MSc in Cyberpsychology

Assessment Cover Sheet

Student Number: N00162952

Year of Programme: Year 2

Assignment:

- Thesis CA2
- (8,173 words)

Date Submitted: 27th April 2018

Title: Does the use of WhatsApp effect satisfaction and engagement levels for students in tertiary education

Thesis submitted as a requirement for the degree of MSc in Cyberpsychology, Dun Laoghaire Institute of Art, Design and Technology, 2017.

Declaration

This Thesis is entirely my own work, and has not been previously submitted to this or any other third level institution.

Sally Connolly

27/04/18

Date

Acknowledgement

I would like to thank my thesis advisors Liam Challenor and Grainne Kirwan from the Cyberpsychology department in the Institute of Art, Design and Technology, Dun Laoghaire. Liam was always available whenever I ran into a difficult spot or had a question about my research or writing. He consistently allowed this paper to be my own work, but steered me in the right direction whenever he thought I needed it.

I would also like express my very profound gratitude to my husband and children for providing me with unfailing support and continuous encouragement throughout the last two years of study and through the process of researching and writing this thesis. This accomplishment would not have been possible without them.

Finally I would like to thank my family, friends and work colleagues for just being understanding!

Thank you.

Sally Connolly

Table of Contents

List of Figures 6

List of Tables 7

List of Appendices 8

Abstract 9

1.0 Introduction 10

1.1 Literature Review 10

1.2 Facebook 11

1.3 WhatsApp 14

1.4 Blackboard 18

1.6 Research Question: 24

1.6 Hypotheses: 24

1.7 Further Research 25

2.0 Method 26

2.1 Design 26

2.2 Pilot Study 27

2.3 Participants 28

2.4 Materials 28

2.5 Procedure 29

2.6 Ethics Statement 30

3.0 Results 32

3.1 Descriptive Analysis....32

3.2 WhatsApp....34

3.3 Blackboard....35

3.4 Inferential Analysis....38

4.0 Discussion....42

4.1 Overview of Findings....42

4.2 Strengths....45

4.3 Limitations....45

4.4 Future Research....46

4.5 Conclusion....46

References....48

Appendices....54

List of Figures

Figure 1. Number of monthly active Facebook users worldwide (in millions) 12

Figure 2. % Social Networking Account Owners in Ireland – August 2017 13

Figure 3. % Social Networking Account Owners in Ireland (August 15/August 2017) 14

Figure 4. % Daily Usage of those with Social Networking Accounts in Éire (Aug'17) .. 14

Figure 5. Number of monthly active WhatsApp users worldwide (in millions) 15

Figure 6. % Social Messaging Account Owners in Ireland in November 2017 16

Figure 7. % Social Messaging Account Owners in Éire between Jan '16 & Nov '17 16

Figure 8. % Daily Use of Account Owners with Social Messaging in Éire in Nov '17 ... 17

Figure 9. Vendor share of education software/application market worldwide '15 18

Figure 10. Illustration of the independent and dependent Variables 28

Figure 11. Screenshot of the videos shown to the participants 29

Figure 12. % breakdown of participants gender used in the study 32

Figure 13. % breakdown of participants age used in the study 33

Figure 14. Daily WhatsApp usage of participants recorded in the study 34

Figure 15. No. of WhatsApp groups, participants members of used in the study 34

Figure 16. Blackboard Usage in minutes of participants 35

Figure 17. Amount of posts participants posted on Blackboard 36

Figure 18. How likely participants would recommend using WhatsApp for learning . 37

List of Tables

Table 1 Correlations for WhatsApp, Satisfaction and Engagement 38

Table 2 Descriptive Statistics for WhatsApp, Satisfaction and Engagement.....39

Table 3 Descriptive statistics for measuring satisfaction.....40

List of Appendices

Appendix 1 Invitation, De-brief, Online Questionnaire 54

Appendix 2 Information Sheet 68

Appendix 3 Consent Form 71

Appendix 4 Debrief Sheet 72

Appendix 5 URL's of vidoes used 73

Appendix 6 Satisfaction Scale 74

Appendix 7 Code Book 75

Appendix 8 SPSS Output 82

Abstract

The ability to use digital technology effectively and reflectively can transform the student learning experience helping them become more engaged thinkers (Butler, Leahy, Shiel & Cosgrove, 2013). To investigate the vision of technology and integration in education a quantitative experimental research study was carried out to examine if encouraging the use of WhatsApp would help students engage more and to measure satisfaction levels. Fifty students participated and were allocated into two groups, WhatsApp intervention and control. Students watched six short instructional videos and answered an online questionnaire gathering demographic data, experimental questions and measuring satisfaction using the Life Satisfaction Scale (Diener, Emmons, Larsen & Griffin, 1985). Statistically no significant differences were found between satisfaction and engagement with students who used WhatsApp or not. Further research is required to investigate is there a role for social network sites in particular WhatsApp and can it be used to retain students in 3rd level.

1.0 Introduction

Today 3rd level education is very different to what is was 10 years ago, students no longer just learn in a classroom. Learning is now being aided with software to learn, research, communicate, evaluate and receive feedback. We need to investigate do we integrate what we are doing in our personal life with how we learn and educate ourselves.

Social Networking Sites (SNS's) are popular among young people in the educational environment (Vural, 2015). This paper looks at whether or not students would engage more in their studies with the use of SNS's in particular WhatsApp and using it with their learning. It also examines students satisfaction with the use of SNS's in a learning based environment based on results from an online questionnaire of 50 students.

1.1 Literature Review

SNS's have been defined as web based services that allow people to create a public or semi-private profile, add a list of other users whom they know in their own accounts, view and revise their list of connections and those made by others within the system (Ellison, 2007). SNS's are the fastest-growing and most popular form of the internet-based technologies among young people (Roblyer, McDaniel, Webb, Herman & Witty, 2010). SNS's have now become an essential part of peoples life's from communication, gaming, sharing photos and a tool for research. In 2017 the Central Statistics Office (CSO) reported that 89% of households have access to the internet at home an increase of 2% from 2016 (CSO, 2016, December, 20). Of this 89% 72% of the usage was social networking. People aged 30 years and over the main activity using the internet was emails and finding information (CSO, 2016, December, 20). Individuals aged between 16 and 29 years were more likely to engage in online leisure and recreation activities such as social networking, about 93% of their activity was recorded as social networking and 70% recorded as uploaded self-created content when compared to other age groups.

In January 2017 the active social media penetration in Ireland was, 57% of internet users in Ireland were monthly active social media users, logging on to social media

services at least once per month (Statista, n.d). Ireland were ranked 14th in Europe (Statista, n.d).

Student's method of engagement has changed over the last 10 years (Cloete, De Villiers & Roodt, 2009). Many educational institutions continue to deliver education through the traditional way of class room teaching but many have introduced new forms of technology such as Virtual Learning Environments (VLE) examples such as Blackboard and Moodle. SNS's such as Facebook and WhatsApp are used all the time, we need to explore can they be used as an instructional tool in education and how would students like this change in delivering information.

E-learning aims to allow the students learn without being present in the classroom, it provides the information to students and educators when one or both are not present and gets over the issue of time delays and distance (Miller & Honeyman, 1993). E-learning is the way that delivering information to students is being carried out now (Barhoumi & Rossi, 2013). It mixes many methods and processes of learning online such as audio, visual and text. In 2001, Prensky delivered the persona titled "digital natives" and wrote these individuals are "native speakers" of the digital language of computers, gaming and the internet. They learn and communicate through these devices sometimes they do this in a virtual world. Students who are starting off in third level education today have learned all their information with the use of online devices as well as class room teaching. More recently according to the CSO the percentage of individuals doing an online course remained unchanged since 2016 at 5%. People using online material other than a complete online course (online learning software, audio visual and electronic textbooks) also remained the same at 11% between 2016 and 2017 (CSO, 2016, December, 20).

1.2 Facebook

Facebook is one of the most popular SNS's developed in 2004, it has been reported that 90% of undergraduate college students have Facebook accounts (Harvard, 2011, March, 31). In 2017 Ipsos reported that Ireland has 1.695 million adults aged 15+ using

Facebook on a daily basis (Ipsos, 2017, September, 15). Facebook can be accessed across all platform's phones, tablets, PC's and laptops. People download the free app create their own profile, add friends, add comments, like and unlike. Many students today set up their own Facebook group where they post all relevant information to the course such as notes, research, jobs and as much irrelevant information such as jokes, videos and photo's.

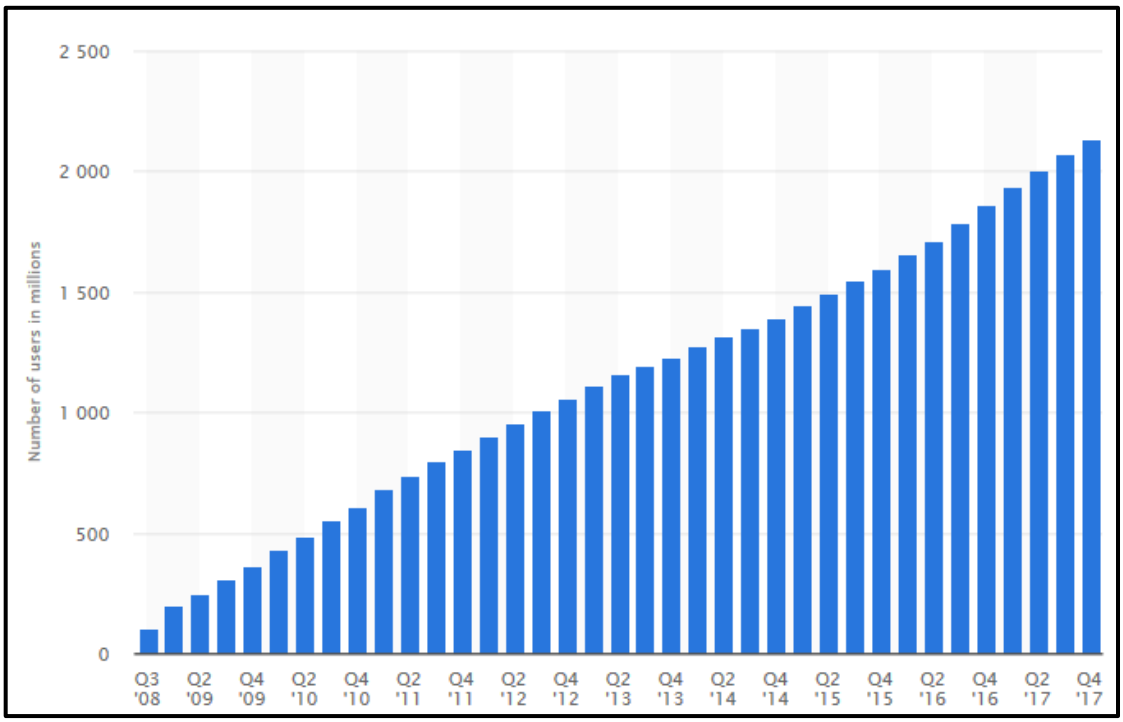


Figure 1. Number of monthly active Facebook users worldwide (in millions)

(Statista, n.d)

In 2016 the Digital Youth Council report (Youth, 2016, n.d) reported that Facebook was the most commonly used social media tool in Ireland. In 2017 the Reuters Digital News Report outlined that Facebook (68%) and YouTube (58%) were the leading social media brands for any purpose in 2017, followed by Twitter (23%), LinkedIn (20%), Instagram (24%) Snapchat (15%), Pinterest (14%) and Google+ (8%). Irish consumers use Twitter and Snapchat more than the international average but use Instagram less. Facebook was the most used social media platform for news (41%), followed by YouTube (18%), Twitter and WhatsApp – both at 11% (Fujomedia, 2017, June, 22).

Ipsos saw a drop in account ownership in Facebook in April 2017 but it had returned to January 2017 levels standing at 64% in August 2017. They reported that 1.695 million adults aged 15+ in the Republic of Ireland use Facebook on a daily basis. See Figure 2 which highlights the account ownership of social network sites in Ireland in August 2017.

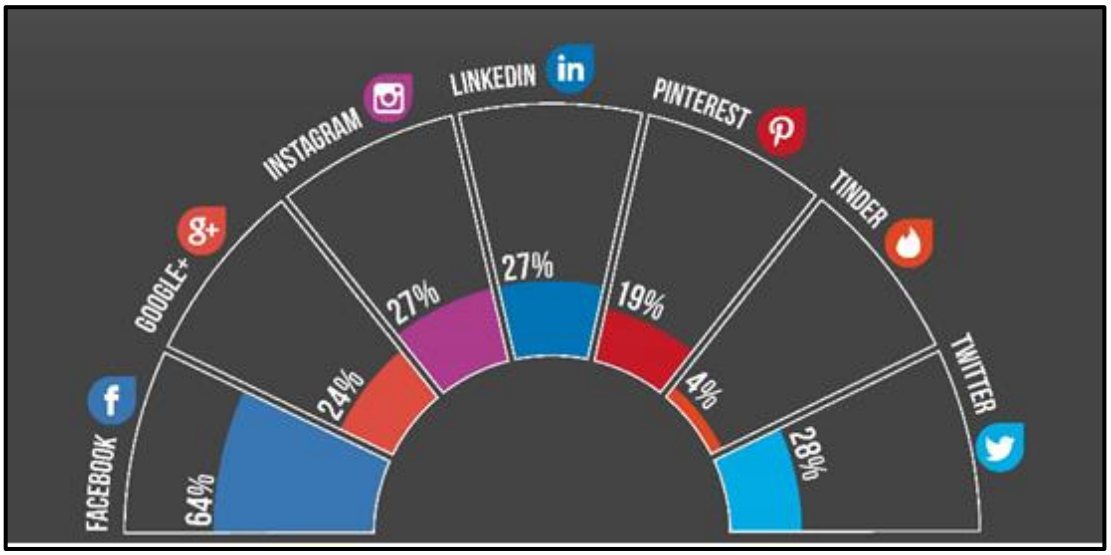


Figure 2. % Social Networking Account Owners in Ireland – August 2017

(Ipsos, 2017, September, 15)

Ipsos reported there has been a steady hold on the percentage of Facebook account owners since August 2015 until August 2017 with a small dip in April 2017. Of those people with Facebook accounts 71% of accounts owners admitted to using the network site daily (Ipsos, 2017, September, 15).

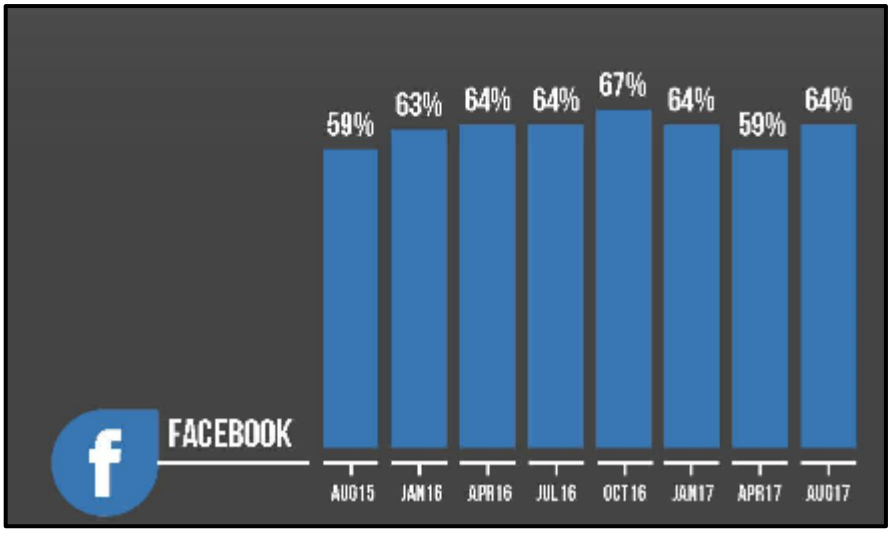


Figure 3. % Social Networking Account Owners in Ireland (August 15/August 2017)

(Ipsos, 2017, September, 15)

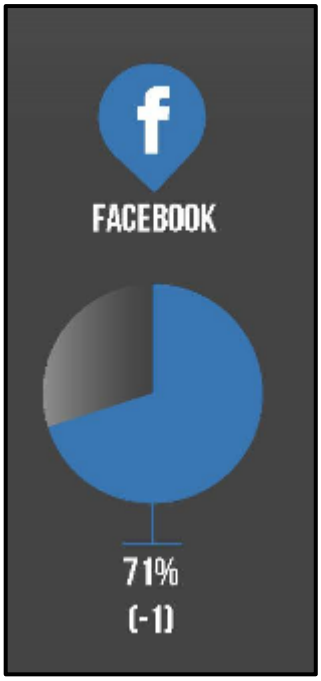


Figure 4. % Daily Usage of those with Social Networking Accounts in Éire (Aug'17)

(Ipsos, 2017, September, 15)

1.3 WhatsApp

WhatsApp was developed in 2009 it is a free instant messaging app that allows users send free messages and make free calls across the internet. It was acquired by

Facebook in 2014 (Facebook, 2018, April, 18). It also allows users send photos and videos for free and it is available across all platforms. In August 2012 WhatsApp instant messaging moved ten billion messages per day (Olanof, 2012) and in June 2013 it handled 27 billion messages in twenty four hours (Sushma, 2012).

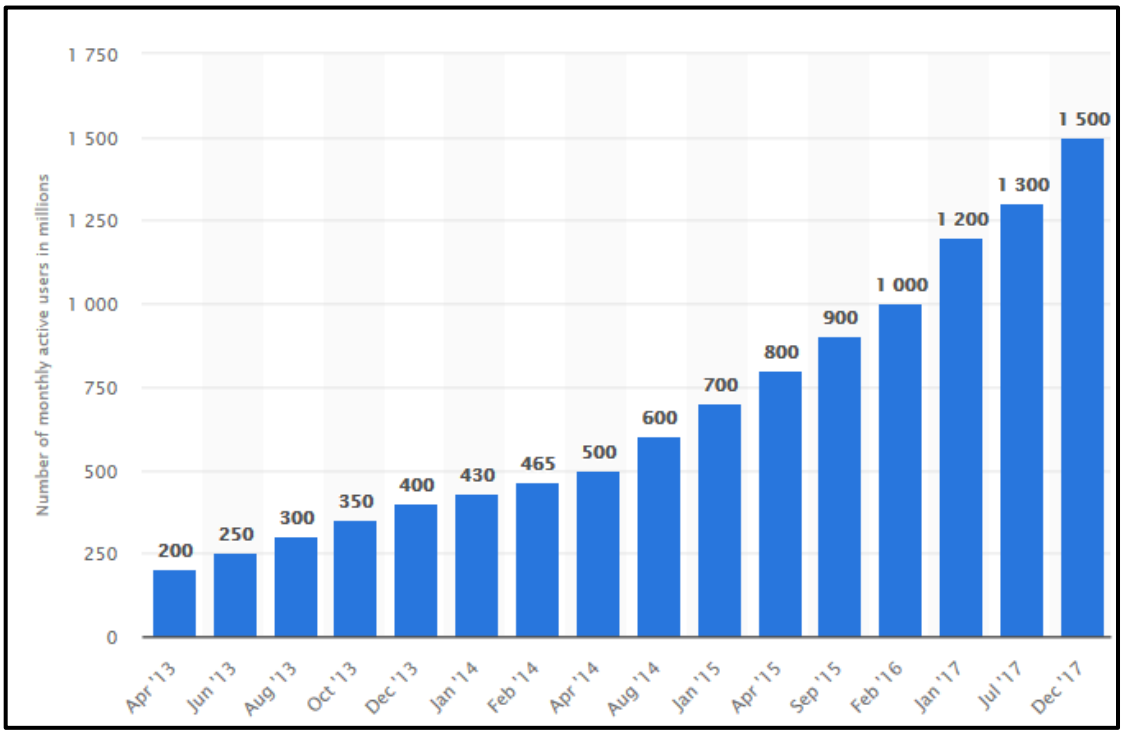


Figure 5. Number of monthly active WhatsApp users worldwide (in millions)

(Statista, n.d)

In 2017 the Reuters Digital News Report reported that the major consumption shift was in the use of private messenger apps, such as WhatsApp and Facebook Messenger, which are used more in Ireland than in many other countries for general use, rather than for news use. Some 40% of Irish respondents are now using WhatsApp, 37% use Facebook Messenger, and 19% use Viber (Fujomedia, 2017, June, 22).

In November 2017 Ipsos reported that 61% of adults aged 15+ have a WhatsApp account, the highest figure recorded to date. 1.4 million adults aged 15+ in the Republic of Ireland use WhatsApp on a daily basis.

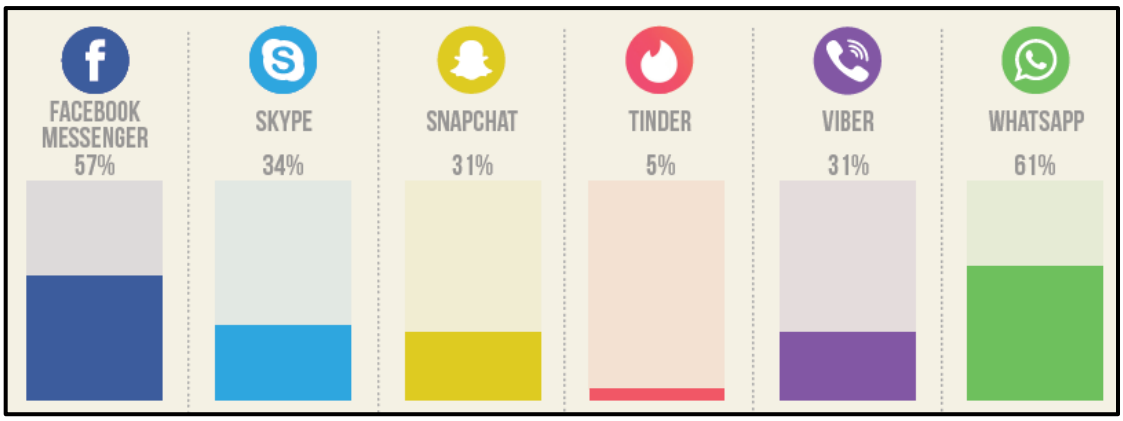


Figure 6. % Social Messaging Account Owners in Ireland in November 2017

(Ipsos, 2017, September, 15)

Ipsos in November 2017 reported there has been more than a 10% increase in account owners in WhatsApp in Ireland since January 2016.

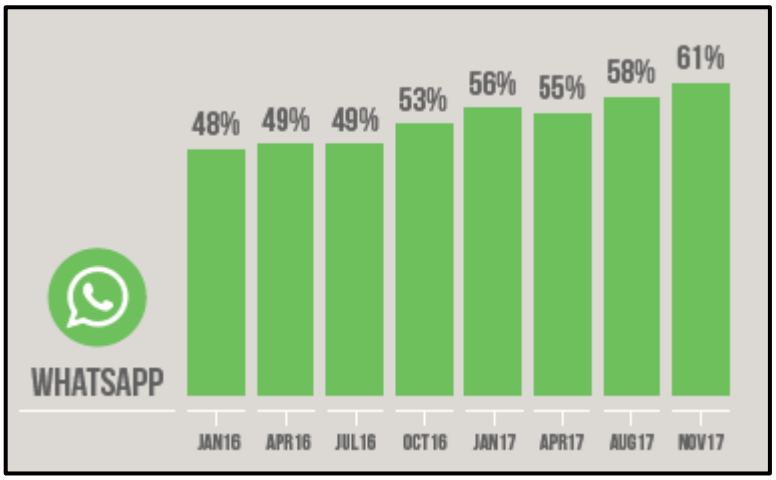


Figure 7. % Social Messaging Account Owners in Éire between Jan '16 & Nov '17

(Ipsos, 2017, September, 15)

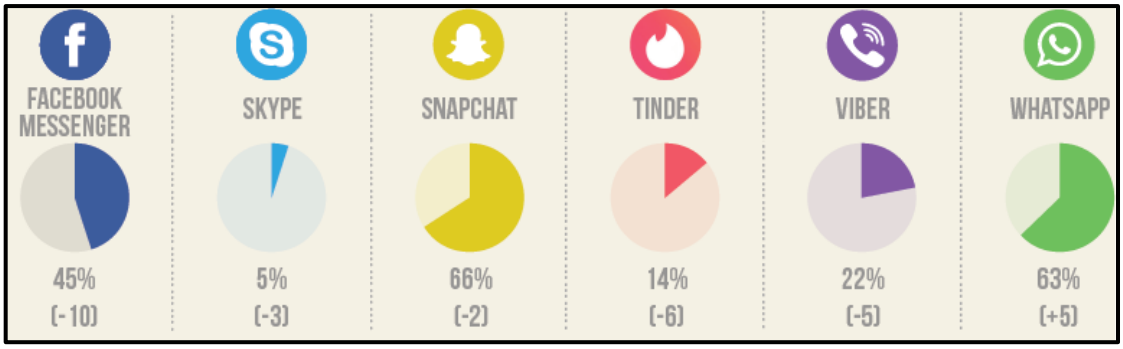


Figure 8. % Daily Use of Account Owners with Social Messaging in Éire in Nov '17

(Ipsos, 2017, September, 15)

Vishranti & Prafulla, 2016) have identified many positives with using SNS's in education such as:

- More educated
- Improve computer literacy
- Build skills to use in working life
- Discovering skills quicker
- Undiscovered talents Greater amounts of sharing
- Experience in design and layout
- More awareness to things happening around them

As with all positives there are negatives (Vishranti & Prafulla, 2016) identified the following using SNS's in education:

- Less attention to spelling and grammar
- Reduced focus on learning as students rely on the web
- Ability to retain information had diminished
- Multi-tasking poses problems, reduced academic performance
- Remove from human interaction
- No anonymity
- Less face to face interaction

1.4 Blackboard

Blackboard is a virtual learning environment where teachers can load class notes and grade marks. Student can access notes and engage in blogs and discussions.

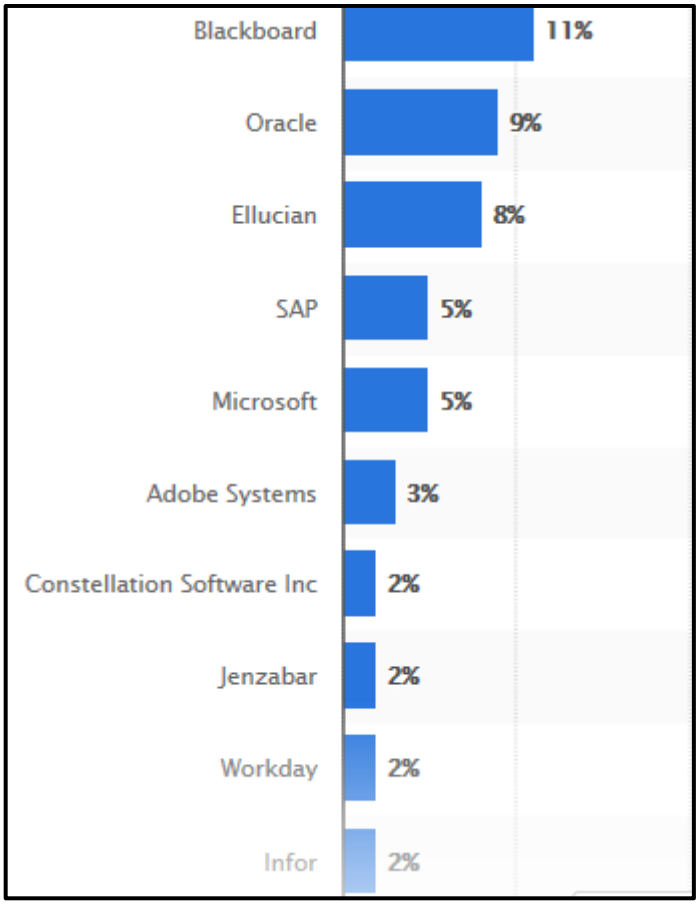


Figure 9. Vendors' share of the education software/application market worldwide '15

(Statista, n.d)

The statistic shows the share held by the leading vendors in the education software market worldwide in 2015. In 2015, Blackboard held 11% of the education software market, which was valued at 5.4 billion U.S. dollars in total (Statistica, n.d).

Blackboard are a worldwide company with offices in Europe and North America. Their main goal is to partner their higher education clients to drive student success through innovative and flexible technologies and service. They pride themselves on their education technology built to enable teaching and learning both inside and outside the classroom. Some of their core functions in education are the following:

- Personalized learning solutions
- Power innovation
- Enhance personalized & competency-based education
- Enable blended learning
- Create a virtual classroom
- Innovative classroom management
- Collaborative learning platform: Learn together
- Manage classrooms on the go

Blackboard offer in communication announcements, chat, discussion and mail and in content they offer course content, calendar, learning modules, assessments, assignments, grades and a media library on their dashboard (Blackboard, 2017, n.d). In 2015, Blackboard held 11% of the education software market, which was valued at 5.4 billion U.S. dollars in total (Statista, n,d).

Facebook released figures in December 2016 showing over one billion people (Facebook, 2016, October, 10) used its website daily. WhatsApp stated in January 2015 when they had 700 million now have over one billion daily users (Statista, n,d). Facebook and WhatsApp aim to get people connected and are now maybe the cause or most definitely a contributing factor of creating a generation of people who are constantly multitasking whether it be their smartphone, tablets, laptops or gaming consoles we cannot escape the gadgets to connect us. The Oxford English dictionary has defined the screenager as a person in their teens or twenties who has an aptitude for computers and the internet (Oxford, 2016). Yoon, Lee and Lee, 2013 identified issues and concerns in interacting with students defined as screenagers in the classroom. Such things as communicating with the students through social media as that's what they are used to, the correct amount of audio-visual resources, side effects of using personal learning devices and also the teachers' roles and responsibilities. Today screenagers are reading from a screen and very few are reading from a book, newspaper or magazine. Screenagers are flicking and scrolling from screen to screen. There is the approach of using the personal learning devices (PLD's) and many schools in Ireland have adopted them now, in 2014 about 100 secondary schools went digital but use the blended approach using digital but also incorporating writing in copy books

and using some text books. The systems in use are integrating with each other as opposed to replacing one with the other. Students engagement can be more easily monitored using the PLD's and they allow the student reflect on what they were taught in class. In 2016 Loch, Borland, & Sukhorukova found that the students thought blended learning or online learning was limited to watching videos or recorded live classes. The students did not want the face-to-face classes replaced with all blended learning and it was critical that the students were communicated this information. This would support the fact that students prefer a bit of both the traditional teaching as well as the online methods.

Students also used independent and self-regulating learning as well as collaborative learning. Overall students felt more positive about their learning as they were in large classrooms and felt they were given more personal time through the interaction on their PDL's by messaging and the teachers would be able to replicate this model for other classes. Yoon Et al. in 2013 refers to Prensky (2001) to the students who are the digital natives and the teachers are the digital immigrants and what was happening is the digital natives were trying to teach the digital immigrants but the digital natives are the students and this had been forgotten. This is why interaction is required between the teachers and the screenagers and both need to understand the importance of technology in their learning.

Anderson (2008) outlined that with the rapid development of information and communication technologies we are continuously transforming the way we live. As a result of the new developments they create new challenges to the delivering of education and require essential changes in both the learning and delivering of the information to the students. At a faster pace, or the influence of technology is transforming education at a rapid pace requiring new approaches to adapt.

Most people who own a smart phone use SNS's every day and often feel they would be lost without them. Van Deursen, Bolle, Hegner and Kommers, (2015) investigated these feelings and also support the evidence that routine smartphone use is an important contributor to addictive smartphone behaviour. Individuals today can feel discomfort or anxiety by not having their mobile phones or a similar device (Siggins &

Flood, 2013). These feelings are as a direct result of them not being able to communicate in their virtual environment (King, Valença, Silva, Baczynski, Carvalho & Nardi, 2013).

When using social networking sites we allow ourselves adopt our own persona which means we use our own name and photograph and we include our offline contacts as our primary contacts (Kirwan, 2016). We also show ourselves in a much more upbeat and capable manner showing all the good things about ourselves what we can do as opposed to the real person who has difficulties in lots of areas.

On a daily basis students are interacting in a world where information is at the fingertips and they are constantly switched "on". As this is the away life is progressing education needs to get on board. (Voogt, Erstad & Mishra, 2013) refer to the "remixing culture" which means allowing the educators move from all the focus on content and information and put more focus on content creation, sharing and creativity.

As the variety of SNS's increases all the time and the availability to access them expands rapidly there now seems to be such an unpreceded level of connectivity that we have never seen before. We need to ask ourselves now that we are so connected is this causing other problems in our lives – such as isolation, bullying, decreased levels of learning and personality traits such as addictions. Is there such a thing as Social Networking overload, are we communicating too much with the virtual environment as opposed to reality. Pelling & White, (2009) found that the desire for belonging did not influence the usage level of SNS's but did influence the intensity associated with the usage. Their research showed that subjects who had a strong desire to belong were more likely to show addictive tendencies toward the usage of SNS's.

SNS's are used in education every day, whether students are working together on a project or on an online course SNS's make it easier for the students to communicate and collaborate. They allow the students to talk, share information and work as part of a team. These types of groups can help students form relationships and social skills

which makes them feel part of a group and will in return prevent students dropping out.

With all good things there is a negative side, SNS's get some bad press such as students are easily distracted, they may decrease their ability to communicate in a face to face setting, poor spelling and poor grammar will show signs in handwriting. Education will have to keep up with the technology trends and embrace the developments, students need to be reached at every level particularly for 1st year students where they are very vulnerable and are adjusting to their new surroundings. Students become dis-engaged from their studies when scrolling through their SNS's when supposed to be paying attention in class. The more time the students spend on their SNS's the less time they are focused on conversation with people in their class and their teacher. Something as simple as not coming of their SNS's not taking proper breaks or even time for sleep will result in poor physical and mental health (Vishranti & Prafulla, 2016).

Online Courses (Online Courses, 2013, May, 22) clearly identified the down side of SNS's and their potential for distraction people can lose hours on their phone as well as encouraging poor handwriting skills. In 2017, Chukwuere & Chukwuere highlight the negative effect that SNS's were having on females in university as they were spending hours browsing the internet and chat rooms and this was having a negative effect on them socially.

There are many positive and productive ways to use SNS's, providing you use it productively and do not let it take over your life. Do not allow it become a distraction allow it be an asset to learning, keeping people connected and engaged with their fellow students. The trick is to figure out and how to navigate the fine line between productivity and obsession and come out ahead in the other side. Madge, Meek, Wellens and Hooley (2009) describe Facebook as a *"social glue"*, pre-registration engagement with a college Facebook network can aid first year students in making the transition to third level education.

Students believe their SNS's accounts are for their own private use and clearly distinguish SNS's for their private life and don't use them for educational purposes

(Tess, 2013). Being part of a group can help a person engage more but it can also can create an environment where the person feels they are unable to interact.

Deng and Taveras, (2013) believed that social media platforms have the potential to enhance teaching and learning in higher education but more research is required particularly into how SNS's could be used as a learning or teaching platform. On the other hand Cloete Et al., (2009) pointed out that lecturers are sensitive about maintaining their credibility as professionals and are often using their social media networking for purely social purposes. They prefer not to interact with their students by means of social networking. Lecturers tend to use the likes of Twitter as a professional SNS's, they use it to communicate with other professionals in their area of expertise creating more room for discussions and debates. Lecturers who use Twitter view it as a platform to find and share resources, be informed and updated on new information and to stay in touch (Bista, 2015).

Student engagement has been discussed and argued for many years in education, for the purpose of this paper it is defined as "the extent to which students are actively involved in a variety of educational activities that are likely to lead to high quality learning" (Coates, 2005). It can refer to the level of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education in other words how satisfied are they with their learning?

Mark in 2013 furthered the research by Kearsley & Schneiderma, (1999) in their engagement theory illustrate students being meaningfully engaged in learning activities through interaction with others and worthwhile tasks. They believed that technology can facilitate engagement in ways which are difficult to achieve otherwise.

According to Mark (2013) student satisfaction occurs when perceived performance meets or exceeds the students "expectations". Cotton, Dollard, and de Jonge, (2002) describe the student satisfaction theory as the "happy-productive" student theory. They have outlined satisfaction as being effected by stress, coping and well-being. The higher these are the less satisfied the student is. Students who are more satisfied with

their studies will remain in the Institute and succeed. Not only is the content and quality of what students are being taught an important factor satisfaction, communication and engagement is just as important. In 2002 Jung, Choi, Lim & Leen reported that students who participated in online collective learning practices had higher levels of satisfaction with their learning experience compared to those who engaged with task focused interactions with their instructor. Factors such as age, gender, exam result and computer literacy were found not to effect satisfaction levels (Kitchen & Mac Dougall, 1998; Yaverbaum & Ocker, 1998). Kitchen and Mac Dougall, 1998 found that students who were studying on a distance course were more dissatisfied with unclear expectations from supervisors, unattainable timelines, workload, poor software interface and slow access.

From reading the literature there is a gap in research in Ireland particularly in relation to the use of WhatsApp in an educational setting. Law, Pelgrum and Plomp (2008) believed the vision of technologies and integration in education had not materialised to the best of their ability and there was a significant gap between technology and education. The study has been carried out to look at the use of SNS's in an educational setting and whether or not they increase the levels of engagement versus the use of VLE's with students. Also satisfaction levels when using SNS's and VLE's were recorded. Are students effected more when specifically looking at WhatsApp which has very little research published to date.

1.5 Research Question:

What effect does encouraging the use of WhatsApp with the traditional virtual learning environment such as blackboard have on levels of satisfaction and engagement in registered students in tertiary education?

1.6 Hypotheses:

- H_1 There is a significant difference in satisfaction levels when a student uses blackboard with WhatsApp

- H_0 There is no significant difference in satisfaction levels when a student uses blackboard without WhatsApp
- H_2 There is a significant difference in engagement levels when a student uses blackboard with WhatsApp notifications
- H_0 There is no significant difference in engagement levels when a student uses blackboard without WhatsApp notifications

1.7 Further Research

There seems to be little research into maintaining students in third level education, alarming figures were released in 2014 by the Higher Education Authority (HEA, 2016, November, 15), a total of 6,414 students — equating to 16% of all first year student numbers quit their college courses in 2014. Students tend to drop out because they chose the wrong course, financial difficulties or health reasons Lowe and Cook, (2003). More support for the first year student is required to try and understand why they are dropping out and what support can be given to them to keep them registered.

2.0 Method

2.1 Design

The proposed study used an experimental strategy design with a web based survey and questionnaire. This quantitative study used the nomothetic approach with comparative and between group's research design by using questions to measure engagement and also data was collected by measuring satisfaction levels using the life satisfaction scale (Diener, Emmons, Larsen & Griffin, 1985). The scale is made up of a series of five statements that the participants could agree or disagree with. They used a 1 – 7 Likert scale to indicate their agreement with each item. The internal consistency reliability (Cronbach's alpha) was 0.90 which indicates a very good internal consistency. Data was analysed using SPPS statistics software to run independent t-test, Pearson and Spearman rho correlation tests were used to examine the two dependable variable's engagement and satisfaction with the independent variable WhatsApp Intervention.

An experimental design was chosen to compare two groups of students (Statistic Solutions, 2018, n.d), with/without WhatsApp intervention. There were two parts to the experiment first part was measuring how engaged the participant was by using a series of questions relating to some videos shown to the participants and the second was measuring how satisfied a participant was after they answered a few WhatsApp messages. Two groups were analysed (control and experimental). The advantage of doing an experimental design is that it is objective, as the experiment was carried out in the filed it is more likely to replicate real life scenarios of (Simply Psychology, 2012). As the study is covert there is a less likelihood of demand characteristics affecting the results (Simply Psychology, 2012). A disadvantage of a field experiment is it is very hard to control other variables that are not related to the participant and then making it harder to replicate the study (Robson & McCartan, 2016).

Both groups were similar in all other characteristics except for the independent variable WhatsApp, which was manipulated by the researcher. Participants were chosen randomly and the independent variable was also applied randomly so as to

avoid any external influences between the two groups. All other variables were controlled and were the same between both groups. A research question and a hypothesis was deigned based on the intervention of WhatsApp, these were investigated and was it the cause of any differences outlined in the results between the two groups.

Both sets of participants were surveyed and analysed in exactly the same format to try and control the design at all times. In order to keep as much control as possible a small pilot test was carried out before the start of the experiment.

2.2 Pilot Study

A short pilot study was carried out before week one of the experiment with five people, initially the experiment was going to include the use of other SNS's and VLE's but these were quickly eliminated as the scope of the experiment was too large within the timeframe allowed. It was decided to focus on an experiment with just WhatsApp and Blackboard and looking at the effect it would have if any on engagement and satisfaction. Two questions were also removed from the questionnaire as the participants felt they had no relevance to the experiment and the questionnaire took too long to complete.

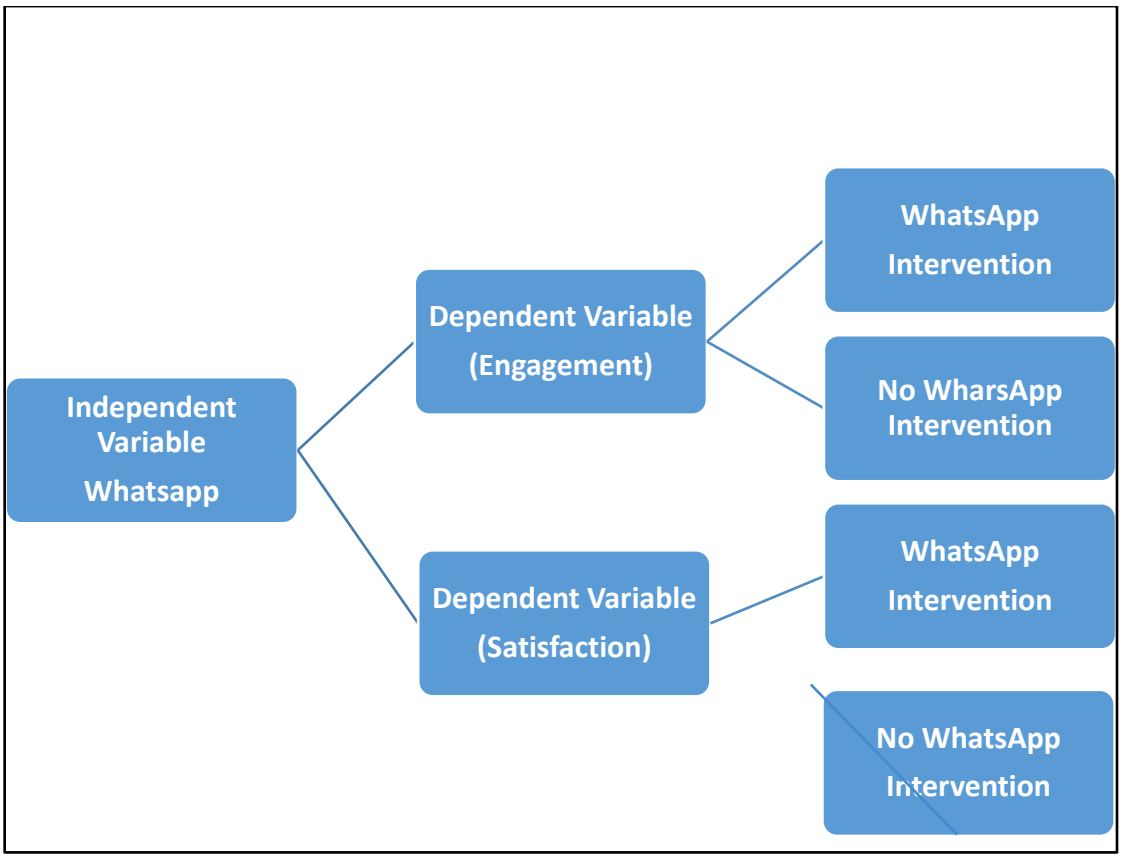


Figure 10. Illustration of the independent and dependent Variables

2.3 Participants

A group of participants were selected randomly from an ad hoc sample of the population in the Institute of Art, Design & Technology, Dún Laoghaire (IADT). Fifty subjects were chosen (11 males, 35 females and 4 did not want to say). By use of posters, emails and social media the researcher advertised to recruit 50 registered students. Once students consented and they had no ethical issues they were given access to Course Sites, which is the free version of Blackboard.

2.4 Materials

1. Online questionnaire (Appendix 1)
2. 6 Short videos on healthy living (Appendix 5)
3. Demographic questionnaire (Appendix 1)
4. The Satisfaction Scale (Diener Et al. 1985) (Appendix 6)
5. WhatsApp software

6. 4 smart phones
7. Course Sites
8. Microsoft excel and SPSS

Each video was selected as they were consistent in terms of content and quick, approximately 3 minutes each.

Figure 11. Screenshot of the videos shown to the participants

(YouTube, n.d)

2.5 Procedure

Each participant viewed a series of six short videos. About 12 hours after they were given access to view the videos 20 participants were added to a group and were sent a few very short WhatsApp messages. Two messages were sent to each of the twenty participants just asking general questions in relation to the six short videos.

An invitation was then sent to all participants to complete an online survey and questionnaire which consisted of a few demographic questions, followed by questions on their WhatsApp and Blackboard usage. This was followed by questions to measure satisfaction levels using the satisfaction scale by Diener Et al. (1985).

Engagement was measured by how many times participants logged into and interacted with Course sites and also how they fared out in a few simple questions relating to the videos.

Descriptive statistics such as frequency distribution, measures of central tendency (mean, median and mode) on the participants was illustrated using Microsoft excel and inferential statistics was measured using SPSS. The questionnaire results were coded categorially (nominally such as yes, no, 1 and 2) in a Microsoft excel sheet as a code book (appendix 7). SPSS was used to measure quantitative research. Correlational experimental design, using parametric statistical analysis for mean, standard deviation, independent t-test, Pearson and Spearman rho correlation tests were run. Researcher used this test as there were two groups used with each group having a greater number than 15.

2.6 Ethics Statement

Ethical permission was granted on the basis that no members of a vulnerable population were used and no sensitive topic would be analyzed. There would be no psychological risk to the participants and work on the study did not take place until ethical approval has been received. All participants were given an opportunity to close out of the survey at any given time if they felt in any way effected by the questions or just did not want to participate anymore without giving any reason.

All participants were fully de-briefed and any participation was done on a voluntary basis, all responses were anonymous and all data was stored securely. Electronic data was encrypted using encryption software and stored on my researchers password protected IADT student drive. Only the researcher and supervisor have access to the raw data and all participants were informed of this. All participants were required to complete an informed consent form which was embedded into the online questionnaire. Respect of the participants and anonymity was considered at all times.

All participants were informed of the protocols of the study and were ensured of anonymity and confidentiality. They were also informed of the context of the experiment and written consent was obtained from all participants, only those who accepted completed the experiment. Each participant was given an information sheet outlining the nature of the study and a consent form. No one from the vulnerable population was used and this includes no one under the age of eighteen years of age.

The biggest ethical issues encountered during the study was getting access to a live blackboard site, participants engaging in WhatsApp messaging and anonymity. To overcome these issues the researcher used Course Sites and purchased their own smart phones with anonymous student's names entered as participant 1 to participant 50.

3.0 Results

In this section the analysis of the data collected in the research process is illustrated and discussed relating to the research question does encouraging the use of WhatsApp help students to engage more and also are the students more satisfied in themselves when using WhatsApp. The data was also used to address the hypotheses that encouraging the use of WhatsApp would increase engagement and satisfaction and if there were any correlations between using the social media network and the way the students behaved.

3.1 Descriptive Analysis

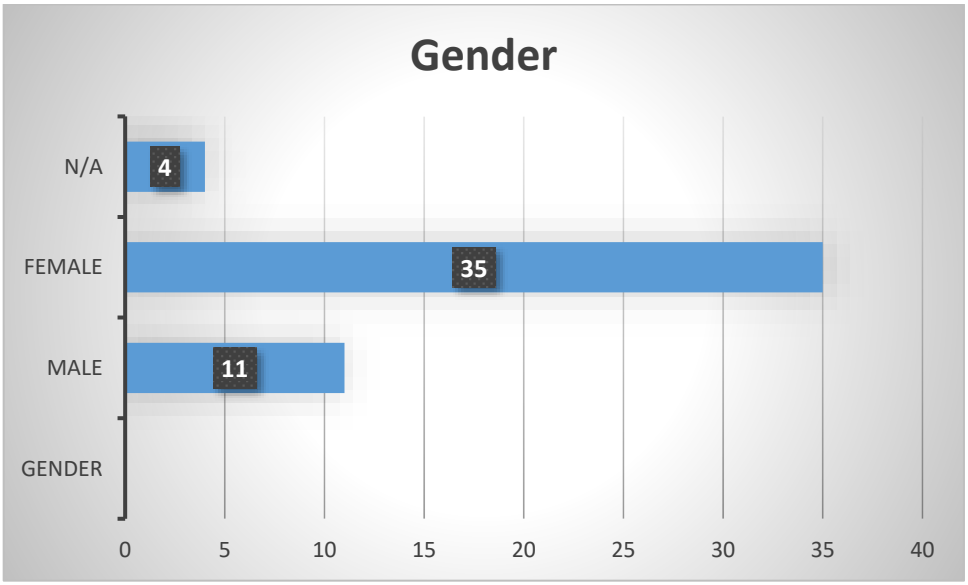


Figure 12. % breakdown of participants gender used in the study

In total 50 participants took part in this research, information from 54 participants was collected but four could not be used due to ethical reasons (under the age of 18). Figure 12 shows that almost ¾ of the participants were made up of females. In 2016 the Central Statistics Office (CSO) reported that 43.2% of women were educated to 3rd level compared with 40.7% of men (Central Statistics Office, 2016, December, 20). Not since 1991 was the level reported by men in higher educational higher than women (Central Statistics Office, 2016, December, 20).

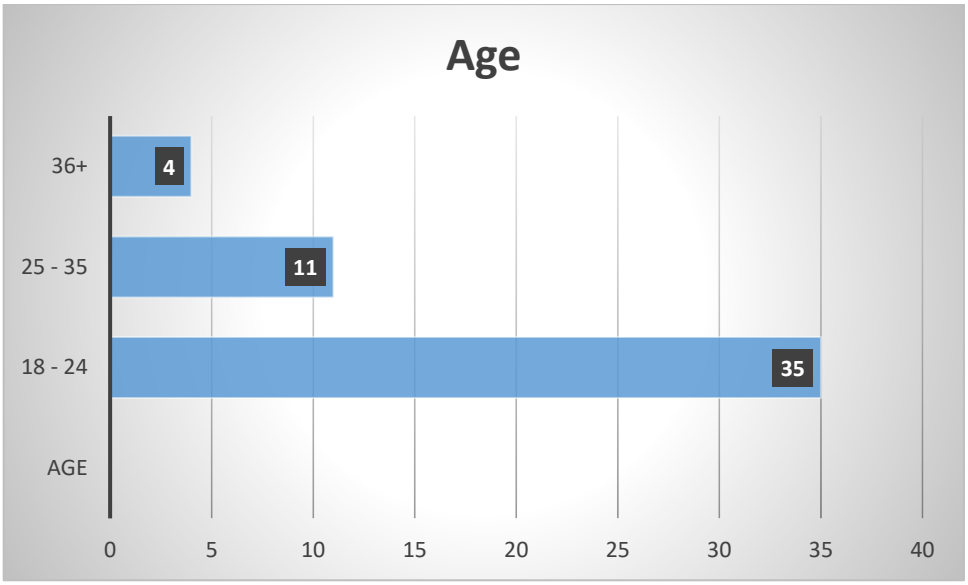


Figure 13. % breakdown of participants age used in the study

Figure 13 shows that almost ¾ of the participants were under 24 years of age. In 2016 the Higher Education Authority reported that 92% of undergraduate students were under the age of 24 (HEA, 2016, November, 15). This is representative of the sample population in 3rd level students. From the demographic information collected 98% of the participants were Irish (*n* = 49*)* with 2% from the United Kingdom (*n* = 1). 86% of the participants live in Dublin (*n* = 43), 6% live in Galway (*n* = 3), 4% living in Cork (*n* = 2) and the other 4% living in Meath (*n* = 2).

3.2 WhatsApp

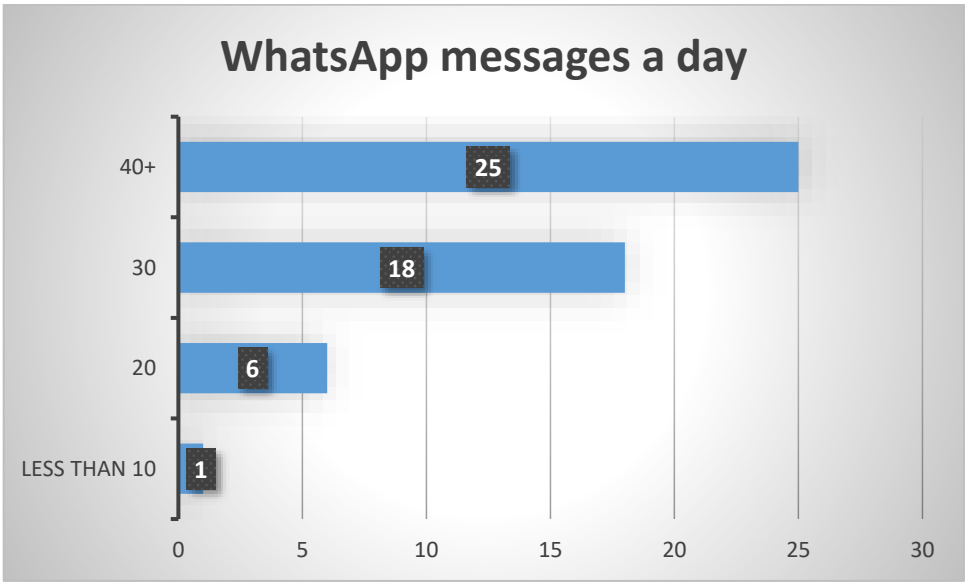


Figure 14. Daily WhatsApp usage of participants recorded in the study

Figure 14 shows that almost 100% of the participants surveyed are sending more than 20 WhatsApp messages daily. This research found that 98% of the participants surveyed were spending more than an hour on WhatsApp each day.

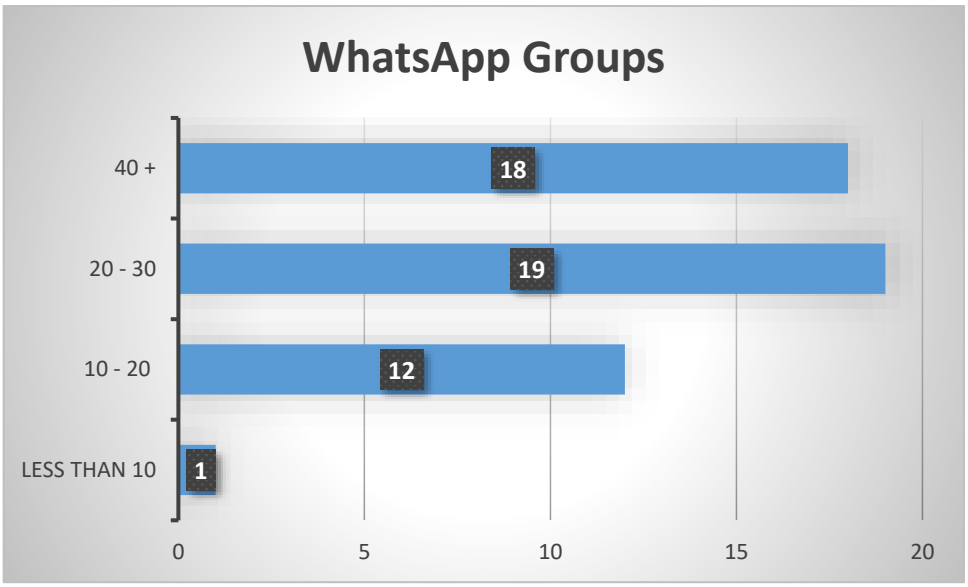


Figure 15. No. of WhatsApp groups, participants members of used in the study

From the participants who used WhatsApp again nearly 100% of them were members of more than 10+ WhatsApp groups. From the sample of participants the minimum

amount of messages the participants were spending a day on WhatsApp was 10 and the maximum was 40. The mean recorded from the sample was 33.4 and the standard deviation was 7.72.

The sample of participants were members of a minimum 10 groups in WhatsApp and a maximum of 40 groups. The mean recorded from the sample in WhatsApp groups was 30.8 and the standard deviation was 8.29.

3.3 Blackboard

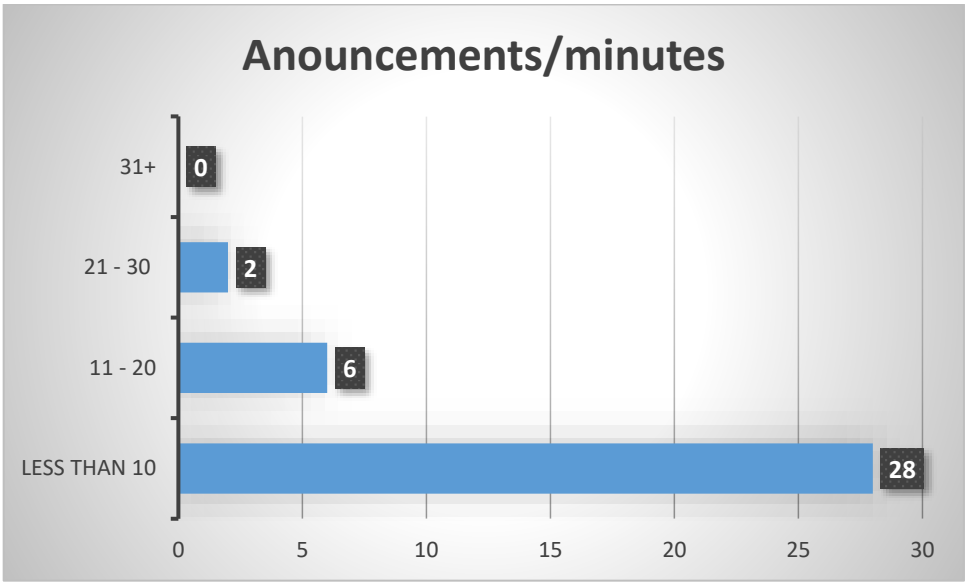


Figure 16. Blackboard Usage in minutes of participants

Figure 16 shows the amount of time (minutes) participants spent reading announcement section daily on Blackboard

Only 72% of the participants surveyed used blackboard on a daily basis. Figure 16 shows that almost ¾ of the participants surveyed spent less than ten minutes reading the announcement section on Blackboard daily.

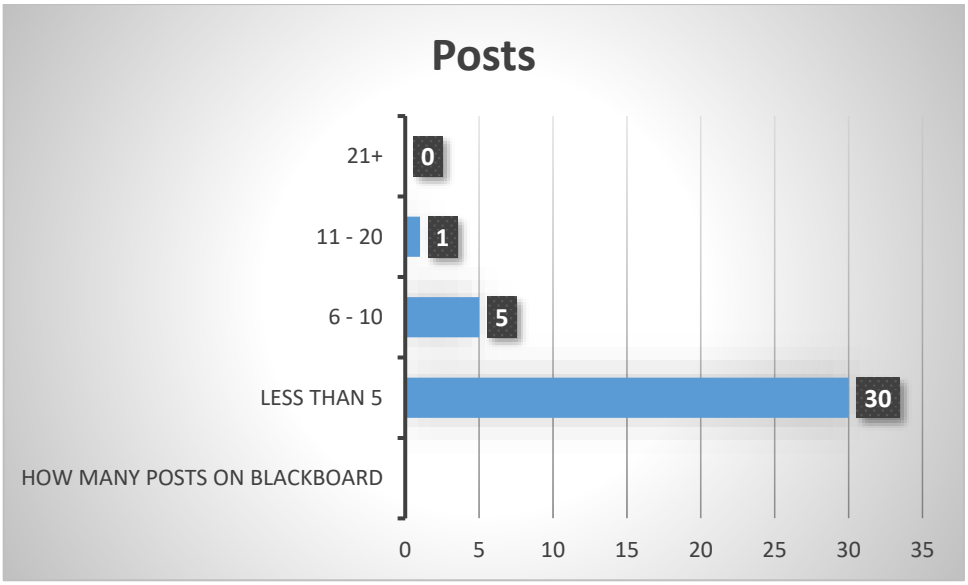


Figure 17. Amount of posts participants posted on Blackboard

Figure 17 shows that over 4/5 of the participants surveyed spent posted less than five announcements on the announcement section on Blackboard. From the sample of participants the maximum amount of time the participants were spending on the announcement section on blackboard was 3 minutes. The mean recorded from the sample was 0.92 and the standard deviation was 0.75.

The sample of participants posted a maximum on two posts on the announcement section on blackboard. The mean recorded from the sample in posting announcements on blackboard was 0.8 and the standard deviation was 0.61.

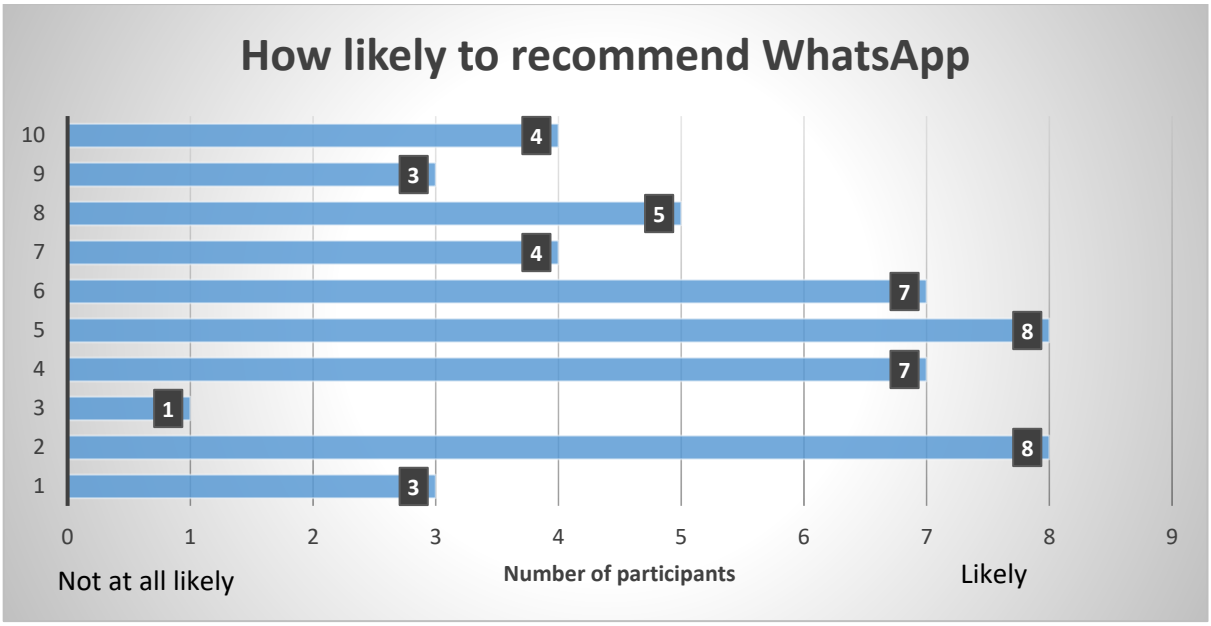


Figure 18 How likely participants were to recommend using WhatsApp for learning

Figure 18 shows that over 50% of the participants surveyed would not recommend using WhatsApp for learning.

The data was checked for normal distributed by plotting the normal bell curve on a histogram to compare data, both sets resembled a bell curve. This allowed the researcher to use parametric tests. In the analysis a kurtosis figure for each scale obtained was between -2 and +2 and the skewness figure was between -1 and +1 (Appendix 8)

When looking at the Kolmogorov-Smirnov[a] and Shapiro-Wilk tests of normality (used when participant numbers are less than 1,000) there was a slight skew in the normal distribution. The results shows this in the data for female and other, they had significant values greater than 0.05 indicating that the data may not be normally distributed particularly in relation to gender and male numbers (Appendix 8). The Normal Q-Q Plot was also checked and the plotted results showing for age and gender illustrated normal distribution (Appendix 8).

3.4 Inferential Analysis

For this study a Pearson correlation test was run to investigate if there was a relationship between the independent variable which was the use of WhatsApp and the dependent variables engagement (did the participants log into blackboard) and satisfaction levels.

Table 1

Correlations for WhatsApp, Satisfaction and Engagement

	Was there WhatsApp Intervention	***Are they satisfied***	***Did they log into blackboard***
Was there WhatsApp Intervention		-0.17	.70**
Are they satisfied			-0.07
Did they log into blackboard			

Note. ** Correlation is statistically significant at the 0.01 level, *N* = 50.

The results show that there was very little correlation between the WhatsApp usage and levels of engagement and satisfaction ($r = 0.70$, $n = 50$, $p = 0.23$).

To measure engagement an Independent T-test was run to look at engagement levels of the participants, by looking at whether or not they answered the six questions correctly and did the participants log into blackboard.

Table 2

Descriptive Statistics for WhatsApp, Satisfaction and Engagement

	WhatsApp Intervention	*N*	*M*	*SD*	*SD Error M*
Did they answer question correctly	No	30	1.6	0.49	0.09
	Yes	20	1.95	0.22	0.05
Did they answer question correctly	No	30	1.6	0.49	0.09
	Yes	20	1.8	0.41	0.09
Did they answer question correctly	No	30	1.6	0.49	0.09
	Yes	20	1.6	0.50	0.11
Did they answer question correctly	No	30	1.63	0.49	0.08
	Yes	20	1.8	0.41	0.09
Did they answer question correctly	No	30	1.56	0.50	0.09
	Yes	20	1.9	0.30	0.06
Did they log into blackboard	No	30	1.23	0.43	0.07
	Yes	20	1.95	0.22	0.05

An independent T-test was run for each question measuring engagement see appendix 8. The study found that there were small significant differences in engagement levels in questions 2, 3 and 4 with WhatsApp (1.80 ± 0.40), (1.60 ± 0.50) and (1.80 ± 0.41), compared with no WhatsApp (1.60 ± 0.50), (1.60 ± 0.50) and (1.63 ± 0.49), $t(48) = .-1.48$, $p = 0.14$, $t(48) = 0.01$, $p = 1.00$ and $t(48) = -1.25$, $p = 0.21$.

Further investigation was done by running a Pearson correlation test for each question measuring engagement see appendix 8.

Following this a Spearmans's rho non-parametric correlation tests was run to measure engagement when answering the questions in relation to the short video's and did the participants log into blackboard. Did the use of WhatsApp have any effect on the participants answering the questions see appendix 8.

An Independent T-test was run to look at satisfaction levels between the participants.

Table 3

Descriptive statistics for measuring satisfaction

	Was there WhatsApp Intervention	***N***	***M***	***SD***	***SD Error Mean***
Are they satisfied	No	30	22.5	5.30	0.97
	Yes	20	20.7	4.76	1.06

The table shows the total ratings of the participants from using the satisfaction scale. The study found that there was no significant difference in satisfaction levels with WhatsApp (20.7 ± 4.76) compared with no WhatsApp (22.5 ± 5.30), $t(48) = 1.22$, $p = 0.23$.

The Levene's test for quality of variances was used and the significant value of 0.361 was recorded. These figures were used to determine whether to accept or reject the null hypotheses.

4.0 Discussion

4.1 Overview of Findings

The purpose of this study was to investigate if encouraging the use of WhatsApp would help students engage more and also are students more satisfied in themselves when using WhatsApp. It was found that there was no significant differences in satisfaction ratings with or without WhatsApp with a small significant difference in engagement but this could be down to a number of factors such as the length of the short video, easy questions and easy access to the blackboard course sites.

In total 50 participants were used, when recruiting participants it was highlighted the higher number of females as one of the limitations of the study. Males were difficult to recruit as they advised they did not have the time or the interest in participating. Most of the participants were living in Dublin and this also was noted as a limiting factor.

In this research 28% of the participants said they did not use the announcement section on blackboard while the other 72% did. For participants who used the announcement sections on blackboard 78% of participants spent less than 10 minutes on it a day. For participants using the announcement section on blackboard 83% posted less than 5 messages. This research identified that students do not use blackboard as a messaging forum, they use their own private messaging network sites such as WhatsApp. When postings video on blackboard they must be short to keep students engaged. The implications of this for tutors is significant because they are using blended learning. They need to keep their students engaged and will not do so if they have long drawn out content posted on a VLE. Most students get announcements from WhatsApp notification from friends, this was highlighted in the results as more than 50% of the students do not want to use WhatsApp in their education and learning.

This study looked at the relationship and correlation between the independent variable WhatsApp and the dependent variables engagement and satisfaction. As

predicted in the null hypothesis there would be no significant effect for engagement or satisfaction.

For WhatsApp usage, satisfaction and engagement a Pearson correlation was conducted to examine the relationship between all three. WhatsApp intervention is more strongly positively related to engagement (logging into blackboard). These findings indicated that when students use WhatsApp they logged into blackboard more frequently and there was no significant difference to satisfaction levels. In essence there was little change to the participants rating on the satisfaction scale when they used WhatsApp. The relationship with engagement and WhatsApp usage was small to moderate and slightly positively correlated. The significant value was less than 0.01 accepting the null hypothesis with no significant difference in satisfaction levels when using WhatsApp.

To measure engagement an independent-sample t-test was conducted to compare engagement with participants who used/did not use WhatsApp. There was significant difference in the scores for engagement with WhatsApp overall but further investigation was required.

To measure engagement a Pearson correlation test was conducted to examine the relationship between engagement and WhatsApp usage. There were two questions on engagement one and five where engagement is more strongly positively related to WhatsApp usage (logging into blackboard), all the other questions had no significant value statistically. The relationship with engagement and WhatsApp usage was small to moderate and slightly positively correlated and the significant value was less than 0.01 the null hypothesis is accepted. There was no significant difference in satisfaction levels when using WhatsApp.

A Spearmans rho non-parametric correlation test was run to look at engagement and whether or not it was effected by WhatsApp usage. There were two questions again on engagement one and five where engagement is more strongly positively related to WhatsApp usage (logging into blackboard). All the other questions had no significant value statistically. These findings indicated that when students used WhatsApp they

logged into blackboard more frequently. The relationship with engagement and WhatsApp usage was small to moderate and slightly positively correlated and the significant value was less than 0.01. The null hypothesis was accepted and overall that there was no significant difference in engagement levels when using WhatsApp. These findings would suggest that students use their WhatsApp for personal and private use and not for their learning, they prefer to keep them separate. WhatsApp usage did have a small significant effect on questions one and five and this could be explained by the students starting the questions with enthusiasm and finishing on a high.

An independent-sample t-test was conducted to compare satisfaction with participants who used/did not use WhatsApp. There was no significant difference in the scores for satisfaction with WhatsApp. These results suggest that WhatsApp usage does not have an effect on satisfaction levels. The satisfaction levels recorded were findings of the student's life and not in particular how satisfied they were with their college or their teaching methods. More focus on the teaching methods and how these effect the student's satisfaction ratings would be required to identify student's preferences when measuring satisfaction. Colleges need to determine what modes of communication their students would prefer to keep them engaged and satisfied.

More research is needed to further investigate the finding of Yoon Et al., 2013. The effect constant use of a screen device has on the learning of what we now call the "Screenagers". Students using their own personal devices and communicating through mobile messenger and a BBS system could it cause more levels of anxiety or stress. Students for this study did not seem to affect their levels of satisfaction when WhatsApp was introduced through learning but were quite clear in their responses that they wanted learning kept away from WhatsApp.

As Voogt, Et al., (2013), refer to the "remixing culture" education needs to move away from the old means of teaching and learning the content and information and more focus needs to go on content creation, sharing and creativity.

4.2 Strengths

One of the strengths of the study was that it was carried out in a timely manner, once the design was set up it was easily managed. The participants had never seen the videos before and had no previous knowledge of the content. The content of the six videos was consistent and the questions asked were phrased easily so the participants did not have to waste time. Survey was anonymous and this ruled out any validity issues. Data collection was relatively quick when using software for online surveys and lastly the fact the experiment was carried out online allowed access to everyone in the college or at home. Running a pilot study is so important even if it is very small, in this instance the researcher had planned on using a few SNS's but it would have made the project too large and also make controlling the experiment difficult or create confounding variables potentially.

4.3 Limitations

One of the limitations was the study was not carried out in a laboratory setting no enabling control was very hard and as there could have been confounding variables that could affect the output such as mood, hunger even Wi-Fi coverage. Retaining anonymity was difficult and costly as this had not been factored with the use of smart phones. Access to a blackboard live system would be very beneficial as the assumption was made that access would not be an issue and alternatives had to be sourced quite quickly. Time required by the students to take part was noted as a limiting factor.

The small sample that was used could be seen as a limitation as well as the sampling method as it would be predicted that students differ by course such as Humanities versus Business. The satisfaction scale was also very specific and participants may select answers to look good. Maybe the answers in the scale could be more generic or a more specific scale used in education could be considered.

Theoretical implications from the study are how to measure engagement, it was very difficult to use the VLE to measure engagement of the students. Can the technology of SNS's such as WhatsApp facilitate engagement in ways which are difficult to achieve otherwise. Another theoretical implication would be the effect stress has on the

satisfactions levels of students and does the use of WhatsApp actually increase stress levels and what initially was engaging for the student would actually cause them to remove themselves. The whole idea of been in touch with teachers and class mates constantly can be all too much for them.

Practical implications of the study would be to introduce a trial run of setting up a communication forum via a WhatsApp group with a lecturer and a class, would it be worthwhile in identifying a system where lecturers who have work phones set up WhatsApp groups for their classes. The basis of doing this is to investigate would it improve engagement with the students or would it deter them away from their studies but consideration would need to be given to the idea of crossing boundaries between student and lecturer.

4.4 Future Research

Everyone is using WhatsApp now so there is definitely a gap in the research in Ireland, the biggest limiting factor for this study was access to a Blackboard live system to get good engagement statistics. Could the use of WhatsApp be used to measure more precisely engagement with students in tertiary education and measure how engaged they are. Could investigating or comparing features of different applications benefit the field of research?

Another area would be retention numbers, could the use of SNS's and in particular WhatsApp be used to help students stay in education. Following on from this WhatsApp could be used to investigate why students are dropping out particularly in the first few months of starting tertiary education. Would notifications on a phone be enough or is the communication needed with students or could this be a source of stress as the students would be constantly switched on.

4.5 Conclusion

Students seem to be more engaged with their own life when using WhatsApp. It has been noted that students do not want to use WhatsApp as a learning tool so we need to use the tools we have such as Blackboard and Moodle and put more focus on the

announcement and discussion means. We need to encourage students to engage more in their studies and also engage with the services the institute offer to make the experience of learning more fulfilling.

References

Anderson, R. E. (2008). Implications of the information and knowledge society for education. In *International handbook of information technology in primary and secondary education* (pp. 5-22). Springer, Boston, MA.

Bista, K. (2015). Is Twitter an effective pedagogical tool in higher education? Perspectives of education graduate students. *Journal of the Scholarship of Teaching and Learning*, *15*(2), 83-102. Anderson, R. E. (2008). Implications of the information and knowledge society for education. *International handbook of information technology in primary and secondary education*, 5-22

Barhoumi, C., & Rossi, P. G. (2013). The Effectiveness of Instruction-Oriented Hypertext Systems Compared to Direct Instruction in e-learning Environments. *Contemporary Educational Technology*, *4*(4), 281-308

'Blackboard'. Retrieved from:

http://www.blackboard.com/about-us/tabs/higher-education.html

'Blackboard'. Retrieved from:

https://www.statista.com/statistics/643918/worldwide-education-software-market-share-by-vendor/

Butler, D., Leahy, M., Shiel, G., & Cosgrove, J. (2013). Building towards a learning society: A national digital strategy for schools. *Dublin: Educational Research Centre*

'Central Statistics Office, 2016'. Retrieved from:

http://www.cso.ie/en/releasesandpublications/ep/p-cp10esil/p10esil/tl/

'Central Statistics Office, 2016'. Retrieved from:

http://www.cso.ie/en/releasesandpublications/er/isshh/informationsocietystatistics-households2016/

Chukwuere, J. E., & Chukwuere, P. C. (2017). The impact of social media on social lifestyle: a case study of university female students. *Gender and Behaviour*, *15*(4), 9966-9981

Coates, H. (2005). The value of student engagement for higher education quality assurance. *Quality in Higher Education*, *11*(1), 25-36

Cotton, S. J., Dollard, M. F., & De Jonge, J. (2002). Stress and student job design: Satisfaction, well-being, and performance in university students. *International Journal of Stress Management*, *9*(3), 147-162

Cloete, S., De Villiers, C., & Roodt, S. (2009). Facebook as an academic tool for ICT lecturers. In *Proceedings of the 2009 Annual Conference of the Southern African Computer Lecturers' Association* (pp. 16-22). ACM

Deng, L., & Tavares, N. J. (2013). From Moodle to Facebook: Exploring students' motivation and experiences in online communities. *Computers & Education*, *68*, 167-176

Dictionary, O. E. (2017). Oxford: Oxford University Press. Website.

Diener, E. D., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The satisfaction with life scale. *Journal of personality assessment*, *49*(1), 71-75

Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, *13*(1), 210-230

'Experimental Design'. Retrieved from:

https://www.statisticssolutions.com/experimental-research-designs/

'Facebook'. Retrieved from:

http://newsroom.fb.com/company-info/

'Facebook'. Retrieved from:

http://www.youth.ie/sites/youth.ie/files/International%20report%20final.pdf

'Facebook'. Retrieved from:

www.fujomedia.eu/reuters-digital-news-report-2017/

'HEA'. 2016. Retrieved from:

http://hea.ie/assets/uploads/2017/06/HEA-Key-Facts-and-Figures-201516.pdf

'Higher Education Authority, 2016'. Retrieved from:

http://hea.ie/assets/uploads/2018/02/HEA-Key-Facts-And-Figures-2016-17-FINAL.pdf

'Facebook Accounts, 2011. Retrieved from:

http://www.iop.harvard.edu/survey/details/spring-2011-survey

Jung, I., Choi, S., Lim, C., & Leem, J. (2002). Effects of different types of interaction on learning achievement, satisfaction and participation in web-based instruction. *Innovations in education and teaching international*, *39*(2), 153-162

Kearsley, G., & Shneiderman, B. (1999). Engagement theory: A framework for technology-based teaching and learning. Retrieved July 2002

King, A. L. S., Valença, A. M., Silva, A. C. O., Baczynski, T., Carvalho, M. R., & Nardi, A. E. (2013). Nomophobia: Dependency on virtual environments or social phobia?. *Computers in Human Behavior*, *29*(1), 140-144

Kirwan, G. (2016). Introduction to cyberpsychology. *An Introduction to Cyberpsychology*, 1.

Kitchen, D., & McDougall, D. (1999). Collaborative learning on the Internet. *Journal of Educational technology systems*, *27*(3), 245-258

Law, N., Pelgrum, W. J., & Plomp, T. (2008). *Pedagogy and ICT use in schools around the world: Findings from the IEA SITES 2006 study* (Vol. 23). Springer Science & Business Media

'Leading vendors' share of the education software/application market worldwide in 2015. Retrieved from:

https://www.statista.com/statistics/643918/worldwide-education-software-market-share-by-vendor

Loch, B., Borland, R., & Sukhorukova, N. (2016). How to engage students in blended learning in a mathematics course: The students' views. In *Proceedings of the 33rd International Conference of Innovation, Practice and Research in the Use of Educational Technologies in Tertiary Education,'Show Me The Learning',(ASCILITE 2016), Adelaide, South Australia, 28-30 November 2016/S. Barker, A. Dawson, A. Pardo, A., and C. Colvin (eds.)* (p. 375)

Lowe, H., & Cook, A. (2003). Mind the gap: are students prepared for higher education? *Journal of further and higher education*, *27*(1), 53-76

Madge, C., Meek, J., Wellens, J., & Hooley, T. (2009). Facebook, social integration and informal learning at university: 'It is more for socialising and talking to friends about work than for actually doing work'. *Learning, Media and Technology*, *34*(2), 141-155

Mark E. (2013). Student satisfaction and the customer focus in higher education Journal of Higher Education Policy and Management *35*(1) 2 – 10

Miller, G., & Honeyman, M. (1993). Agricultural distance education: A valid alternative for higher education. *Proceedings of the 20th Annual National Agricultural Research Meetins*, *20*, 67-73

'Number of Facebook Users Worldwide'. Retrieved from: https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/

'Number of WhatsAppUsers Worldwide'.

Retrieved from: https://www.statista.com/statistics/264810/number-of-monthly-active-whatsapp-users-worldwide/

'Number of WhatsAppUsers Worldwide'. Retrieved from:

https://www.ipsos.com/en-ie/social-networking-aug-2017

Olanof, D. (2012). WhatsApp hits new record with 10 billion total messages in one day. *The Next Web*

'Online courses'. Retrieved from:

http://www.onlinecollegecourses.com/2013/05/22/how-social-media-is-killing-student-success-2/

Pelling, E. L., & White, K. M. (2009). The theory of planned behaviour applied to young people's use of social networking web sites. *CyberPsychology & Behaviour*, *12*(6), 755-759

Prensky, M. (2001). Digital natives, digital immigrants part 1. *On the horizon*, *9*(5), 1-6

Roblyer, M. D., McDaniel, M., Webb, M., Herman, J., & Witty, J. V. (2010). Findings on Facebook in higher education: A comparison of college faculty and student uses and perceptions of social networking sites. *The Internet and higher education*, *13*(3), 134-140

Robson, C., & McCartan, K. (2016). *Real world research*. John Wiley & Sons

Siggins, M., & Flood, C. (2013). Mobile phone separation and anxiety. *Cyberpsychology and new media: a thematic reader*, 38-48

'Social Networking Sites, 2017'. Retrieved from:

https://www.ipsos.com/en-ie/social-networking-aug-2017

Sushma, P. (2012). WhatsApp founder to operators: We're no SMS-killer, we get people hooked on data. *The Next Web*

Tess, P. A. (2013). The role of social media in higher education classes (real and virtual)–A literature review. *Computers in Human Behaviour*, *29*(5), A60-A68

Van Deursen, A. J., Bolle, C. L., Hegner, S. M., & Kommers, P. A. (2015). Modeling habitual and addictive smartphone behavior: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Computers in human behavior*, *45*, 411-420

Vishranti, R., & Prafulla, P. (2016). Use of Social Media in Education: Positive and Negative impact on the students. *International Journal on Recent and Innovation Trends in Computing and Communication*, *4*(1), 281-285

Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of computer assisted learning*, *29*(5), 403-413

Vural, O. F. (2015). Positive and negative aspects of using social networks in higher education: A focus group study. *Educational Research and Reviews*, *10*(8), 1147-1166

Yaverbaum, G. J., & Ocker, R. J. (1998). Problem Solving in the Virtual Classroom: A Study of Student Perceptions Related to Collaborative Learning Techniques

Yoon, S. Y., Lee, J., & Lee, C. H. (2013). Interacting with screenagers in classrooms. *Procedia-Social and Behavioral Sciences*, *103*, 534-541

Appendices

Appendix 1

Invitation

Welcome!

You are being invited to consider taking part in a research study to see what effect does encouraging the use of WhatsApp with the traditional virtual learning environment such as blackboard have on levels of satisfaction and engagement in registered students in tertiary education. This project is being undertaken by Sally Connolly, a Masters student at IADT.

Before you decide whether to take part, it is important for you to understand why the research is being done and what it will in involve. Please take time to read this information and discuss it with family and friends if you wish.

Do I have to take part?

You are free to decide whether you wish to take part or not. If you do decide to take part you will be asked to check a tick box before and after taking the survey. You are free to withdraw from this study at any time and without giving any reasons.

If I take part, what do I have to do?

As a participant of this study you will be required to: 1.Check a consent box to signify your willingness to take part in the study

2.Confirm that you are over 18 years of age by checking a declaration

3.Watch six short videos

4.Maybe required to send an anonymous message or two on WhatsApp

5.Maybe required to send an anonymous message or two on Blackboard

6.Complete an anonymous online survey that will include1.Background information

2.Questions on your usages of blackboard

3.Questions on your usages of WhatsApp

4.A few simple questions in relation to the videos you watch

5.A set of rating scales on levels of satisfaction

The total estimated time for completion of the questionnaire should take no longer than 20 minutes.

What are the benefits (if any) of taking part?

By taking part in this study you will further aid research in the Cyberpsychology field and provide more data within this area.

What are the disadvantages and risks (if any) of taking part?

There are no known disadvantages or risks.

How will information about me be used?

Data for this study will be collected via the questionnaires. The information from these questionnaires will be used to develop statistics to support or reject the hypotheses. No other information will be required such as name, address etc. The data from the research will be retained by the researcher for at least one year.

Who will have access to information about me?

The researcher and supervisor of the study shall be the only ones with access to the information from the questionnaires. The use of no names or address is to further safeguard your confidentiality during and after the study. The data will be stored on a password protected computer and will be unlinked and anonymous. The data will be retained by the researcher for at least one year. The data will be disposed of after a period of five years.

What will happen to the results of the study?

The results of this study will be used as a requirement for the completion of the Master's program in Cyberpscyhology in the Dun Laoghaire Institute of Art, Design & Technology as a final year major research project. The study will not be published but submitted to the college for assessment. A copy of the research can be requested from the researcher (s).

What if there is a problem?

If you have a concern about any aspect of this study, you may wish to speak to the researcher(s) who will do their best to answer your questions. You should contact Sally or her supervisor Liam Challenor, information on which can be found below.

Contact for further information

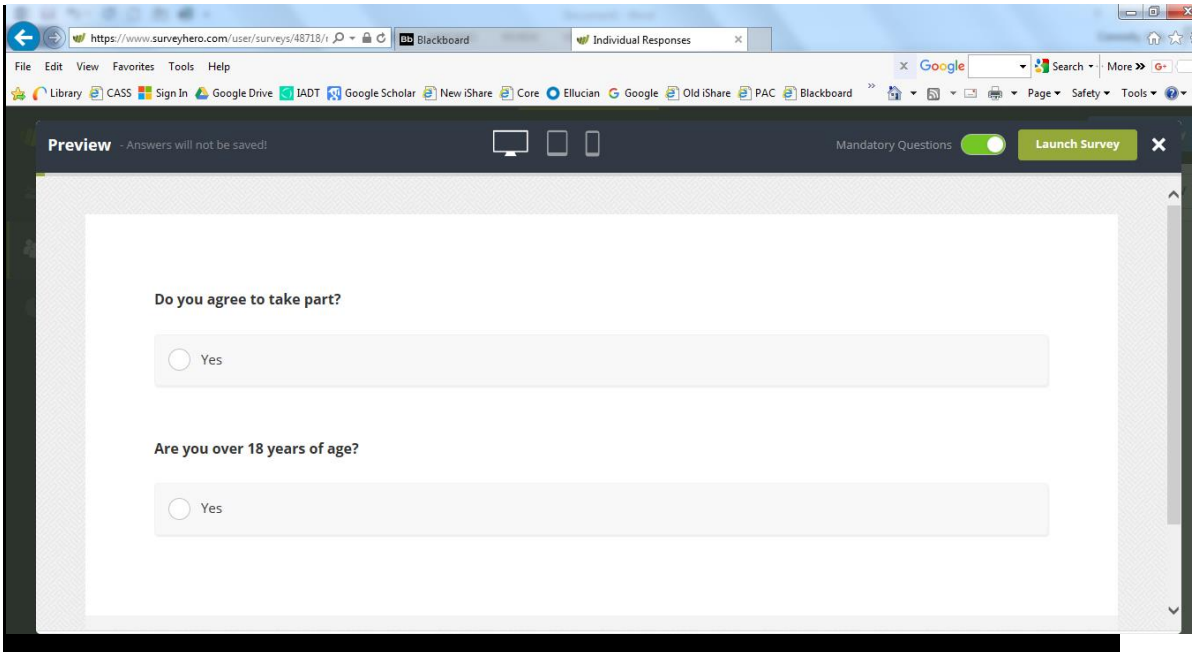
Sally Connolly

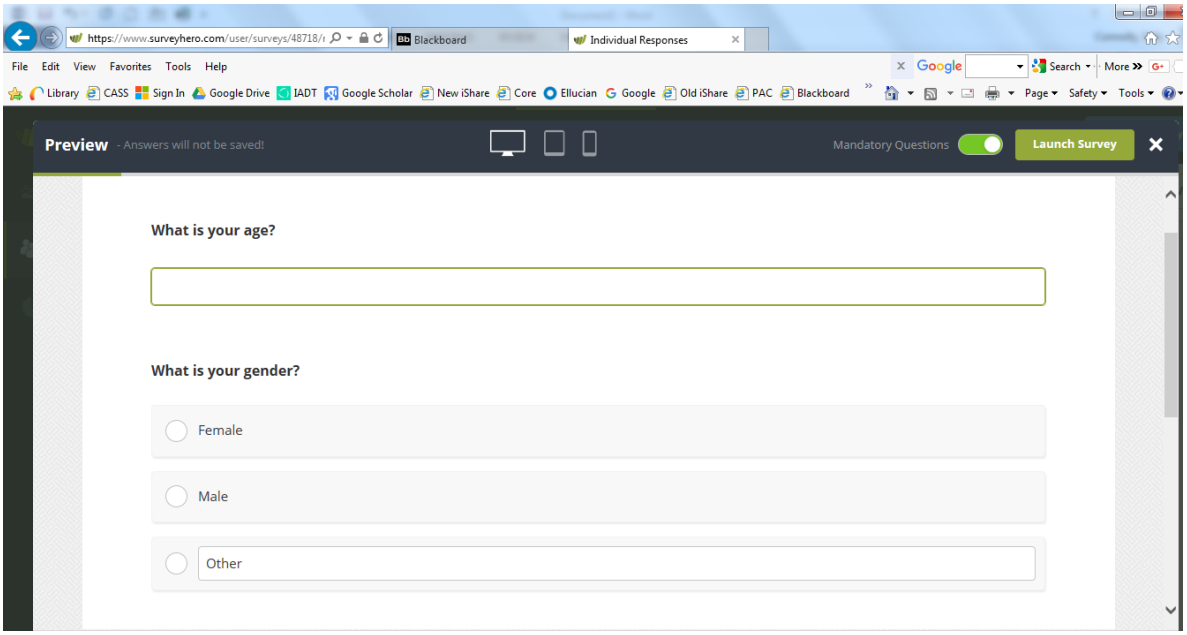
N00162952@student.iadt.ie

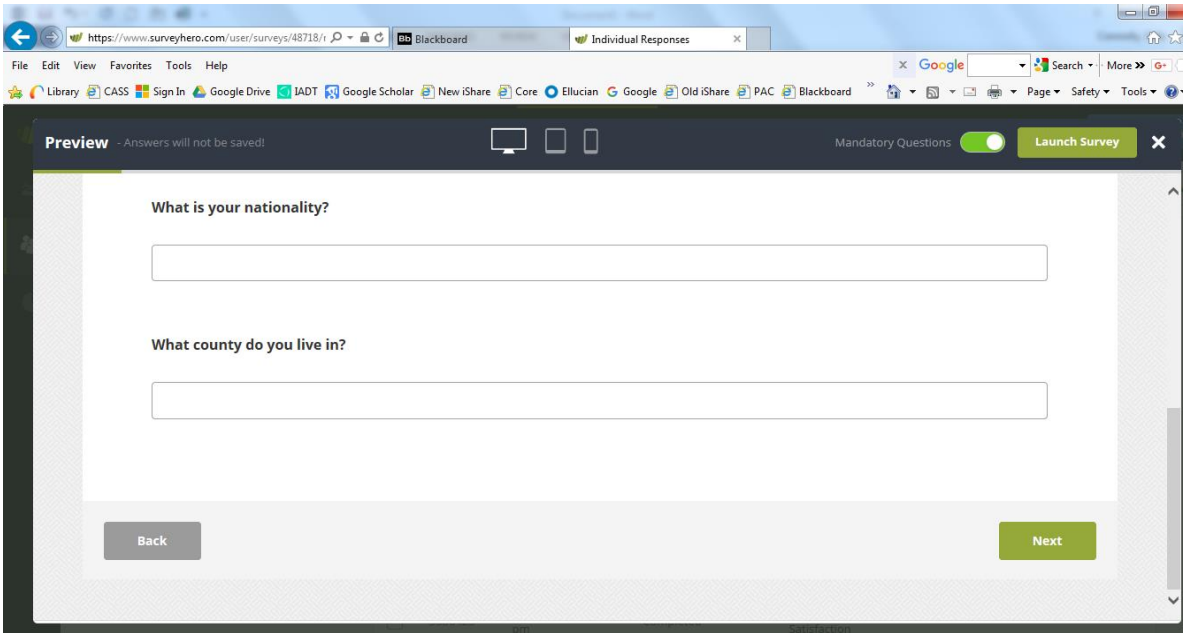
Liam Challenor

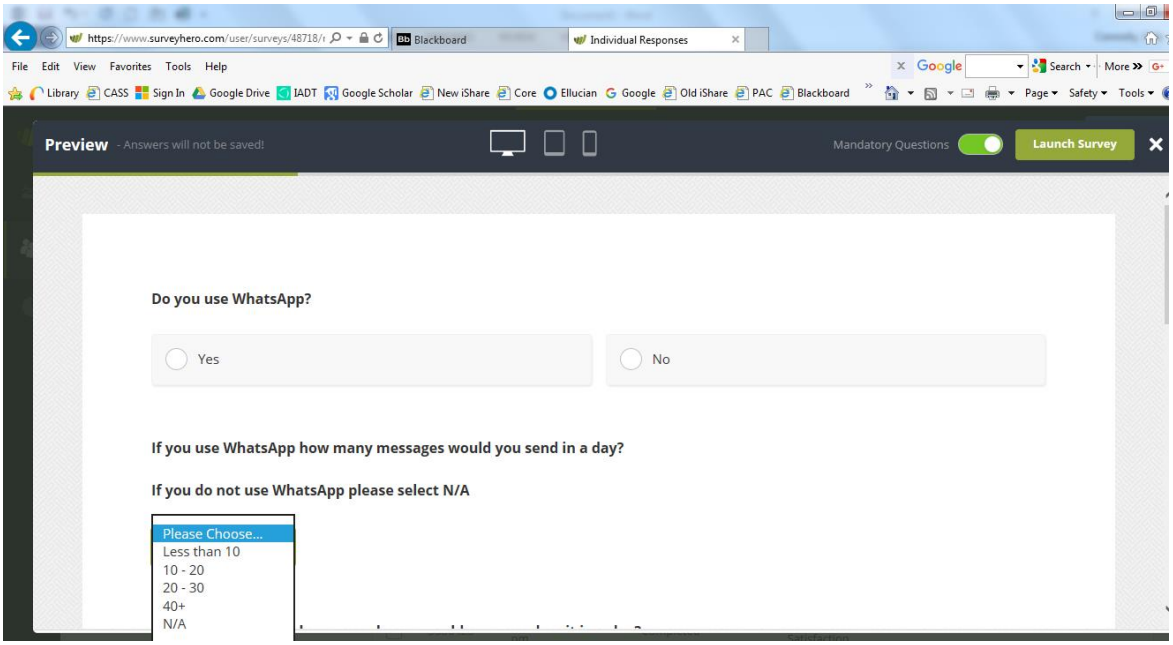
liam.challenor@dcu.ie

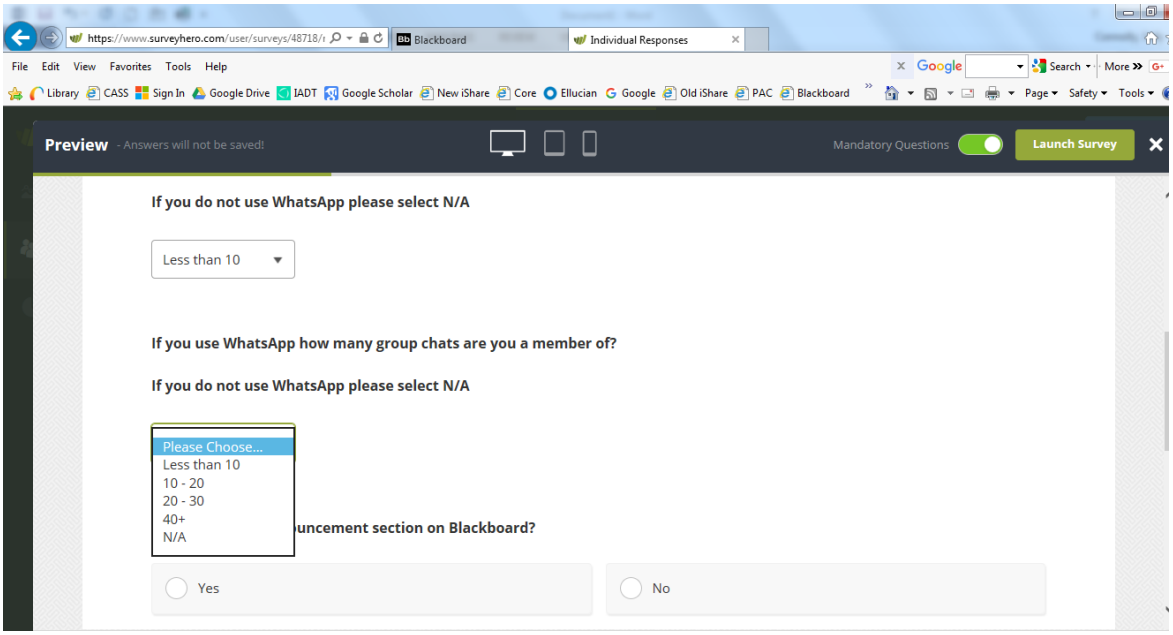
Thank You

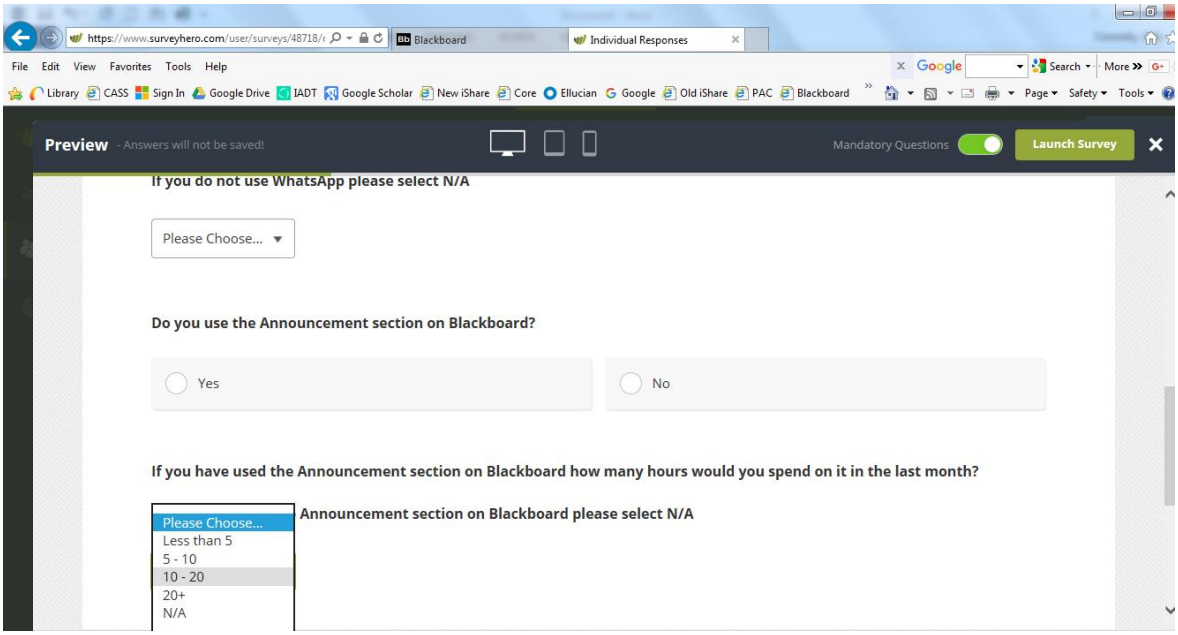


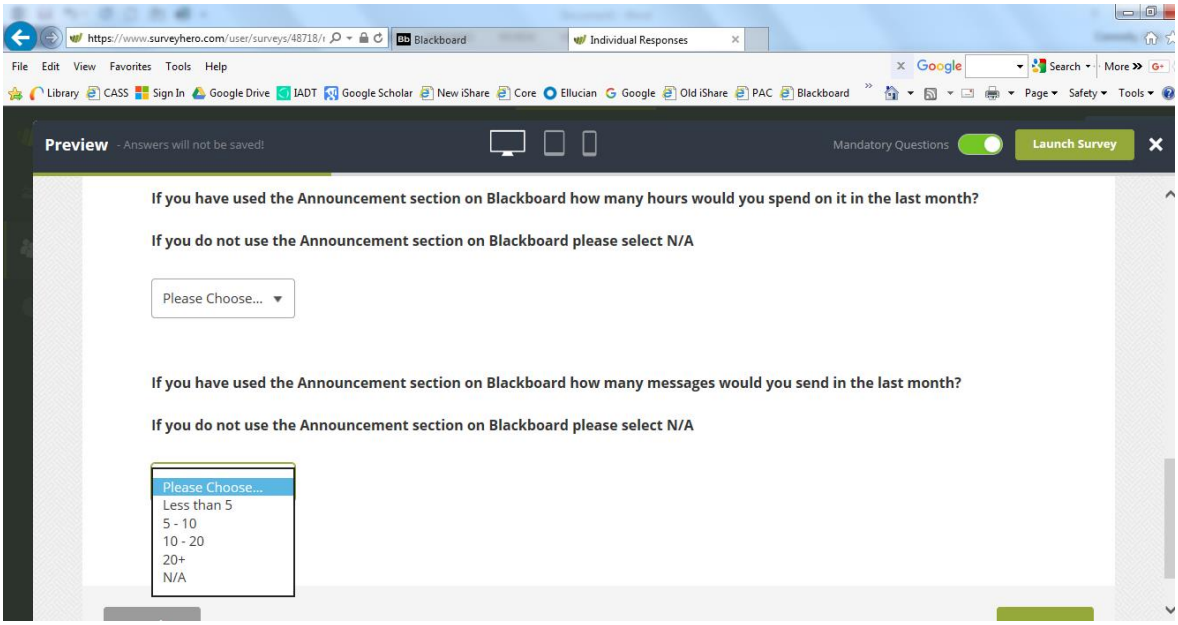

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
What is your age?
What is your gender?
Female
Male
Other

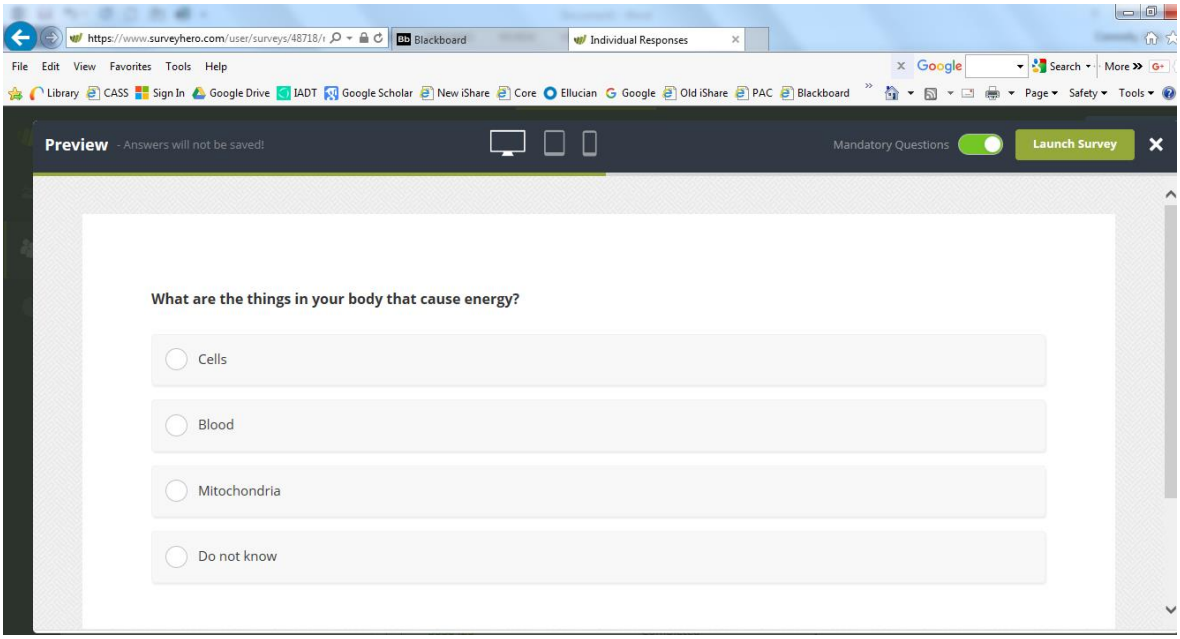

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
What is your nationality?
What county do you live in?
Back
Next

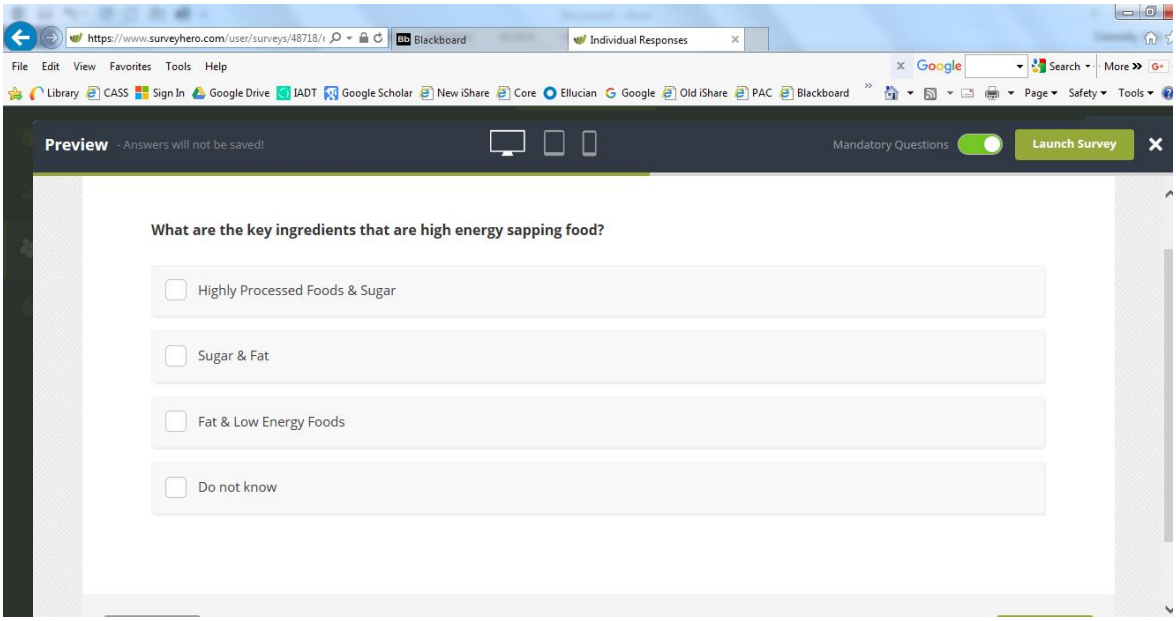

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
Do you use WhatsApp?
Yes
No
If you use WhatsApp how many messages would you send in a day?
If you do not use WhatsApp please select N/A
Please Choose...
Less than 10
10 - 20
20 - 30
40+
N/A

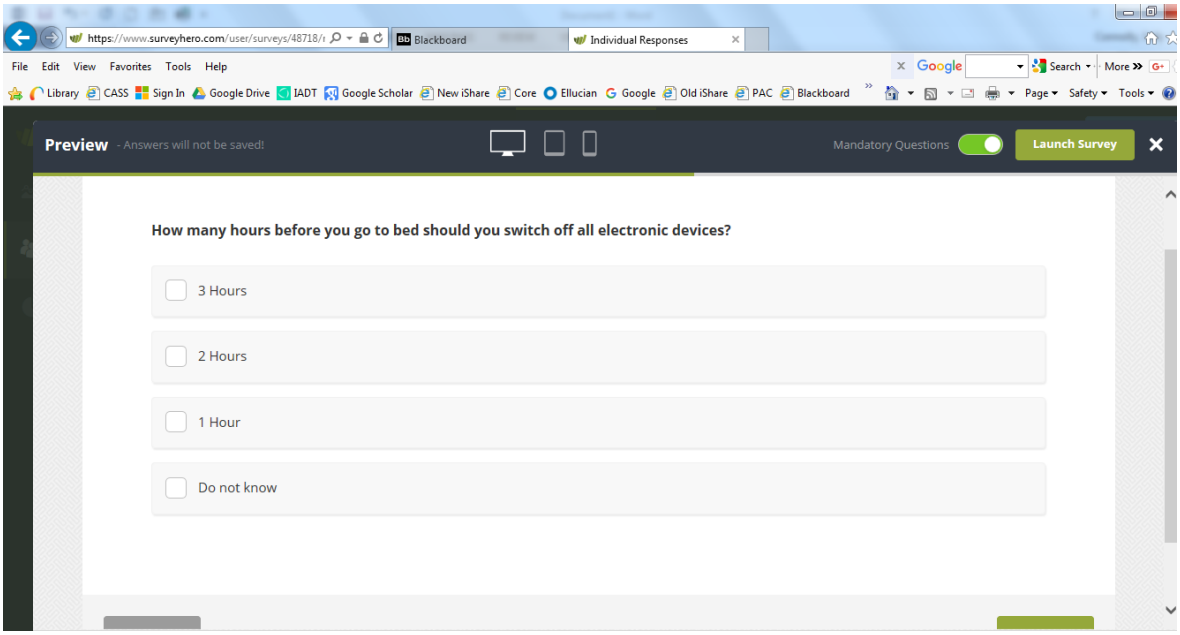

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
If you do not use WhatsApp please select N/A
Less than 10
If you use WhatsApp how many group chats are you a member of?
If you do not use WhatsApp please select N/A
Please Choose...
Less than 10
10 - 20
20 - 30
40+
N/A
uncement section on Blackboard?
Yes
No

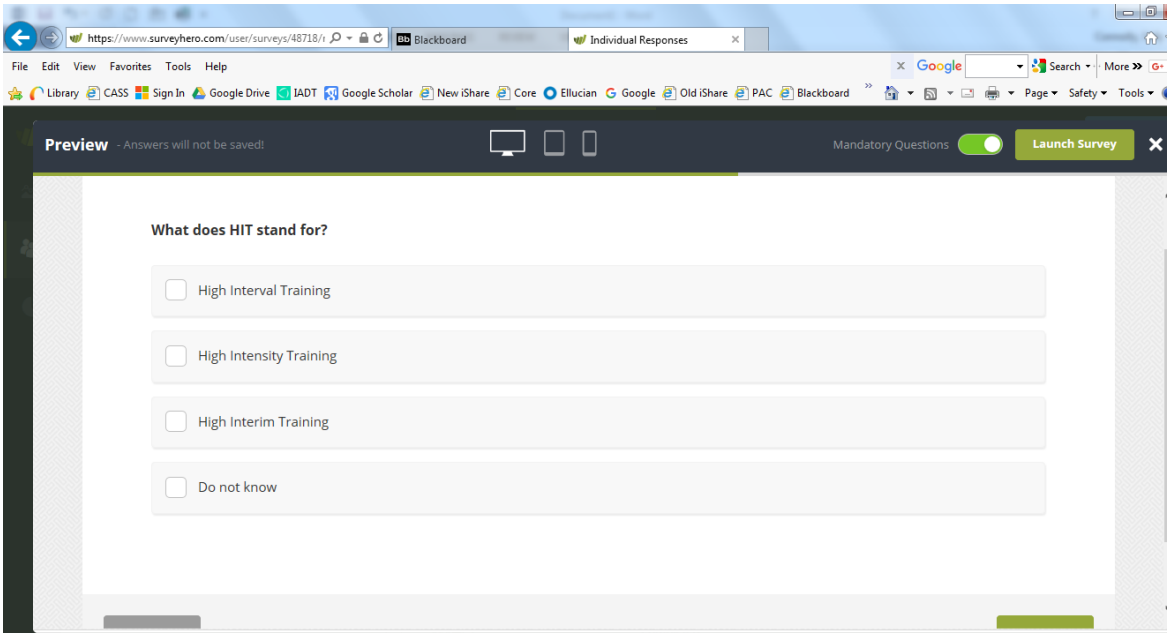

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
If you do not use WhatsApp please select N/A
Please Choose...
Do you use the Announcement section on Blackboard?
Yes
No
If you have used the Announcement section on Blackboard how many hours would you spend on it in the last month?
Please Choose...
Less than 5
5 - 10
10 - 20
20+
N/A
Announcement section on Blackboard please select N/A

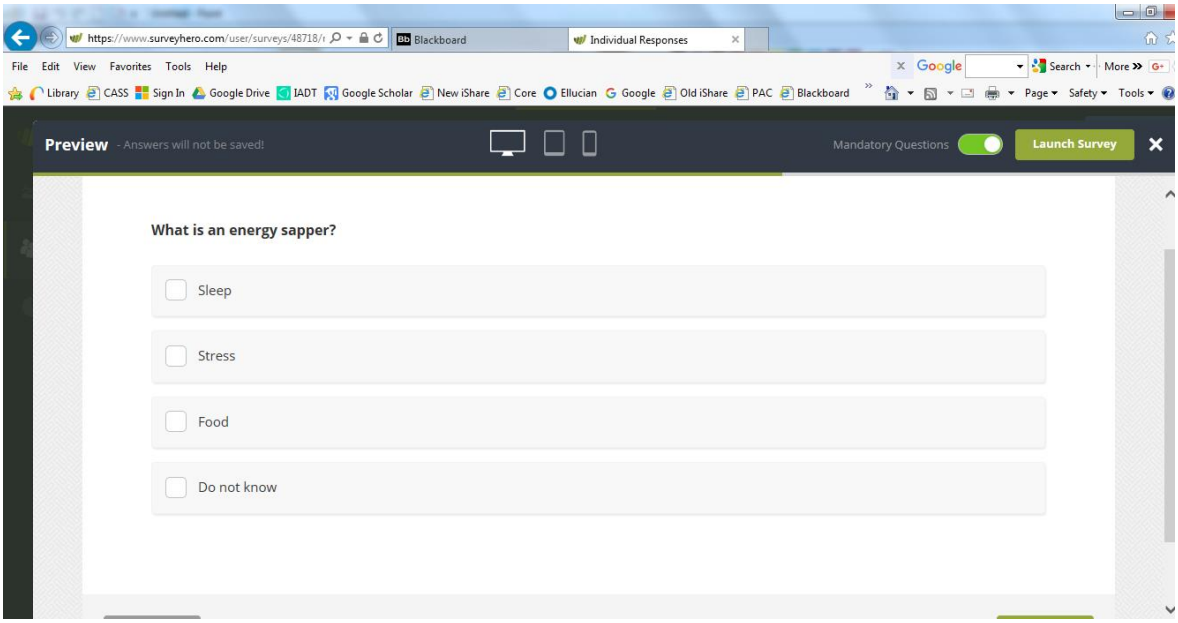

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
If you have used the Announcement section on Blackboard how many hours would you spend on it in the last month?
If you do not use the Announcement section on Blackboard please select N/A
Please Choose...
If you have used the Announcement section on Blackboard how many messages would you send in the last month?
If you do not use the Announcement section on Blackboard please select N/A
Please Choose...
Less than 5
5 - 10
10 - 20
20+
N/A

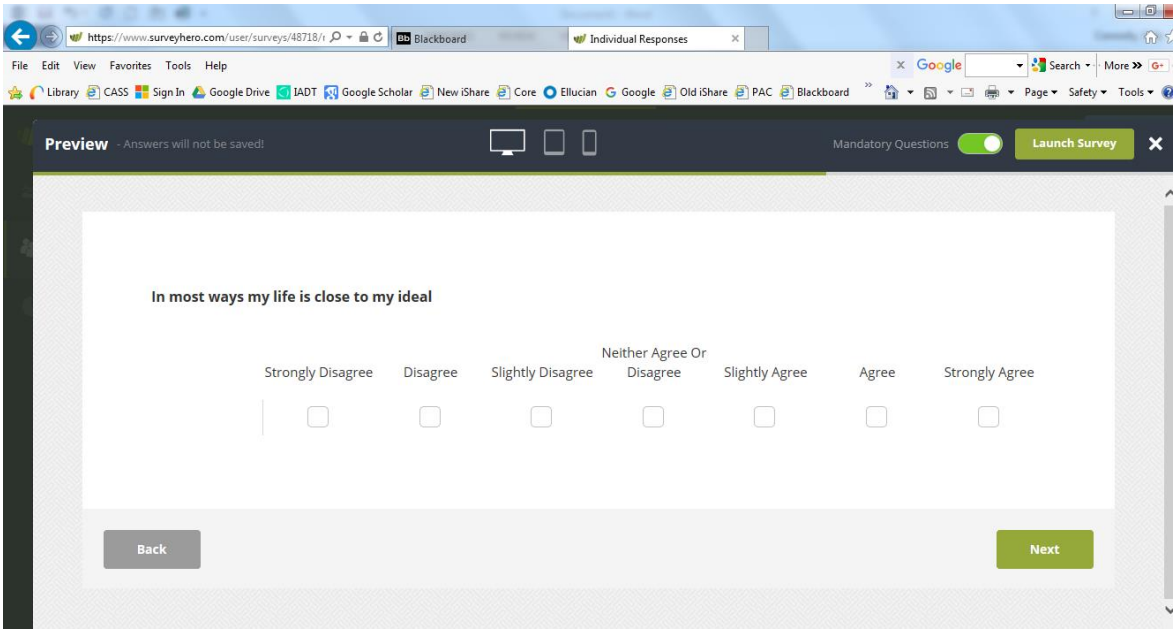

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
What are the things in your body that cause energy?
Cells
Blood
Mitochondria
Do not know

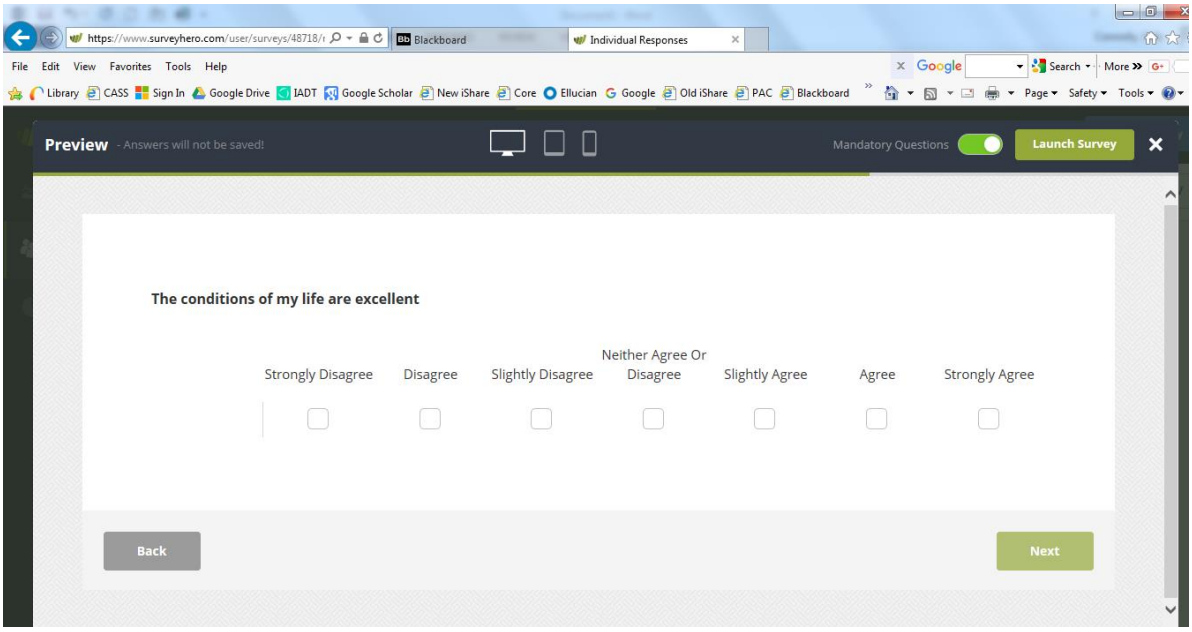

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
What are the key ingredients that are high energy sapping food?
Highly Processed Foods & Sugar
Sugar & Fat
Fat & Low Energy Foods
Do not know

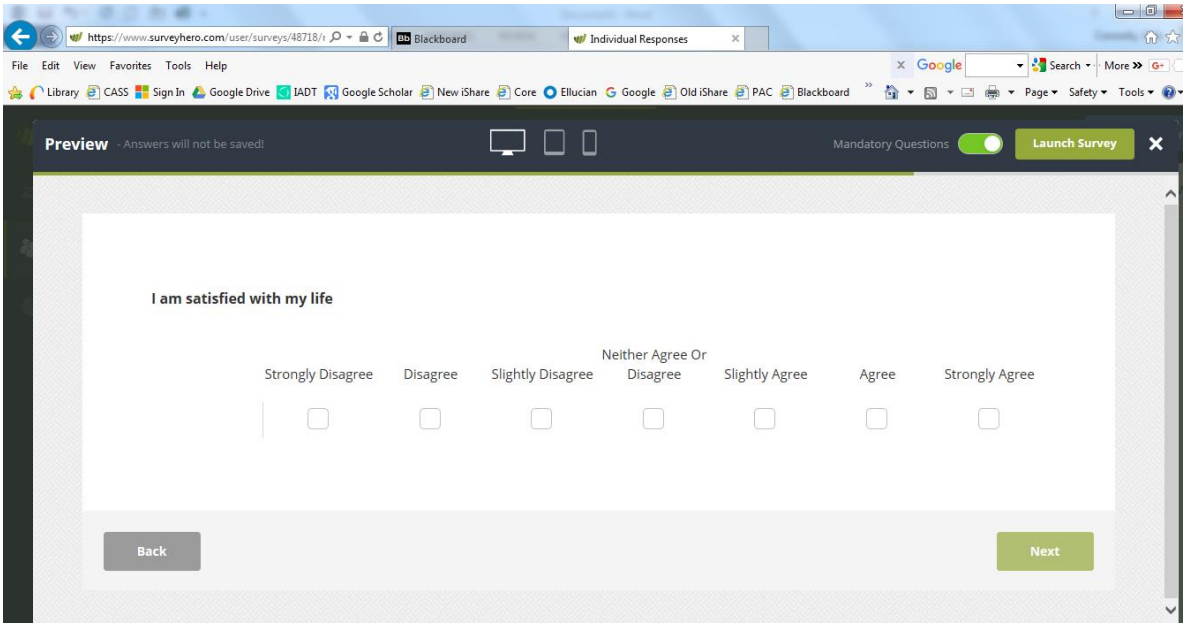

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
How many hours before you go to bed should you switch off all electronic devices?
3 Hours
2 Hours
1 Hour
Do not know

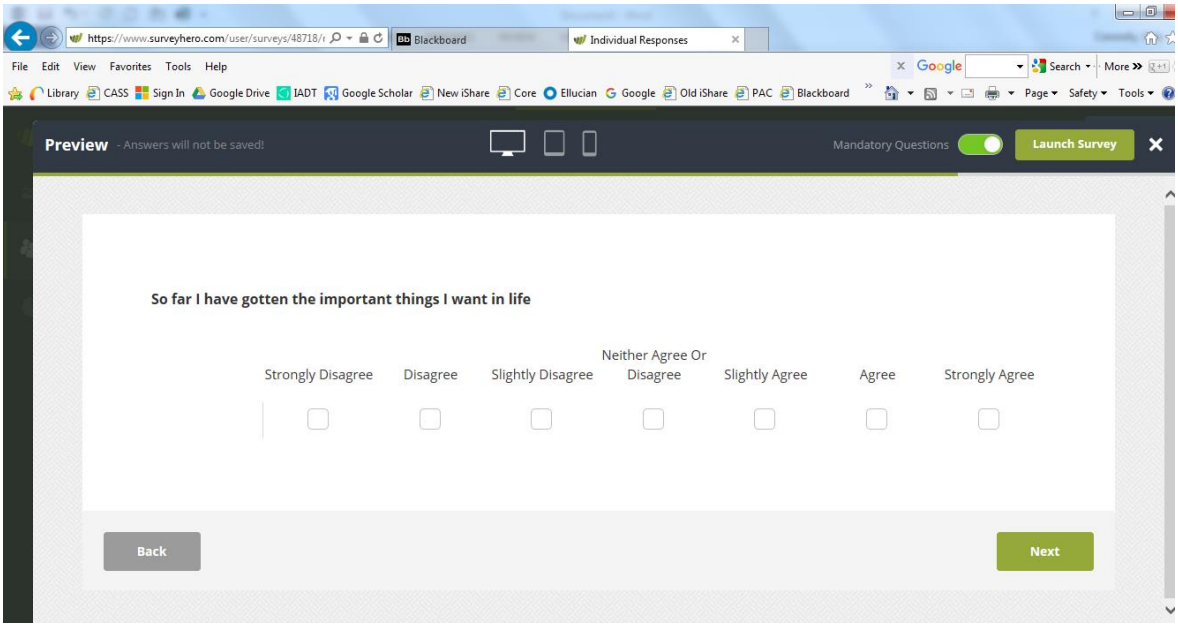

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
What does HIT stand for?
High Interval Training
High Intensity Training
High Interim Training
Do not know

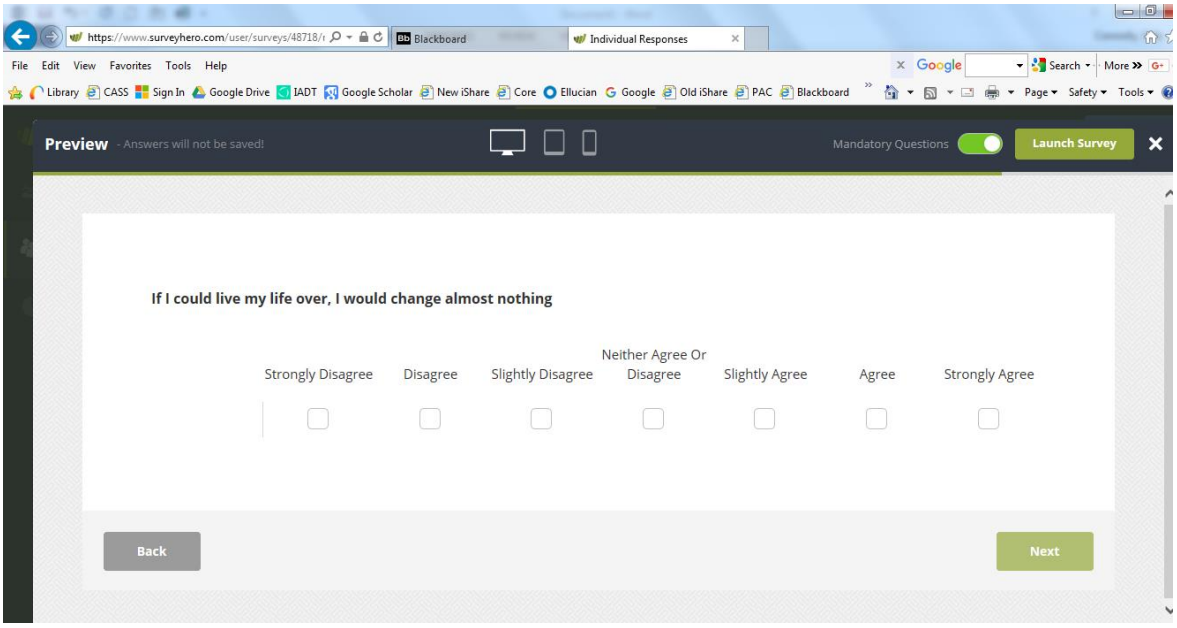

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
What is an energy sapper?
Sleep
Stress
Food
Do not know

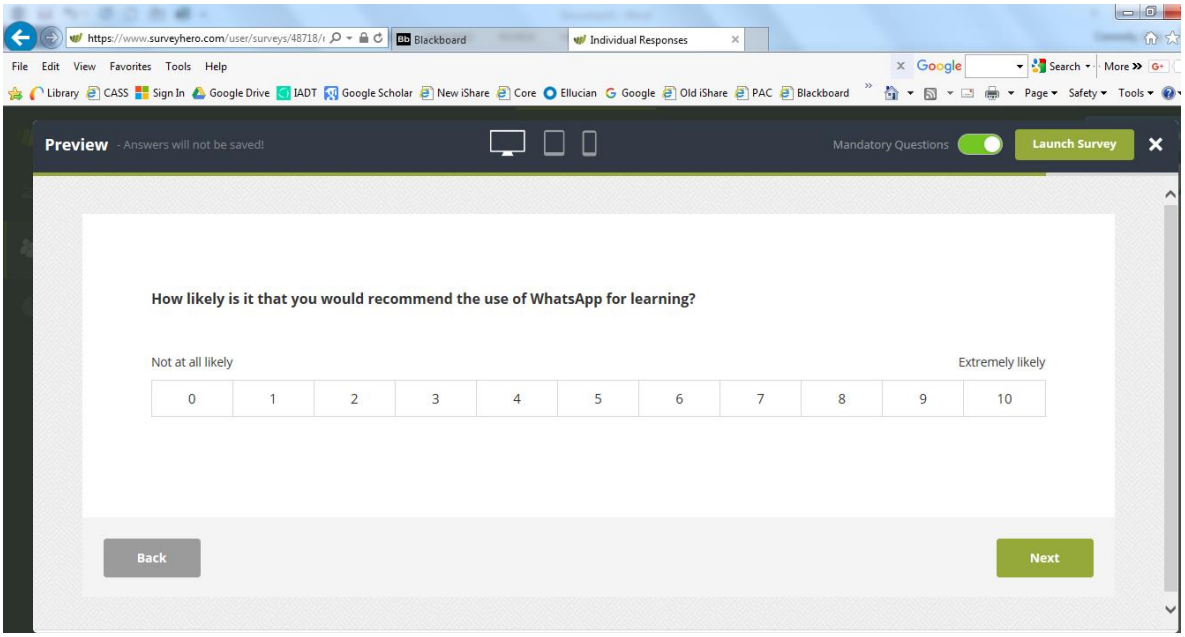

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
In most ways my life is close to my ideal
Strongly Disagree
Disagree
Slightly Disagree
Neither Agree Or Disagree
Slightly Agree
Agree
Strongly Agree
Back
Next

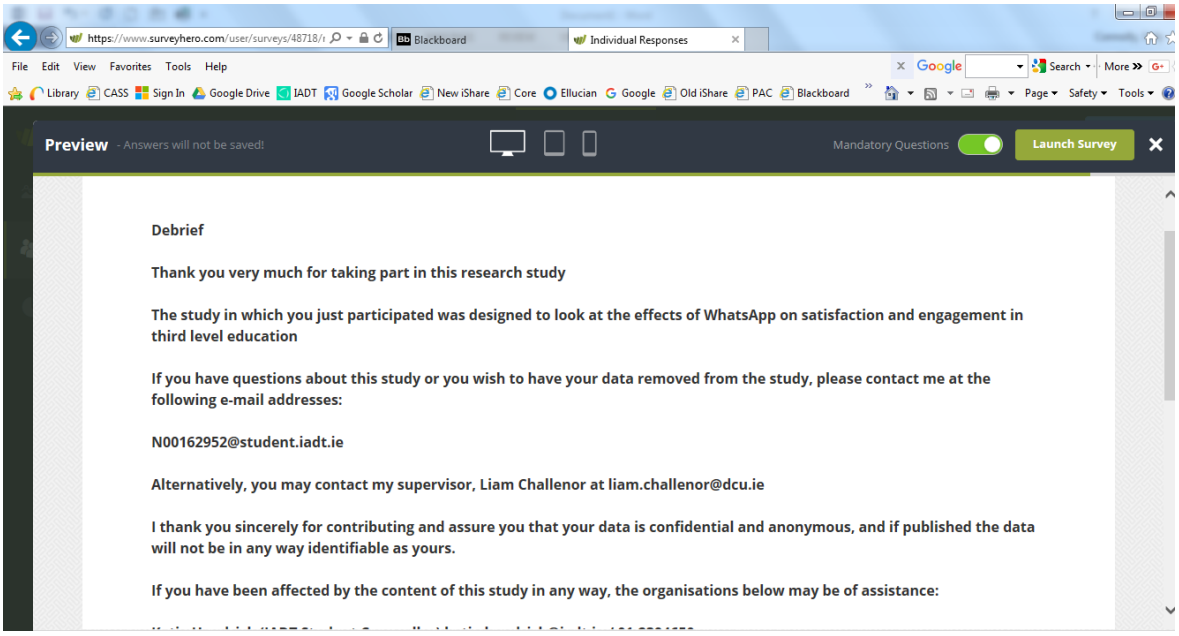

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
The conditions of my life are excellent
Strongly Disagree
Disagree
Slightly Disagree
Neither Agree Or Disagree
Slightly Agree
Agree
Strongly Agree
Back
Next

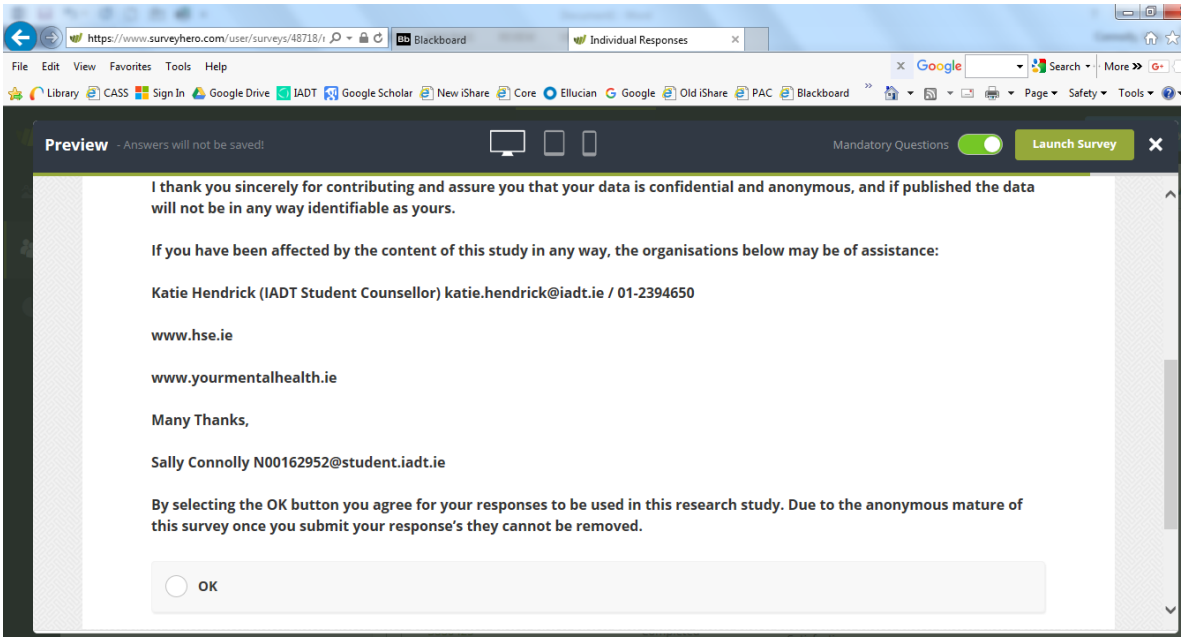

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
I am satisfied with my life
Strongly Disagree
Disagree
Slightly Disagree
Neither Agree Or Disagree
Slightly Agree
Agree
Strongly Agree
Back
Next

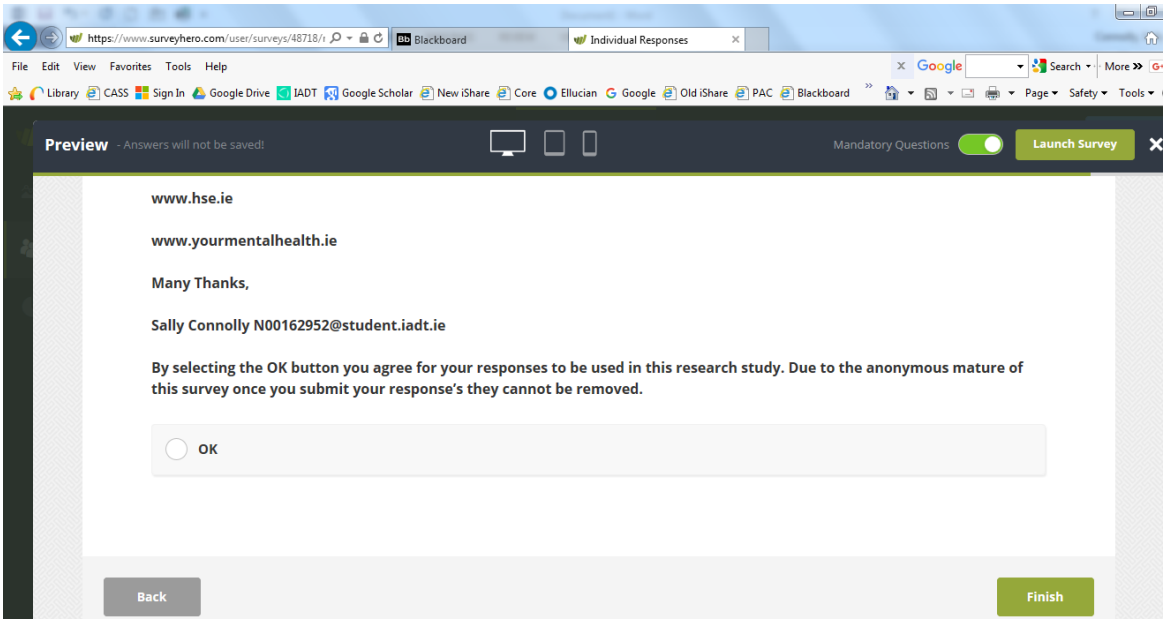

Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
So far I have gotten the important things I want in life
Strongly Disagree
Disagree
Slightly Disagree
Neither Agree Or Disagree
Slightly Agree
Agree
Strongly Agree
Back
Next


Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
If I could live my life over, I would change almost nothing
Strongly Disagree
Disagree
Slightly Disagree
Neither Agree Or Disagree
Slightly Agree
Agree
Strongly Agree
Back
Next


Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
How likely is it that you would recommend the use of WhatsApp for learning?
Not at all likely
Extremely likely
0 1 2 3 4 5 6 7 8 9 10
Back
Next


Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
Debrief
Thank you very much for taking part in this research study
The study in which you just participated was designed to look at the effects of WhatsApp on satisfaction and engagement in third level education
If you have questions about this study or you wish to have your data removed from the study, please contact me at the following e-mail addresses:
N00162952@student.iadt.ie
Alternatively, you may contact my supervisor, Liam Challenor at liam.challenor@dcu.ie
I thank you sincerely for contributing and assure you that your data is confidential and anonymous, and if published the data will not be in any way identifiable as yours.
If you have been affected by the content of this study in any way, the organisations below may be of assistance:


Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
I thank you sincerely for contributing and assure you that your data is confidential and anonymous, and if published the data will not be in any way identifiable as yours.
If you have been affected by the content of this study in any way, the organisations below may be of assistance:
Katie Hendrick (IADT Student Counsellor) katie.hendrick@iadt.ie / 01-2394650
www.hse.ie
www.yourmentalhealth.ie
Many Thanks,
Sally Connolly N00162952@student.iadt.ie
By selecting the OK button you agree for your responses to be used in this research study. Due to the anonymous mature of this survey once you submit your response's they cannot be removed.
OK


Preview - Answers will not be saved!
Mandatory Questions
Launch Survey
www.hse.ie
www.yourmentalhealth.ie
Many Thanks,
Sally Connolly N00162952@student.iadt.ie
By selecting the OK button you agree for your responses to be used in this research study. Due to the anonymous mature of this survey once you submit your response's they cannot be removed.
OK
Back
Finish

Dear Student,

I am conducting an online questionnaire as part of a research study to increase our understanding of how WhatsApp with the traditional virtual learning environment such as blackboard can have on levels of satisfaction and engagement in registered students. As a third level student you are in an ideal position to give me valuable first-hand information from your own perspective.

The online questionnaire takes around 30 minutes and is very informal. We are simply trying to capture your thoughts and perspectives on being a student and using WhatsApp and blackboard. Your responses to the questions will be kept confidential. Each participant will be assigned a number code for blackboard, WhatsApp and a questionnaire to help ensure that personal identifiers are not revealed during the analysis and write up of findings. There is no compensation for participating in this study. However, your participation will be a valuable addition to my research and findings could lead to greater public understanding of WhatsApp and the use in a tertiary education setting.

If you are willing to participate please contact me at the email address below. If you have any questions please do not hesitate to ask.

Thank you

Sally Connolly

N01622@student.iadt.ie

Liam Challenor

liam.challenor@dcu.ie

Appendix 2

Information Sheet

Study Title

Does the use of WhatsApp effect satisfaction and engagement levels for students in tertiary education

Purpose of the Research

The purpose of this study is to investigate does WhatsApp and blackboard effect satisfaction and engagement levels in registered students in tertiary education? Quantitative research methods such as a questionnaire was employed for data collection.

You are being invited to consider taking part in this laboratory experiment study to look at the effects of WhatsApp on satisfaction and engagement in third level education. This study is being undertaken by Sally Connolly who is a Msc. Cyberpsychology student in the Institute of Art, Design & Technology, Dún Laoghaire.

Before you decide whether or not you wish to take part, it is important for you to understand why this research is being done and what it will involve. Please take time to read this information sheet carefully and discuss it with friends and relatives if you wish. Please ask the researcher (s) if there is anything that is unclear or if you would like more information.

Do I have to take part?

You are free to decide whether you wish to take part or not. If you do decide to take part you will be asked to sign two consent forms, one is for you to keep and the other

is for our records. You are free to withdraw from this study at any time and without giving any reasons.

If I take part, what do I have to do?

As a participant of this study you will be required to watch a short video, send a few messages on blackboard or WhatsApp to other students and then answer an online questionnaire. It should take no longer than 30 minutes.

What are the benefits (if any) of taking part?

By taking part in this study you will further aid research in the Cyberpsychology field and provide more data within the area of online behaviours for student satisfaction and engagement.

How will information about me be used?

Data for this study will be collected via the questionnaires. The information from these questionnaires will be used to develop statistics to support or reject the study. No other information will be required such as name, address etc. The data from the research will be retained by the researcher for at least one year.

Who will have access to information about me?

The researcher and supervisor of the study shall be the only ones with access to the information from the questionnaires. The use of no names or address is to further safeguard your confidentiality during and after the study. The data will be stored on a password protected computer and will be unlinked and anonymous.

The data will be retained by the researcher so as to be available if the research is published in an academic journal. The data will be disposed of after a period of five years.

What will happen to the results of the study?

The results of this study will be used as a requirement for the completion of the Master's program in Cyberpscyhology in the Dun Laoghaire Institute of Art, Design & Technology as a final year major research project. The study will be published and submitted to the college for assessment. A copy of the research can be requested from the researcher (s).

What if there is a problem?

If you have a concern about any aspect of this study, you may wish to speak to the researcher(s) who will do their best to answer your questions. You should contact the researcher or her supervisor Liam Challenor, information on which can be found below.

Contact for further information

Sally Connolly

N00162952@student.iadt.ie

Liam Challenor

liam.challenor@dcu.ie

The researcher would like to thank you for taking the time to read this information sheet.

Appendix 3

Consent Form

Title of Research:

Does the use of WhatsApp effect satisfaction and engagement levels for students in tertiary education

Name of Researcher: Sally Connolly

Please tick box

1	I confirm that I have read and understand the information sheet for the above study and have had the opportunity to ask questions.	□
2	I understand that my participation is voluntary and that I am free to withdraw at any time.	□
3	I agree to take part in this study.	□
4	I understand that data collected about me during this study will be anonymise	□

Participant Number

	_____	
	Date	
_____	_____	_____
Researcher	Date	Signature

Appendix 4

Debrief Sheet

Thank you very much for taking part in this research study

The study in which you just participated was designed to look at the effects of WhatsApp on satisfaction and engagement in third level educationIf you have questions about this study or you wish to have your data removed from the study, please contact us at the following e-mail addresses: N00162952@student.iadt.ie

Alternatively, you may contact my supervisor, Liam Challenor at the Institute of Art, Design & Technology Dún Laoghaire, at liam.challenor@dcu.ie

I thank you sincerely for contributing and assure you that your data is confidential and anonymous, and if published the data will not be in any way identifiable as yours.

If you have been affected by the content of this study in any way, the organisations below may be of assistance:

The Samaritans provide a 24 hour telephone support on 116 123 (free call) or E-mail Helpline: jo@samaritans.org or Drop-in service: 112 Marlborough Street Dublin, 10am - 10pm.Pieta House Lucan. Open weekdays 9am-9pm, Sat & Sun 10am-2pm. The Lucan number is 01-6010000. A 24-hour free phone suicide support line is available at 1800 247 247.

www.hse.ie

www.yourmentalhealth.ie

Many Thanks,

Sally Connolly

N00162952@student.iadt.ie

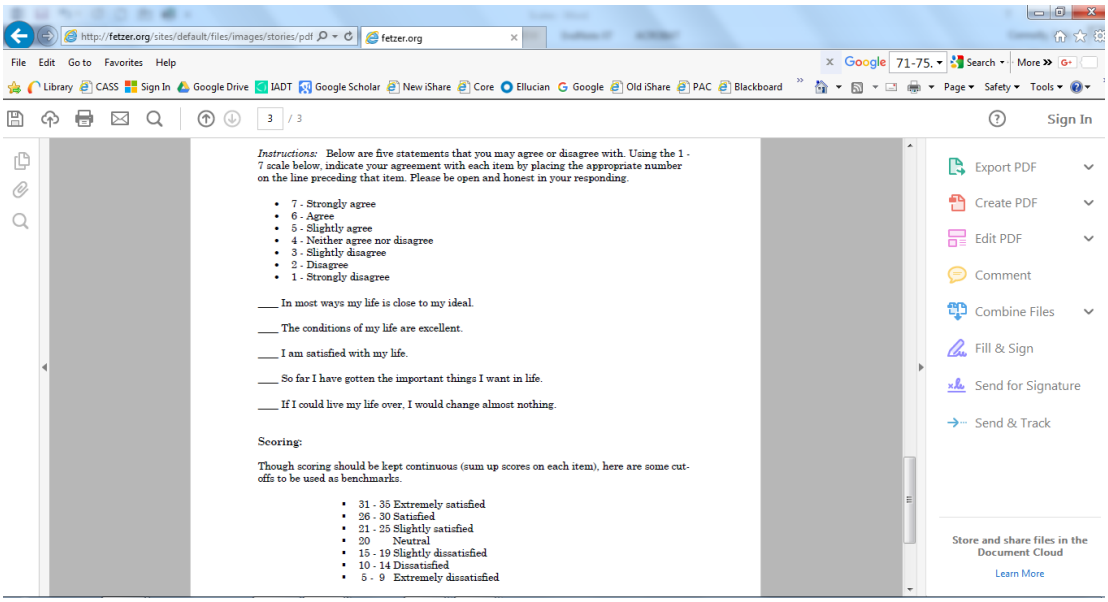
Appendix 5

Links of short videos used or experiment

1. https://www.youtube.com/watch?v=lxVSUhpSgq4&feature=youtu.be
2. https://youtu.be/Rod_EwLV20w
3. https://youtu.be/_2rKq24XuGY
4. https://youtu.be/P5ug-JCXDvo
5. https://youtu.be/_NN5M90gNhE
6. https://youtu.be/DsIwwDcwrHM

Appendix 6

Satisfaction Scale



Instructions: Below are five statements that you may agree or disagree with. Using the 1 - 7 scale below, indicate your agreement with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding.

- 7 - Strongly agree
- 6 - Agree
- 5 - Slightly agree
- 4 - Neither agree nor disagree
- 3 - Slightly disagree
- 2 - Disagree
- 1 - Strongly disagree

___ In most ways my life is close to my ideal.

___ The conditions of my life are excellent.

___ I am satisfied with my life.

___ So far I have gotten the important things I want in life.

___ If I could live my life over, I would change almost nothing.

Scoring:

Though scoring should be kept continuous (sum up scores on each item), here are some cut-offs to be used as benchmarks.

- 31 - 35 Extremely satisfied
- 26 - 30 Satisfied
- 21 - 25 Slightly satisfied
- 20 Neutral
- 15 - 19 Slightly dissatisfied
- 10 - 14 Dissatisfied
- 5 - 9 Extremely dissatisfied

Appendix 7

Code Book

Participant	Gender	SPSS	Age			Age		SPSS
1	M	1	24			18 - 24	35	1
2	F	2	24			25 - 35	11	2
3	F	2	19			36+	4	3
4	M	1	19					
5	M	1	24			**Gender**		
6	N/A	3	20			Male	11	1
7	F	2	19			Female	35	2
8	F	2	23			N/A	4	3
9	F	2	26					
10	F	2	36					
11	M	1	19					
12	F	2	21					
13	F	2	20					
14	M	1	22					
15	F	2	24					
16	N/A	3	19					
17	F	2	31					
18	M	1	18					
19	F	2	18					
20	F	2	33					
21	F	2	36					
22	F	2	23					
23	M	1	21					
24	F	2	22					
25	N/A	3	23					
26	M	1	25					
27	F	2	21					
28	F	2	19					
29	N/A	3	24					
30	F	2	21					
31	M	1	25					
32	F	2	20					
33	F	2	28					
34	F	2	27					
35	M	1	25					
36	F	2	29					
37	M	1	19					
38	F	2	20					
39	F	2	21					
40	F	2	19					
41	F	2	22					
42	F	2	23					
43	F	2	24					
44	F	2	25					
45	F	2	36					
46	F	2	25					
47	F	2	20					
48	F	2	19					
49	F	2	19					
50	F	2	39					

WhatsApp groups			
40		**WhatsApp messages in a Day**	
30		Less than 10	1
40		20	6
30		30	18
20		40+	25
30			
20			
30			
20		**WhatsApp groups**	
20		Less than 10	1
30		10 - 20	12
40		20 - 30	19
30		40 +	18
30			
40			
30			
30			
30			
30			
20			
40			
30			
20			
30			
40			
30			
30			
30			
30			
30			
30			
40			
20			
40			
20			
40			
40			
20			
40			
40			
20			
40			
20			
40			
20			
40			
40			
40			
10			

Participa	Age	Minutes on BB Announcements	Posts on blackboard		Blackboard Announcement		SPSS
1	24	3			No	14	
2	24	2	1		Yes	36	
3	19	0	0				
4	19	1	2				
5	24	1	1		**Blackboard Announcement (minutes)**		
6	20	0	0		Less than 10	28	1
7	19	1	1		11 - 20	6	2
8	23	0	0		21 - 30	2	3
9	26	1	1		31+	0	4
10	36	1	1				
11	19	0	0		**How many posts on blackboard**		
12	21	1	1		Less than 5	30	1
13	20	0	0		6 - 10	5	2
14	22	1	1		11 - 20	1	3
15	24	1	2		21+	0	4
16	19	2	1				
17	31	1	1				
18	18	1	1				
19	18	0	0				
20	33	0	0				
21	36	2	1				
22	23	1	1				
23	21	1	1				
24	22	1	2				
25	23	1	1				
26	25	1	1				
27	21	3	1				
28	19	1	1				
29	24	1	1				
30	21	0	0				
31	25	0	0				
32	20	1	1				
33	28	1	1				
34	27	2	1				
35	25	0	0				
36	29	0	0				
37	19	2	1				
38	20	1	1				
39	21	1	1				
40	19	0	0				
41	22	0	0				
42	23	1	1				
43	24	2	0				
44	25	1	1				
45	36	0	0				
46	25	1	1				
47	20	1	1				
48	19	1	2				
49	19	1	1				
50	39	1	1				

Participant	Question	Question	Question	Question	Question			WhatsApp Messages Sent	2= Yes		Did they log into blackboard	2= Yes
1	2	2	2	1	2	1 = Incorrect		2	1 = No		2	1 = No
2	2	2	2	2	2	2 = Correct		2			2	
3	1	1	1	2	1			1			1	
4	2	2	1	2	2			2			2	
5	2	2	2	2	2			2			2	
6	1	2	2	2	2			1			1	
7	2	2	2	2	2			2			2	
8	2	1	1	1	2			2			2	
9	2	2	1	2	1			2			2	
10	2	2	2	2	2			2			2	
11	1	1	2	2	2			1			1	
12	2	2	1	2	2			2			2	
13	2	2	1	2	2			1			1	
14	1	2	1	1	2			1			1	
15	2	2	2	1	2			1			1	
16	2	1	1	2	2			1			1	
17	2	1	1	2	2			2			2	
18	2	2	2	1	1			1			1	
19	2	1	1	2	1			1			1	
20	2	2	1	2	2			1			2	
21	1	1	1	2	2			2			2	
22	2	2	2	2	2			2			2	
23	2	2	2	1	2			2			2	
24	1	2	1	2	2			1			1	
25	2	2	1	1	2			1			1	
26	2	2	2	2	2			2			1	
27	2	2	2	2	2			2			2	
28	2	2	2	2	1			1			1	
29	2	2	2	1	2			2			2	
30	1	2	2	2	2			1			2	
31	1	1	2	2	2			1			2	
32	1	2	1	2	1			1			1	
33	2	2	2	1	2			1			2	
34	2	2	2	1	1			1			1	
35	2	2	2	2	1			1			2	
36	2	2	2	2	2			2			2	
37	1	1	2	2	1			1			1	
38	1	1	2	2	2			1			2	
39	2	2	1	1	2			1			1	
40	2	1	2	2	1			2			2	
41	2	1	2	2	1			1			1	
42	2	1	2	1	1			1			1	
43	2	1	2	2	2			1			1	
44	2	2	1	2	2			2			2	
45	2	2	1	2	1			1			2	
46	2	2	2	1	2			1			1	
47	1	1	2	1	1			1			1	
48	1	1	1	1	2			1			1	
49	2	2	2	2	1			1			1	
50	2	2	1	2	2			2			2	

Participant	Question 1	Question 2	Question 3	Question 4	Question 5	Scoring	Explanation			Satisfaction		WhatsApp Messages Sent	2= Yes	Did they log into blackboard		2= Yes
1	4	5	4	7	1	21	Slightly Satisfied	1	Extremely Disatisfied	6		2	1 = No	2		1 = No
2	5	2	3	4	3	17	Slightly Dissatisfied	2	Dissatisfied	3		2		2		
3	6	5	4	6	5	26	Satisfied	3	Slightly Dissatisfied	5		1		1		
4	3	7	4	6	2	22	Slightly Satisfied	4	Neutral	6		2		2		
5	2	5	5	7	6	25	Slightly Satisfied	5	Satisfied	6		2		2		
6	4	6	6	3	7	26	Satisfied	6	Slightly Satisfied	5		1		1		
7	4	5	3	5	5	22	Slightly Satisfied	7	Extremely Satisfied	6		2		2		
8	6	6	7	7	7	33	Extremely Satisfied			7		2		2		
9	3	5	5	1	3	17	Slightly Dissatisfied			3		2		2		
10	4	6	7	5	3	25	Slightly Satisfied			6		2		2		
11	6	3	4	5	7	25	Slightly Satisfied			6		1		1		
12	6	3	2	5	3	19	Slightly Dissatisfied			3		2		2		
13	2	2	3	5	6	18	Slightly Dissatisfied			3		1		1		
14	7	6	7	2	6	28	Satisfied			5		1		1		
15	4	7	7	3	5	26	Satisfied			5		1		1		
16	7	7	3	5	1	23	Slightly Satisfied			6		1		1		
17	6	3	2	3	5	19	Slightly Dissatisfied			3		2		2		
18	3	4	1	2	2	12	Dissatisfied			2		1		1		
19	6	7	6	5	7	31	Extremely Satisfied			7		1		1		
20	6	4	7	5	4	26	Satisfied			5		1		2		
21	1	4	7	5	3	20	Neutral			4		2		2		
22	4	7	3	4	3	21	Slightly Satisfied			6		2		2		
23	6	6	5	5	1	23	Slightly Satisfied			6		2		2		
24	7	7	4	6	7	31	Extremely Satisfied			7		1		1		
25	5	2	7	2	3	19	Slightly Dissatisfied			3		1		1		
26	5	7	3	4	5	24	Slightly Satisfied			6		2		1		
27	4	4	7	4	4	23	Slightly Satisfied			6		2		2		
28	6	5	2	7	5	25	Slightly Satisfied			6		1		1		
29	4	2	2	3	3	14	Dissatisfied			2		2		2		
30	6	6	7	5	1	25	Slightly Satisfied			6		1		2		
31	4	3	3	3	7	20	Neutral			4		1		2		
32	2	6	5	6	6	25	Slightly Satisfied			6		1		1		
33	4	4	4	7	6	25	Slightly Satisfied			6		1		2		
34	1	1	3	1	2	8	Extremely Dissatisfied			1		1		1		
35	7	7	7	2	4	27	Satisfied			5		1		2		
36	3	6	7	7	2	25	Slightly Satisfied			6		2		2		
37	4	2	5	6	1	18	Slightly Dissatisfied			3		1		1		
38	4	4	7	7	3	25	Slightly Satisfied			6		1		2		
39	3	6	3	7	6	25	Slightly Satisfied			6		1		1		
40	3	4	2	2	5	16	Slightly Dissatisfied			3		2		2		
41	4	2	5	4	1	16	Slightly Dissatisfied			3		1		1		
42	4	6	6	7	4	27	Satisfied			5		1		1		
43	5	3	2	5	3	18	Slightly Dissatisfied			3		1		1		
44	4	1	1	5	1	12	Dissatisfied			2		2		2		
45	5	5	4	4	1	19	Slightly Dissatisfied			3		1		2		
46	6	3	5	5	6	25	Slightly Satisfied			6		1		1		
47	7	5	3	2	1	18	Slightly Dissatisfied			3		1		1		
48	2	3	1	6	6	18	Slightly Dissatisfied			3		1		1		
49	5	3	6	3	3	20	Neutral			4		1		1		
50	3	3	5	3	2	16	Slightly Dissatisfied			3		2		2		

Participant	Recommend the use of WhatsApp for learning			SPSS
1	5	0 = Not at all likely	3	1
2	10	10 = Likely	8	2
3	4		1	3
4	1		7	4
5	6		8	5
6	4		7	6
7	5		4	7
8	9		5	8
9	4		3	9
10	8		4	10
11	8			
12	8			
13	6			
14	9			
15	4			
16	5			
17	2			
18	8			
19	2			
20	9			
21	5			
22	2			

23	5
24	5
25	4
26	6
27	7
28	5
29	5
30	4
31	6
32	10
33	2
34	4
35	6
36	6
37	7
38	2
39	1
40	2
41	2
42	3
43	7
44	7
45	8

46	2
47	10
48	10
49	6
50	1

Appendix 8

SPSS Output

```
FREQUENCIES VARIABLES=Gender Age WhatsApp_Mess WhatsApp_Gr
  /ORDER=ANALYSIS.
```

Frequencies

Statistics

		What gender is someone	What age is someone	How many WhatsApp messages would you send in a day	How many WhatsApp groups are you a member off
N	Valid	50	50	50	50
	Missing	0	0	0	0

Frequency Table

What gender is someone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	11	22.0	22.0	22.0
	Female	35	70.0	70.0	92.0
	Other	4	8.0	8.0	100.0
	Total	50	100.0	100.0	

What age is someone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18.00	2	4.0	4.0	4.0
	19.00	10	20.0	20.0	24.0
	20.00	5	10.0	10.0	34.0
	21.00	5	10.0	10.0	44.0
	22.00	3	6.0	6.0	50.0
	23.00	4	8.0	8.0	58.0
	24.00	6	12.0	12.0	70.0
	25.00	5	10.0	10.0	80.0
	26.00	1	2.0	2.0	82.0
	27.00	1	2.0	2.0	84.0
	28.00	1	2.0	2.0	86.0
	29.00	1	2.0	2.0	88.0
	31.00	1	2.0	2.0	90.0
	33.00	1	2.0	2.0	92.0

	36.00	3	6.0	6.0	98.0
	39.00	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

How many WhatsApp messages would you send in a day

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10.00	1	2.0	2.0	2.0
	20.00	6	12.0	12.0	14.0
	30.00	18	36.0	36.0	50.0
	40.00	25	50.0	50.0	100.0
	Total	50	100.0	100.0	

How many WhatsApp groups are you a member off

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10.00	1	2.0	2.0	2.0
	20.00	12	24.0	24.0	26.0
	30.00	19	38.0	38.0	64.0
	40.00	18	36.0	36.0	100.0
	Total	50	100.0	100.0	

```
DESCRIPTIVES VARIABLES=WhatsApp_Mess WhatsApp_Gr
 /STATISTICS=MEAN STDDEV MIN MAX.
```

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
How many WhatsApp messages would you send in a day	50	10.00	40.00	33.4000	7.72222
How many WhatsApp groups are you a member off	50	10.00	40.00	30.8000	8.29064
Valid N (listwise)	50				

```
NEW FILE.

DATASET NAME DataSet3 WINDOW=FRONT.

SAVE OUTFILE='D:\2nd Year\Thesis\Stats\Gen_Age_BB.sav'

  /COMPRESSED.

SAVE OUTFILE='D:\2nd Year\Thesis\Stats\Gen_Age_BB.sav'

  /COMPRESSED.

DATASET ACTIVATE DataSet1.

DATASET CLOSE DataSet3.

SAVE OUTFILE='D:\2nd Year\Thesis\Stats\Gen_Age_WhatsApp.sav'

  /COMPRESSED.

GET

  FILE='D:\2nd Year\Thesis\Stats\Gen_Age_WhatsApp.sav'.
```

```
DATASET NAME DataSet2 WINDOW=FRONT.

FREQUENCIES VARIABLES=Age WhatsApp_Mess WhatsApp_Gr
  /STATISTICS=STDDEV MEAN
  /HISTOGRAM NORMAL
  /ORDER=ANALYSIS.
```

Frequencies

[DataSet2] D:\2nd Year\Thesis\Stats\Gen_Age_WhatsApp.sav

Statistics

		What age is someone	How many WhatsApp messages would you send in a day	How many WhatsApp groups are you a member off
N	Valid	50	50	50
	Missing	0	0	0
Mean		23.5800	33.4000	30.8000
Std. Deviation		5.15114	7.72222	8.29064

Frequency Table

What age is someone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18.00	2	4.0	4.0	4.0
	19.00	10	20.0	20.0	24.0
	20.00	5	10.0	10.0	34.0
	21.00	5	10.0	10.0	44.0

	22.00	3	6.0	6.0	50.0
	23.00	4	8.0	8.0	58.0
	24.00	6	12.0	12.0	70.0
	25.00	5	10.0	10.0	80.0
	26.00	1	2.0	2.0	82.0
	27.00	1	2.0	2.0	84.0
	28.00	1	2.0	2.0	86.0
	29.00	1	2.0	2.0	88.0
	31.00	1	2.0	2.0	90.0
	33.00	1	2.0	2.0	92.0
	36.00	3	6.0	6.0	98.0
	39.00	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

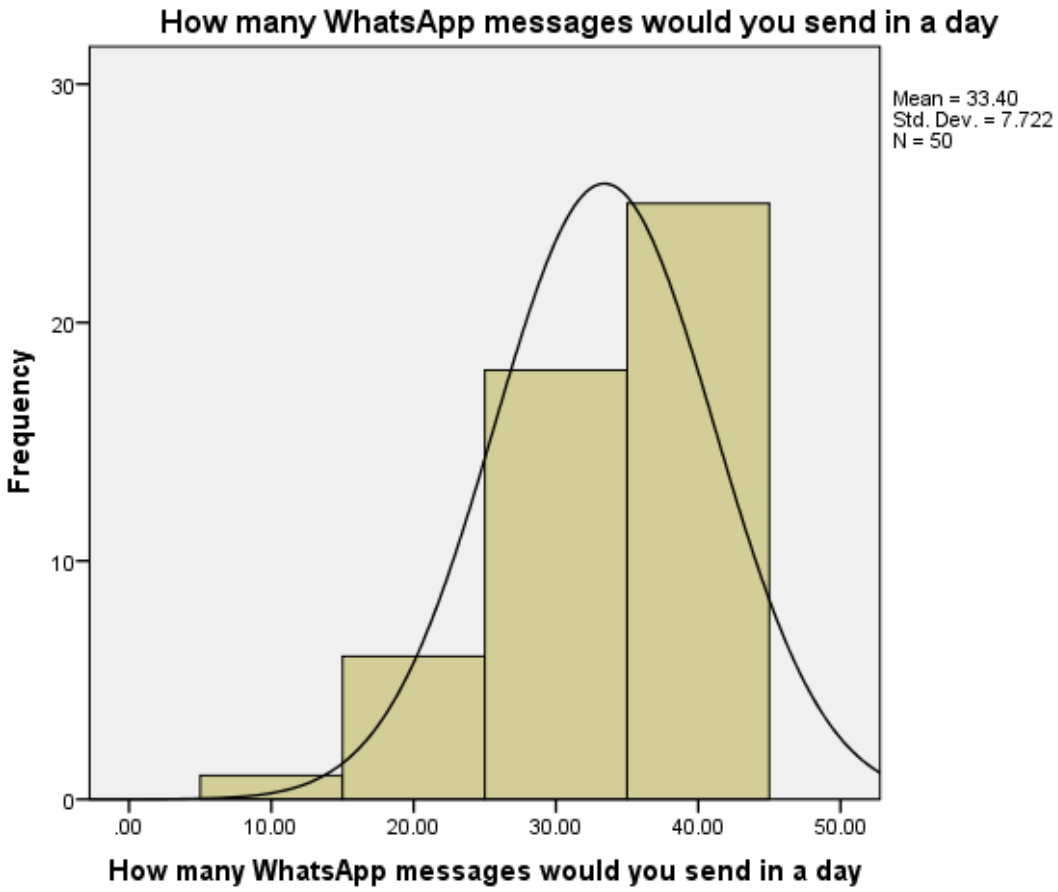
How many WhatsApp messages would you send in a day

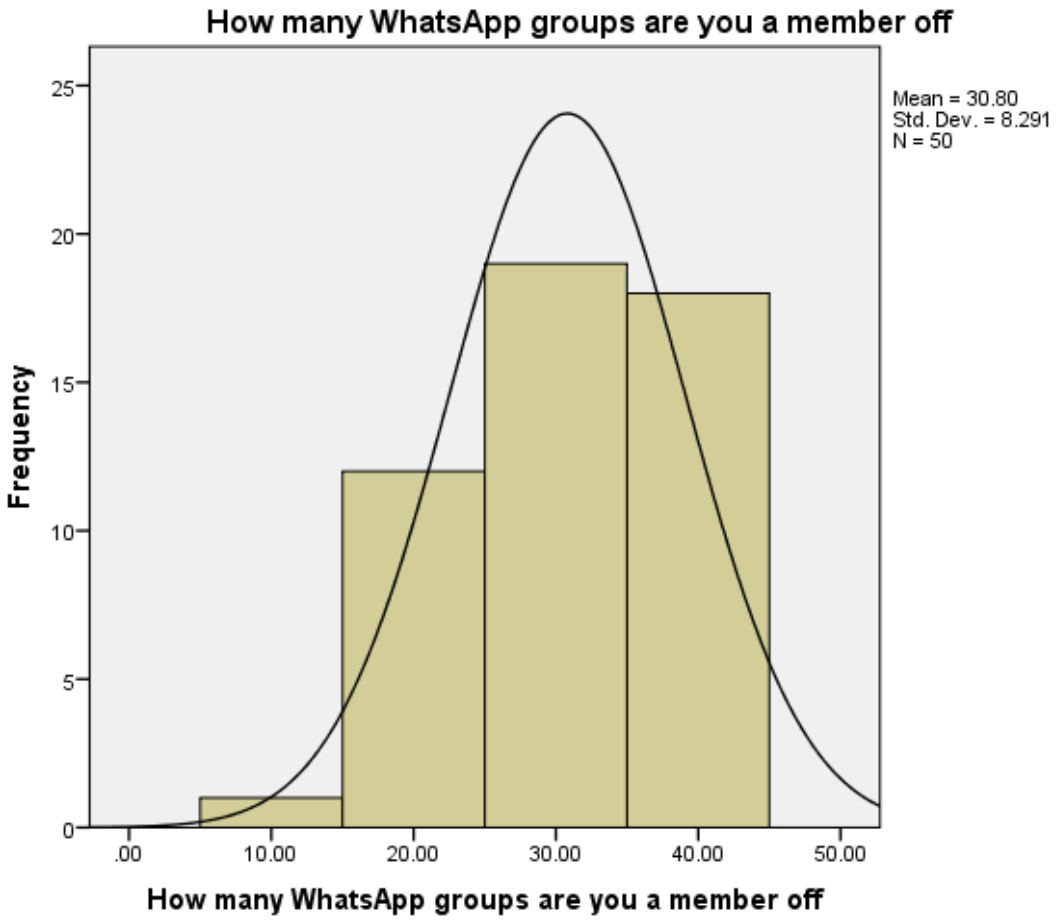
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10.00	1	2.0	2.0	2.0
	20.00	6	12.0	12.0	14.0
	30.00	18	36.0	36.0	50.0
	40.00	25	50.0	50.0	100.0
	Total	50	100.0	100.0	

How many WhatsApp groups are you a member off

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10.00	1	2.0	2.0	2.0
	20.00	12	24.0	24.0	26.0
	30.00	19	38.0	38.0	64.0
	40.00	18	36.0	36.0	100.0
	Total	50	100.0	100.0	

Histogram


How many WhatsApp messages would you send in a day
Mean = 33.40
Std. Dev. = 7.722
N = 50
Frequency
30
20
10
0
.00
10.00
20.00
30.00
40.00
50.00
How many WhatsApp messages would you send in a day



GET

FILE='D:\2nd Year\Thesis\Stats\Gen_Age_BB.sav'.

Warning # 67. Command name: GET FILE

The document is already in use by another user or process. If you make

changes to the document they may overwrite changes made by others or your

changes may be overwritten by others.

File opened D:\2nd Year\Thesis\Stats\Gen_Age_BB.sav

DATASET NAME DataSet3 WINDOW=FRONT.

FREQUENCIES VARIABLES=Age BB_Minutes BB_Posts

/STATISTICS=STDDEV MEAN

/HISTOGRAM NORMAL

/ORDER=ANALYSIS.

Frequencies

[DataSet3]

Statistics

		What age is someone	How many Minutes on BB	How many Posts on BB
N	Valid	50	50	50
	Missing	0	0	0
Mean		23.5800	.9200	.8000
Std. Deviation		5.15114	.75160	.60609

Frequency Table

What age is someone

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18.00	2	4.0	4.0	4.0
	19.00	10	20.0	20.0	24.0
	20.00	5	10.0	10.0	34.0
	21.00	5	10.0	10.0	44.0
	22.00	3	6.0	6.0	50.0
	23.00	4	8.0	8.0	58.0
	24.00	6	12.0	12.0	70.0

	25.00	5	10.0	10.0	80.0
	26.00	1	2.0	2.0	82.0
	27.00	1	2.0	2.0	84.0
	28.00	1	2.0	2.0	86.0
	29.00	1	2.0	2.0	88.0
	31.00	1	2.0	2.0	90.0
	33.00	1	2.0	2.0	92.0
	36.00	3	6.0	6.0	98.0
	39.00	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

How many Minutes on BB

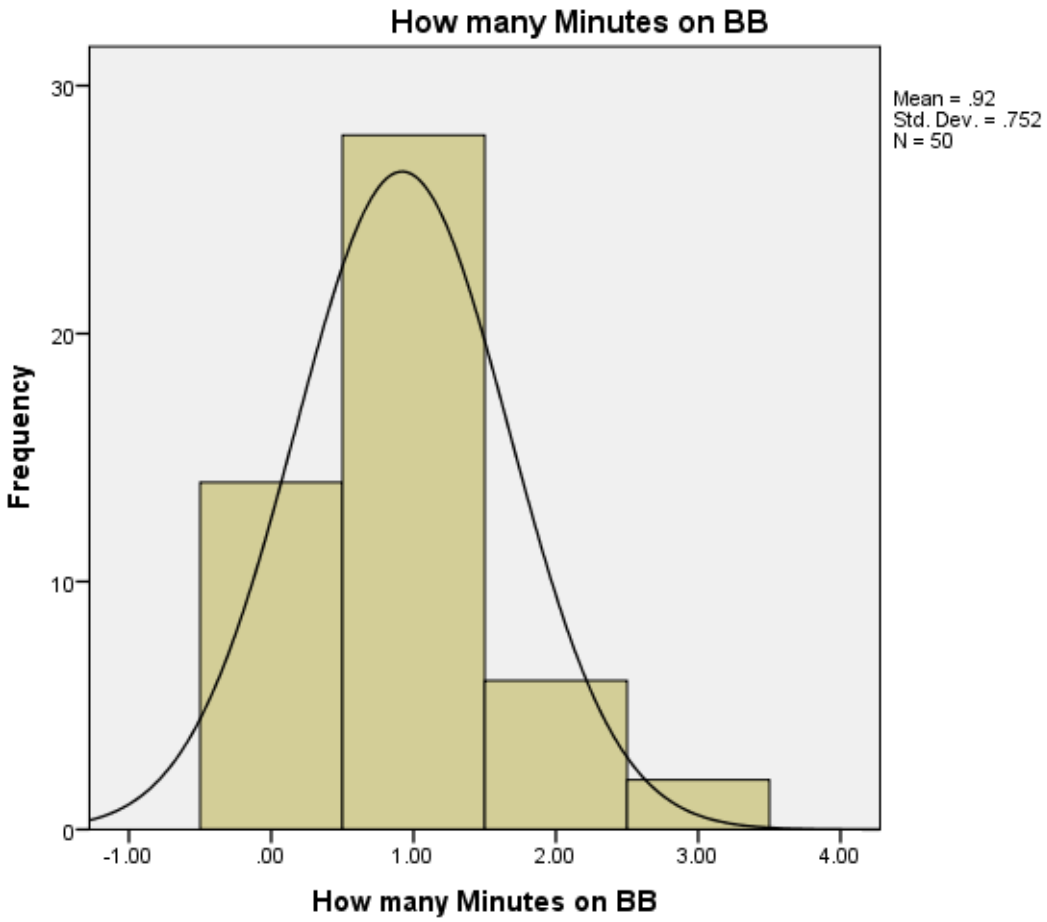
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	14	28.0	28.0	28.0
	1.00	28	56.0	56.0	84.0
	2.00	6	12.0	12.0	96.0
	3.00	2	4.0	4.0	100.0
	Total	50	100.0	100.0	

How many Posts on BB

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	15	30.0	30.0	30.0

	1.00	30	60.0	60.0	90.0
	2.00	5	10.0	10.0	100.0
	Total	50	100.0	100.0	

Histogram




```
EXAMINE VARIABLES=Age BB_Minutes BB_Posts BY Gender
 /PLOT BOXPLOT STEMLEAF
 /COMPARE GROUPS
 /STATISTICS DESCRIPTIVES
 /CINTERVAL 95
 /MISSING LISTWISE
 /NOTOTAL
```

Explore

Notes

Output Created		08-MAR-2018 17:47:24
Comments		
Input	Data	D:\2nd Year\Thesis\Stats\Gen_Age_BB.sav
	Active Dataset	DataSet3
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	50
Missing Value Handling	Definition of Missing	User-defined missing values for dependent variables are treated as missing.
	Cases Used	Statistics are based on cases with no missing values for any dependent variable or factor used.
Syntax		EXAMINE VARIABLES=Age BB_Minutes BB_Posts BY Gender /PLOT BOXPLOT STEMLEAF /COMPARE GROUPS /STATISTICS DESCRIPTIVES /CINTERVAL 95 /MISSING LISTWISE /NOTOTAL.

Resources	Processor Time	00:00:00.92
	Elapsed Time	00:00:00.61

What gender is someone

Case Processing Summary

		Cases			
		Valid		Missing	
	What gender is someone	N	Percent	N	Percent
What age is someone	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%
How many Minutes on BB	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%
How many Posts on BB	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%

Case Processing Summary

		Cases	
		Total	
	What gender is someone	N	Percent
What age is someone	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%

How many Minutes on BB	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%
How many Posts on BB	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%

Descriptives

	What gender is someone			Statistic	Std. Error
What age is someone	Male	Mean		21.9091	.84697
		95% Confidence Interval for Mean	Lower Bound	20.0219	
			Upper Bound	23.7963	
		5% Trimmed Mean		21.9545	
		Median		22.0000	
		Variance		7.891	
		Std. Deviation		2.80908	
		Minimum		18.00	
		Maximum		25.00	
		Range		7.00	
		Interquartile Range		6.00	
		Skewness		-.151	.661
		Kurtosis		-1.926	1.279

	Female	Mean		24.3429	.97700
		95% Confidence Interval for Mean	Lower Bound	22.3574	
			Upper Bound	26.3284	
		5% Trimmed Mean		23.9286	
		Median		23.0000	
		Variance		33.408	
		Std. Deviation		5.78000	
		Minimum		18.00	
		Maximum		39.00	
		Range		21.00	
		Interquartile Range		7.00	
		Skewness		1.185	.398
		Kurtosis		.437	.778
	Other	Mean		21.5000	1.19024
		95% Confidence Interval for Mean	Lower Bound	17.7121	
			Upper Bound	25.2879	
		5% Trimmed Mean		21.5000	
		Median		21.5000	
		Variance		5.667	
		Std. Deviation		2.38048	
		Minimum		19.00	

		Maximum		24.00	
		Range		5.00	
		Interquartile Range		4.50	
		Skewness		.000	1.014
		Kurtosis		-4.339	2.619
How many Minutes on BB	Male	Mean		1.0000	.26968
		95% Confidence Interval for Mean	Lower Bound	.3991	
			Upper Bound	1.6009	
		5% Trimmed Mean		.9444	
		Median		1.0000	
		Variance		.800	
		Std. Deviation		.89443	
		Minimum		.00	
		Maximum		3.00	
		Range		3.00	
		Interquartile Range		1.00	
		Skewness		1.025	.661
		Kurtosis		1.563	1.279
	Female	Mean		.8857	.12142
		95% Confidence Interval for Mean	Lower Bound	.6390	
			Upper Bound	1.1325	

		5% Trimmed Mean		.8413	
		Median		1.0000	
		Variance		.516	
		Std. Deviation		.71831	
		Minimum		.00	
		Maximum		3.00	
		Range		3.00	
		Interquartile Range		1.00	
		Skewness		.679	.398
		Kurtosis		.975	.778
	Other	Mean		1.0000	.40825
		95% Confidence Interval for Mean	Lower Bound	-.2992	
			Upper Bound	2.2992	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.667	
		Std. Deviation		.81650	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.50	

		Skewness		.000	1.014
		Kurtosis		1.500	2.619
How many Posts on BB	Male	Mean		.9091	.21125
		95% Confidence Interval for Mean	Lower Bound	.4384	
			Upper Bound	1.3798	
		5% Trimmed Mean		.8990	
		Median		1.0000	
		Variance		.491	
		Std. Deviation		.70065	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.00	
		Skewness		.123	.661
		Kurtosis		-.453	1.279
	Female	Mean		.7714	.10113
		95% Confidence Interval for Mean	Lower Bound	.5659	
			Upper Bound	.9770	
		5% Trimmed Mean		.7460	
		Median		1.0000	
		Variance		.358	

		Std. Deviation		.59832	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.00	
		Skewness		.111	.398
		Kurtosis		-.330	.778
	Other	Mean		.7500	.25000
		95% Confidence Interval for Mean	Lower Bound	-.0456	
			Upper Bound	1.5456	
		5% Trimmed Mean		.7778	
		Median		1.0000	
		Variance		.250	
		Std. Deviation		.50000	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.75	
		Skewness		-2.000	1.014
		Kurtosis		4.000	2.619

What age is someone

Stem-and-Leaf Plots

What age is someone Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

4.00 1 . 8999

4.00 2 . 1244

3.00 2 . 555

Stem width: 10.00

Each leaf: 1 case(s)

What age is someone Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

7.00 1 . 8999999

16.00 2 . 0000111122333444

6.00 2 . 556789

2.00 3 . 13

3.00 3 . 666

1.00 Extremes (>=39)

Stem width: 10.00

Each leaf: 1 case(s)

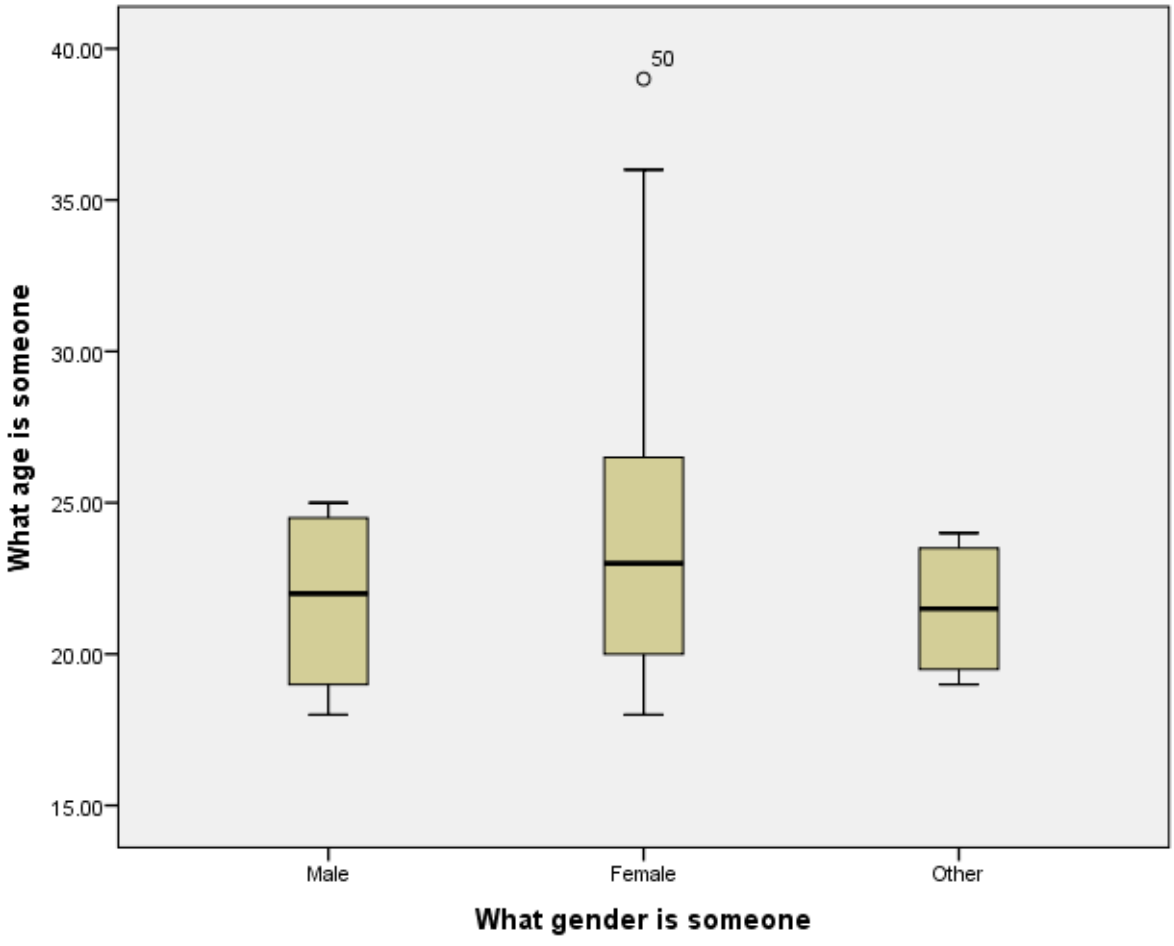
What age is someone Stem-and-Leaf Plot for

Gender= Other

Frequency	Stem & Leaf
1.00	1 . 9
3.00	2 . 034

Stem width: 10.00

Each leaf: 1 case(s)



How many Minutes on BB

Stem-and-Leaf Plots

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

3.00 0 . 000

.00 0 .

6.00 1 . 000000

2.00 Extremes (>=2.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

10.00 0 . 0000000000

.00 0 .

20.00 1 . 00000000000000000000

.00 1 .

4.00 2 . 0000

1.00 Extremes (>=3.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Other

Frequency Stem & Leaf

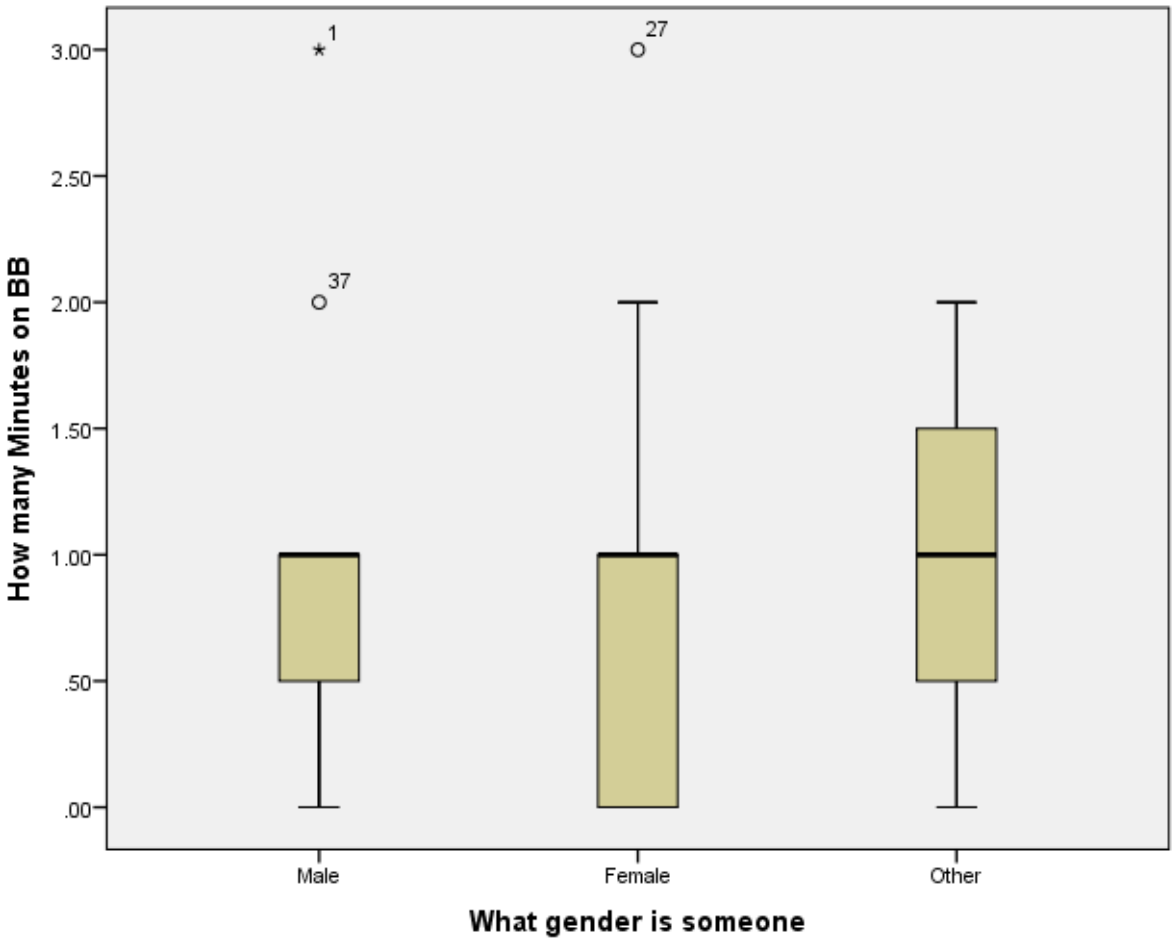
1.00 0 . 0

2.00 1 . 00

1.00 2 . 0

Stem width: 1.00

Each leaf: 1 case(s)



How many Posts on BB

Stem-and-Leaf Plots

How many Posts on BB Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

3.00 0 . 000

.00 0 .

6.00 1 . 000000

2.00 Extremes (>=2.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Posts on BB Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

11.00 0 . 00000000000

.00 0 .

21.00 1 . 000000000000000000000

.00 1 .

3.00 2 . 000

Stem width: 1.00

Each leaf: 1 case(s)

How many Posts on BB Stem-and-Leaf Plot for

Gender= Other

Frequency Stem & Leaf

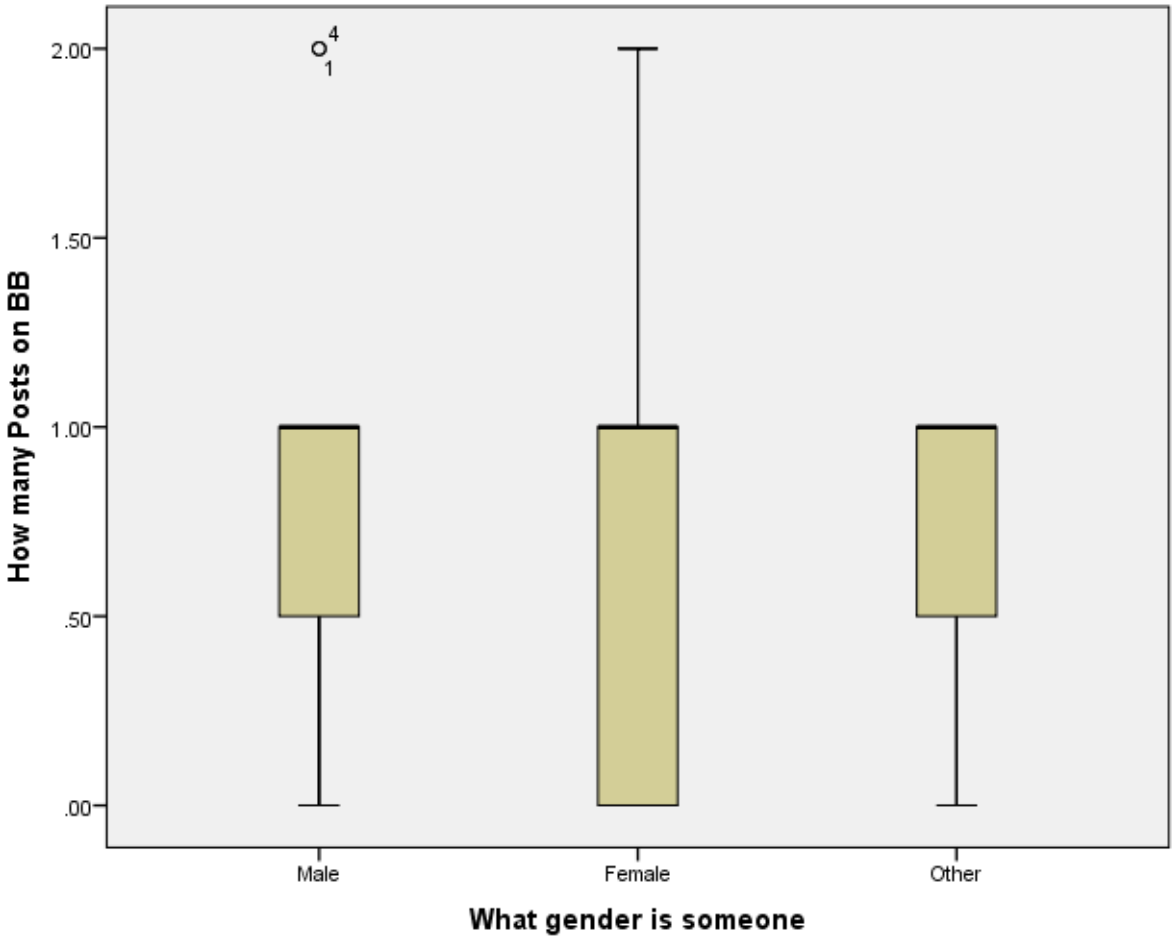
1.00 0 . 0

.00 0 .

3.00 1 . 000

Stem width: 1.00

Each leaf: 1 case(s)



EXAMINE VARIABLES=Age BB_Minutes BB_Posts BY Gender

/PLOT BOXPLOT STEMLEAF NPPLOT

/COMPARE GROUPS

/STATISTICS DESCRIPTIVES

/CINTERVAL 95

/MISSING LISTWISE

/NOTOTAL.

Explore

What gender is someone

Case Processing Summary

		Cases			
		Valid		Missing	
	What gender is someone	N	Percent	N	Percent
What age is someone	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%
How many Minutes on BB	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%
How many Posts on BB	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%

Case Processing Summary

		Cases	
		Total	
	What gender is someone	N	Percent
What age is someone	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%
How many Minutes on BB	Male	11	100.0%
	Female	35	100.0%

	Other	4	100.0%
How many Posts on BB	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%

Descriptives

	What gender is someone			Statistic	Std. Error
What age is someone	Male	Mean		21.9091	.84697
		95% Confidence Interval for Mean	Lower Bound	20.0219	
			Upper Bound	23.7963	
		5% Trimmed Mean		21.9545	
		Median		22.0000	
		Variance		7.891	
		Std. Deviation		2.80908	
		Minimum		18.00	
		Maximum		25.00	
		Range		7.00	
		Interquartile Range		6.00	
		Skewness		-.151	.661
		Kurtosis		-1.926	1.279
	Female	Mean		24.3429	.97700
			Lower Bound	22.3574	

		95% Confidence Interval for Mean	Upper Bound	26.3284	
		5% Trimmed Mean		23.9286	
		Median		23.0000	
		Variance		33.408	
		Std. Deviation		5.78000	
		Minimum		18.00	
		Maximum		39.00	
		Range		21.00	
		Interquartile Range		7.00	
		Skewness		1.185	.398
		Kurtosis		.437	.778
	Other	Mean		21.5000	1.19024
		95% Confidence Interval for Mean	Lower Bound	17.7121	
			Upper Bound	25.2879	
		5% Trimmed Mean		21.5000	
		Median		21.5000	
		Variance		5.667	
		Std. Deviation		2.38048	
		Minimum		19.00	
		Maximum		24.00	

		Range		5.00	
		Interquartile Range		4.50	
		Skewness		.000	1.014
		Kurtosis		-4.339	2.619
How many Minutes on BB	Male	Mean		1.0000	.26968
		95% Confidence Interval for Mean	Lower Bound	.3991	
			Upper Bound	1.6009	
		5% Trimmed Mean		.9444	
		Median		1.0000	
		Variance		.800	
		Std. Deviation		.89443	
		Minimum		.00	
		Maximum		3.00	
		Range		3.00	
		Interquartile Range		1.00	
		Skewness		1.025	.661
		Kurtosis		1.563	1.279
	Female	Mean		.8857	.12142
		95% Confidence Interval for Mean	Lower Bound	.6390	
			Upper Bound	1.1325	
		5% Trimmed Mean		.8413	

		Median		1.0000	
		Variance		.516	
		Std. Deviation		.71831	
		Minimum		.00	
		Maximum		3.00	
		Range		3.00	
		Interquartile Range		1.00	
		Skewness		.679	.398
		Kurtosis		.975	.778
	Other	Mean		1.0000	.40825
		95% Confidence Interval for Mean	Lower Bound	-.2992	
			Upper Bound	2.2992	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.667	
		Std. Deviation		.81650	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.50	
		Skewness		.000	1.014

		Kurtosis		1.500	2.619
How many Posts on BB	Male	Mean		.9091	.21125
		95% Confidence Interval for Mean	Lower Bound	.4384	
			Upper Bound	1.3798	
		5% Trimmed Mean		.8990	
		Median		1.0000	
		Variance		.491	
		Std. Deviation		.70065	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.00	
		Skewness		.123	.661
		Kurtosis		-.453	1.279
	Female	Mean		.7714	.10113
		95% Confidence Interval for Mean	Lower Bound	.5659	
			Upper Bound	.9770	
		5% Trimmed Mean		.7460	
		Median		1.0000	
		Variance		.358	
		Std. Deviation		.59832	

		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.00	
		Skewness		.111	.398
		Kurtosis		-.330	.778
	Other	Mean		.7500	.25000
		95% Confidence Interval for Mean	Lower Bound	-.0456	
			Upper Bound	1.5456	
		5% Trimmed Mean		.7778	
		Median		1.0000	
		Variance		.250	
		Std. Deviation		.50000	
		Minimum		.00	
		Maximum		1.00	
		Range		1.00	
		Interquartile Range		.75	
		Skewness		-2.000	1.014
		Kurtosis		4.000	2.619

Tests of Normality

	What gender is someone	Kolmogorov-Smirnov[a] Statistic	df	Sig.	Shapiro-Wilk Statistic
What age is someone	Male	.226	11	.121	.850
	Female	.181	35	.005	.848
	Other	.236	4	.	.911
How many Minutes on BB	Male	.318	11	.003	.825
	Female	.294	35	.000	.801
	Other	.250	4	.	.945
How many Posts on BB	Male	.279	11	.017	.822
	Female	.334	35	.000	.756
	Other	.441	4	.	.630

Tests of Normality

	What gender is someone	Shapiro-Wilk[a] df	Sig.
What age is someone	Male	11	.043
	Female	35	.000
	Other	4	.488
How many Minutes on BB	Male	11	.020
	Female	35	.000
	Other	4	.683
How many Posts on BB	Male	11	.018

	Female	35	.000
	Other	4	.001

a. Lilliefors Significance Correction

What age is someone

Stem-and-Leaf Plots

What age is someone Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

4.00 1 . 8999

4.00 2 . 1244

3.00 2 . 555

Stem width: 10.00

Each leaf: 1 case(s)

What age is someone Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

7.00 1 . 8999999

16.00 2 . 0000111122333444

6.00 2 . 556789

2.00 3 . 13

3.00 3 . 666

1.00 Extremes (>=39)

Stem width: 10.00

Each leaf: 1 case(s)

What age is someone Stem-and-Leaf Plot for

Gender= Other

Frequency Stem & Leaf

1.00 1 . 9

3.00 2 . 034

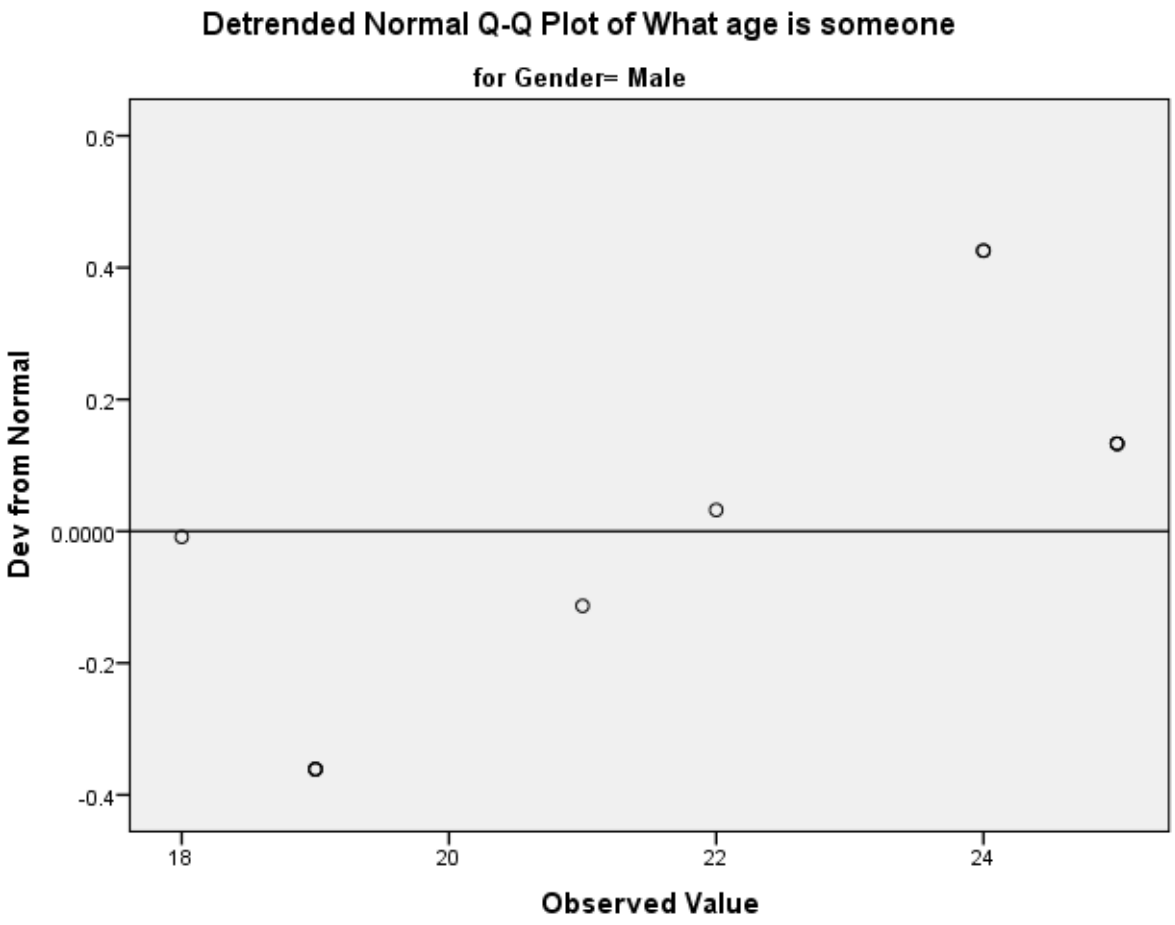
Stem width: 10.00

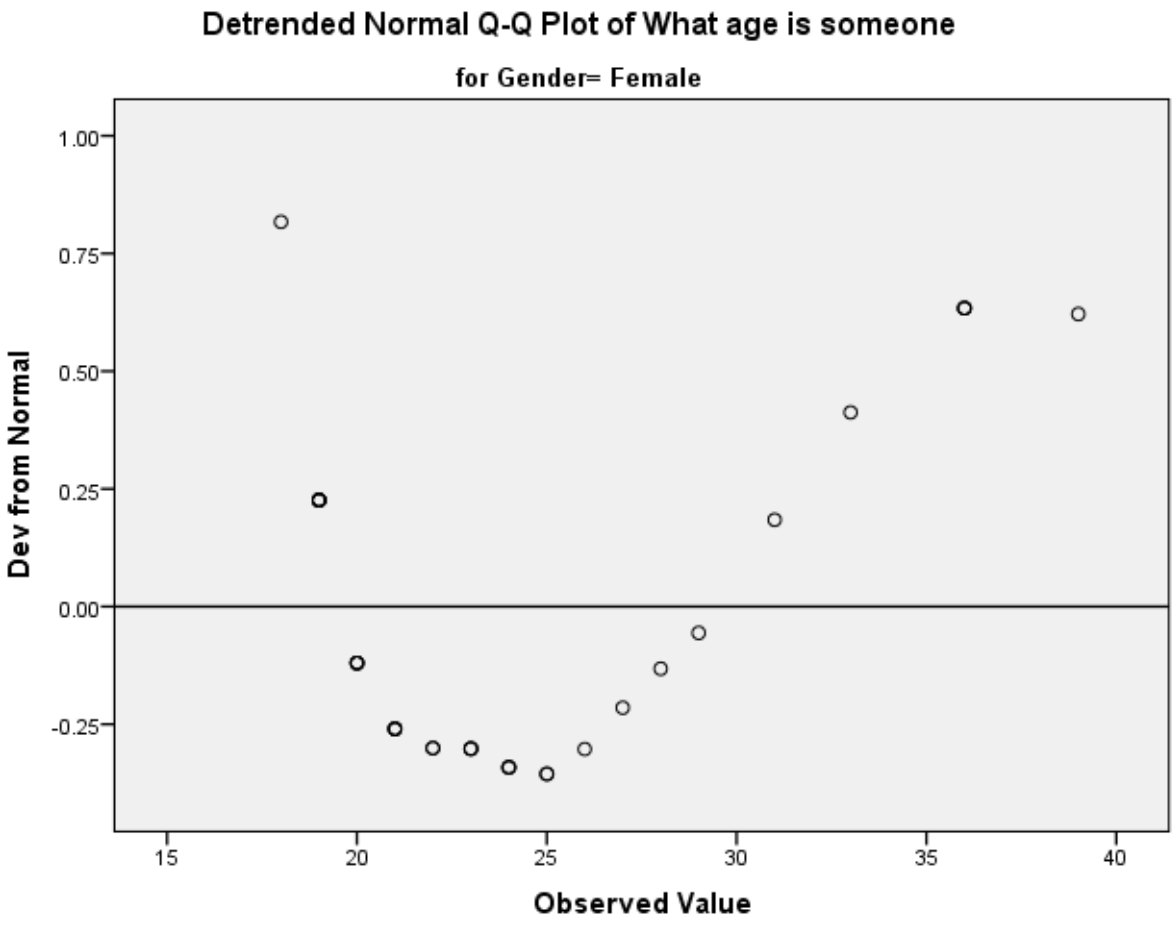
Each leaf: 1 case(s)

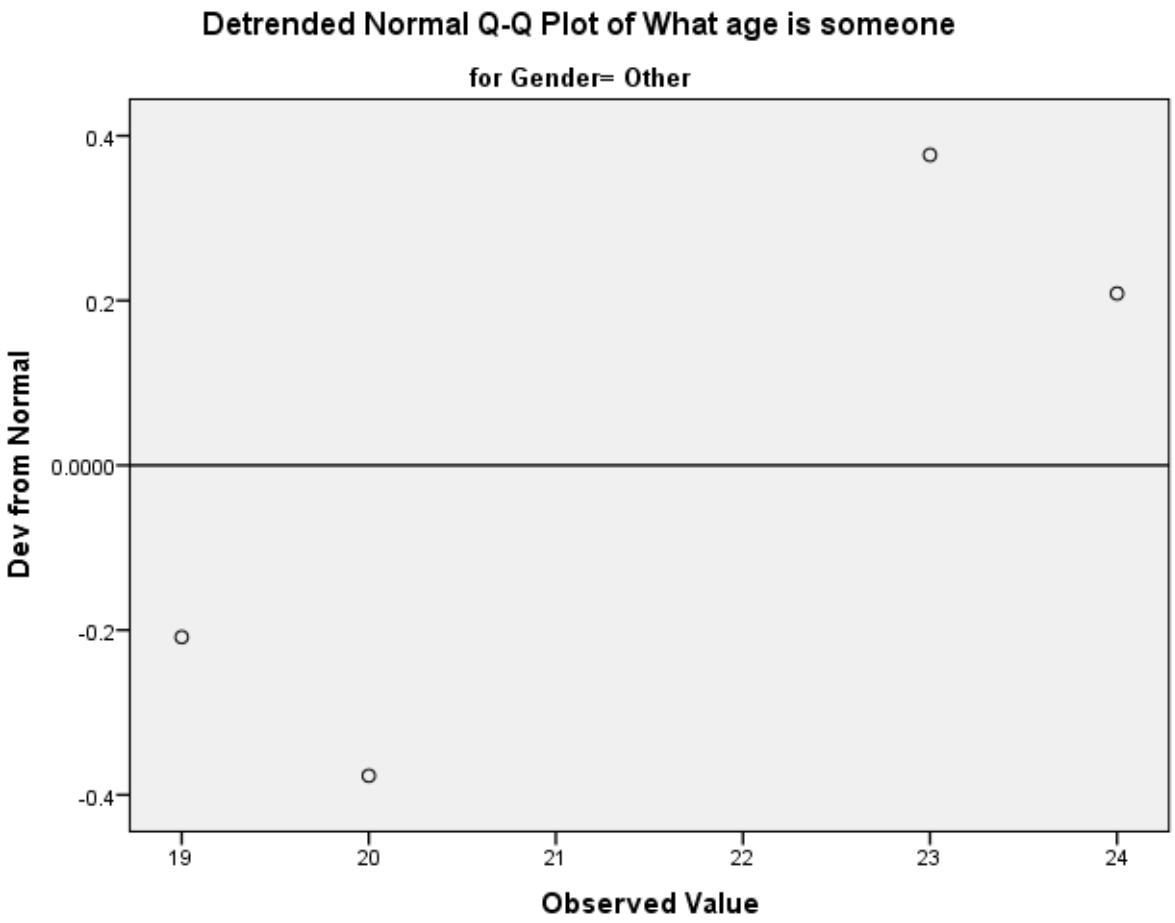
Normal Q-Q Plots

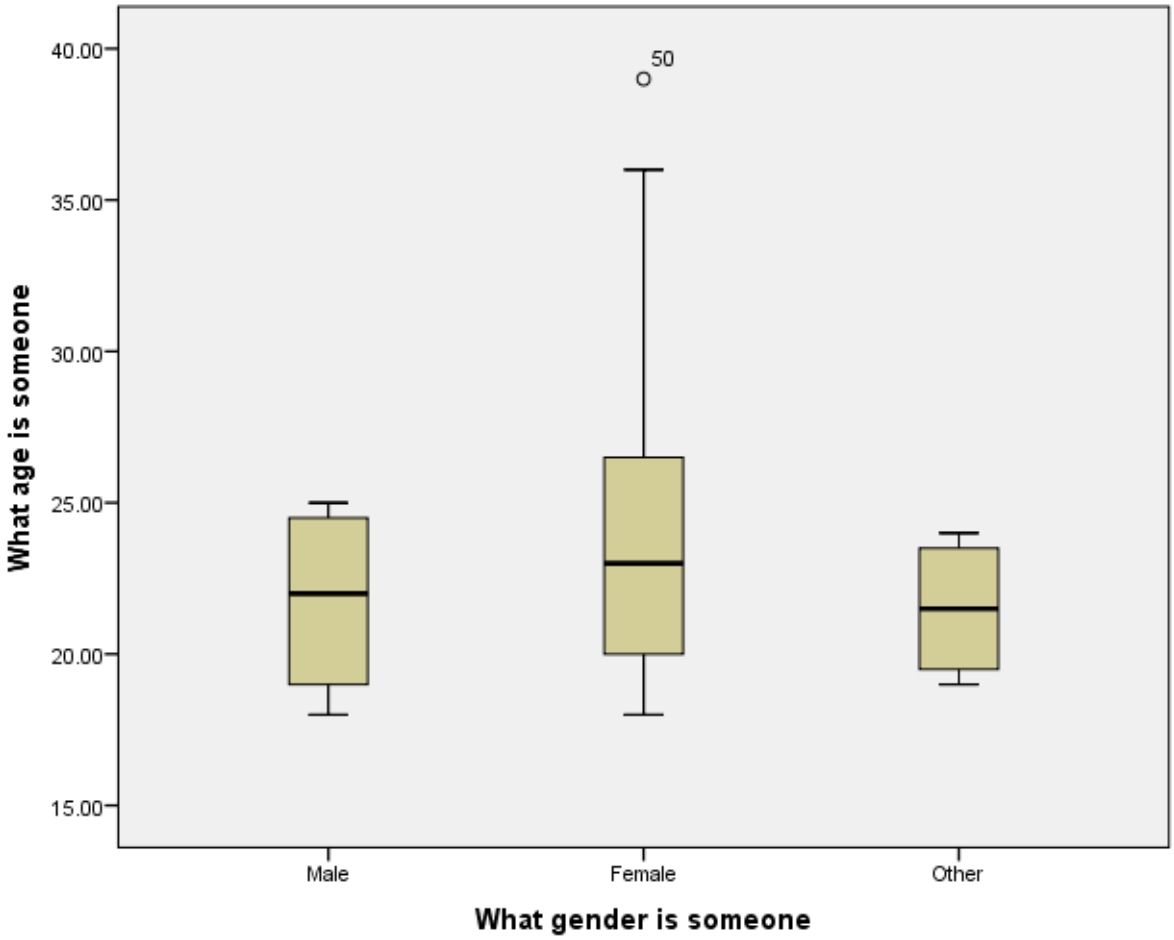
Normal Q-Q Plot of What age is someone
for Gender= Female
Expected Normal
Observed Value
3
2
1
0
-1
-2
15
20
25
30
35
40
45

Detrended Noral Q-Q Plots


Detrended Normal Q-Q Plot of What age is someone
for Gender= Male
Dev from Normal
0.6
0.4
0.2
0.0000
-0.2
-0.4
18
20
22
24
Observed Value


Detrended Normal Q-Q Plot of What age is someone
for Gender= Female
Dev from Normal
1.00
0.75
0.50
0.25
0.00
-0.25
15
20
25
30
35
40
Observed Value


Detrended Normal Q-Q Plot of What age is someone
for Gender= Other
Dev from Normal
0.4
0.2
0.0000
-0.2
-0.4
19
20
21
22
23
24
Observed Value



How many Minutes on BB

Stem-and-Leaf Plots

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

3.00 0 . 000

.00 0 .

6.00 1 . 000000

2.00 Extremes (>=2.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

10.00 0 . 0000000000

.00 0 .

20.00 1 . 00000000000000000000

.00 1 .

4.00 2 . 0000

1.00 Extremes (>=3.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Other

Frequency Stem & Leaf

1.00 0 . 0

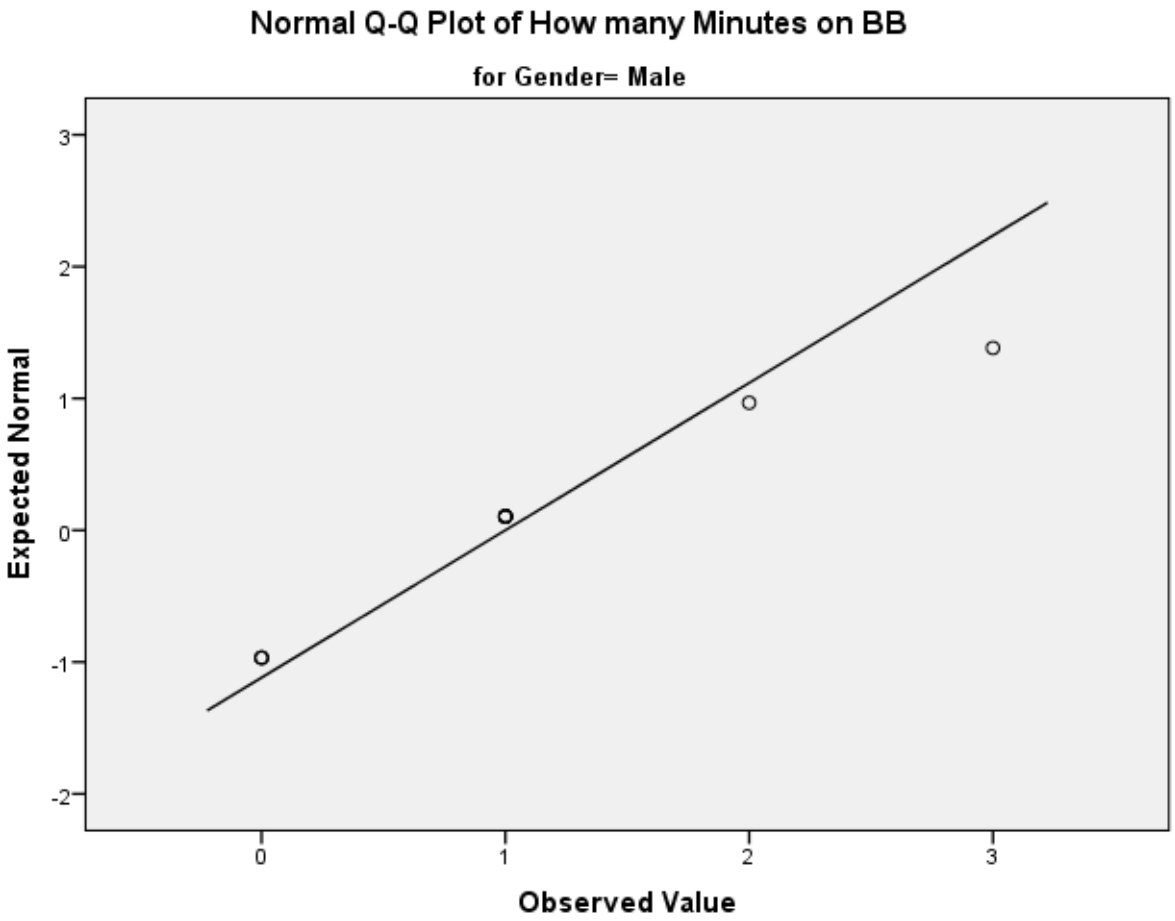
2.00 1 . 00

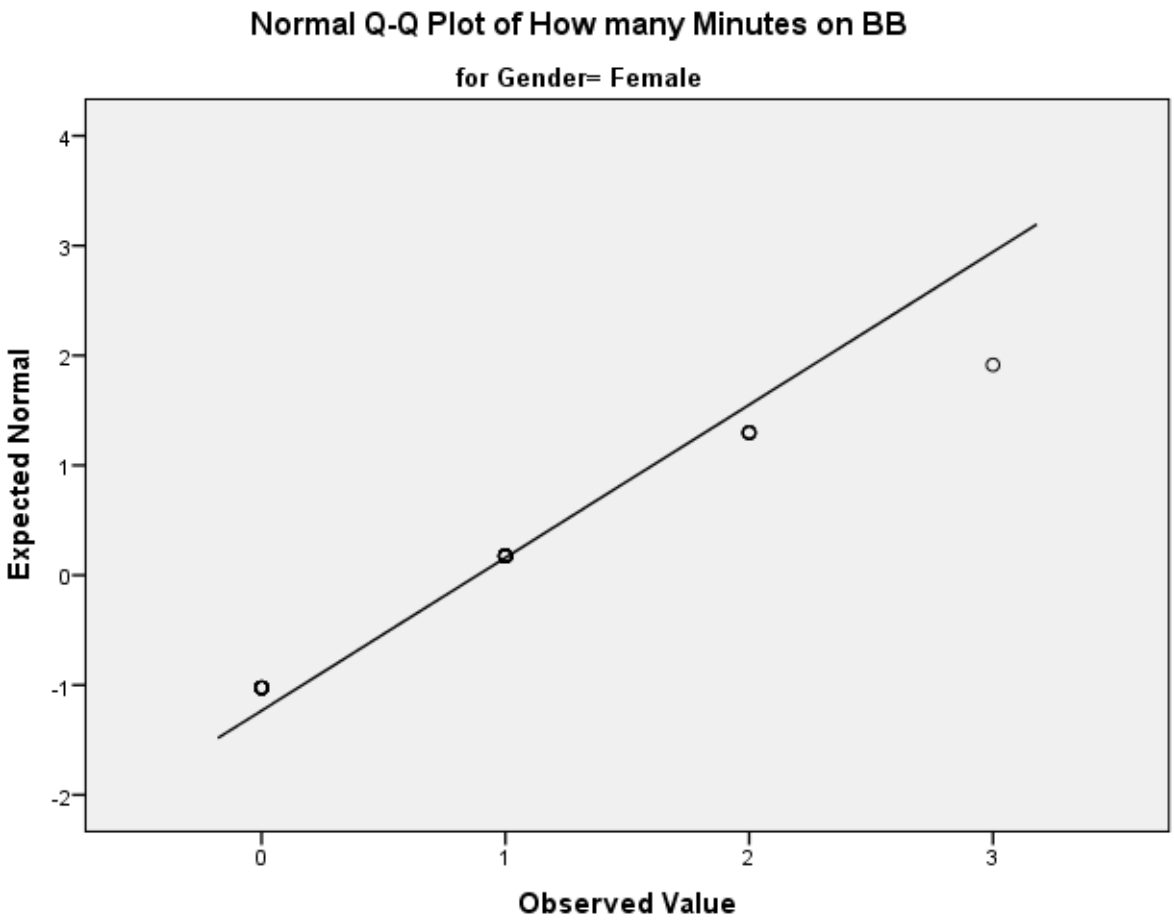
1.00 2 . 0

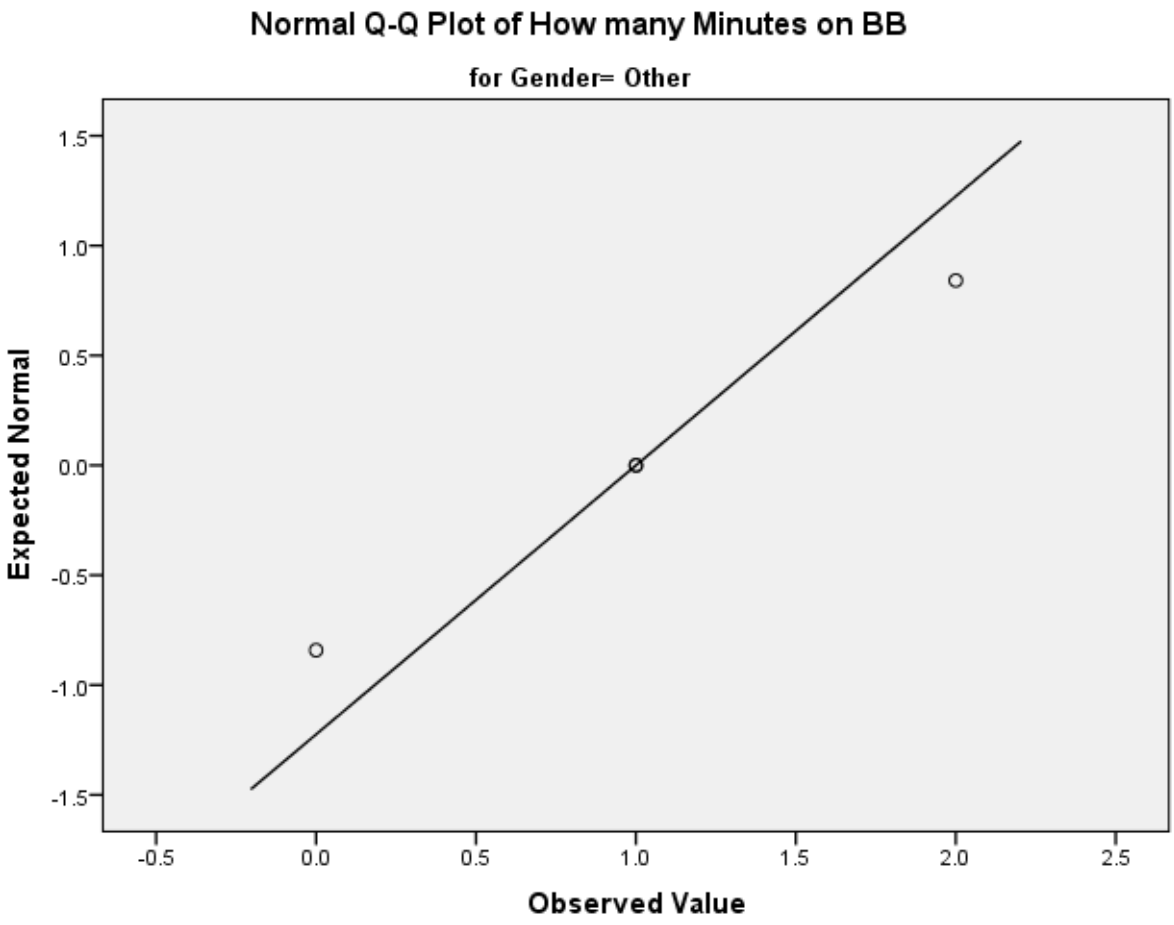
Stem width: 1.00

Each leaf: 1 case(s)

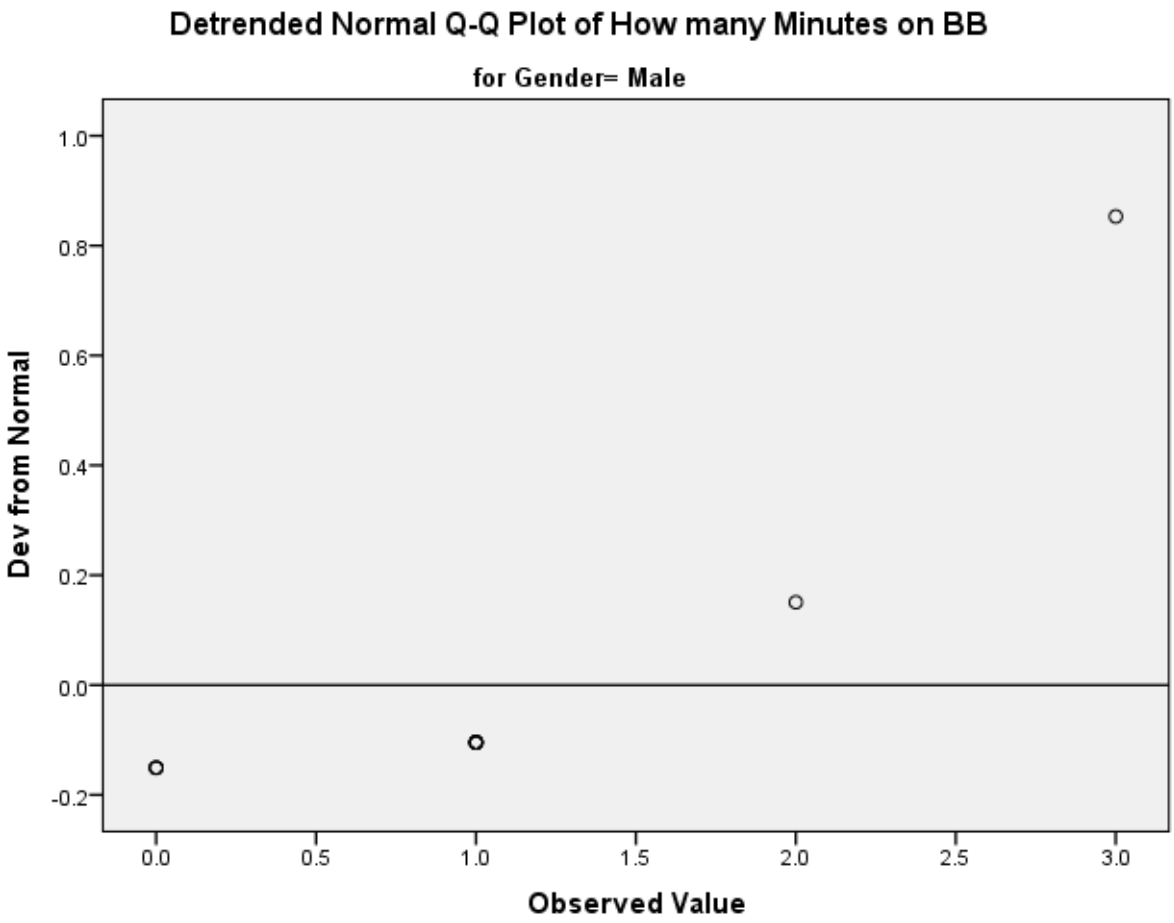
Normal Q-Q Plots

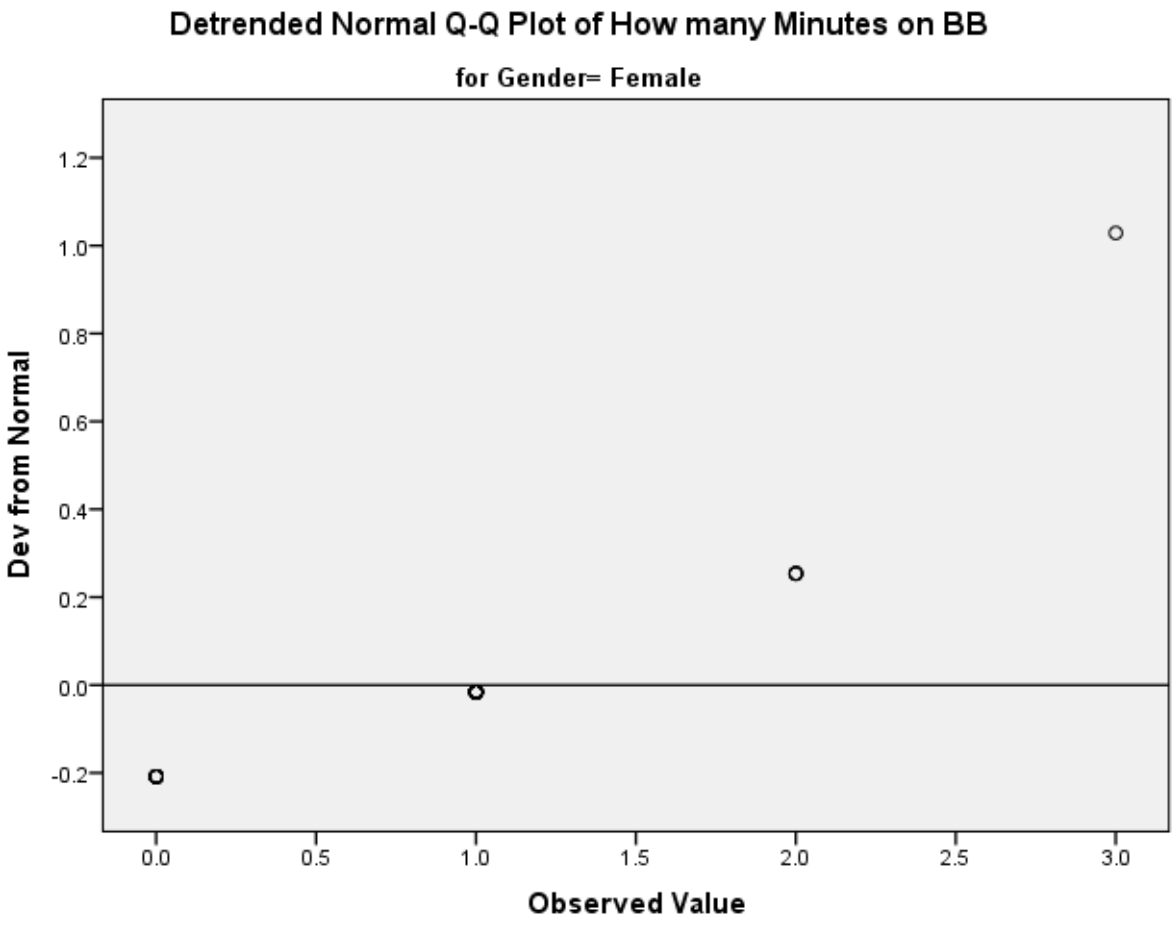


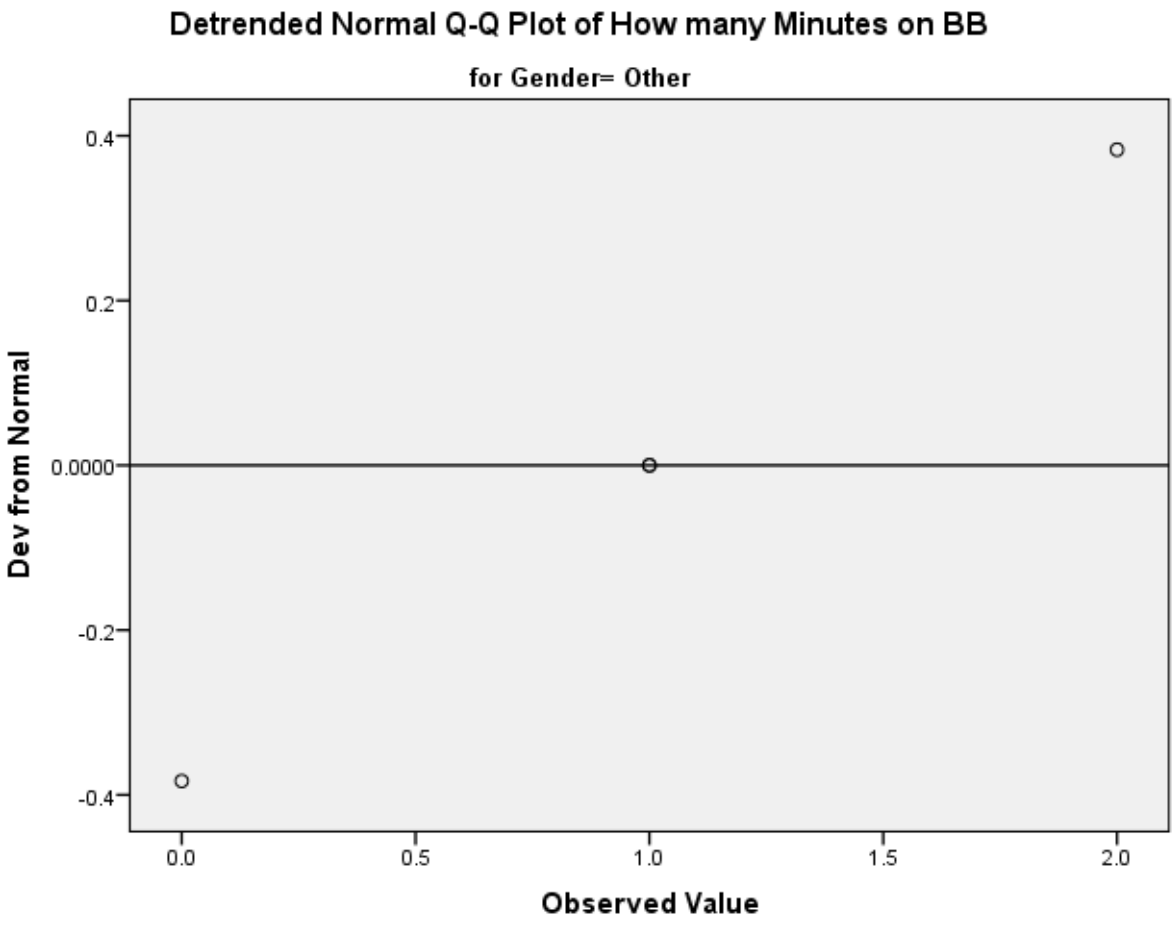

Normal Q-Q Plot of How many Minutes on BB
for Gender= Female
Expected Normal
4
3
2
1
0
-1
-2
0
1
2
3
Observed Value

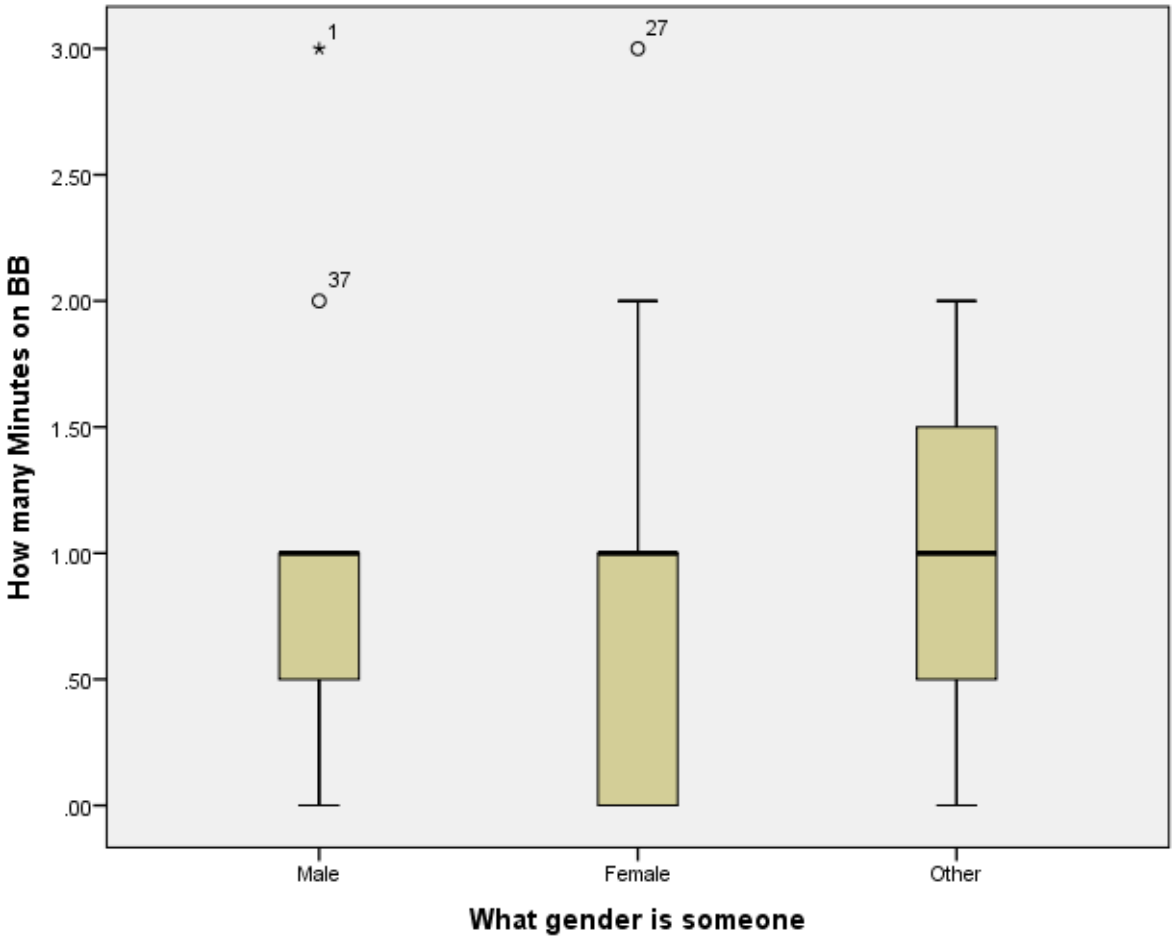


Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of How many Minutes on BB
for Gender= Male
Dev from Normal
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Observed Value


Detrended Normal Q-Q Plot of How many Minutes on BB
for Gender= Female
Dev from Normal
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Observed Value


Detrended Normal Q-Q Plot of How many Minutes on BB
for Gender= Other
Dev from Normal
0.4
0.2
0.0000
-0.2
-0.4
0.0
0.5
1.0
1.5
2.0
Observed Value



How many Posts on BB

Stem-and-Leaf Plots

How many Posts on BB Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

3.00 0 . 000

.00 0 .

6.00 1 . 000000

2.00 Extremes (>=2.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Posts on BB Stem-and-Leaf Plot for

Gender= Female

Frequency	Stem &	Leaf
11.00	0 .	00000000000
.00	0 .	
21.00	1 .	000000000000000000000
.00	1 .	
3.00	2 .	000

Stem width: 1.00

Each leaf: 1 case(s)

How many Posts on BB Stem-and-Leaf Plot for

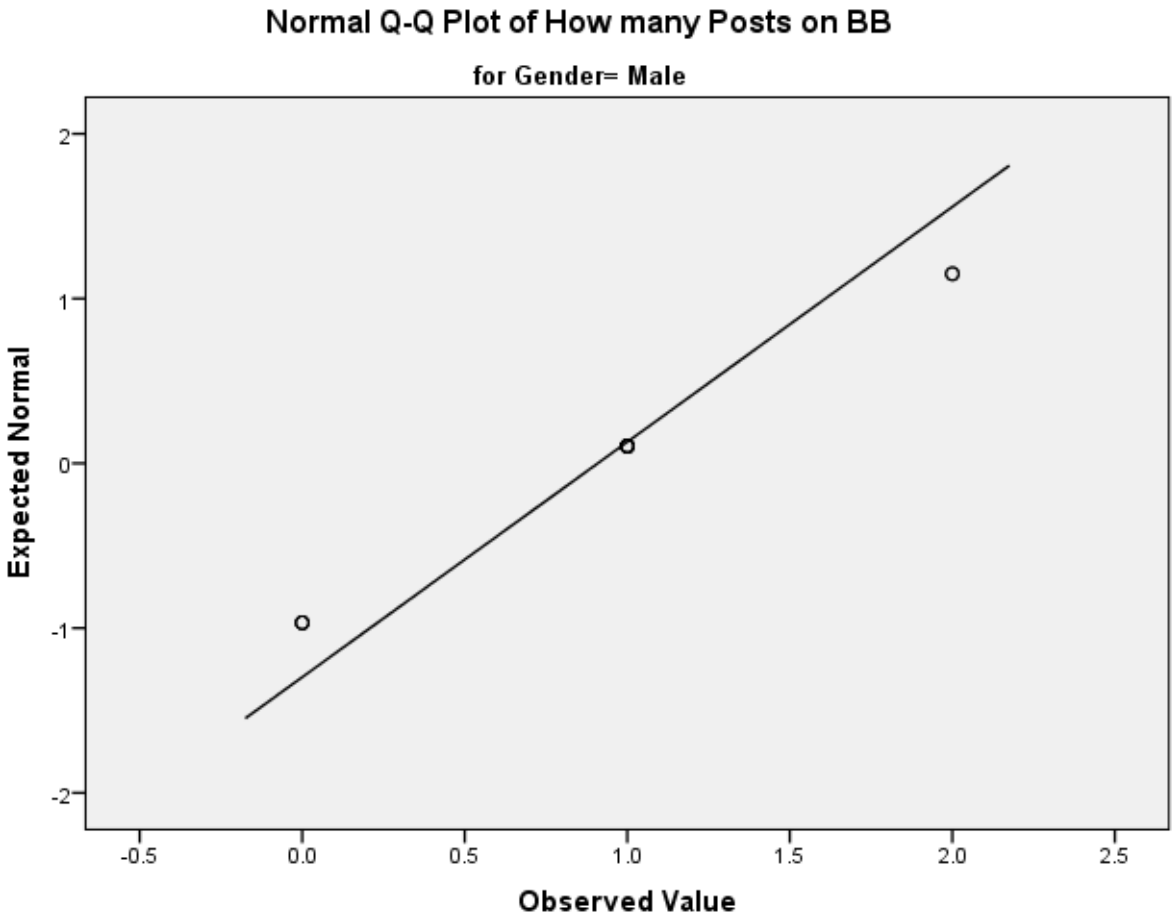
Gender= Other

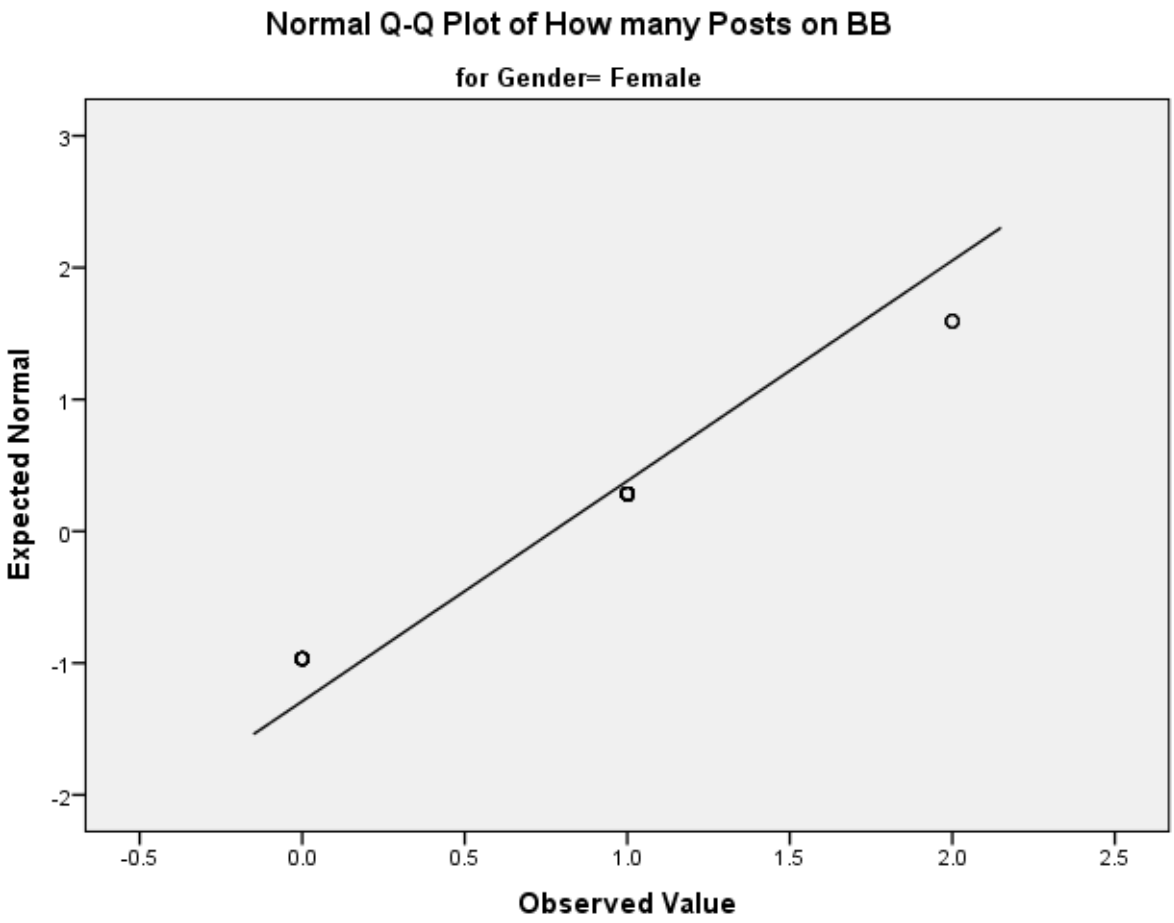
Frequency	Stem &	Leaf
1.00	0 .	0
.00	0 .	
3.00	1 .	000

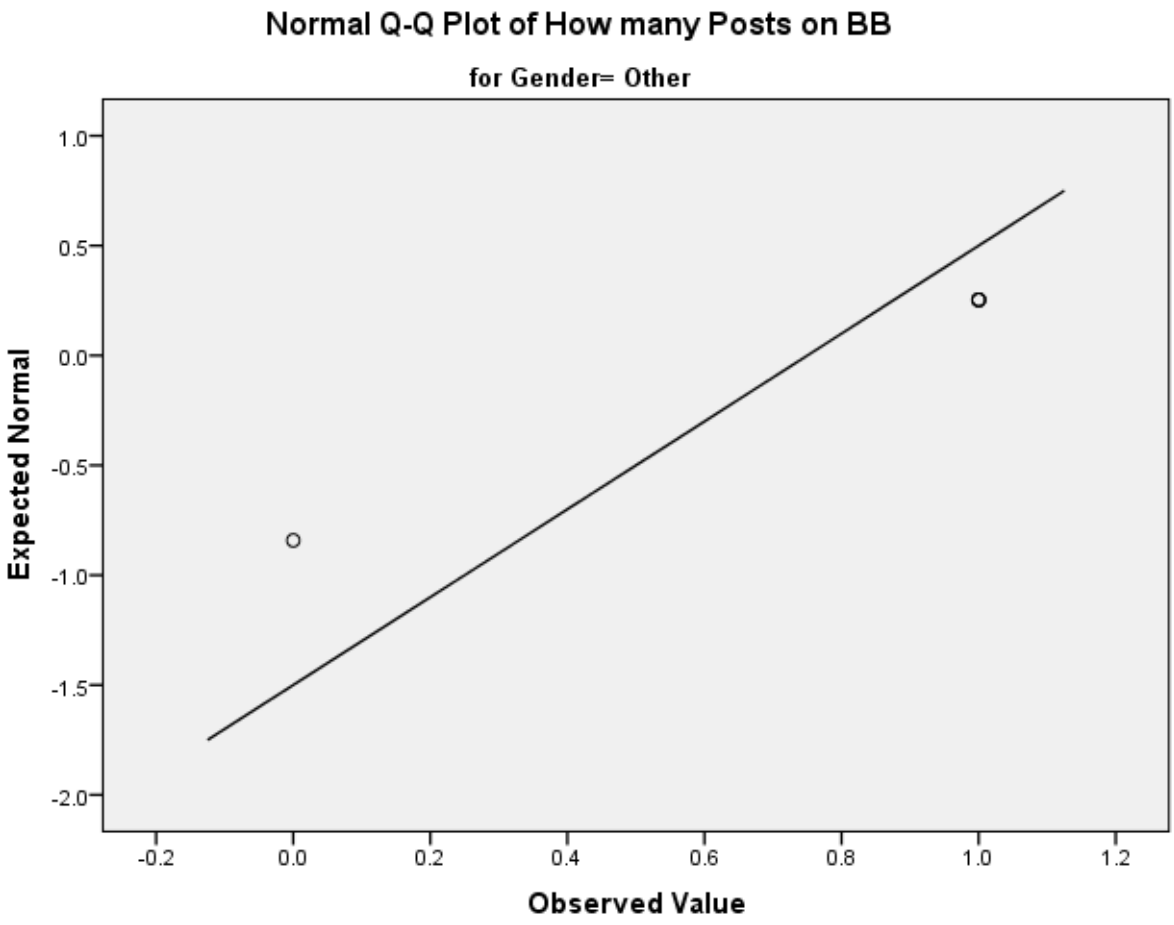
Stem width: 1.00

Each leaf: 1 case(s)

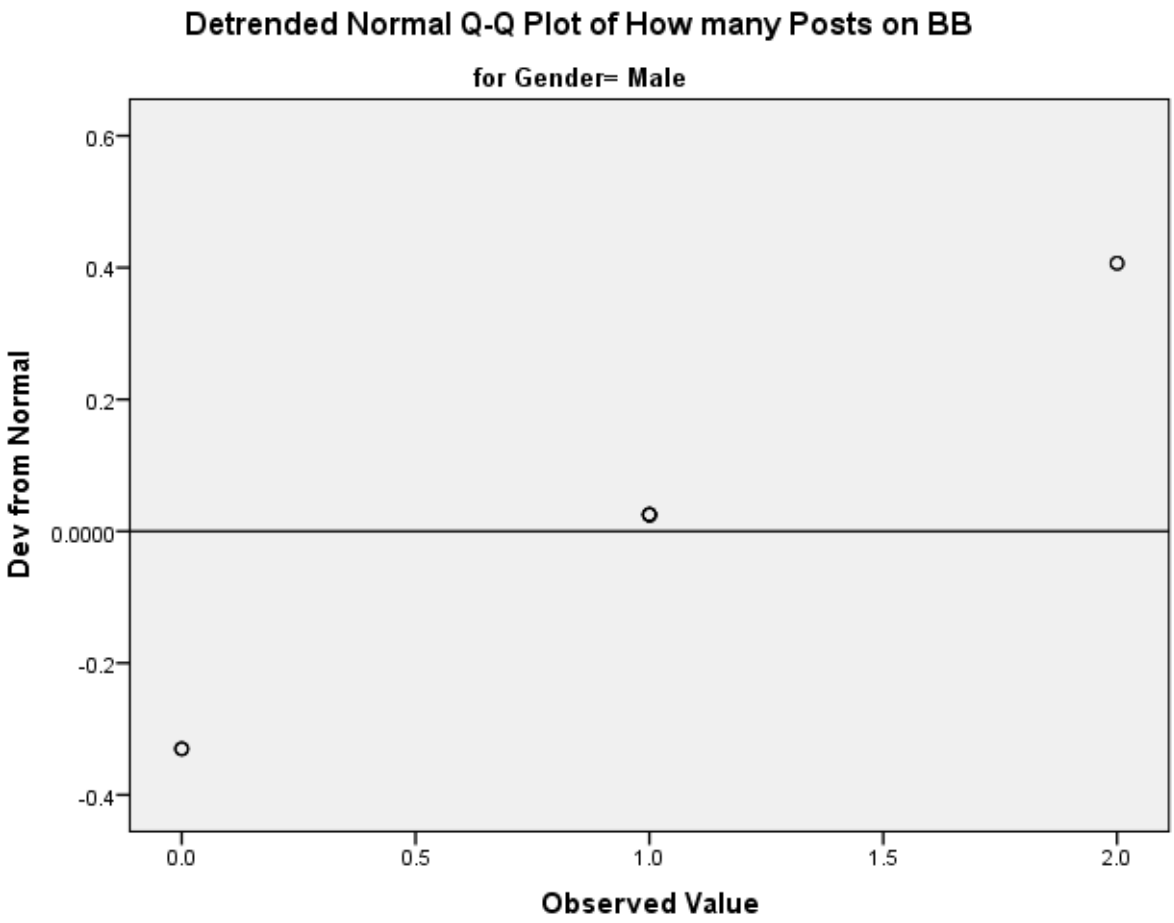
Normal Q-Q Plots

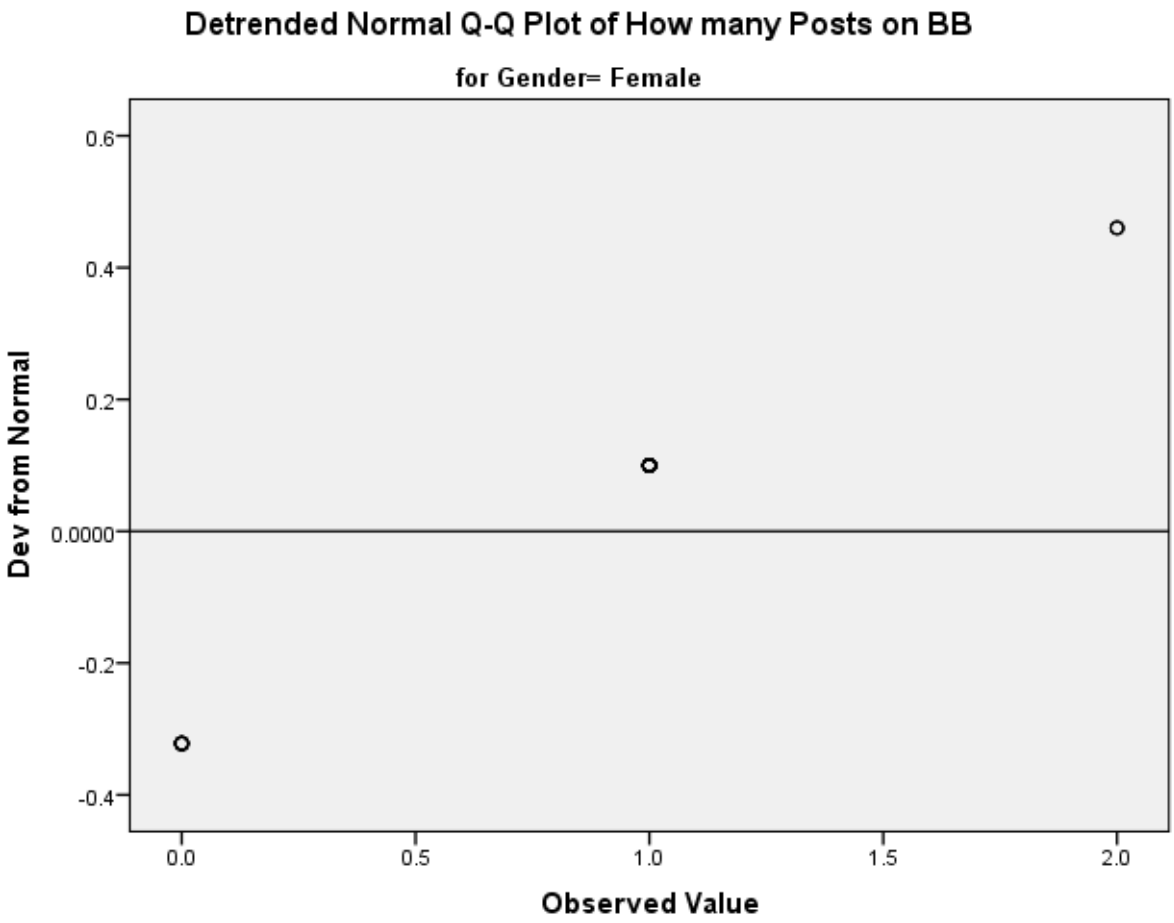

Normal Q-Q Plot of How many Posts on BB
for Gender= Male
Expected Normal
Observed Value
2
1
0
-1
-2
-0.5
0.0
0.5
1.0
1.5
2.0
2.5

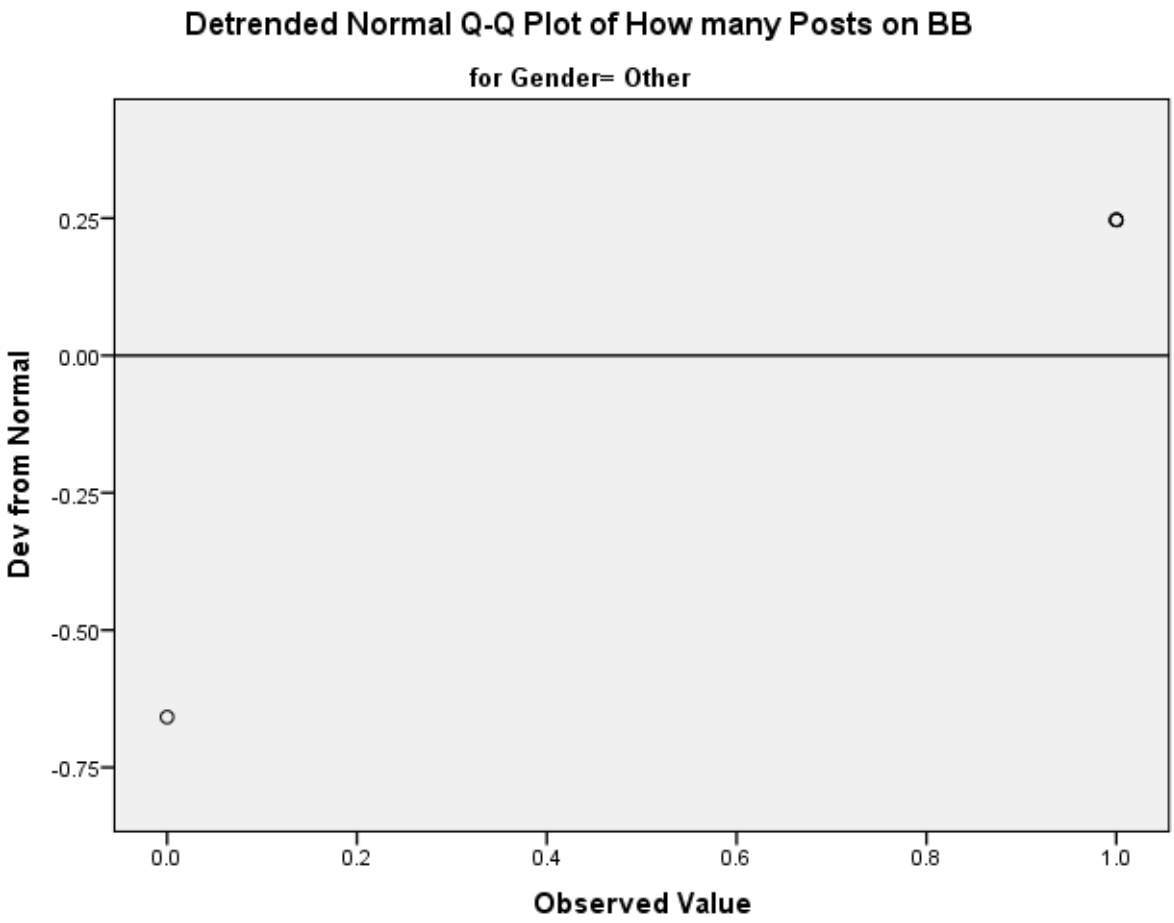

Normal Q-Q Plot of How many Posts on BB
for Gender= Female
Expected Normal
Observed Value
3
2
1
0
-1
-2
-0.5
0.0
0.5
1.0
1.5
2.0
2.5

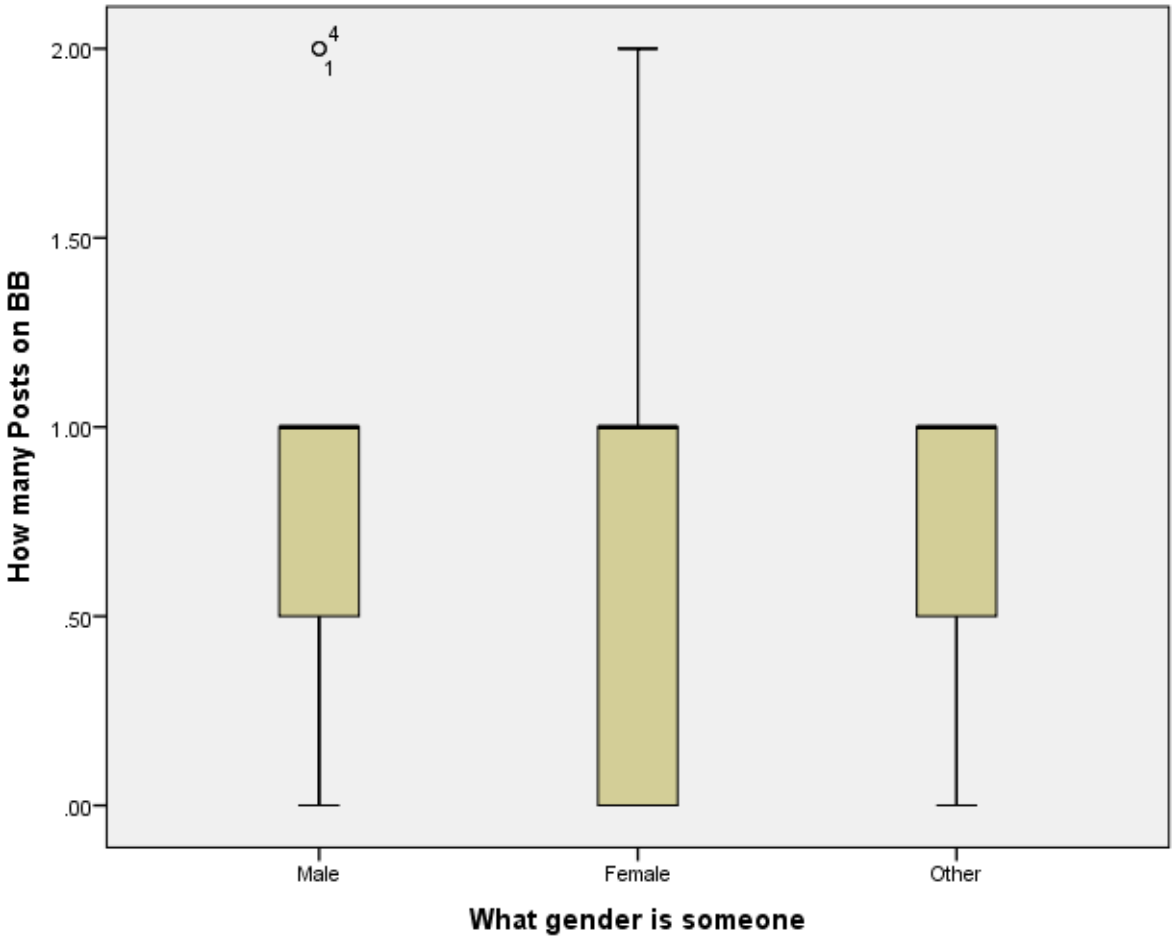


Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of How many Posts on BB
for Gender= Male
Dev from Normal
0.6
0.4
0.2
0.0000
-0.2
-0.4
0.0
0.5
1.0
1.5
2.0
Observed Value


Detrended Normal Q-Q Plot of How many Posts on BB
for Gender= Female
Dev from Normal
0.6
0.4
0.2
0.0000
-0.2
-0.4
0.0
0.5
1.0
1.5
2.0
Observed Value


Detrended Normal Q-Q Plot of How many Posts on BB
for Gender= Other
Dev from Normal
0.25
0.00
-0.25
-0.50
-0.75
0.0
0.2
0.4
0.6
0.8
1.0
Observed Value



Explore

[DataSet1] D:\2nd Year\Thesis\Stats\Gen_Age_BB.sav

What gender is someone

Case Processing Summary

		Cases			
		Valid		Missing	
	What gender is someone	N	Percent	N	Percent
What age is someone	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%

How many Minutes on BB	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%
How many Posts on BB	Male	11	100.0%	0	0.0%
	Female	35	100.0%	0	0.0%
	Other	4	100.0%	0	0.0%

Case Processing Summary

		Cases	
		Total	
	What gender is someone	N	Percent
What age is someone	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%
How many Minutes on BB	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%
How many Posts on BB	Male	11	100.0%
	Female	35	100.0%
	Other	4	100.0%

Descriptives

	What gender is someone		Statistic	Std. Error
What age is someone	Male	Mean	21.9091	.84697

		95% Confidence Interval for Mean	Lower Bound	20.0219	
			Upper Bound	23.7963	
		5% Trimmed Mean		21.9545	
		Median		22.0000	
		Variance		7.891	
		Std. Deviation		2.80908	
		Minimum		18.00	
		Maximum		25.00	
		Range		7.00	
		Interquartile Range		6.00	
		Skewness		-.151	.661
		Kurtosis		-1.926	1.279
	Female	Mean		24.3429	.97700
		95% Confidence Interval for Mean	Lower Bound	22.3574	
			Upper Bound	26.3284	
		5% Trimmed Mean		23.9286	
		Median		23.0000	
		Variance		33.408	
		Std. Deviation		5.78000	
		Minimum		18.00	
		Maximum		39.00	

		Range		21.00	
		Interquartile Range		7.00	
		Skewness		1.185	.398
		Kurtosis		.437	.778
	Other	Mean		21.5000	1.19024
		95% Confidence Interval for Mean	Lower Bound	17.7121	
			Upper Bound	25.2879	
		5% Trimmed Mean		21.5000	
		Median		21.5000	
		Variance		5.667	
		Std. Deviation		2.38048	
		Minimum		19.00	
		Maximum		24.00	
		Range		5.00	
		Interquartile Range		4.50	
		Skewness		.000	1.014
		Kurtosis		-4.339	2.619
How many Minutes on BB	Male	Mean		1.0000	.26968
		95% Confidence Interval for Mean	Lower Bound	.3991	
			Upper Bound	1.6009	
		5% Trimmed Mean		.9444	

		Median		1.0000	
		Variance		.800	
		Std. Deviation		.89443	
		Minimum		.00	
		Maximum		3.00	
		Range		3.00	
		Interquartile Range		1.00	
		Skewness		1.025	.661
		Kurtosis		1.563	1.279
	Female	Mean		.8857	.12142
		95% Confidence Interval for Mean	Lower Bound	.6390	
			Upper Bound	1.1325	
		5% Trimmed Mean		.8413	
		Median		1.0000	
		Variance		.516	
		Std. Deviation		.71831	
		Minimum		.00	
		Maximum		3.00	
		Range		3.00	
		Interquartile Range		1.00	
		Skewness		.679	.398

		Kurtosis		.975	.778
	Other	Mean		1.0000	.40825
		95% Confidence Interval for Mean	Lower Bound	-.2992	
			Upper Bound	2.2992	
		5% Trimmed Mean		1.0000	
		Median		1.0000	
		Variance		.667	
		Std. Deviation		.81650	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.50	
		Skewness		.000	1.014
		Kurtosis		1.500	2.619
How many Posts on BB	Male	Mean		.9091	.21125
		95% Confidence Interval for Mean	Lower Bound	.4384	
			Upper Bound	1.3798	
		5% Trimmed Mean		.8990	
		Median		1.0000	
		Variance		.491	
		Std. Deviation		.70065	

		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.00	
		Skewness		.123	.661
		Kurtosis		-.453	1.279
	Female	Mean		.7714	.10113
		95% Confidence Interval for Mean	Lower Bound	.5659	
			Upper Bound	.9770	
		5% Trimmed Mean		.7460	
		Median		1.0000	
		Variance		.358	
		Std. Deviation		.59832	
		Minimum		.00	
		Maximum		2.00	
		Range		2.00	
		Interquartile Range		1.00	
		Skewness		.111	.398
		Kurtosis		-.330	.778
	Other	Mean		.7500	.25000
			Lower Bound	-.0456	

		95% Confidence Interval for Mean	Upper Bound	1.5456
		5% Trimmed Mean		.7778
		Median		1.0000
		Variance		.250
		Std. Deviation		.50000
		Minimum		.00
		Maximum		1.00
		Range		1.00
		Interquartile Range		.75
		Skewness		-2.000
		Kurtosis		4.000

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk
	What gender is someone	Statistic	df	Sig.	Statistic
What age is someone	Male	.226	11	.121	.850
	Female	.181	35	.005	.848
	Other	.236	4	.	.911
How many Minutes on BB	Male	.318	11	.003	.825
	Female	.294	35	.000	.801
	Other	.250	4	.	.945

How many Posts on BB	Male	.279	11	.017	.822
	Female	.334	35	.000	.756
	Other	.441	4	.	.630

Tests of Normality

		Shapiro-Wilk[a]		
	What gender is someone	df	Sig.	
What age is someone	Male	11	.043	
	Female	35	.000	
	Other	4	.488	
How many Minutes on BB	Male	11	.020	
	Female	35	.000	
	Other	4	.683	
How many Posts on BB	Male	11	.018	
	Female	35	.000	
	Other	4	.001	

a. Lilliefors Significance Correction

What age is someone

Stem-and-Leaf Plots

What age is someone Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

4.00 1 . 8999

4.00 2 . 1244

3.00 2 . 555

Stem width: 10.00

Each leaf: 1 case(s)

What age is someone Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

7.00 1 . 8999999

16.00 2 . 0000111122333444

6.00 2 . 556789

2.00 3 . 13

3.00 3 . 666

1.00 Extremes (>=39)

Stem width: 10.00

Each leaf: 1 case(s)

What age is someone Stem-and-Leaf Plot for

Gender= Other

Frequency Stem & Leaf

1.00 1 . 9

3.00 2 . 034

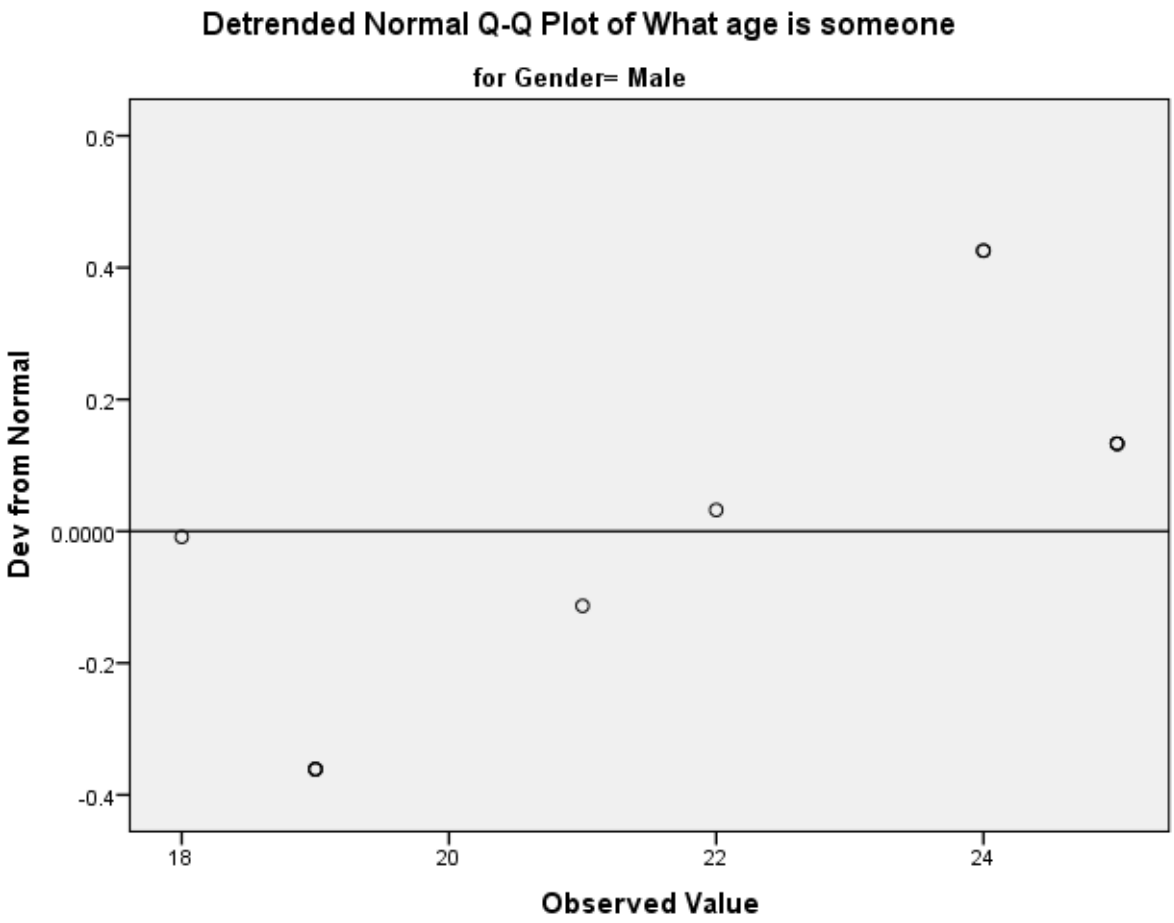
Stem width: 10.00

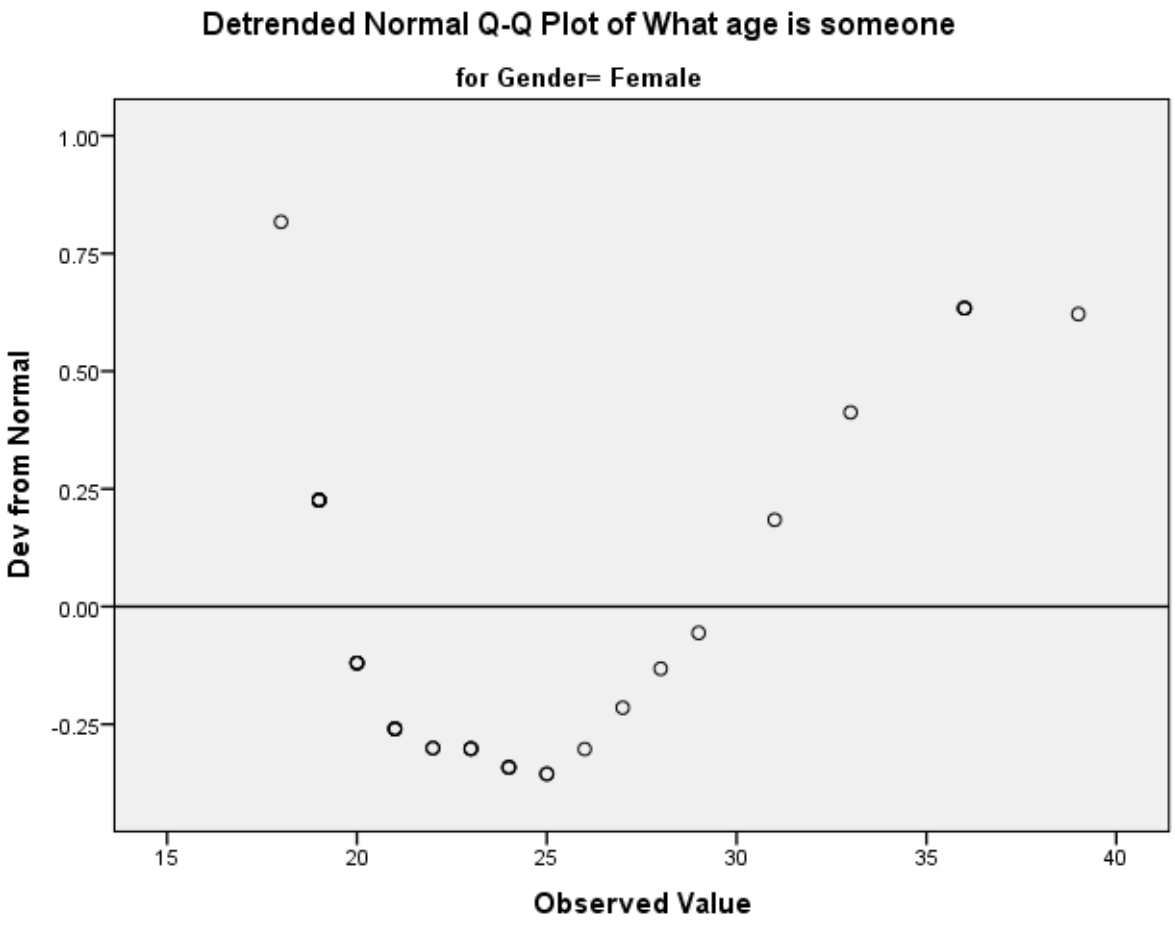
Each leaf: 1 case(s)

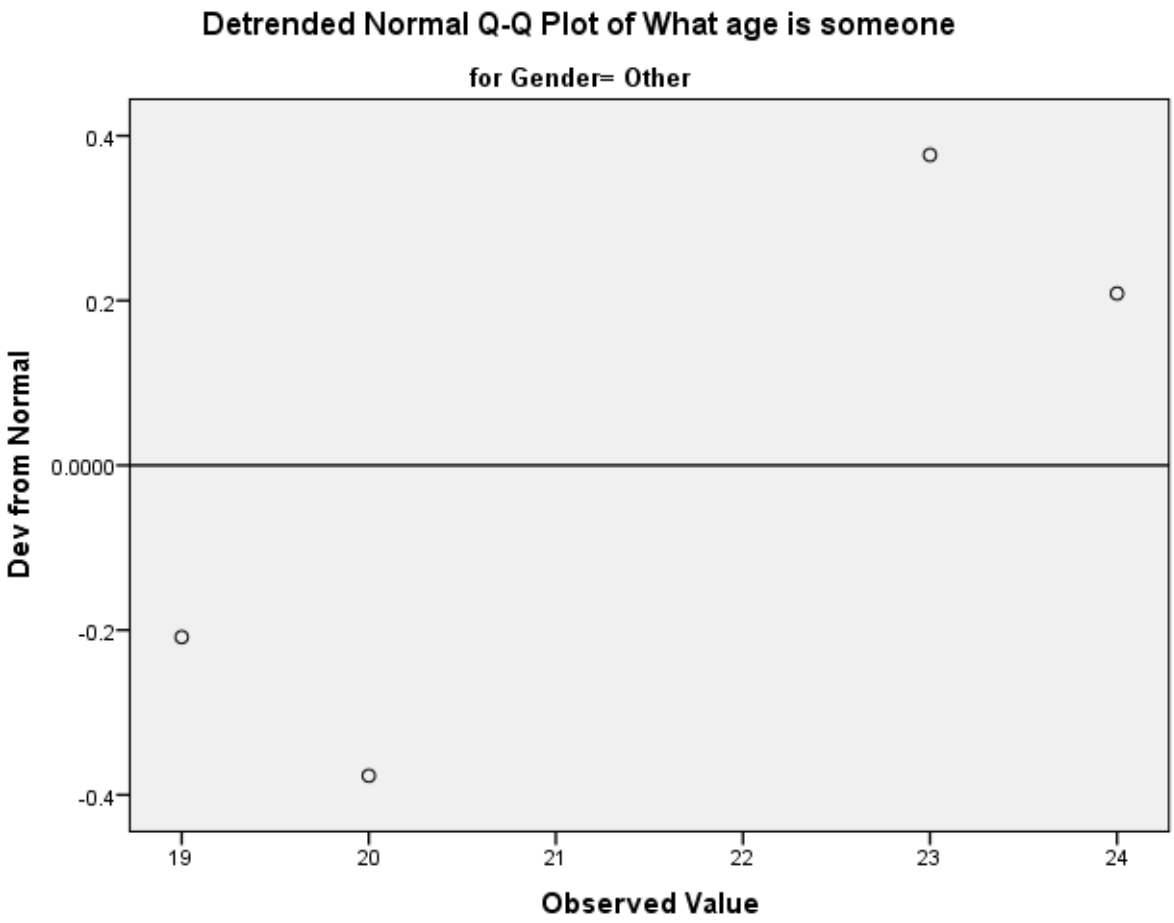
Normal Q-Q Plots

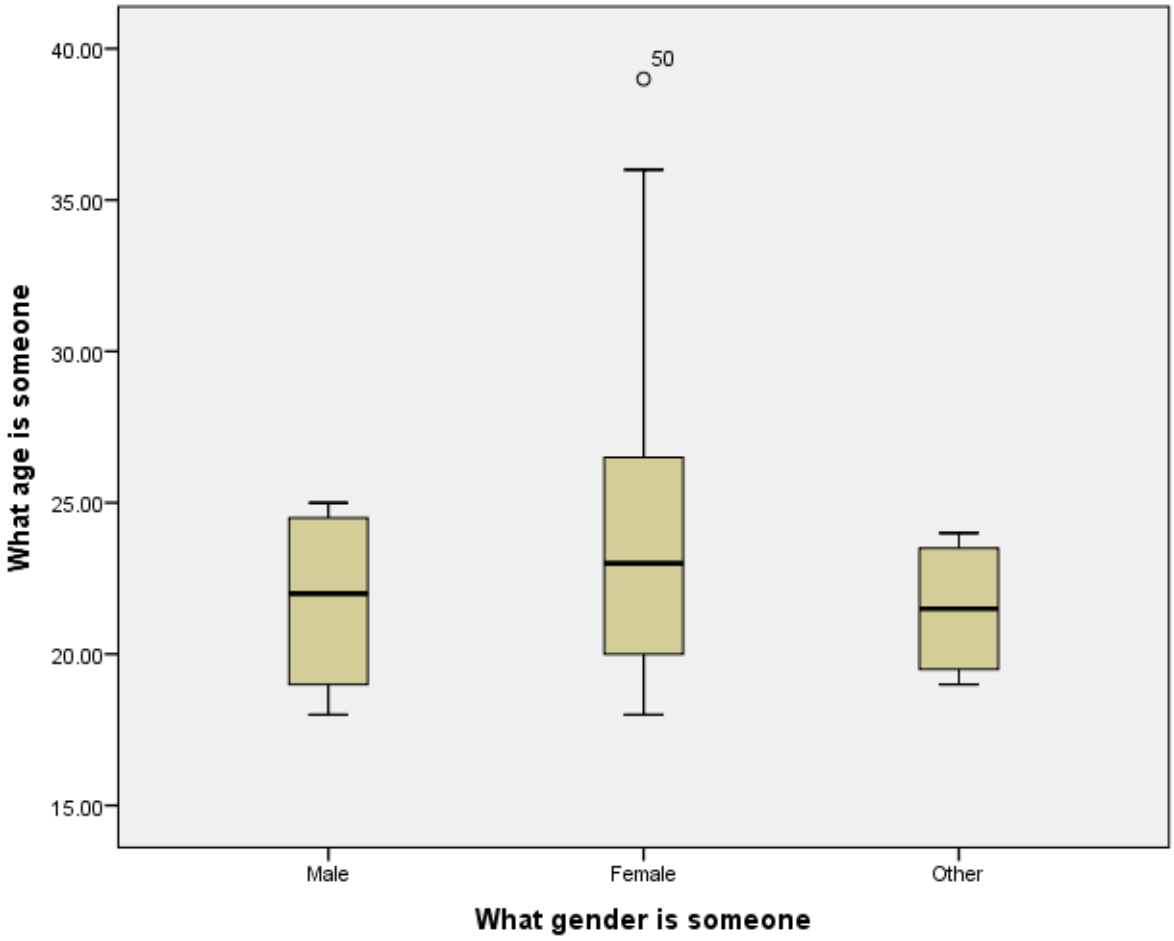
Normal Q-Q Plot of What age is someone
for Gender= Female
Expected Normal
Observed Value
3
2
1
0
-1
-2
15
20
25
30
35
40
45

Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of What age is someone
for Gender= Male
Dev from Normal
0.6
0.4
0.2
0.0000
-0.2
-0.4
18
20
22
24
Observed Value


Detrended Normal Q-Q Plot of What age is someone
for Gender= Female
Dev from Normal
1.00
0.75
0.50
0.25
0.00
-0.25
15
20
25
30
35
40
Observed Value


Detrended Normal Q-Q Plot of What age is someone
for Gender= Other
Dev from Normal
0.4
0.2
0.0000
-0.2
-0.4
19
20
21
22
23
24
Observed Value



How many Minutes on BB

Stem-and-Leaf Plots

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

3.00 0 . 000

.00 0 .

6.00 1 . 000000

2.00 Extremes (>=2.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Female

Frequency Stem & Leaf

10.00 0 . 0000000000

.00 0 .

20.00 1 . 00000000000000000000

.00 1 .

4.00 2 . 0000

1.00 Extremes (>=3.0)

Stem width: 1.00

Each leaf: 1 case(s

How many Minutes on BB Stem-and-Leaf Plot for

Gender= Other

Frequency Stem & Leaf

1.00 0 . 0

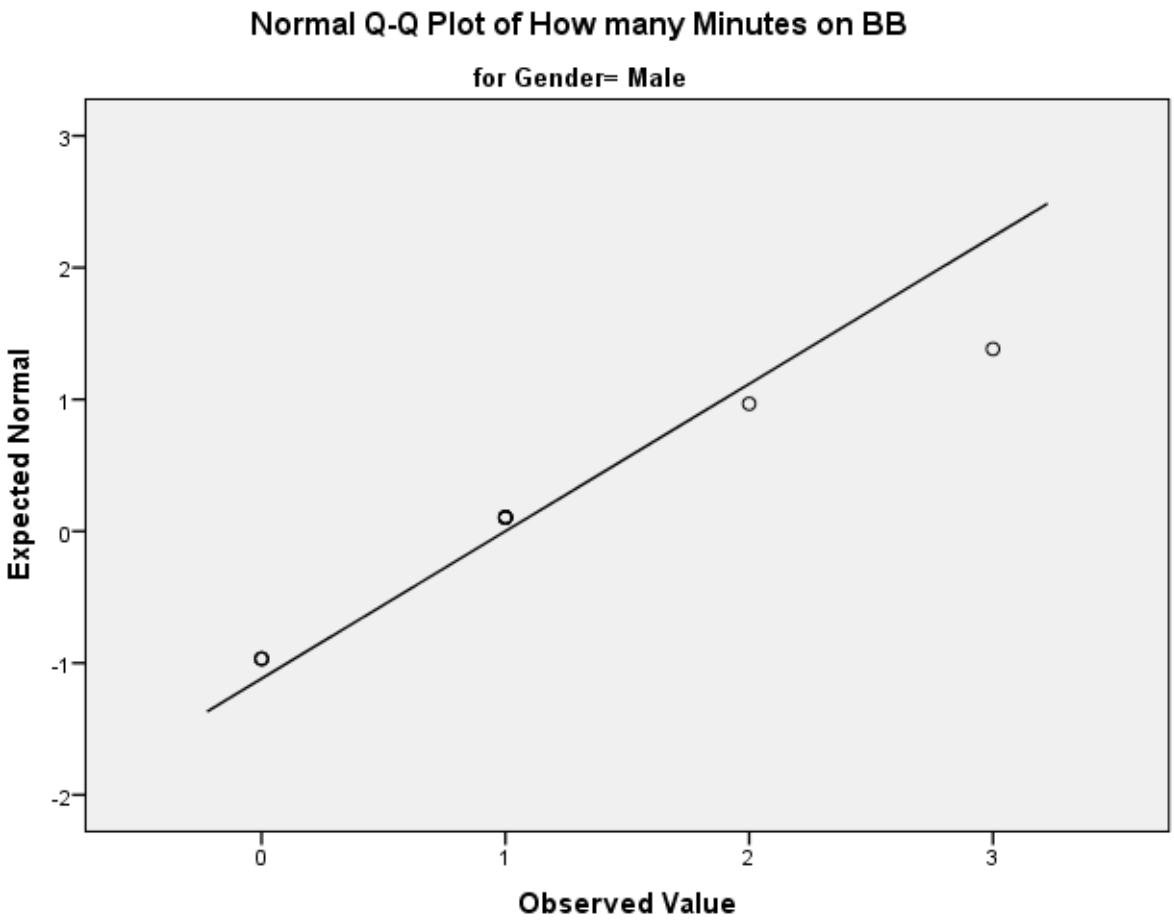
2.00 1 . 00

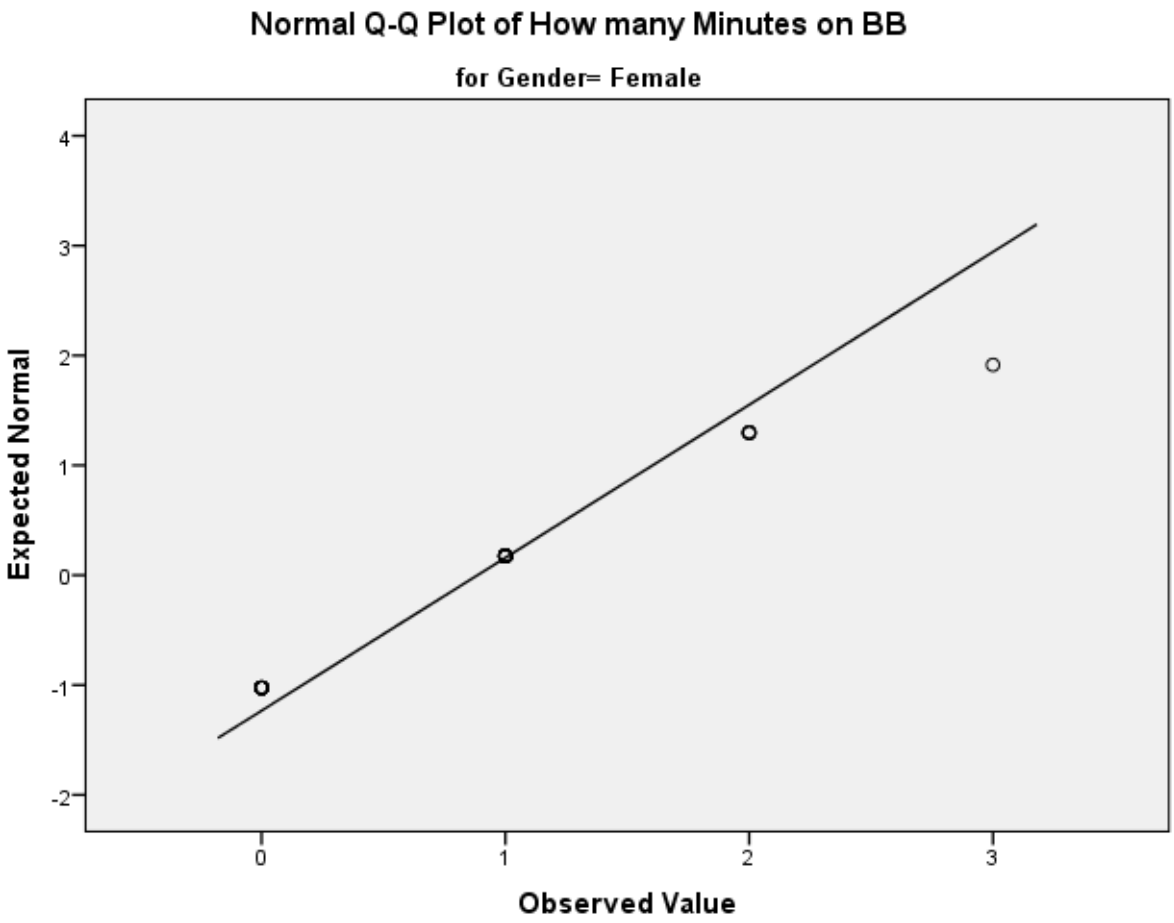
1.00 2 . 0

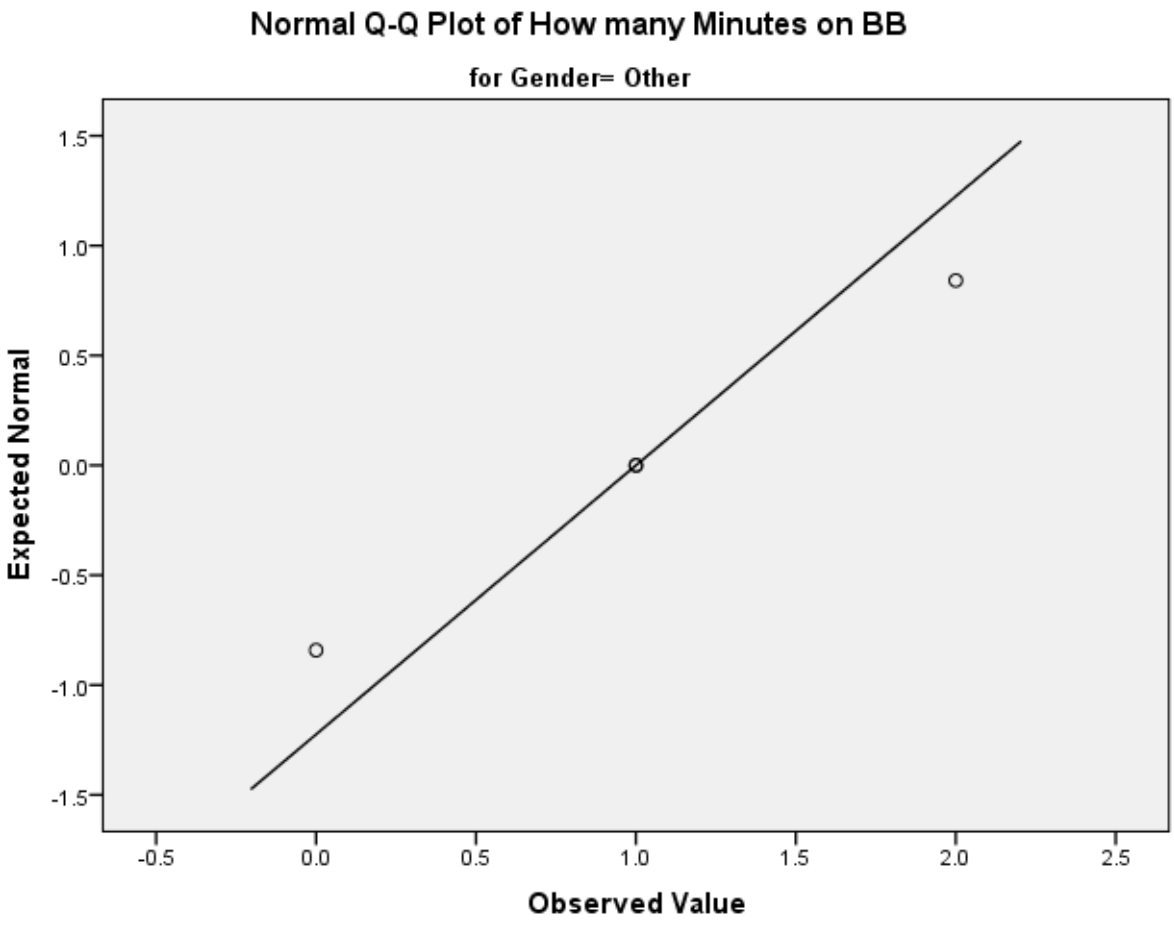
Stem width: 1.00

Each leaf: 1 case(s)

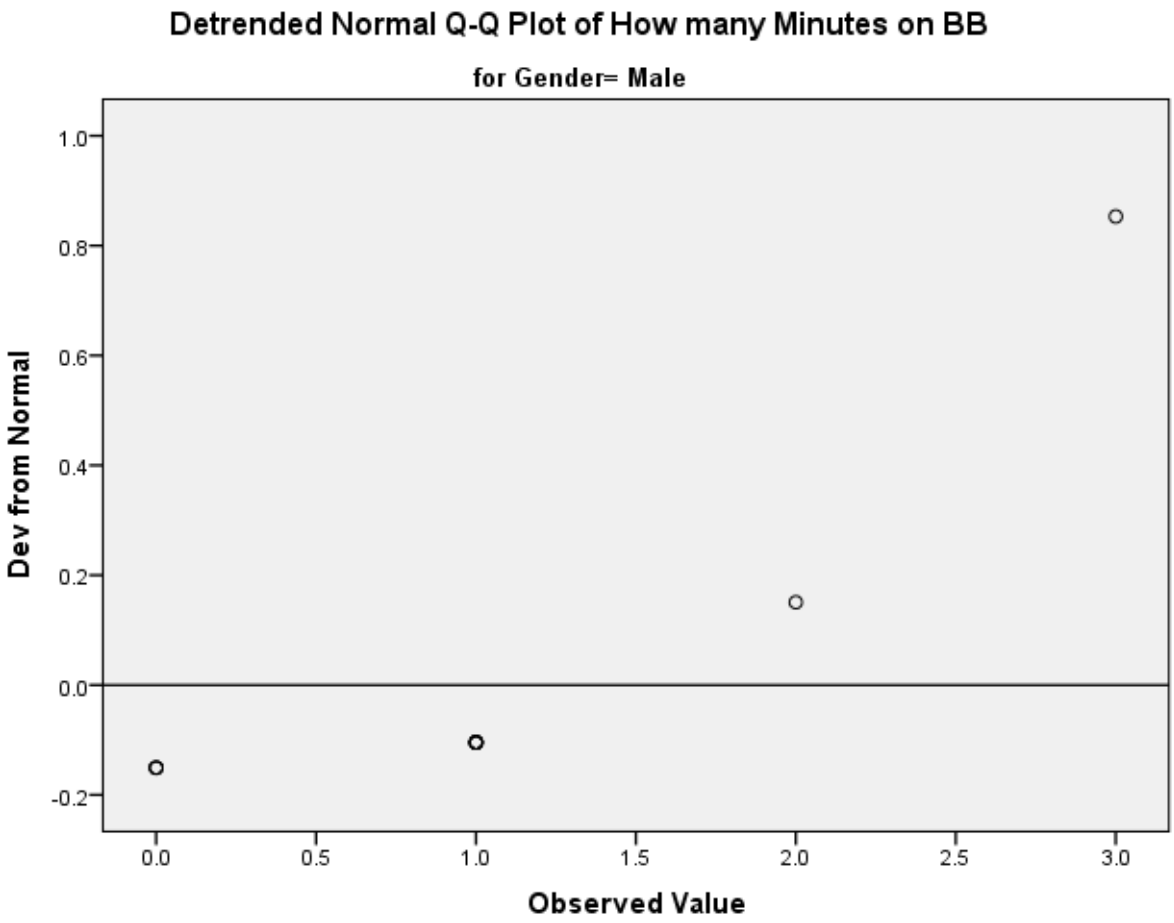
Normal Q-Q Plots

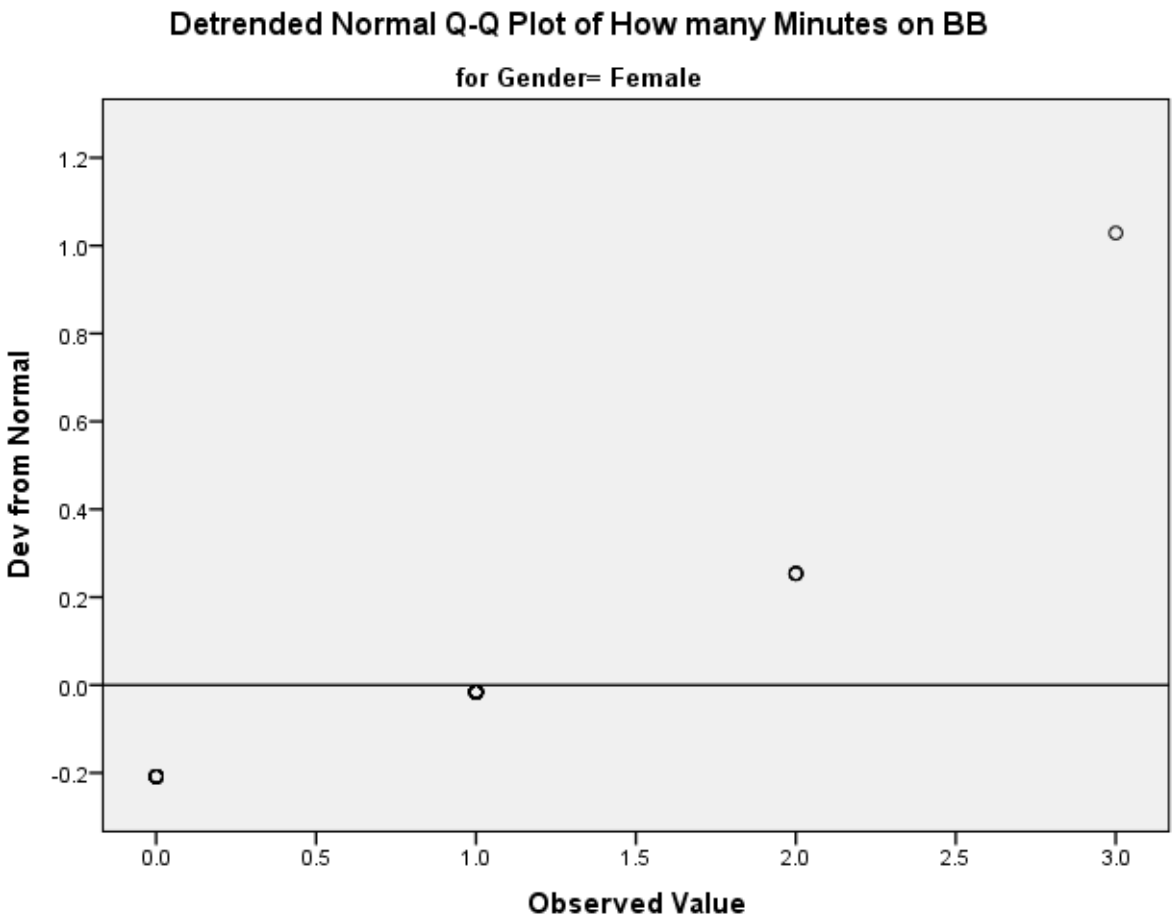

Normal Q-Q Plot of How many Minutes on BB
for Gender= Male
Expected Normal
3
2
1
0
-1
-2
0
1
2
3
Observed Value

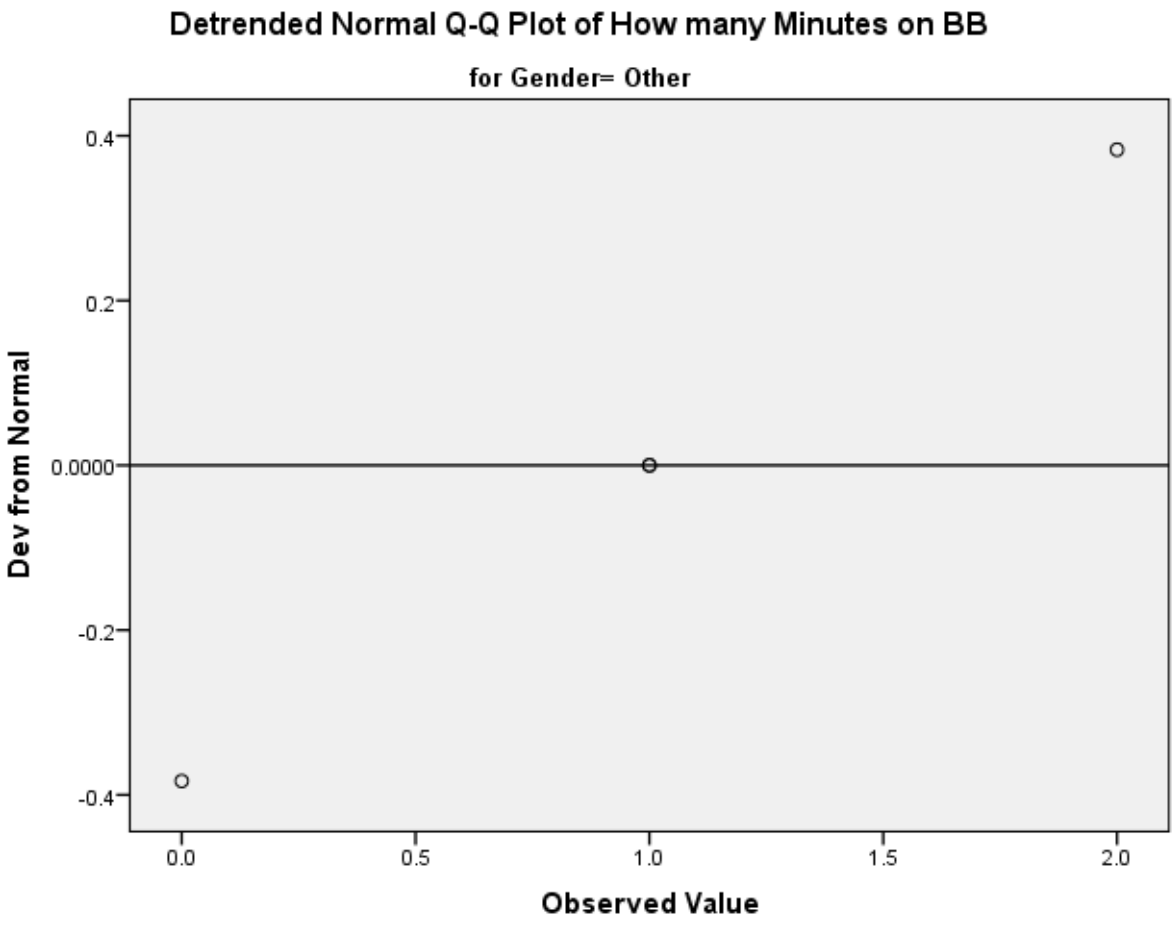

Normal Q-Q Plot of How many Minutes on BB
for Gender= Female
Expected Normal
4
3
2
1
0
-1
-2
0
1
2
3
Observed Value

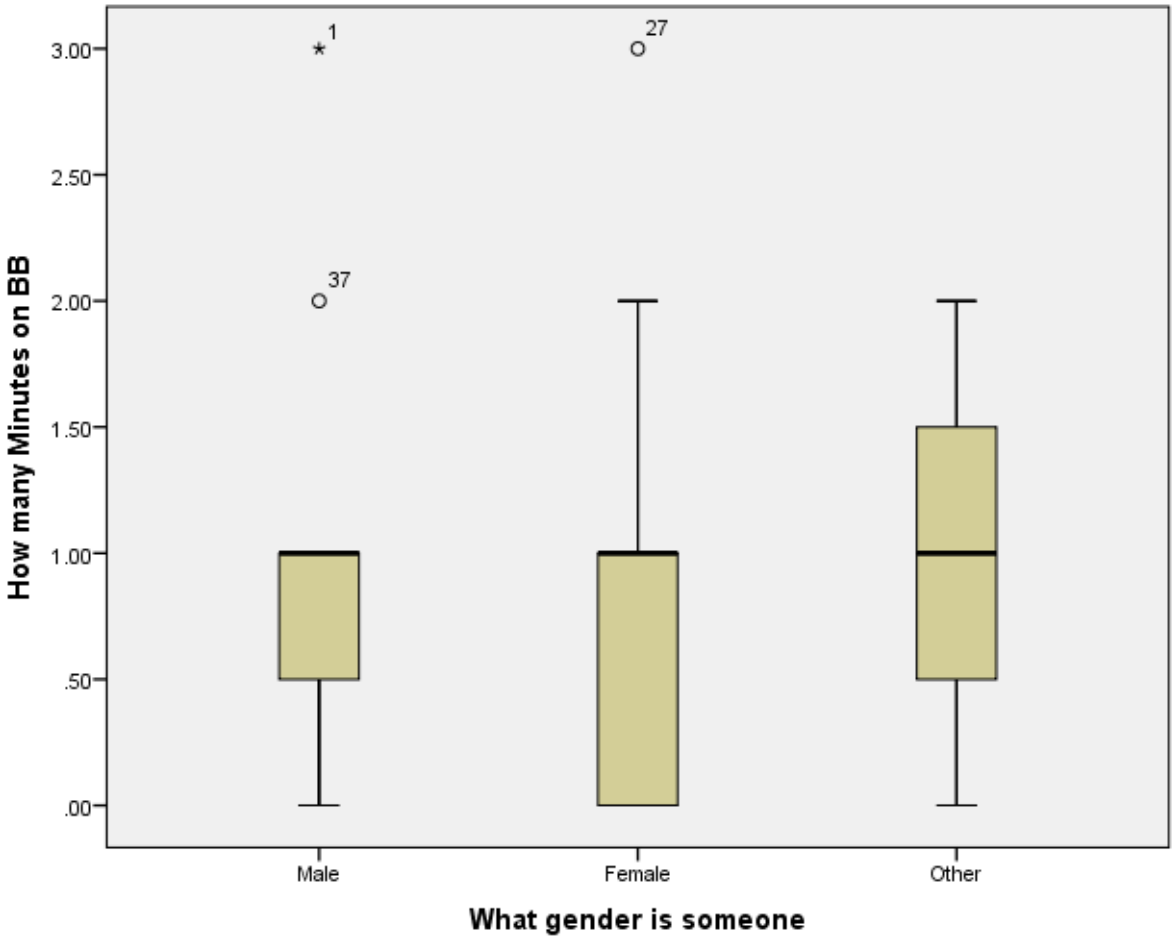


Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of How many Minutes on BB
for Gender= Male
Dev from Normal
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Observed Value


Detrended Normal Q-Q Plot of How many Minutes on BB
for Gender= Female
Dev from Normal
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Observed Value


Detrended Normal Q-Q Plot of How many Minutes on BB
for Gender= Other
Dev from Normal
0.4
0.2
0.0000
-0.2
-0.4
0.0
0.5
1.0
1.5
2.0
Observed Value



How many Posts on BB

Stem-and-Leaf Plots

How many Posts on BB Stem-and-Leaf Plot for

Gender= Male

Frequency Stem & Leaf

3.00 0 . 000

.00 0 .

6.00 1 . 000000

2.00 Extremes (>=2.0)

Stem width: 1.00

Each leaf: 1 case(s)

How many Posts on BB Stem-and-Leaf Plot for

Gender= Female

Frequency	Stem & Leaf
11.00	0 . 00000000000
.00	0 .
21.00	1 . 000000000000000000000
.00	1 .
3.00	2 . 000

Stem width: 1.00

Each leaf: 1 case(s)

How many Posts on BB Stem-and-Leaf Plot for

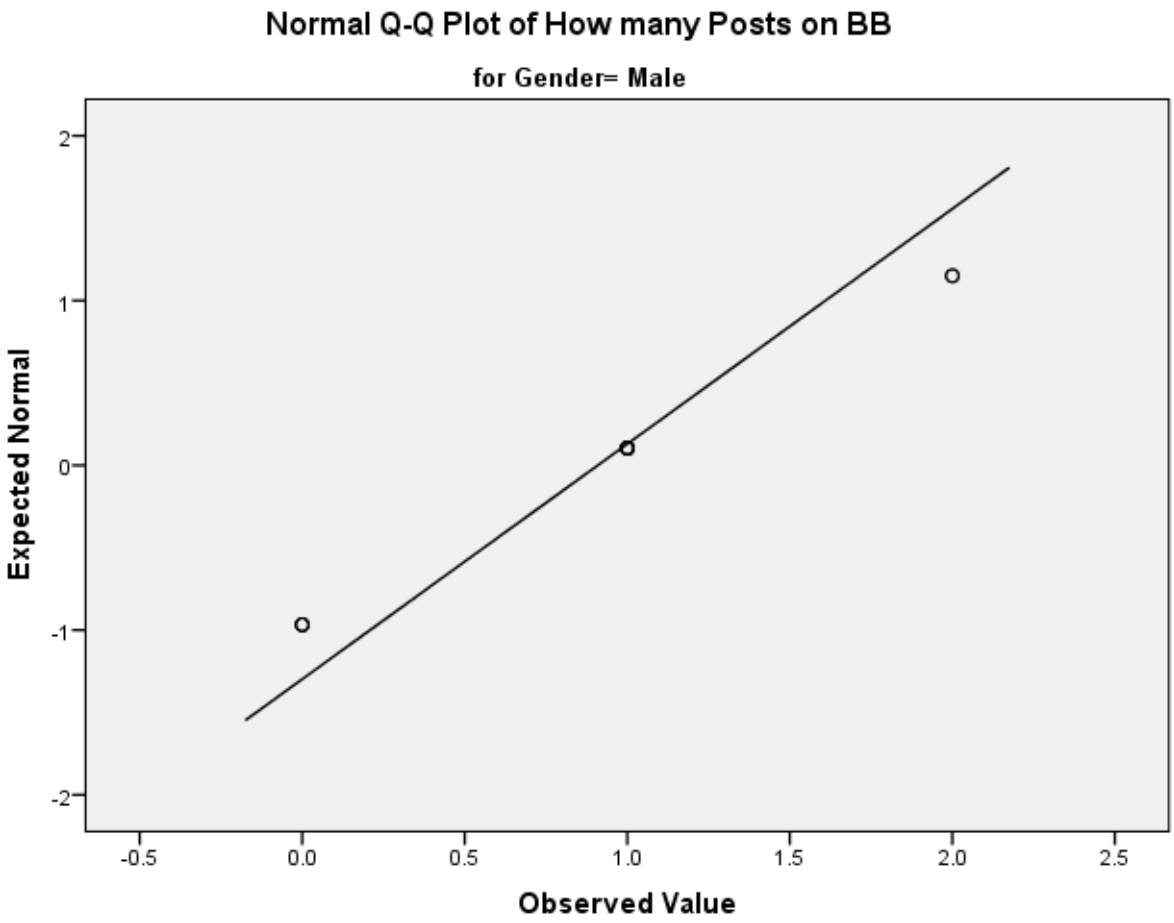
Gender= Other

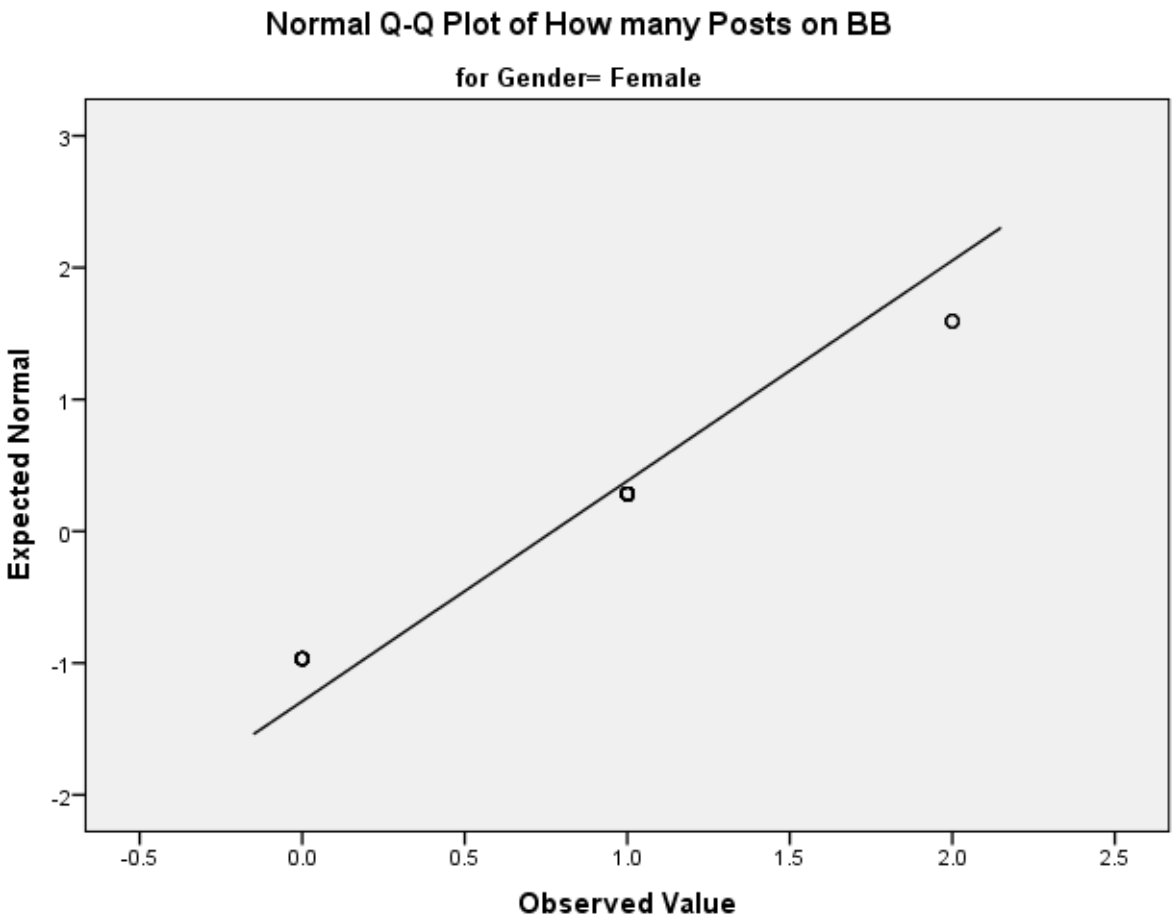
Frequency	Stem & Leaf
1.00	0 . 0
.00	0 .
3.00	1 . 000

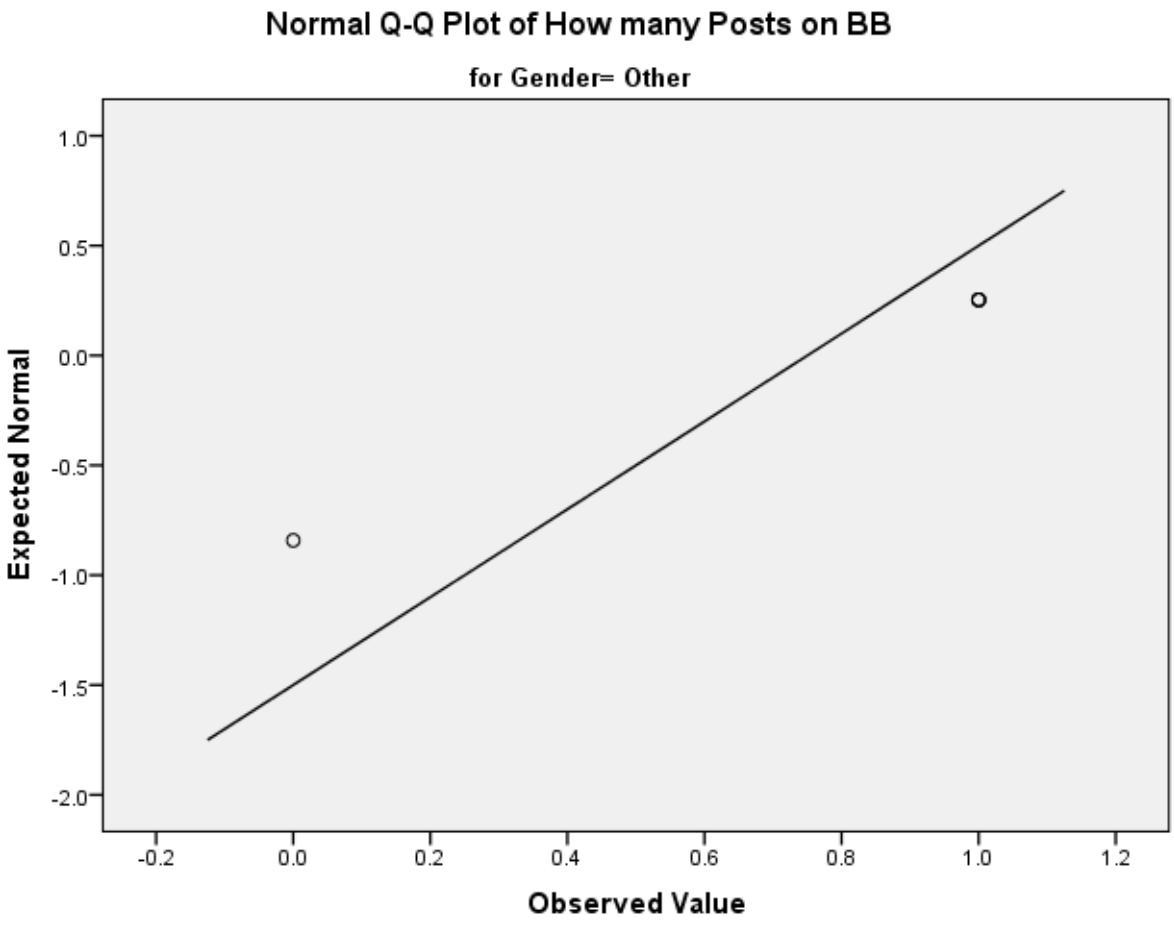
Stem width: 1.00

Each leaf: 1 case(s)

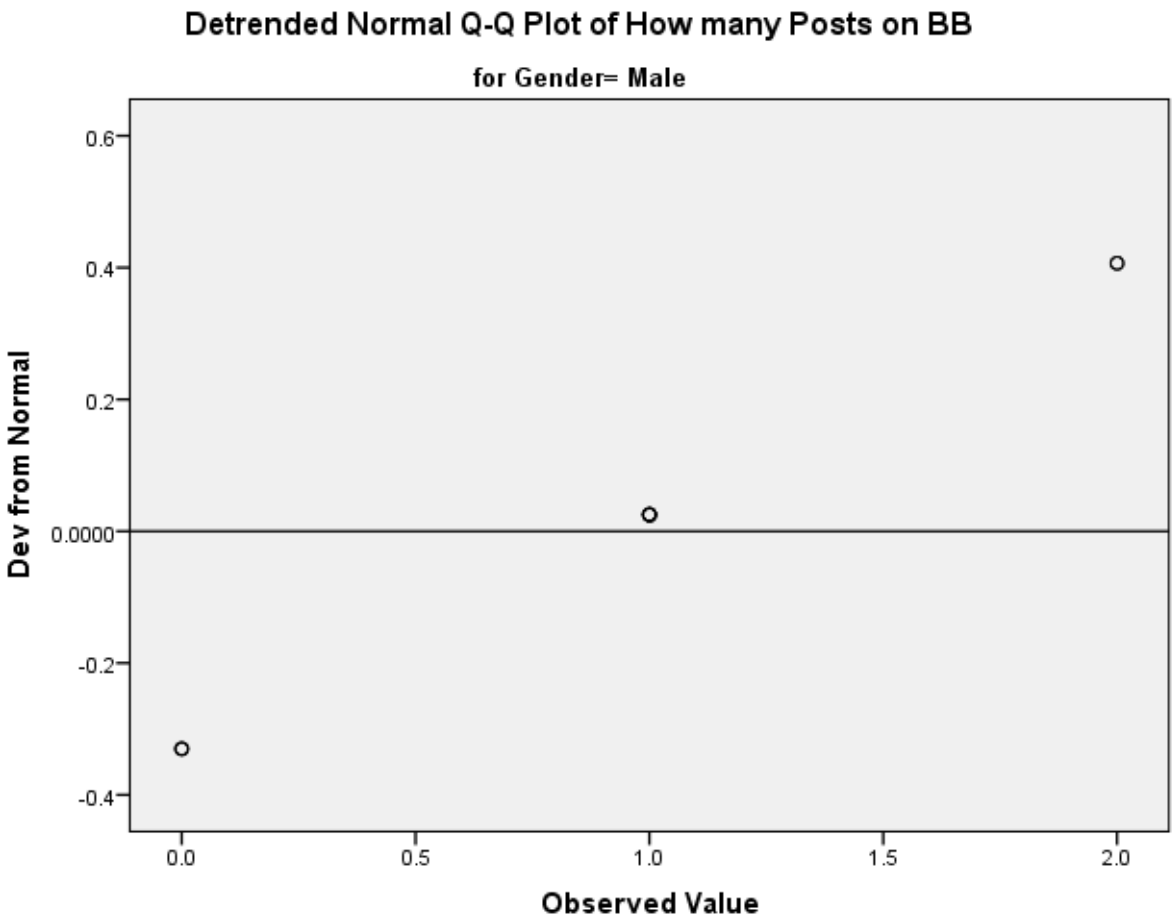
Normal Q-Q Plots

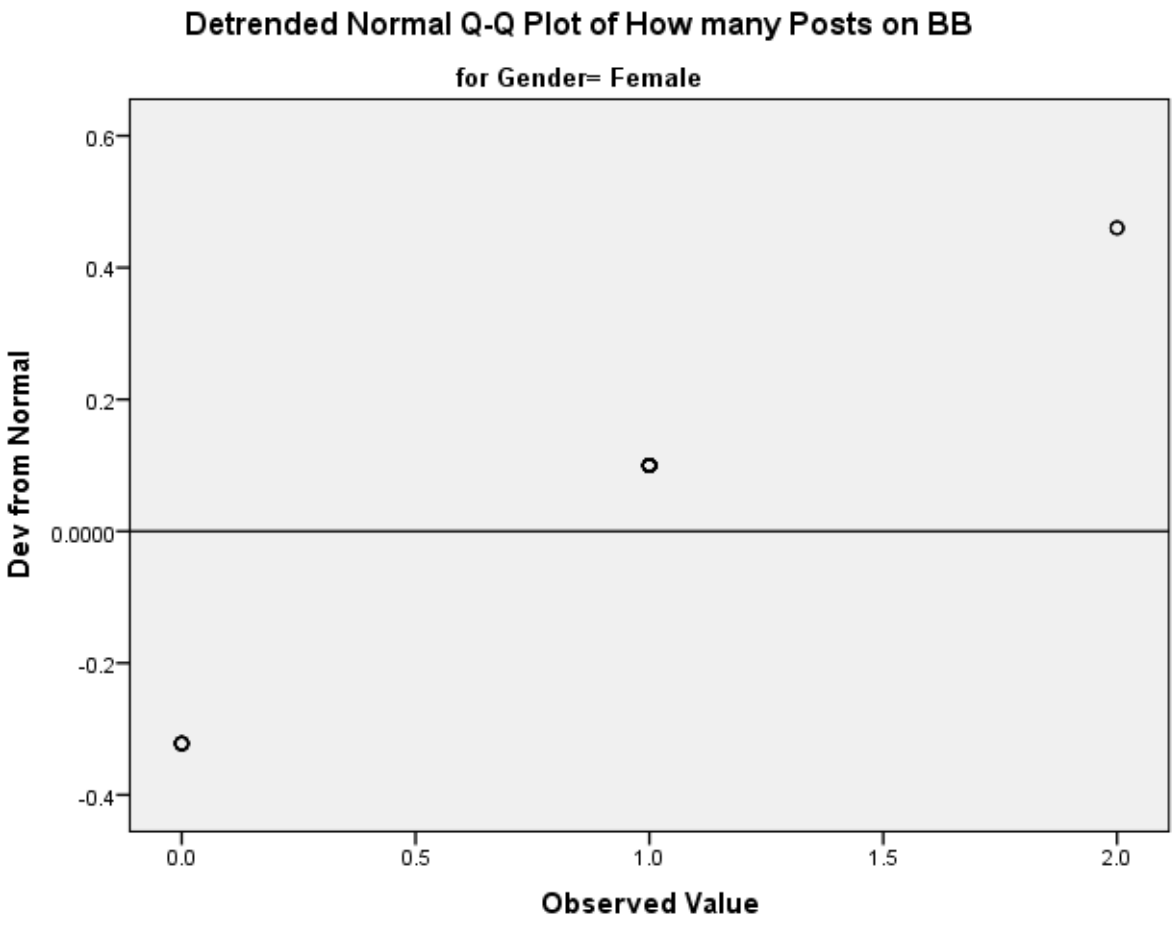

Normal Q-Q Plot of How many Posts on BB
for Gender= Male
Expected Normal
Observed Value
2
1
0
-1
-2
-0.5
0.0
0.5
1.0
1.5
2.0
2.5

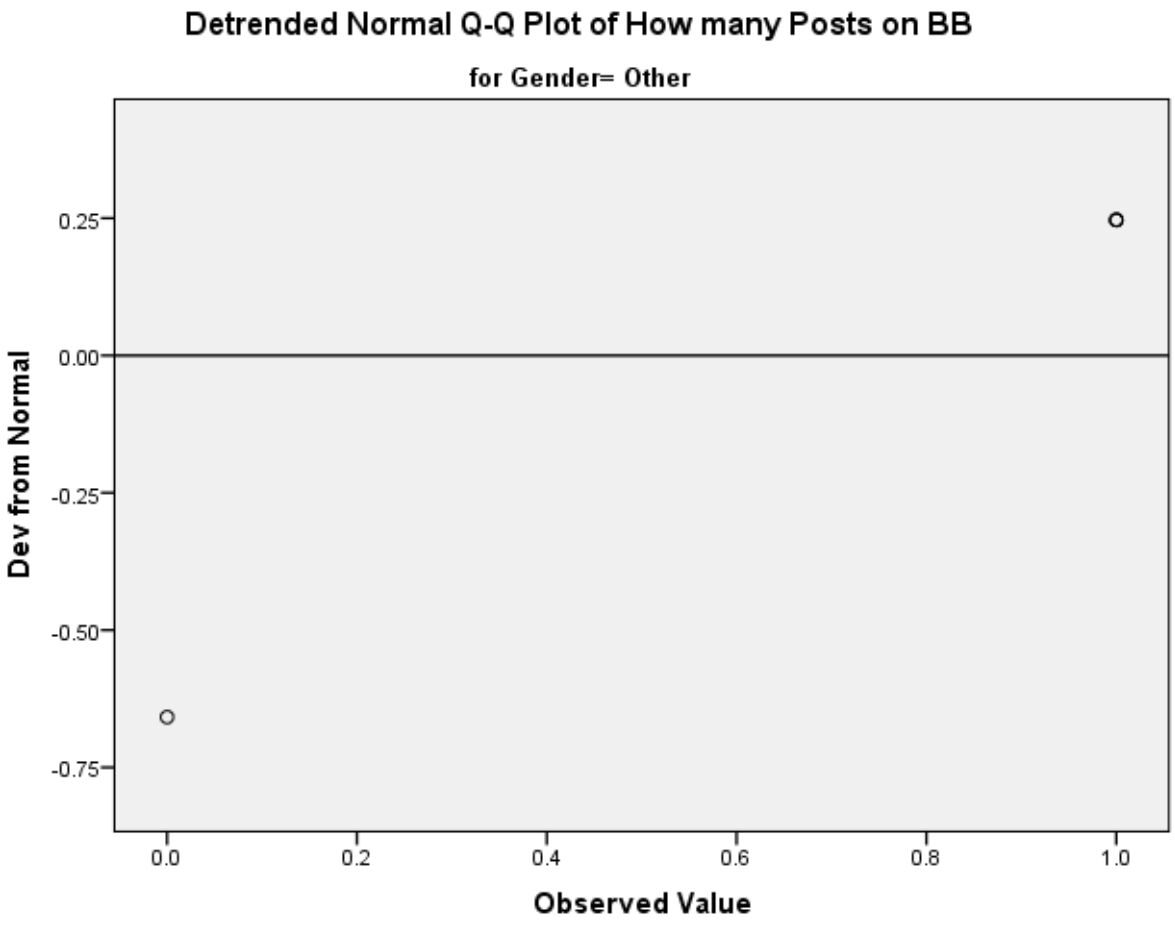

Normal Q-Q Plot of How many Posts on BB
for Gender= Female
Expected Normal
Observed Value
3
2
1
0
-1
-2
-0.5
0.0
0.5
1.0
1.5
2.0
2.5

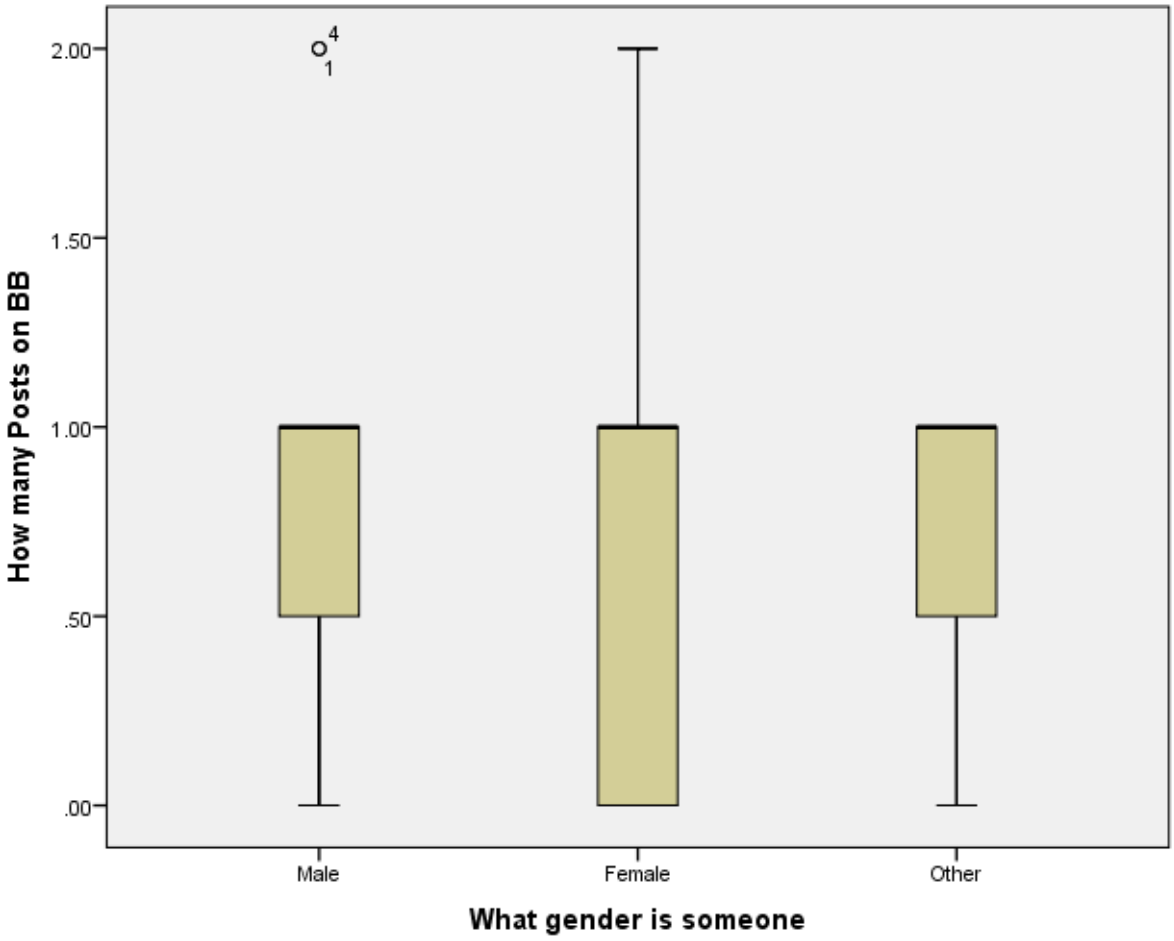


Detrended Normal Q-Q Plots


Detrended Normal Q-Q Plot of How many Posts on BB
for Gender= Male
Dev from Normal
0.6
0.4
0.2
0.0000
-0.2
-0.4
0.0
0.5
1.0
1.5
2.0
Observed Value


Detrended Normal Q-Q Plot of How many Posts on BB
for Gender= Female
Dev from Normal
0.6
0.4
0.2
0.0000
-0.2
-0.4
0.0
0.5
1.0
1.5
2.0
Observed Value


Detrended Normal Q-Q Plot of How many Posts on BB
for Gender= Other
Dev from Normal
0.25
0.00
-0.25
-0.50
-0.75
0.0
0.2
0.4
0.6
0.8
1.0
Observed Value



T-Test

Group Statistics

	Was there WhatsApp Intervention	N	Mean	Std. Deviation	Std. Error Mean
Are they satisfied	No	30	22.5000	5.30289	.96817
	Yes	20	20.7000	4.75837	1.06400

Independent Samples Test

	Levene's Test for Equality of Variances		t-test for Equality of Means		

		F	Sig.	t	df	Sig. (2-tailed)
Are they satisfied	Equal variances assumed	.851	.361	1.224	48	.227
	Equal variances not assumed			1.251	43.811	.217

Independent Samples Test

		t-test for Equality of Means			
		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Are they satisfied	Equal variances assumed	1.80000	1.47060	-1.15685	4.75685
	Equal variances not assumed	1.80000	1.43856	-1.09959	4.69959

T-TEST GROUPS=WhatsApp_Intervention(1 2)

/MISSING=ANALYSIS

/VARIABLES=Engagement.1 Engagement.2 Engagement.3 Engagement.4 Engagement.5 Blackboard

/CRITERIA=CI(.95).

T-Test

Group Statistics

	Was there WhatsApp Intervention	N	Mean	Std. Deviation	Std. Error Mean

Did they answer question correctly	No	30	1.6000	.49827	.09097
	Yes	20	1.9500	.22361	.05000
Did they answer question correctly	No	30	1.6000	.49827	.09097
	Yes	20	1.8000	.41039	.09177
Did they answer question correctly	No	30	1.6000	.49827	.09097
	Yes	20	1.6000	.50262	.11239
Did they answer question correctly	No	30	1.6333	.49013	.08949
	Yes	20	1.8000	.41039	.09177
Did they answer question correctly	No	30	1.5667	.50401	.09202
	Yes	20	1.9000	.30779	.06882
Did they log into blackboard	No	30	1.2333	.43018	.07854
	Yes	20	1.9500	.22361	.05000

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		
		F	Sig.	t	df	Sig. (2-tailed)
Did they answer question correctly	Equal variances assumed	80.735	.000	-2.942	48	.005
	Equal variances not assumed			-3.372	43.156	.002
Did they answer question correctly	Equal variances assumed	10.240	.002	-1.488	48	.143
	Equal variances not assumed			-1.548	45.747	.129

Did they answer question correctly	Equal variances assumed	.000	1.000	.000	48	1.000
	Equal variances not assumed			.000	40.627	1.000
Did they answer question correctly	Equal variances assumed	7.295	.010	-1.255	48	.216
	Equal variances not assumed			-1.300	45.412	.200
Did they answer question correctly	Equal variances assumed	43.455	.000	-2.642	48	.011
	Equal variances not assumed			-2.901	47.725	.006
Did they log into blackboard	Equal variances assumed	17.323	.000	-6.844	48	.000
	Equal variances not assumed			-7.697	45.790	.000

Independent Samples Test

		t-test for Equality of Means			
		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
				Lower	Upper
Did they answer question correctly	Equal variances assumed	-.35000	.11895	-.58917	-.11083
	Equal variances not assumed	-.35000	.10381	-.55932	-.14068
Did they answer question correctly	Equal variances assumed	-.20000	.13437	-.47017	.07017
	Equal variances not assumed	-.20000	.12922	-.46014	.06014

Did they answer question correctly	Equal variances assumed	.00000	.14434	-.29021	.29021
	Equal variances not assumed	.00000	.14459	-.29210	.29210
Did they answer question correctly	Equal variances assumed	-.16667	.13286	-.43379	.10046
	Equal variances not assumed	-.16667	.12817	-.42476	.09143
Did they answer question correctly	Equal variances assumed	-.33333	.12615	-.58698	-.07969
	Equal variances not assumed	-.33333	.11491	-.56441	-.10226
Did they log into blackboard	Equal variances assumed	-.71667	.10472	-.92722	-.50611
	Equal variances not assumed	-.71667	.09311	-.90410	-.52923

CORRELATIONS

/VARIABLES=WhatsApp_Intervention Engagement.1 Engagement.2 Engagement.3 Engagement.4 Engagement.5

Blackboard

/PRINT=TWOTAIL NOSIG

/STATISTICS DESCRIPTIVES

/MISSING=PAIRWISE.

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Was there WhatsApp Intervention	1.4000	.49487	50
Did they answer question correctly	1.7400	.44309	50
Did they answer question correctly	1.6800	.47121	50
Did they answer question correctly	1.6000	.49487	50
Did they answer question correctly	1.7000	.46291	50
Did they answer question correctly	1.7000	.46291	50
Did they log into blackboard	1.5200	.50467	50

Correlations

		Was there WhatsApp Intervention	Did they answer question correctly	Did they answer question correctly	Did they answer question correctly
Was there WhatsApp Intervention	Pearson Correlation	1	.391**	.210	.000
	Sig. (2-tailed)		.005	.143	1.000
	N	50	50	50	50
Did they answer question correctly	Pearson Correlation	.391**	1	.375**	.074
	Sig. (2-tailed)	.005		.007	.607
	N	50	50	50	50

Did they answer question correctly	Pearson Correlation	.210	.375**	1	.053
	Sig. (2-tailed)	.143	.007		.717
	N	50	50	50	50
Did they answer question correctly	Pearson Correlation	.000	.074	.053	1
	Sig. (2-tailed)	1.000	.607	.717	
	N	50	50	50	50
Did they answer question correctly	Pearson Correlation	.178	-.090	-.075	-.089
	Sig. (2-tailed)	.216	.536	.605	.538
	N	50	50	50	50
Did they answer question correctly	Pearson Correlation	.356*	.010	.206	-.089
	Sig. (2-tailed)	.011	.945	.152	.538
	N	50	50	50	50
Did they log into blackboard	Pearson Correlation	.703**	.252	.199	.033
	Sig. (2-tailed)	.000	.078	.166	.822
	N	50	50	50	50

Correlations

		Did they answer question correctly	Did they answer question correctly	Did they log into blackboard
Was there WhatsApp Intervention	Pearson Correlation	.178	.356*	.703**
	Sig. (2-tailed)	.216	.011	.000
	N	50	50	50
	Pearson Correlation	-.090	.010	.252

Did they answer question correctly	Sig. (2-tailed)	.536	.945	.078
	N	50	50	50
Did they answer question correctly	Pearson Correlation	-.075	.206	.199
	Sig. (2-tailed)	.605	.152	.166
	N	50	50	50
Did they answer question correctly	Pearson Correlation	-.089	-.089	.033
	Sig. (2-tailed)	.538	.538	.822
	N	50	50	50
Did they answer question correctly	Pearson Correlation	1	-.048	.245
	Sig. (2-tailed)		.743	.087
	N	50	50	50
Did they answer question correctly	Pearson Correlation	-.048	1	.332*
	Sig. (2-tailed)	.743		.019
	N	50	50	50
Did they log into blackboard	Pearson Correlation	.245	.332*	1
	Sig. (2-tailed)	.087	.019	
	N	50	50	50

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

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

NONPAR CORR

/VARIABLES=WhatsApp_Intervention Engagement.1 Engagement.2 Engagement.3 Engagement.4 Engagement.5

Blackboard

/PRINT=SPEARMAN TWOTAIL NOSIG

/MISSING=PAIRWISE.

Nonparametric Correlations

a. Based on availability of workspace memory

Correlations

			Was there WhatsApp Intervention	Did they answer question correctly	Did they answer question correctly
Spearman's rho	Was there WhatsApp Intervention	Correlation Coefficient	1.000	.391**	.210
		Sig. (2-tailed)	.	.005	.143
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	.391**	1.000	.375**
		Sig. (2-tailed)	.005	.	.007
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	.210	.375**	1.000
		Sig. (2-tailed)	.143	.007	.
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	.000	.074	.053
		Sig. (2-tailed)	1.000	.607	.717
		N	50	50	50

	Did they answer question correctly	Correlation Coefficient	.178	-.090	-.075
		Sig. (2-tailed)	.216	.536	.605
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	.356*	.010	.206
		Sig. (2-tailed)	.011	.945	.152
		N	50	50	50
	Did they log into blackboard	Correlation Coefficient	.703**	.252	.199
		Sig. (2-tailed)	.000	.078	.166
		N	50	50	50

Correlations

			Did they answer question correctly	Did they answer question correctly	Did they answer question correctly
Spearman's rho	Was there WhatsApp Intervention	Correlation Coefficient	.000	.178	.356*
		Sig. (2-tailed)	1.000	.216	.011
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	.074	-.090	.010
		Sig. (2-tailed)	.607	.536	.945
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	.053	-.075	.206
		Sig. (2-tailed)	.717	.605	.152

		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	1.000	-.089	-.089
		Sig. (2-tailed)	.	.538	.538
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	-.089	1.000	-.048
		Sig. (2-tailed)	.538	.	.743
		N	50	50	50
	Did they answer question correctly	Correlation Coefficient	-.089	-.048	1.000
		Sig. (2-tailed)	.538	.743	.
		N	50	50	50
	Did they log into blackboard	Correlation Coefficient	.033	.245	.332*
		Sig. (2-tailed)	.822	.087	.019
		N	50	50	50

Correlations

			Did they log into blackboard
Spearman's rho	Was there WhatsApp Intervention	Correlation Coefficient	.703**
		Sig. (2-tailed)	.000
		N	50
	Did they answer question correctly	Correlation Coefficient	.252
		Sig. (2-tailed)	.078
		N	50
		Correlation Coefficient	.199

	Did they answer question correctly	Sig. (2-tailed)	.166
		N	50
	Did they answer question correctly	Correlation Coefficient	.033
		Sig. (2-tailed)	.822
		N	50
	Did they answer question correctly	Correlation Coefficient	.245
		Sig. (2-tailed)	.087
		N	50
	Did they answer question correctly	Correlation Coefficient	.332*
		Sig. (2-tailed)	.019
		N	50
	Did they log into blackboard	Correlation Coefficient	1.000
		Sig. (2-tailed)	.
		N	50

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

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

```
CORRELATIONS
 /VARIABLES=WhatsApp_Intervention Satisfaction Blackboard
 /PRINT=TWOTAIL NOSIG
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Was there WhatsApp Intervention	Are they satisfied	Did they log into blackboard
Was there WhatsApp Intervention	Pearson Correlation	1	-.174	.703**
	Sig. (2-tailed)		.227	.000
	N	50	50	50
Are they satisfied	Pearson Correlation	-.174	1	-.073
	Sig. (2-tailed)	.227		.613
	N	50	50	50
Did they log into blackboard	Pearson Correlation	.703**	-.073	1
	Sig. (2-tailed)	.000	.613	
	N	50	50	50

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