), together with your research proposal, as an appendix to your final dissertation submission.

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INTERNAL RESEARCH ETHICS APPLICATION
Part A: Compliance with the module's block ethical approval

Ethical review is required for all research involving human participants, including research undertaken by students within a taught student module. Further details of the University of Leeds ethical review requirements are provided in the *Research Ethics Policy* available at: http://ris.leeds.ac.uk/ResearchEthicsPolicies and at www.leeds.ac.uk/ethics.

1. Will your dissertation involve any of the following?	Yes	No
New data collected by administering questionnaires/interviews for quantitative analysis	✓	
New data collected by qualitative methods	✓	
New data collected from observing individuals or populations		✓
Working with aggregated or population data		✓
Using already published data or data in the public domain		✓
Any other research methodology, please specify: Will be using the Kimberly Young, Internet Addiction Test and the Felder-Silverman Index of Learning Styles Questionnaire.		

2. Will any of the participants be from any of the following groups? (Tick as appropriate)	Yes	No
Children under 16		✓
Adults with learning disabilities		✓
Adults with other forms of mental incapacity or mental illness		✓
Adults in emergency situations		✓
Prisoners or young offenders		✓
Those who could be considered to have a particularly dependent relationship with the investigator, e.g. members of staff, students		✓
Other vulnerable groups, please specify:		

3. Will the project/dissertation/fieldwork involve any of the following: (You may select more than one)	Yes	No
Patients and users of the NHS (including NHS patients treated under contracts with private sector)		✓
Individuals identified as potential participants because of their status as relatives or carers of patients and users of the NHS		✓
The use of, or potential access to, NHS premises or facilities		✓
NHS staff - recruited as potential research participants by virtue of their professional role		✓
A prison or a young offender institution in England and Wales (and is health related)		✓

If you have answered 'yes' to ANY of the above questions in 2 or 3 then you will need to apply for full ethical review, a faculty committee level process. This can take up to 6-8 weeks, so it is important that you consult further with your supervisor for guidance with this application as soon as possible. Please now complete and sign the final page of this document. The application form for full ethical review and further information about the process are available at http://ris.leeds.ac.uk/uolethicsapplication.

If you answered 'no' to ALL of the questions in sections 2 and 3 please continue to part B.

INTERNAL RESEARCH ETHICS APPLICATION
Part B: Ethical considerations within block ethical approval

4. Will the research touch on sensitive topics or raise other challenges?	Yes	No
Will the study require the cooperation of a gatekeeper for initial access to groups or individuals who are taking part in the study (eg students at school, members of self-help groups, residents of a nursing home)?		✓
Will participants be taking part in the research without their knowledge and consent (eg covert observation of people in non-public places)?		✓
Will the study involve discussion of sensitive topics (eg sexual activity, drug use)?		✓
Could the study induce psychological stress or anxiety or cause harm or have negative consequences beyond the risks encountered in normal life?		✓
Are there any potential conflicts of interest?		✓
Does any relationship exist between the researcher(s) and the participant(s), other than that required by the activities associated with the project (e.g., fellow students, staff, etc)?		✓
Does the research involve any risks to the researchers themselves, or individuals not directly involved in the research?		✓

If you have answered 'yes' to any of the questions in (5), please describe the ethical issues raised and your plans to resolve them on a separate page. Agree this with your supervisor and submit it with this form. Again, you MAY be referred for light touch or full ethical review.

5. International Research Does your research involve participants outside of the UK?	Yes	No
Are any of your research participants located outside of the UK, e.g., will you be gathering data through Skype interviews with participants located overseas?		✓
Will any of the fieldwork or research require you to travel outside of the UK to collect data?		✓

If you have answered 'yes' to either part of question (5), please describe the ethical issues raised with: gaining consent and gathering data from participants located overseas, securely storing and transferring data from the field back to the UK, any cultural issues that may be relevant. Please outline your plans to resolve this on a separate page and ensure that you have completed a risk assessment form. Agree this with your supervisor and submit it with this form.

You MAY be referred for light touch or full ethical review if you are unable to demonstrate that you have resolved the ethical issues relating to international research.

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6. Personal safety
Where will any fieldwork/ interviews/ focus groups take place?

	Yes	No
At the university or other public place (please specify below).	✓	
At my home address		✓
At the research subject's home address		✓
Some other location (please specify below). • Questionnaire sent over email		

If you conduct fieldwork anywhere except at the university or other public place you need to review security issues with your supervisor and have them confirmed by the Module Leader who may refer you for light touch or full ethical review. Write a brief statement indicating any security/personal safety issues arising for you and/or for your participants, explaining how these will be managed. Agree this with your supervisor and submit it with this form.

Please note that conducting fieldwork at the research subject's home address will require strong justification and is generally not encouraged.

A risk assessment is required before any data is gathered for any dissertation project, please view the Health and Safety advice on the module's VLE pages.

7. Anonymity

	Yes	No
Is there any potential for data to be traced back to individuals or organisations, for instance because it has been anonymised in such a way that there remains risk (eg highlighting people's positions within an organisation, which may reveal them).		✓

If you have answered 'yes' to question 7, please discuss this further with your supervisor. You need to provide a strong justification for this decision on a separate sheet. **This application will need to be reviewed by the dissertation Module Leader and may require a full ethical review.**

8. Data management issues

Will the research involve any of the following activities at any stage (including identification of potential research participants)?	Yes	No
a. Examination of personal records by those who would not normally have access		✓
b. Sharing data with other organisations		✓
c. Use of personal addresses, postcodes, faxes, e-mails or telephone numbers		✓
d. Publication of direct quotations from respondents	✓	
e. Publication of data that might allow identification of individuals to be identified		✓
f. Use of audio/visual recording devices		✓
g. Storage of personal data on any of the following:		✓
FLASH memory or other portable storage devices		✓
Home or other personal computers		✓
Private company computers		✓
Laptop computers		✓

If you have answered 'yes' to any of the questions under 8, you must ensure that you follow the University of Leeds Information Protection Policy: http://www.leeds.ac.uk/informationsecurity and the Research Data Management Policy: http://library.leeds.ac.uk/research-data-policies#activate-tab1_university_research_data_policy.

You are obliged to provide a copy of your anonymised data to your supervisor for their records and to destroy other copies of your data when your degree has been confirmed.

Dissertation Research Ethical Approval: Declaration

For students	Please tick as appropriate
Option 1: I will NOT conduct fieldwork with (data on) human participants for my dissertation.	
Option 2: I will conduct fieldwork with (data on) human participants for my dissertation.	✓

For **options 1 and 2 -** I confirm that:

- The research ethics form is accurate to the best of my knowledge.
- I have consulted the University of Leeds Research Ethics Policy available at http://ris.leeds.ac.uk/ResearchEthicsPolicies.
- I understand that ethical approval will only apply to the project I have outlined in this application and that I will need to re-apply, should my plans change substantially.

For **option 2** only:

- I am aware of the University of Leeds protocols for ethical research, in particular in respect to protocols on **informed consent, verbal consent, reimbursement for participants and low risk observation.** If any are applicable to me, signing this form confirms that I will carry out my work in accordance with them. http://ris.leeds.ac.uk/PlanningResearch

Student's signature: .... [redacted] ....

Date: .... 18/12/2017. ....

For supervisors	Yes	No
No further action required		
I confirm that the dissertation is in line with the module's block ethical approval (Part A & question 8).	✓	
I have discussed the ethical issues arising from the research with the student and agree that these have been accurately and fully addressed.	✓	
I have reviewed the student's research proposal.	✓	
I have reviewed the student's Risk Assessment Form.		
Further actions required		
Refer to dissertation Module Leader for further review / discussion.		✓
The dissertation falls outside the module's block ethical approval and the student was advised [redacted]		✓

Supervisor's signatur[e] [redacted] ....

Date: ...19/12/17 ....

Risk Assessment Form

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Fieldwork Assessment Form (Low Risk Activities)

Fieldwork Project Details	
Faculty School/Service	LUBS
Location of Fieldwork	University of Leeds campus
Brief description of Fieldwork activity and purpose *(Include address, area, and grid reference and map where applicable).*	Asking volunteers to complete a short questionnaire regarding digital behaviour and learning styles.
Fieldwork itinerary *E.g. flight details, hotel address, down time and personal time.*	Will be completing this in my own personal time, during normal 9-5 hours, weekdays on Leeds University campus.
University Travel Insurance Policy Number	
Organiser Details	**Contact details** *Name, email, telephone*
Fieldwork Activity Organiser / Course Leader	████████████
Departmental Co-ordinator	
Nature of visit *Size of Group, lone working, staff, postgraduate, undergraduate.*	I will be working alone and conducting this research on undergraduate, postgraduate and staff members.
Participant Details *Attach information as separate list if required.*	**Contact details** *Name, Address, email, telephone, gender and next of kin contact details*
	███████████
	███████████
	███████████
	███████████
	███████████

Title:	Fieldwork Assessment Form (low risk)	Number:	PRSG17.4 v4	Issue date:	11/11/2015	Page Number:	Page 1 of 4

HAZARD IDENTIFICATION

Identify all hazards specific to fieldwork trip and activities, describe existing control measures and identify any further measures required.

HAZARD(S) IDENTIFIED	CONTROL MEASURES *(e.g. alternative work methods, training, supervision, protective equipment)*
Nature of the site *School, college, university, remote area, laboratory, office, workshop, construction site, farm, etc.* ☑	University of Leeds campus.
Transport *Mode of transport while on site, to and from site, carriage of dangerous goods etc.* ☑	No transport will be involved within this project.
Violence *Potential for violence in location, political and social unrest; against participants (previous incidents etc.).* ☑	No violent areas or locations will be visited within this project.
Cultural Considerations *Specific to the activity or participants.* ☑	No culturally sensitive questions will be asked within this questionnaire. The questionnaire states that it is voluntary to complete and if any a participant wishes not to answer they can abstain.
Individual(s) *medical condition(s), young, inexperienced, disabilities etc.* ☑	This project does not involve anyone under the age of 18 or of ill health.
Work Pattern *Time and location e.g. shift work, work at night.* ☑	Project shall be conducted during normal 9-5 hours weekdays on Leeds University campus.
Other *E.g. temperature, humidity, confined spaces.* ☑	N/A

Title:	Fieldwork Assessment Form (low risk)	Number:	PRSG17.4 v4	Issue date:	11/11/2015	Page Number:	Page 2 of 4

Additional Control Measures

Pre-departure Briefing *Carried out and attended.*		Attended seminar for pre-departure briefing.
Training *Identify level and extent of information; instruction and training required consider experience of workers.* ☑		Seminar briefing and discussions with supervisor about how I will conduct the research.
Supervision *Identify level of supervision required e.g. full time, Periodic telephone/radio contact.* ☑		This research will be completed alone.
FCO advice *Include current FCO advice for travel to the area where applicable.*		N/A
Other Controls *E.g. background checks for site visits.* ☑		No security clearance or background checks required.
Identify Persons at Risk *This may include more individuals than the fieldwork participants e.g. other employees of partner organisations.* *Copy of other Organisation's risk assessment attached?* ☑		No individuals that will be involved will be at any kind of risk. Individuals taking the questionnaire will be invited to complete it either online in the safety of their own homes or within a café/library on campus via an iPad.
Additional Information *relevant to the one working activity including existing control measures; information instruction and training received, supervision, security, increased lighting, emergency procedures, first aid provision etc.* ☑		No other additional information.

Residual Risk *Is the residual risk acceptable with the identified controls?*	Yes	√
	No	

Title:	Fieldwork Assessment Form (low risk)	Number:	PRSG17.4 v4	Issue date:	11/11/2015	Page Number:	Page 3 of 4

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Assessment carried out by	Name:	████████████	
	Signature:	████████████	
	Date:	11/01/18	
Names of person(s) involved in Fieldwork *N.B: This can take the form of a signed class register when large group work*	Name:	████████████	
	Signature:	████████████	
	Date:	11/01/18	
Fieldwork Activity Organiser / Course Leader *e.g. PI, etc*	Name:	████████████	
	Signature:	████████████	
	Date:	17/01/2018	

Title:	Fieldwork Assessment Form (low risk)	Number:	**PRSG17.4 v4**	Issue date:	**11/11/2015**	Page Number:	Page 4 of 4

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