Virtual Assistants: Trust and Adoption in Telecommunication Customer Support

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Declaration

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

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Abstract

Virtual Assistants have been used to deliver question and answer support or as website navigation aids but there is little research on their effectiveness in this or other online commercial roles. This study aimed to address that gap by investigating if trust and likely adoption of a telecommunication network switching experience are significantly higher when mediated by a virtual assistant. The experiment replicated a traditional online form and created an alternative version mediated by an interactive chat bot. It used mixed methods; a usability test followed by a within group online experiment completed by 103 participants. The online experiment failed to support the hypotheses. Some interesting findings on usability, deployment strategy and future research are uncovered and discussed.

Introduction

Customer service has become a critical success factor for modern telecommunications (telco) companies. Service breadth and product complexity can increase the volume of customer support requests that are not adequately serviced by telco websites and therefore result in the customer calling directly for support (Dixon, Freeman & Toman, 2010). At the same time revenue deflection to over-the-top content providers, price competition from within the industry and the steady migration away from voice services, a core revenue stream for all telcos, has led to intense pressure within the industry for each telco to protect its customer base by reducing the drivers for defection (Chappuis, Gaffey & Parvizi, 2011). Poor customer service is one such driver of defection amongst otherwise loyal customers, but customer service is also one of the most expensive functions for a telco to deliver (Gustafsson, Johnson & Roos, 2005). Encouraging customers to self-serve on the web often necessitates working through a complex set of telecommunication options which can often lead to information overload (Lurie, 2004). Given this background there is a requirement for telcos to find new and more effective customer support solutions.

Complex product sets and processes call for agents that have 'the ability to interact with a customer and, in a sense, understand what the customer wants to do and guide them to an answer to their question' (Beck, 2010, p. 32). It is becoming too expensive to deliver this service through live agents so an alternative approach must be found. This study aims to address that gap by investigating if a virtual assistant will be trusted, if it will outperform a traditional linear order form in a mock online network switching exercise and is it likely to be adopted by telecommunication customers. The following sections will introduce the concepts of Artificial Intelligence, chat bots and how they relate to the psychology of problem solving and trust to deliver enhanced online self-care capabilities in the burgeoning field of the virtual assistance (VA).

Artificial Intelligence and Chat Bots

Alan Turing is considered to be the first scientist to address the subject of Artificial Intelligence. He suggested a test, called The Imitation Game, during which a participant has a conversation with either another unidentified human or a computer.

If the participant can not tell the difference between the two, the computer has passed what is now described as the Turing Test (Turing, 1950; DeAngeli & Brahnam, 2008). It seems that humans are predisposed to interact in a natural manner with computers:

> 'Having originally set out in the 1960s to write a computer program that would spoof Turing's vision… Weizenbaum serendipitously discovered that people would not only show respect to computers but would in fact prefer interacting with machines over human beings. Despite interactions well below the standard set by Turing, Weizenbaum witnessed, over and over, people professing their feelings and struggles to his computer program (ELIZA), sometimes even seeking ELIZA's empathy' (Weizenbaum, 1966, cited by Kerr & Bornfreund, 2005, p. 649).

Reeves and Nass (1996) found that people are inclined to treat computers with the same social norms as they do other people. They coined the term the 'Media Equation' from their research into social responses to communication technologies which 'found that individuals' reactions to computers, television, and new media are fundamentally social and natural' (Reeves & Nass, 1996, p. 5). Given that finding and previous research showing that consumers prefer to find answers to their questions over the Internet (Dixon, Freeman & Toman, 2010) there is a significant opportunity to deliver customer service via virtual assistants. Virtual assistants originated from a mix of artificial intelligence technologies and expert systems. Artificial intelligence is 'the science and engineering of making intelligent machines, especially intelligent computer programs' McCarthy (2007, p. 1). A virtual assistant can be described as

> 'any program that can be considered by the user to be acting as an assistant or helper, rather than as a tool in the manner of a conventional direct-manipulation interface. An agent should display some… of the characteristics that we associate with human intelligence: learning, inference, adaptability, independence, creativity' (Lieberman, 1997, p. 1).

The Elbot chat bot (Artificial Solutions, 2011) points the way to the future of interactive agents. Agents in human form are difficult to make realistic and animated characters may engender more empathy (Kerr & Bornfreund, 2005). But an Elbot styled automated service agent with a narrow field of knowledge is not an exciting view of the future. The service bot of the future needs to do more than just facilitate a

question and answer session. The work being undertaken at IBM gives us a glimpse of the future model for a VA; IBM's Watson showed that there has been a breakthrough in natural language processing and problem solving with its ability to understand and answer open-ended questions (Ando, 2011). This is evidence of groundbreaking computing design that will set the path for future developments in this area. Yet, for Watson to compete effectively with humans it needed a room full of the most powerful multi-core servers and terabytes of stored data. If a single processor was used it would take a couple of hours to answer just one question (IBM, 2011).

There is an opportunity for telecommunications operators to develop virtual assistants to solve problems for customers; whether it be to guide the customer through filling a form or to find the latest smartphone and where it can be purchased. This is not a new concept, many telcos have deployed virtual assistants (Chatbots.org, 2012), but there is no academic research to support their effectiveness when deployed to deliver customer support.

The Psychology of Problem Solving, Information Seeking and Interaction

Cognitive psychology focuses on the relationships between perception, problem solving, memory and language and is linked to the development of artificial intelligence as a research discipline (Malim & Birch, 1998; Chi, Glaser & Rees, 1982). Cognitive research has shown that expert individuals tend to have a superior memory capacity, which is exactly what a domain specific virtual assistant can deliver to a telco:

> 'Cognitive psychologists appear to support the recommendation that a significant focus for understanding expertise is investigation of the characteristics and influence of organised, hierarchical knowledge structures that are acquired over years of learning and experience' (Chi, Glaser & Rees, 1982, p. 11).

It is common for a telecommunication customer to search their supplier's website for a solution to a problem they are experiencing (Dixon, Freeman & Toman, 2010). In typical search a pattern match is undertaken and the best matches are presented in a list to the customer. If this leads to information overload, which can exist at both a sensory and a cognitive level (Milord & Perry, 1977), the resulting behaviour is that

the customer either disregards or spends less time on individual pieces of information leading to 'confused and dysfunctional' behaviour (Jacoby, Speller & Kohn, 1974). Milgram (1970) defined the concept of overload in his essay on 'The Experience of Living in Cities' as

> 'a system's inability to process inputs from the environment because there are too many inputs for the system to cope with, or because successive inputs come so fast that input A cannot be processed when B is presented' (p. 42).

There is a significant potential for overload on telecommunication websites; the product sets are complex and the relative importance of the purchase is high as most actions result in the acceptance of a fixed term contract at a specific price. Virtual assistants can do a lot to prevent information overload; it has been shown that increasing the levels of interaction a user has with media reduces the associated 'cognitive load and improve[s] self-efficacy' (Zheng, McAlack, Wilmes, Kohler-Evans & Williamson, 2009, p. 790). Interactive multimedia also increases the level of control offered to the user which has been shown to promote self-efficacy and improve cognitive performance (Lurie, 2004).

The virtual assistant's goal is primarily to aid the user to solve problems. A problem can be split into three operational parts: starting state, goal state and operators (Parkin, 2000). The starting state is essentially the problem and the VA is an operator that can assist the customer in moving to the goal state, or resolving the problem. Parkin (2000) identifies the 'problem space' (p. 281) as encircling all of the possible answers or solutions to a problem and the way of getting there, it could also be described as a decision tree. This is a particularly useful concept in telecommunication customer support as the options, or solution branches, are bounded and so most problem interactions can be predetermined.

There are many strategies that can be employed to solve a problem; they are based on the fact that humans can only hold a limited number of solution steps at any given time. Strategies include (Parkin, 2000): hill climbing (pick the next move that gets you closer to the solution), means-end (breaking down the problem into smaller sub-problems and tackling each in turn) and analogical mapping. Virtual assistants support a hill climbing strategy; the purpose of the telecommunication VA is to find the least effort path for the consumer to move from problem state to goal state.

Wilson (2000) turned the focus away from how the user is interacting with the website toward focusing on what are that user's information needs and how those needs direct behaviour. A VA can support information seeking behaviour by tailoring the experience to the needs of the user; high need for cognition users can ask probing questions or be directed to other web links for forums whilst low need for cognition users can ask for a recommendation and be brought directly to the end of the information search process (Cacioppo & Petty, 1982)

The aim of the virtual assistant is to act as a repository of knowledge that is easily accessible for each user on the telco's support and sales website. Critical to the success of the VA is its ability to process and interpret queries received in natural language, to ask clarifying questions when necessary and to effectively engage and interact with the user. Natural language processing (NLP) is used to interpret text input and match it with a specific knowledge set in a database (Chowdhury, 2003). NLP does this by calculating statistical probability or by pattern matching, it is an enabling tool for the VA. The challenge for the telco VA is not just to process natural language, it is to engage with the customer in a way that delivers a natural language interaction. Graesser, Jeon and Dufty (2008) summarised that there have been significant developments in the area of NLP and artificial interaction agents. Graesser et al (2008) note that recent advances in 'discourse processing and computational linguistics' (p. 299) make practical humanoid animated agents possible.

The Importance of Avatar Design

The novelty and presence of an avatar on a website can encourage information seeking and present an opportunity for the telco to interact in a more personal manner with its customers (Holzwarth, Janiszewski & Neumann, 2006). Avatars can be defined as 'general graphic representations that are personified by means of computer technology' (Holzwarth et al, 2006, p. 20). In this study the avatar is, in essence, a depictive representation of a human assistant in a computer mediated chat environment. The role of the avatar is not just to act a focal point for the interaction, it also has to make itself appealing to the maximum number of users. Avatar design is therefore critical to the success of a virtual assistant. Holzwarth et al (2006) set about showing that the mere presence of an avatar would increase the effectiveness of a

website. Their premise was that just as a human sales agent can have a positive influence on attitudes and purchase intention an avatar can have the same effect.

Hozwarth, Janiszewski and Neumann (2006) showed that the attractiveness of the avatar is 'a prerequisite for motivating the recipient to adapt the communicator's [avatar's] position' (p. 21) which, in turn, is positively linked to trust and compliance. The interaction is moderated by the user's level of purchase involvement; attractive avatars were found to be more influential when the consumer had low involvement in the purchase and expert avatars were found to be more influential when the consumer had high involvement. A case could be made for the development of multiple avatars in telecommunications sales and support. One surprising result of this experiment is that Holzwarth et al (2006) found that it was the avatar itself that had the positive impact on persuasion and not the information that the avatar presented. This highlights how important avatar design could be to the implementation of a virtual assistant. A telecomms switching experience is a high involvement and low frequency activity and as such the design of an expert avatar may be more appropriate.

Personality and Engagement

Reeves and Nass (1996) purported that humans generally apply social norms when interacting with computers. They state that the interaction is directed by a genetically pre-programmed instinct and that the design of computer interfaces should bear this in mind.   Critical to the design of a virtual assistant are the norms of interaction: politeness, etiquette, personality and flattery (Reeves & Nass, 1996). The level of interactivity afforded by the virtual assistant further promotes the likelihood of interacting with the VA as a social entity. The virtual assistant can be designed around these rules to maximise the possibility of successful interactions with telco customers. Personality is also very important, if the same social and interpersonal rules are applied to human-computer interaction the most desirable characteristics should be designed into the interface, according to Reeves and Nass (1996) these are dominance (or assertiveness) and friendliness.

Serenko, Bontis and Detlor (2007) looked at user acceptance of animated interface agents in Microsoft Office. A key finding from this study was that perceived enjoyment of the animated agent made a significant difference to the perceived

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benefits, positive customer experience and adoption of the tool. 'It has been confirmed that computer playfulness is an application-independent and intrinsic-motivation antecedent for system adoption and use' (p. 122).

Appearance

Baylor (2009) found that the appearance of a VA can have an impact on consumer use and performance, concluding that 'anthropomorphic virtual agents can serve as powerful technological mediators to impact motivational outcomes such as self-efficacy and attitude change' (p. 3,559). Baylor (2009) promotes customisation of anthropomorphic agents to suit the expectation of the user. The telco should focus on replicating the capabilities of what is perceived to be an ideal support agent. It was also found that the use of separate agents for different subject areas helped the user recognise context.

Nowak and Rauh (2008) purported that the visual representation of a person has an influence over 'partner credibility' (p. 1,473) as well as user immersion in the interaction. Although focused on person to person computer mediated communication there is no reason why this finding can not be aligned with a support avatar interacting with a telco customer. As partner credibility was shown to influence trust it is therefore an interesting concept both supporting the use of an avatar based virtual assistant and to bear in mind when designing that avatar.

Nowak and Rauh (2008) suggest that the visual characteristics of the avatar have such a strong influence on the person interacting with it that it outweighs the influence of actual behaviour in the interaction and that the more anthropomorphic a character is the higher its perceived credibility. In a telco setting the utilitarian nature of the interaction is such that this theory will probably not hold. Reliance on visual characteristics for success should also be tempered by the Uncanny Valley phenomenon (Mori, 1970). The Uncanny Valley describes the process by which our perception of an inanimate representation of a human being improves with the quality of that representation but only to a point. At a certain point, approaching a lifelike appearance, the viewer reacts with an instinctive feeling of revulsion. The reaction is explained by Mori (1970) as a visual association with death; the closer the representation is to a human form the more difficult it is to make it appear lifelike. It would be prudent to set the design goal for the avatar to be anthropomorphic but not

humanlike. Using a cartoon representation would be a good example of this, one suggested by Mori (1970) is to use visual aids, like glasses, to enhance the overall design at the same time as deflecting realism. Although Mori (1970) did not substantiate his hypothesis it has been supported by a number of subsequent studies (Misselhorn, 2009).

Hussain and Griffiths (2008) studied the prevalence of gender swapping in massively multiplayer online role playing games and found that nearly 60% of players had used an avatar of a different gender, predominately female, as part of an in-game strategy. Players found that 'the online female persona has a number of positive social attributes' (Hussain & Griffiths, 2008, p. 47) one of which was that male players were more positively disposed toward female avatars. The design of the avatar has not been tested in this study although the learnings from previous research have been taken into account in the development of a cartoon-like female character.

Virtual Assistance

There is a growing movement away from pursuing the delivery of exceptional customer service; it is argued by Dixon, Freeman and Toman (2010) that it is much more efficient to ensure that basic requirements are met with the minimum of customer effort and in the shortest possible timeframe. Dixon et al (2010) indicate that customers prefer to use the Web to find answers to their questions but also claim that the Web is failing to deliver the required support as illustrated by the large number of customers (57%) that resort to telephone support after first checking the Web. It is possible that having to learn the navigational structure of large websites or find the right search string and work through a complex set of telecommunication options can result in customers experiencing information overload (Lurie, 2004).

A virtual assistant is available at all times, it does not get tired and it does not get frustrated (Graesser, Jeon & Dufty 2008). It also can cope with demand spikes avoiding frustrating wait times for a telephone agent to answer a call. Graesser, McNamara and VanLehn (2005) found that the benefit of interactivity with an automated agent (a teacher in this case) was clearly shown in the statistics generated by their study; 'in the dialogue condition [students] asked 39% more questions and recalled 40% more of the content' (p. 226). Virtual assistants are very good at handling routine questions but as the level of integration into existing customer

management systems increases they could also be used as a sales channel; support bots can efficiently data mine accounts during the interaction and deliver customer appropriate sales messages (Barbara, 2005). Other strengths include ease of use, speed, consistency, confirming interaction and flexible media (delivering solutions graphically, demonstratively, verbally or by co-browsing). It allows customers interact at their own pace, whilst guaranteeing the message and the compliance of the agent (Barbara, 2000).

Chen and Ho's (2009) research on expert systems found that the quality of the output of the expert system was normally dependent on the quality of the input which 'significantly limits the flexibility and practicability of an expert system in the real world applications' (p. 214). Chen and Ho (2009) proposed a self-adaptive system that can search for alternative solutions if the use case offered is not immediately matched to the predetermined criteria. For the telco this could mean diverting the user to a matched topic in a forum page rather than closing the interaction.

One of the rarely spoken about topics in VA design is the disinhibition effect that interacting with a chat bot can produce. DeAngeli and Brahnam (2008) found that 10% of avatar based computer mediated conversations involved the use of abusive language and 11% 'addressed hard-core sex' (p. 302). This contradicts Reeves and Naas (1996) and addresses a vital element of the psychology of interacting with a support bot; the possibility that the user is in a negative state of mind when attempting to resolve a problem increases the potential for disinhibition and could lead to an escalation of feelings of anger. Therefore the design of a virtual assistant will have to take this into account by monitoring for abusive content and possibly offering the customer a live agent call-back or transferring the VA interaction to a live agent chat session.

Future Developments

The virtual assistant of the future will have to foster an empathetic relationship with the customer, give appropriate answers and execute complex account functions such as 'check my balance'. In short, it needs to be fun to use and serve a beneficial purpose. The virtual assistant needs to be engaging, it needs to be able to understand broad variations in questions, actively ask for clarification when required and then retrieve the correct response or action from a database. It may be a tall order but the

prize is worth the challenge; cost savings and service quality benefits could be substantial (Schwartz, 2000).

Virtual Assistance: Impact on Trust and Adoption

> 'An animated character capable of small talk can lead to shared values and higher trust' (Bickmore & Cassell, 2001, as cited by Patrick, 2002, p. 6).

Rousseau, Sitkin, Burt, and Camerer (1998) define trust as 'a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behaviour of another' (p. 395). They identify that risk and interdependence are pre-requites of trust; risk relates to the possibility that there could be a negative outcome and interdependence is the level of one party's reliance on the other to achieve a certain outcome. Trust is a prerequisite to adoption and frequent use, it is also a prerequisite for most economic exchanges, especially in a commoditised telecom market. If the customer does not trust the VA to give them the correct answer then they will not attempt or repeat its use. Rousseau et al (1998) propose that trust is built over time, starting with initial conditional trust and, if unbroken, ending with relational trust. Both are mitigated by institutional trust.

Beldad, deJong and Steehouder (2010) point out key differences between offline and online trust. Offline trust is directed at the individual and/or the organisation whereas online trust is focused on the technology and how it is deployed as well as the organisation itself. Trust is also subjective; individual attitudes, beliefs, experience and culture all mediate propensity to trust (Beldad et al, 2010). When focusing on customer interactions with a telco website the level of trust attributed to the organisation or the site with be ascertained with all of these elements in mind. Mediating that will be the institutional reputation of the organisation (Mayer, Davis & Schoorman, 1995) and the functionality of the site itself.

Keeling, McGoldrick and Beatty (2010) highlight the importance of customer-salesperson interaction in the development of trust and in supporting positive purchase intention. Offline sales interactions generate trust through of fact-to-face communication, high levels of interaction, personalisation and likeability. These elements are absent in standard Web interactions. Computer mediated communication delivered by an avatar can mimic the role of a real life sales assistant

by encouraging natural language interactivity which was shown by Keeling et al (2010) to have a positive effect on both trust and behavioural intent. They showed that that there are three key elements to the successful implementation of an avatar in an online sales experience: appearance, website positioning and interaction style. A shortcoming of Keeling et al (2010) is that they developed a simplistic online purchase experience that merely showed the participant images of what an avatar supported interaction might look like and did not put the participant through an actual sales experience.

Walsh and Mitchell (2010) showed that there is a connection between conscious and unconscious confusion and trust. If the customer is confused there is an increased likelihood of them postponing or making an irrational purchasing decision. Trust will also be negatively impacted if there is a significant volume or level of ambiguity in the information being presented to the customer. Walsh and Mitchell (2010) were primarily concerned with looking at inter-product choices and individual susceptibility to confusion. However the relationships that are drawn between overload, confusion and trust are very relevant to this study as a primary driver for a VA is to reduce the cognitive load on the user.

Bart, Shankar, Sultan and Urban's (2005) empirical study supports the assertion that perceived ease of use and the capability to direct the user to their desired goal quickly leads to the formation of trust. In turn this trust positively influences behavioural intent: 'online trust partially mediates the relationships between Web site and consumer characteristics and behavioural intent' (Bart et al, 2005, p. 113). Website design is one of the key influencers of trust which is increasingly important now that e commerce is such an important channel for both companies and consumers. Bart et al (2005) argue that the existence of a virtual assistant may increase user trust in that website as it both supports decision-making and enhances credibility. They also found that

> 'advice is an influential driver of online trust for automobile, computer, and travel-related products and e-tailers. We expected advice to be a powerful driver of trust for information-intensive websites whose product categories require a high degree of consumer search' (p. 142).

Telco websites typically have a strong bias toward informational/technical search usage. As discussed, reducing the cognitive load for a customer has a positive impact on behavioural intent. Bart et al (2005) used an effective and validated scale for the measurement of trust and behavioural intent, those measures have been replicated in this study.

Efficacy in Virtual Assistance Interactions

The importance of testing the assisted experience is illustrated by Cocosila, Archer and Yuan (2009) who showed that if a new technology is studied in its early phase of development it can predict and improve the chances of later success. Davis, Bagozzi and Warshaw (1989) were early proponents of the study of technology adoption highlighting that the introduction of computer systems can not improve efficiency if they are not used.

Compeau, Higgins and Huff (1999) found that positive performance outcomes supported additional use. Usability engineering uses a systematic approach to make human-computer interaction the focal point during all stages of development (Mayhew, 1999). There are gaps and weaknesses when usability engineering is applied to the development of a virtual assistant; a lack of emotional consideration at the requirements analysis and usability testing stages, risk analysis from an engineering and business perspective is not included, market analysis, feasibility studies and cost-benefit analysis are also not mentioned in the requirements phase. Employing a human centred design approach will ensure that development activity focuses on application effectiveness, efficiency and satisfaction (Stone, Jarrett, Woodroffe, & Minocha, 2005). All of the afore mentioned are essential components of an effective self-service application.

To be useable a software interface normally requires the user to learn the language of the program or interface (Mayhew, 1999). A VA may not have the same requirement as it uses natural language permitting the user to type or speak questions in a conversational manner. An effective VA should engage the user in a conversation so the focus on usability shifts to the chat interface design and the supporting NLP system. Usability therefore is therefore measured by the VA's ability to answer the user questions in a meaningful and purposeful manner. There is a significant gap in research into this area and it would be incorrect to assume that there are no usability

issues with a chat interface as it is fundamentally different to face-to-face communication. The aim of this study is to measure if the experience of completing an online form is in fact easier when mediated by a virtual assistant, can it improve usability by managing the flow of information given to the user and responding in a natural way to resulting questions.

Virtual assistant design principles should be driven by the need to deliver: an engaging experience, flow (or user immersion), support high interrupt-ability, require no training, be task orientated and offer escape options. Mayhew (1999) also suggests that the interface should achieve an average satisfaction rating of four when measured on a five level Likert scale. This study compares a measure of self-reported efficacy related to the experience of completing a traditional online form and a similar process supported by a virtual assistant.

Research Question

This study was implemented in two parts: a usability test, Study 1, and an online experiment, Study 2. The aim of Study 1 was to test the usability of the interface by tracking eye movement during the experience and capturing qualitative data in a post experience interview (Compeau, Higgins & Huff, 1999; Mayhew, 1999). Study 2 investigated if measures of trust and likely adoption of a telecommunication network switching experience will be significantly higher when the experience is mediated by a virtual assistant (Keeling, McGoldrick & Beatty, 2009; Bart, Shankar, Sultan & Urban, 2005). Therefore the primary hypothesis states that:

H1 - respondents will have higher trust for a switching experience that uses a virtual assistant to guide them through a complex online request when compared with a traditional linear online form.

It is also predicted that:

H2 - behavioural intent will be higher for a switching experience that uses a virtual assistant when compared with a traditional linear online form.

Virtual Assistant Design and Approach

The impact a virtual assistant has on trust and adoption of a Web transaction was tested by experiment. Telecommunication consumers have the ability to move their mobile accounts to alternative networks by completing online forms. In this context a traditional online network switching process was replicated in two ways; a direct copy and a version, with the same functionality, mediated by a virtual assistant. This online transaction was chosen for three reasons; firstly, in its traditional form it is a lengthy and complex process with a high user abandonment rate. Secondly, it limited the lexicon required for the conversational agent (the VA), which made the build process more feasible. Lastly, it is a commercial process making it easier to find financial support for the research. The purpose of the VA was to improve self-efficacy by increasing the level of interactivity and by splitting up complex tasks into smaller, more manageable, actions (Zheng, McAlack, Wilmes, Kohler-Evans & Williamson, 2009; Parkin, 2000).

A chat bot character, 'Ask Vivian', was created and three user centric routes were developed to aid participant progress through the switching scenario, each was designed to support a different problem solving style (Parkin, 2000): 'budget', 'usage' and 'help'. At the outset of the assisted switching experience the participant was asked how they would like to be helped to select the correct telecommunications package. Participants with a low need for cognition could choose the 'budget' route which began with setting an end goal then progressed by asking an allocation question before automatically choosing the most suitable package. At the other end of the spectrum, high need for cognition participants could choose 'usage' or 'help' and be stepped through each element of the telecommunication package to produce an outcome. The outcome for both was a selection of telecommunication package add-ons which are services additional to the basic package that was preselected for the participants.

A female, cartoon style avatar was designed and deployed as this was presumed to have the maximum appeal (Baylor, 2009; Hussain & Griffiths, 2008). The bias that the avatar design could have on the participants' perceptions of the experience needed to be kept to a minimum as this study tested the influence only of its presence and the interactivity produced by a natural language interface. The design of the VA interface

consisted of a speech bubble in a primary position on the top of the screen, an input bar under that and a supplementary window at the bottom of the screen.

The study was divided into three phases. The replication of an existing online experience and the creation of an assisted alternative. Then Study 1 tested the usability of the experiment in laboratory conditions using eye tracking and a semi-structured post completion interview. As this is a relatively new method of computer mediated interaction the usability test was required to evaluate ease-of-use and expose any significant design flaws. Finally Study 2, an online experiment, quantitatively tested the hypotheses. Study 1 will be described in detail in the next section.

Study 1: Usability

Study 1 was undertaken to test the usability of the experiment and to generate some qualitative data to supplement the quantitative data extracted from the online experiment (Study 2).

Method

Study 1 was a laboratory experiment designed to monitor a small number of participants completing the experiment under observation by the researcher. On completion of the study the participants were interviewed by the researcher to gain further insight into their views and opinions.

Participants

A demographic and Internet experience cross section of 6 consumers was recruited using quota sampling. Each was asked to participate in the usability evaluation and given a reward incentive of €50 for their time, which was approximately 1 hour. Corporate sponsorship was received to support the payment and an external company was used to recruit and schedule the participants. Nielsen and Landauer (1993) found that the law of diminishing returns becomes valid after approximately five or six usability test iterations. They proposed that the maximum cost-benefit ratio was achieved by the first four tests with additional benefits becoming negligible after approximately 12 tests. Therefore the sample population target for the usability test was set at six. Table 1 gives a breakdown of the participants that took part in the usability test.

Table 1

Usability Participants

Gender	Age group	Internet Experience
Female	18-29	Novice
Female	30-39	Expert
Female	40-49	Expert
Male	40-49	Expert
Male	40-49	Novice
Male	50-59	Novice

Materials

The HTML from an existing switching experience was captured and reproduced on a Web accessible server. In order to create a context for the experiment and to simplify the process a basic mobile communication package was selected and the experiment centred around supporting the selection of additional package elements, described as 'add-ons'. The online switching experience encompassed the selection of add-ons and the subsequent gathering of personal information (name, address, credit card). The personal information pages were included to make the experience as realistic as possible. Participants were informed that the data inputted would not be captured and were instructed that they could enter fictitious information. The credit card page was pre-filled with dummy data to prevent concerns about privacy.

A second version of the same sales flow, mediated by a virtual assistant, was created. The design of the VA interface was dictated by common practice in commercial VA solutions that use an avatar, an input area and an output speech bubble. The bottom of the page was used for form information and supplementary information. As the experiment operated in a controlled environment it was possible to fully integrate the VA into the webpage architecture. Figures 1 and 2 show a sample screen of each of the two completed designs.

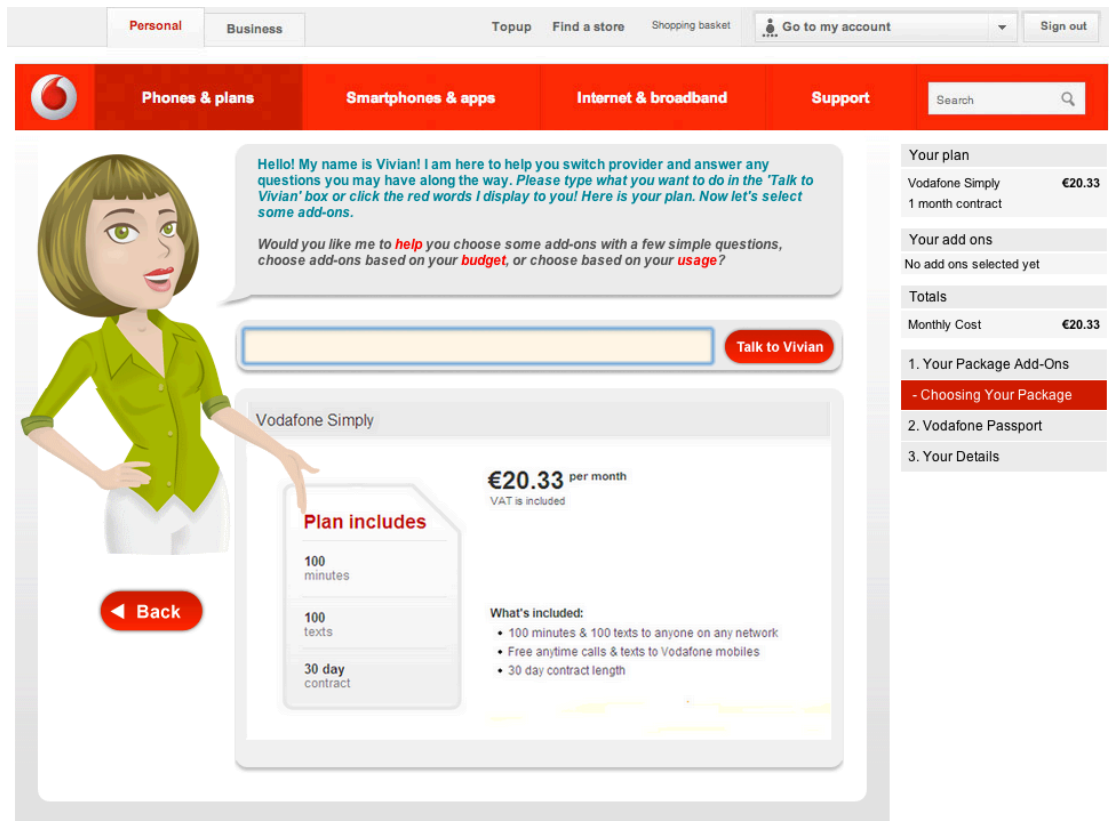*Figure 1*. Traditional process screen.

Figure 2. Virtual Assistant process screen.

The experiment comprised of a consent form, two demographic questions (gender and age group), a preamble which set the scenario for the participant before launching the first switching experience. The consent form, demographic questions and preamble can be viewed in Appendix A.

The order the switching experiences were presented was randomised using a browser session identifier and a time stamp. This was to negate any bias from the learning effect that the first experience would have over the second. Usage rates for online switching are very low so it was presumed that most participants would not have had previous experience. Following the first experience the participant was asked to complete a short self-reported questionnaire that used a validated scale of trust and adoption from Bart, Shankar, Sultan and Urban (2006). The questionnaire measured trust, behavioural intent (likely adoption) and efficacy. To encourage completion when each question was answered the line was coloured green, as can be seen in Appendix B. The preamble was repeated before the second experience and questionnaire was launched, and a final preference question was asked upon completion. Both questionnaires and the preference question had an open comments

invitation. After the preference question the participant was presented with debriefing information. The linking preamble, preference question and debrief are detailed in Appendix B, the questionnaire used for both the traditional and the VA experiences is illustrated below in Figure 3, the only difference between the two was a reference to the experience in the 'other comments' section (VA version shown).

Figure 3. Questionnaire used after both experiences and in both Study 1 and 2.

The online experience was optimised to work with screen resolutions from 1024x768 pixels. This is the screen resolution of the most popular tablet device (the iPad) and the most common resolution for standard PC monitors (Anderson, 2012). The laboratory equipment used was; a dual screen PC equipped with a Tobii X80 Eye Tracker system and an IE8 browser with a monitor set at a screen resolution of 1024x768. The switching experience was hosted on a remote web server. The Tobii X80 was unobtrusively located at the bottom of the participant's screen. The participant used the primary monitor, the secondary monitor was offset so that it would not distract the participant and used by the researcher to monitor the progress of the participant and the performance of the eye tracking software. The Tobii system facilitated both the tracking of the iris position and recording the screen activity.

Procedure

The usability evaluation study used a mixed methods, within groups, design as the goal was to compare a traditional online switching experience with one mediated by a virtual assistant and measure and compare respondent's preference, levels of trust, efficacy and likely adoption of each. The independent variable was the method used to mediate the online switching experience and the dependent variable was the resulting self reported measures of trust, efficacy and likely adoption.

Participants were welcomed then brought into a lab with the researcher and introduced verbally to the study as a test of two different ways to port/switch an account to a mobile company using an online form. The researcher sat beside the participant monitoring activity on a second offset screen. The eye tracking software was calibrated before each user started the experiment, as well as iris position it also recorded screen activity. The researcher did not interfere with the process unless the participant became stuck and visibly uncomfortable.

Retrospective Think Aloud (RTA) was used to stimulate accurate recall of the process:

> 'the method provides a valid account of what people attended to in completing tasks, it has a low risk of introducing fabrications, and its validity is unaffected by task complexity. More detailed analysis of RTA shows that it also provides additional information about user's inferences and strategies in completing tasks' (Guan, Lee, Cuddihy, Ramey, 2006, p. 1253).

Once the experiment was over the virtual assisted experience screen capture along with eye tracking position graphic was replayed to the participant at which time each participant was prompted to "tell [the researcher] what you were thinking at this point". RTA was used to prompt the participant's memory and help gather more detailed qualitative feedback. The notes taken by the researcher are available in Appendix C. In most cases it was not necessary to review the whole experience, there are multiple and repetitive form screens toward the end of the experience which would not have yielded valuable feedback. Once the RTA was complete the researcher asked if the participant had any further comments to make or any questions about the process. Upon probing answers and responding to any remaining questions the researcher thanked the participant and escorted them to the exit of the premises.

The order in which the experiences could not be reliably randomised with a population size of six so when the quota of one experience was reached the order was manipulated manually to ensure an equal distribution.

Ethics

This study received ethical approval on the grounds that it restricted the minimum age of the participant to 18, it received informed consent before participation and maintained the anonymity of the participant and their responses. Each participant was informed that they had the right to withdraw at any time and not answer individual questions. Questions were restricted to the experience only and each participant was debriefed at the end of the process.

Results

Four out of six of the participants preferred the traditional experience. Each participant took approximately 45 minutes to complete the experience and post-experience interview. Order bias was strong; there was a certain amount of confusion when each of the participants started the experience, especially when the VA was presented first. The learning effect was observed to have a positive impact on the second experience. Three out of the four participants who preferred the traditional experience received the VA first.

The presumption that a natural language interface would not require training for the user was found to be incorrect. Participant One got to the first virtual assistant screen and could not progress any further. After waiting to see if she could work it out for herself the researcher intervened with additional instructions on how to proceed. The majority of respondents stopped on the first VA page, they did not know how to proceed and took some time to figure it out, in all two participants required intervention before proceeding. However Participant Three, an experienced user who had used click to chat interfaces before, did not need support and was very positive about the VA interaction.

Participants Four and Six chose a decision route that took them to the end of the package selection process very quickly. In both cases this increased their levels of uncertainty about the validity of their choice. As a result Participant Four restarted

the process and Participant Six, whose observed computer self-efficacy was low, felt that this impacted negatively on his level of trust.

Two participants were seen to move closer to the screen during the process, so much so that for one of the participants the eye tracking mechanism ceased to function. During the RTA interview it surfaced that the font size used in the VA experience was too small for these participants.

The nature of a conversational agent is that the flow in a process such as this is open to interruption. A user can stop and ask a tangential question then return to the flow at a point of his choosing. Whilst this is a natural process in a face-to-face conversation, when that takes place during an assisted flow it can have a negative impact on the participants orientation. It was observed that some participants wanted to return to a previous page to confirm a selection, the back button on the browser did not support this as each part of the flow was a sequence within the same window so the browser page did not require a refresh. A navigational breadcrumb was deployed in the right hand column of the screen but it appeared that participants either did not register its presence or could not use it. Additionally the usability test identified some link and information errors in the implementation of both the VA and the traditional flows.

The eye tracking results for the usability test found that there was more eye movement in the traditional form. Figure 4 shows the eye track heat map for a typical page on the traditional experience.
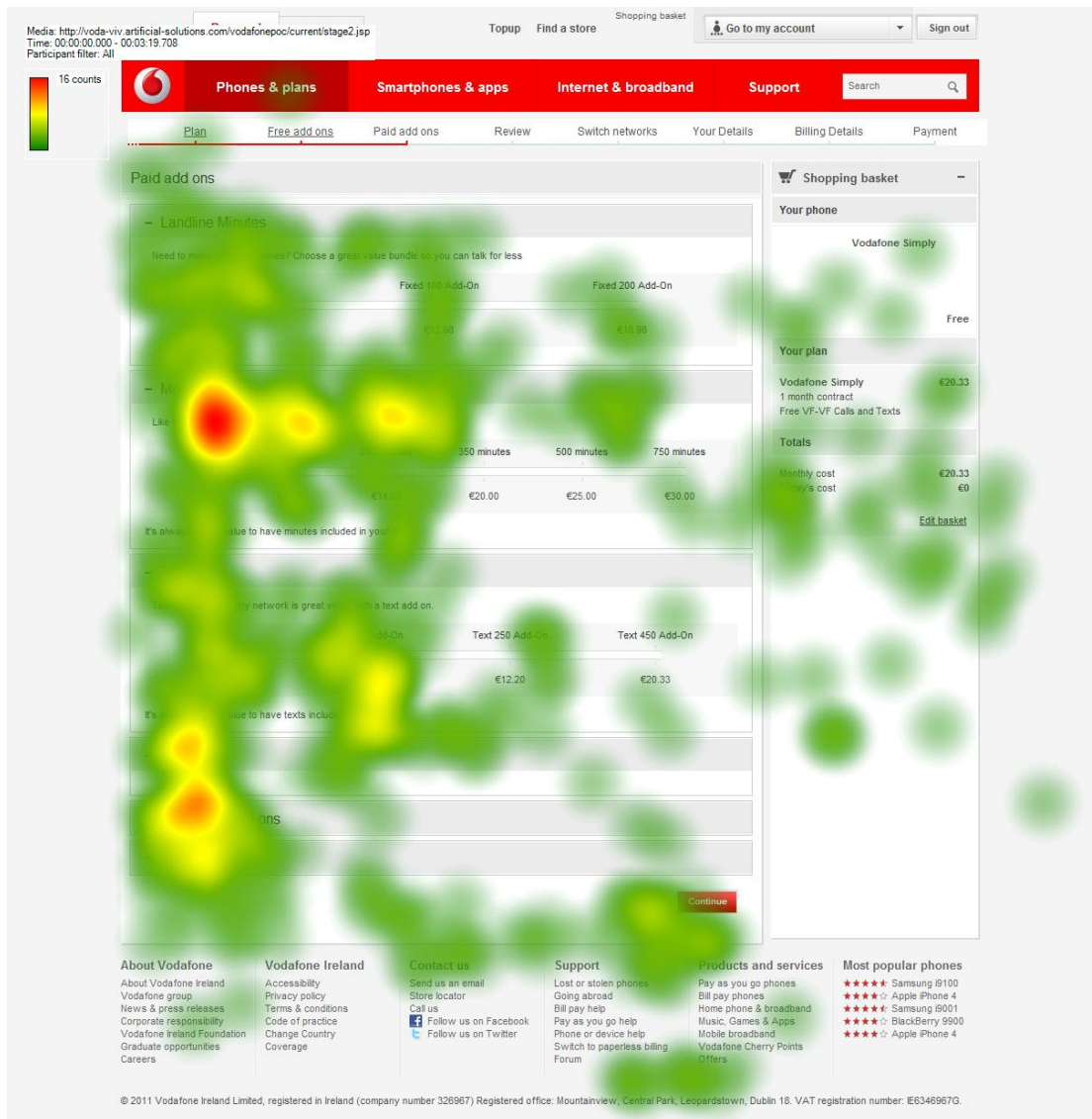
Figure 4. Eye tracking heat map of the traditional experience.

The colours on the heat map are an aggregation of all six participants, going from cold (green) all the way to warm (red) showing where most of the users focused for most of the time they spent on that screen. The design of the VA page worked against the Tobii X80 Eye Tracker system; as the VA page did not refresh the resulting heat maps for the VA show an amalgamation of all of the sections of the flow and not just one specific step. This explains why the VA heat map in Figure 5 shows a denser pattern. However the heat maps do confirm that the traditional switching flow displays a conventional 'F' shaped visual path and a much more scattered page scan.
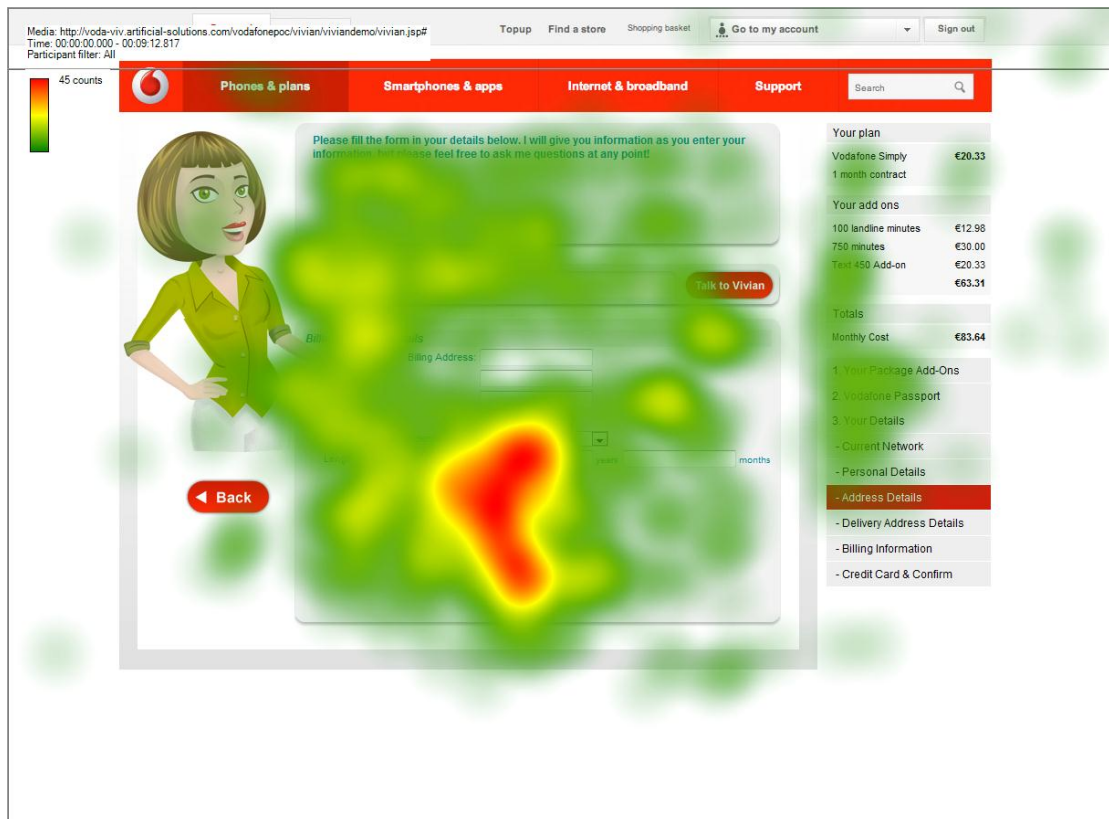
Figure 5. Eye tracking heat map of the VA experience.

Figures 6 and 7 show the gaze pattern of the traditional and VA experiences respectively. Each colour represents a single participant and the number is a measure of the length of time in milliseconds the participant looked at that point of focus. Again the VA view has a much greater density as the eye tracking software could not differentiate between each of VA screens.
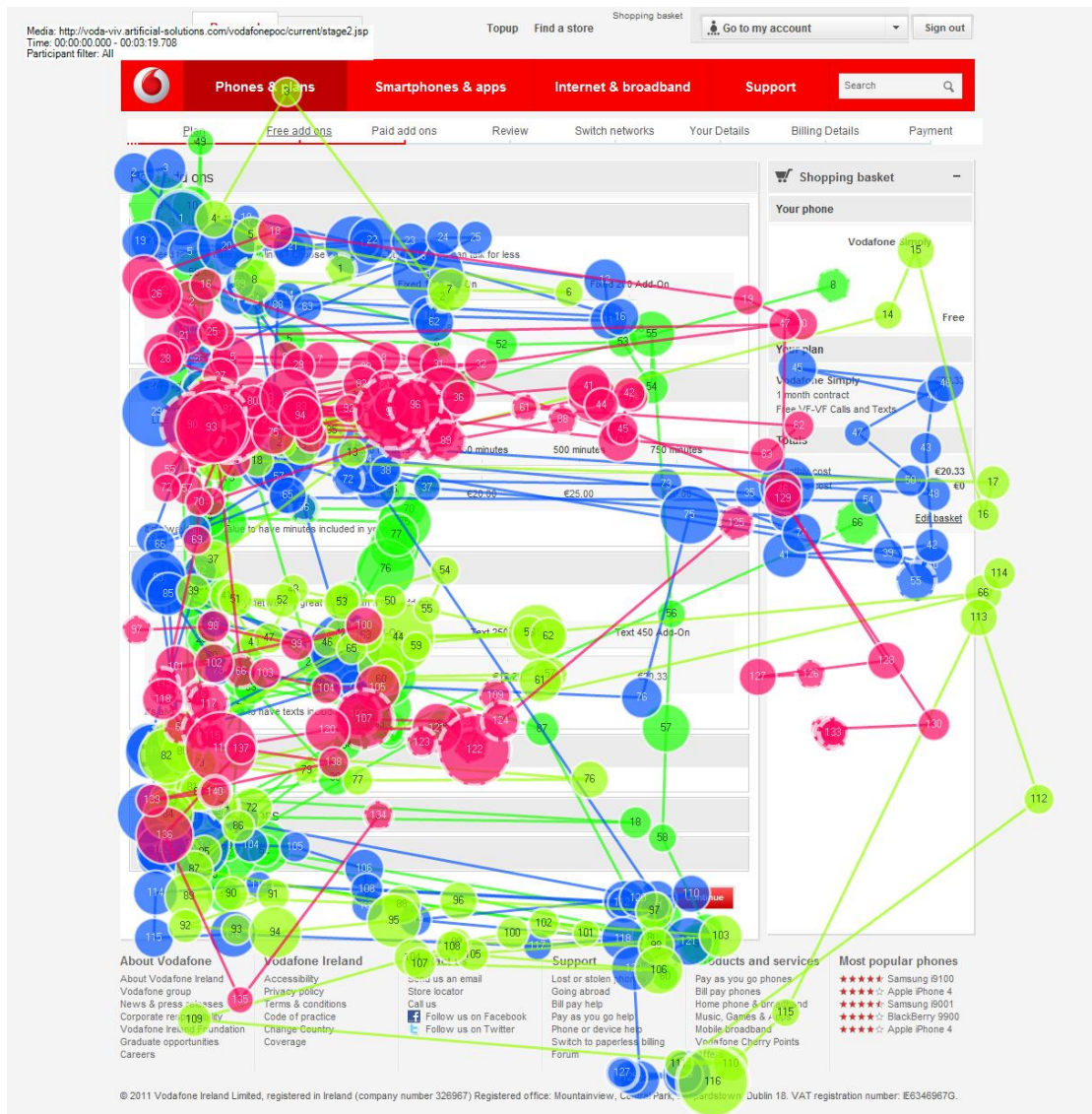
Figure 6. Eye tracking gaze pattern of the traditional experience.
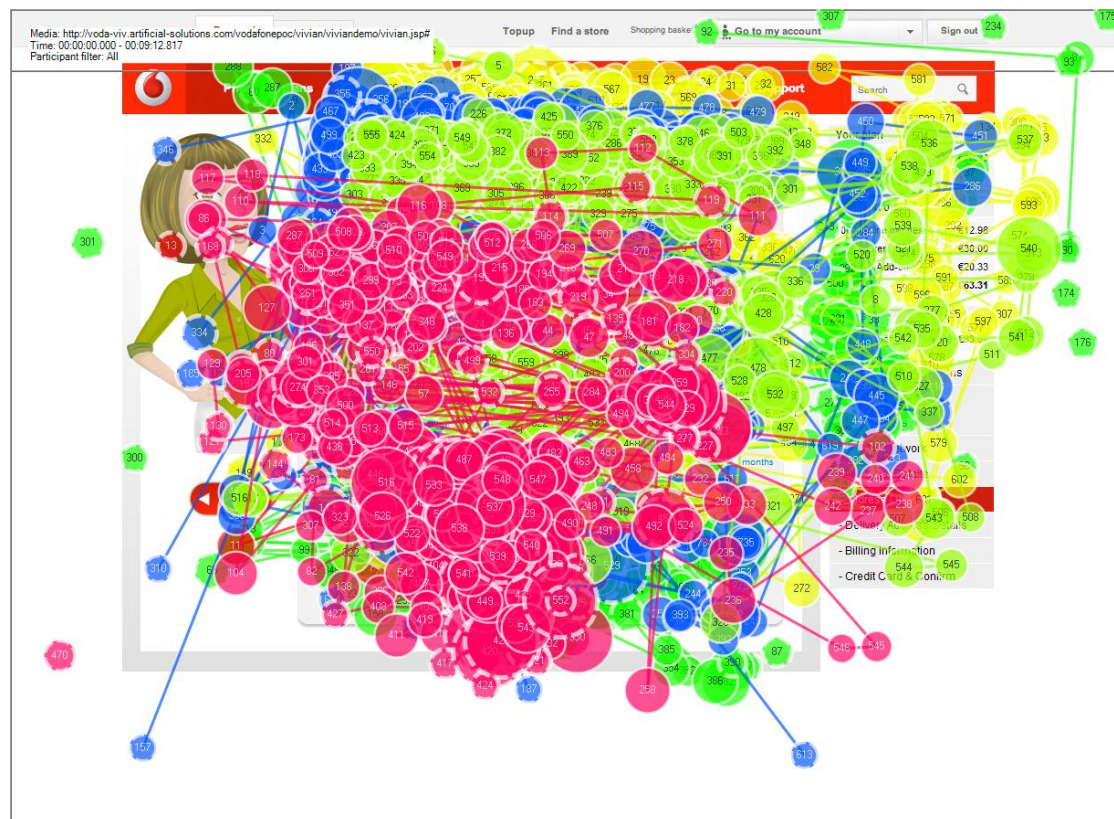
Figure 7. Eye tracking gaze pattern of the VA experience.

An additional benefit from utilising the eye tracker system is that participant interaction with the questionnaire can also be monitored. This is the subject for another study but has been included in Appendix D for reference.

Detailed qualitative feedback is available in Appendix C.   Participant One did not like the VA, it didn't seem real to her, Participant One commented that "it felt like spam" which may have been a response to the VA suggesting packages or doing too much for the Participant. Participant One also requested a headline for each section, she possibly felt a bit lost and needed this for a navigational bearing. Participant One was also frustrated by the lack of an ability to review a prior submission commenting that "it wouldn't let me go back". This Participant was observed to have a lower computer self-efficacy driving the requirement to revisit and check their selection and commented that they "would not be comfortable buying from the VA".

Participant Two became stuck after typing the first response to the VA, she needed to told how to interact with the VA; "once I was told to press 'Ask Vivian' it was a lot more clear to complete the task". Participant Two was very meticulous in her approach to the task. Eye tracking did not work as the Participant had to move closer

to the screen. It was confirmed later that the VA screen text size was too small for this participant.

Participant Three opted for the Budget flow and appeared to understand it and completed the process very quickly. She had a lot of Internet experience and had used click-to-chat services in the past. When asked for some free association comments about the VA, Participant Three remarked that it was "more personal, more fun and trusted". Trust was observed to be more strongly correlated with brand and practical Web browser experience versus the experience itself. When asked to comment on trust Participant Three said that they would just look for HTTPS and log that as a symbol of trust; Participant One responded by mentioning the supplier's brand and did not reference the experience and therefore saw not difference between the traditional and the virtual assistant flows.

Participant Four had trouble operating the sliders in the summary section of the VA and became stuck on the 'choose' section, it was not intuitive to him what he should do next. Participant Four worked out for himself that he could type 'choose' to continue.

Participant Five did not like the way the VA presented information in a piecemeal fashion commenting that he would prefer to have all of the options presented at the same time. Even though this participant preferred the traditional process he commented that he thought that the VA "looked good" and also mentioned that it was a "more enjoyable experience dealing with it". This participant was in the process of considering switching their account at the time of the test so made more specific and realistic selections.

Participant Six preferred the VA experience commenting that "this is a reasonabl[y] good site in as much as it is not too confusing". Participant Six was also confused by the choice logic made and expressed by the virtual assistant; some choice confirmation questions gave the participant an option to accept or select a higher package, with a 'yes' response indicating the selection of the second option. This up-sell functionality was written into the logic of the VA flow.

Some bias in the selection of service options with the experiment may have been introduced as the browser cache was not cleared between participants. This meant

that the browser suggested previous input in the VA input bar when the participant started typing. This had more of an impact on later participants as the browser history increased with each answer.

Discussion of Study 1

The results of the usability test showed that trust and adoption were lower for the VA experience when compared to the traditional experience. This was attributed to usability issues related to the design of the process and the user interface. The usability test also showed that a virtual assistant interface was not intuitive for the participants and that some of the terminology used was not clearly understood.

Four out of six of the participants preferred the traditional experience. This contrasted with the fact that four out of the six liked the virtual assistant, which indicated that there were other usability issues influencing the preference question. Only one of the six participants was immediately able to interact with the VA. The one participant that did know how to interact with the VA had previous experience with click to chat services. Two of the novice Internet users had to be told how to interact with the VA and the remaining three worked it out after a period. There was also an indication that the context of the experience may have been too complex and that this may have had an impact on the resulting measures of trust and adoption. In response to this a welcome page was added to the beginning of the VA flow which offered additional instructions to participants, informing them of the VA interaction options and more explanation dialogue was added to the VA's conversational knowledge base.

Once participants became familiar with the interface they found it easy to use so the main lesson from the usability test is that addition support was required to get the participant started. Apart from bug fixes the other major redevelopment undertaken was to change the layout of the VA interface. The text was made larger, and the first response line was highlighted using black text and a font that was one size bigger than the surrounding text. Additionally the input bar was moved inside the speech bubble to make it feel like a unified area of question asking and response delivery.

The eye tracking results show that there is significantly less scanning activity required to complete the VA experience. It is posited that as the virtual assistant presents

information in a more piecemeal fashion and contains this information in a speech bubble that the user has to expend less cognitive resource in a VA flow.

In order to better orientate the user it was decided to change the design of the 'back' button and the navigational breadcrumbs that were in the lower right hand column. The package summary in the top of the right hand column was also simplified to improve ease of comprehension. Also some of the flows were simplified, removing any choice up-sell that was programmed into the interface. For example, if a participant made a choice that was between two bands the VA opted for the higher of the two in the confirming question, this was confusing to the participants. The summary page was made more concise and let the participant know that they had finished selecting add-ons, how to adjust their selection and what they will be asked next. It also added a continue button in the speech bubble to encourage the participant to progress to the next step.

User expectations of a natural language interface are higher once they realise what that interface can do. There is an immediate expectation that the virtual assistant should be able to answer any question and there is a high degree of frustration when this is not the case. The main learning from the usability test was that content and interaction design is key. The VA required more context for the user before the experience started, it needed to tell the user where they are in the process, what they need to do next or what's coming next and improve the breadcrumbs. The VA interaction required training at the beginning of the experience, it was not immediately intuitive but it became natural very quickly.

Study 2: Online Experiment

Study 2 was designed to discover if measures of trust and likely adoption of a telecommunication network switching experience will be significantly higher when the experience is mediated by a virtual assistant. Therefore the primary hypothesis states that:

H1 - respondents will have higher trust for a switching experience that uses a virtual assistant to guide them through a complex online request when compared with a traditional linear online form.

It is also predicted that:

H2 - behavioural intent will be higher for a switching experience that uses a virtual assistant when compared with a traditional linear online form.

Method

Study 2, an online experiment, quantitatively tested the hypotheses that the virtual assistant would improve levels of trust and adoption.

Participants

Convenience sampling was used. The target population for the experiment was drawn from a list of company employees that had volunteered to take part in testing and new product introduction. The group was newly formed and so had not yet been asked to take part in a test event. The researcher was given access to 150 names and email addresses. The list was not filtered and an email invitation to participate in the study was sent to all 150 potential participants.

A total of 103 responses were received. Three responses were discarded as they had insufficient data. Of the 100 responses 71% were male and 29% female. The individual breakdown of age and gender is detailed in Table 2. Four respondents did not answer the age question giving a sample size of 96.

Table 2

Demographics of the Sample Population

Gender		%	Age group	Male	%	Female	%
Male	68	70.8	18-29	9	13.2	4	14.3
Female	28	29.2	30-39	32	47.1	17	60.7
			40-49	21	30.9	3	10.7
			50-59	6	8.8	3	10.7
			60+	0	0.0	1	3.6
Total		100.0			100.0		100.0

Materials

Participants were asked to complete the online experience answering the same questionnaire after each experience and a comparison question at the end of the process. Open questions were included at the end of each experience and after the preference question inviting participant comments. The issues identified in the usability test were addressed with the addition of a welcome page before the VA experience started, see Figure 8, the aim of which was to instruct the participant on how to interact with the VA.
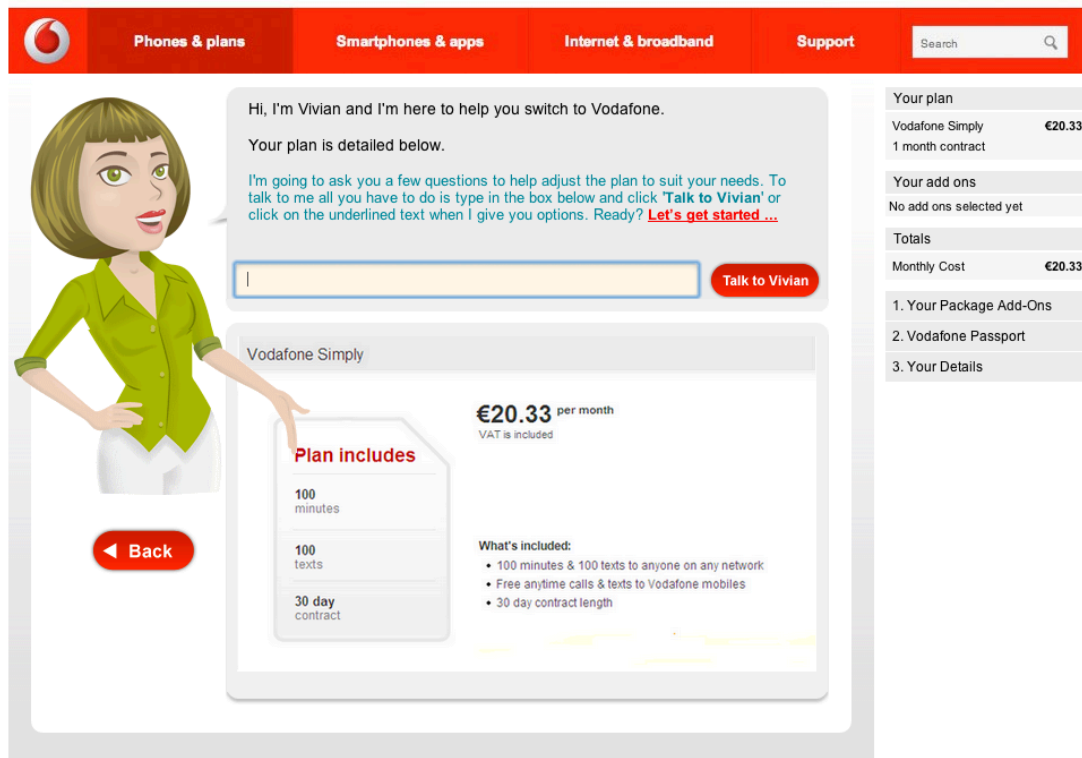
Figure 8. Redesigned VA experience welcome screen.

The materials and design used are similar to Study 1. The consent form was amended to reflect the additional of a participation incentive and the online context, see Appendix H. The transition from the welcome screen illustrated in Figure 8 and the first screen in the flow is shown in Appendix I. The preamble introducing the second half of the experiment was amended slightly to make clear to the participant that they were progressing to the second stage of the process. The debrief was amended and a competition entry was also added; the preamble, debrief and competition entry can be viewed in Appendix J.

The online experiment was optimised to work with screen resolutions from 1024x768 pixels. This is the screen resolution of the most popular tablet device (the iPad) and the most common resolution for standard PC monitors (Anderson, 2012). It was tested on various browsers: IE8/9, Firefox 4+, Chrome (latest) and Safari 5. The questionnaire was built into the process to ensure the participant did not have to open multiple windows and all extraneous links were disabled in the experience pages. The experience was hosted on an external server that was addressable on the Internet. A Samsung Galaxy Tablet PC was donated to the researcher to be used as an incentive for participation in the study.

Bart, Shankar, Sultan and Urban (2005) studied the relationship between website design and trust as well as the impact that trust has on behavioural intent. Therefore the validated scale used by Bart et al (2005) has been replicated in this experiment. A Likert scale was used to determine trust and adoption (behavioural intent), each of the questions were positive and scored between 1 and 5 as detailed in Table 3 and Table 4. As a result a lower score indicated a more positive result.

Table 3

Validated Scale Used to Measure Trust (Bart et al, 2005)

Trust items	Scoring
T1. This site seems to be more trustworthy than other sites I have visited	1-5, Strongly agree to strongly disagree
T2. The site represents a company or organisation that will deliver on promises made	1-5, Strongly agree to strongly disagree
T3. My overall trust in this site is	1-5, Very high to very low
T4. My overall believeability of the information on this site is	1-5, Very high to very low
T5. My overall confidence in the recommendations on this site is	1-5, Very high to very low

Table 4

Validated Scale Used to Measure Adoption (Bart et al, 2005)

Adoption (behavioural intent) items	Scoring
A1. I would purchase an item at this site	1-5, Strongly agree to strongly disagree
A2. I would recommend this site to a friend	1-5, Strongly agree to strongly disagree
A3. I am comfortable providing financial and personal information on this site	1-5, Strongly agree to strongly disagree
A4. I would book mark this site	1-5, Strongly agree to strongly disagree
A5. I would register at this site	1-5, Strongly agree to strongly disagree

Procedure

An email invitation was sent to 150 potential participants with a statement of purpose, a link to the experiment and a request to complete the process within 48 hours. The link was kept active for a period of five days, on day three a reminder email was sent to all participants. Responses were recorded in individual pipe delimited text files saved on an FTP server. Each of the files was concatenated in a DOS (Disk Operating System) window using the following command > copy *.txt all.txt. Headers were filtered out in Windows Excel and the results were reformatted to support entry to SPSS. The mix of VA/traditional presentation order was monitored to ensure an equal distribution.

Prize entry requests were also stored separately and were concatenated using the same process. A third party was asked to select a number at random, the participant name associated with that number was deemed to be the winner of the Galaxy Tab.

Table 5 gives a breakdown of the presentation order of each experience for the survey population. It shows an even distribution; the virtual assistant experience was presented first to 51% of the population and the traditional experience was presented first to 49% of the population.

Table 5

Experience Presentation Order

Order Presented	Male	%	Female	%	Unknown Gender	Total	%
VA	36	52.9	14	50.0	1	51	51.0
Traditional	32	47.1	14	50.0	3	49	49.0
Total	68		28		4		100.0

Ethics

This study received ethical approval on the grounds that it restricted the minimum age of the participant to 18, it received informed consent before participation and maintained the anonymity of the participant and their responses. Each participant was informed that they had the right to withdraw at any time and not answer individual questions. Questions were restricted to the experience only and each participant was debriefed at the end of the process. The details of those participants who entered into the incentive draw were stored in a separate file from their survey response.

Results

The mean, minimum and maximum duration of each experience is listed in Table 6. The virtual assistant took an average of just under six minutes to complete whereas the traditional experience took an average of five minutes to complete.

Table 6

Experience Duration

Experience	Min (sec)	Max (sec)	Mean (sec)	Std. Deviation
VA	75	1,562	346	212
Traditional	60	1,114	297	223

The minimum to maximum range of time taken to complete each experience is significant but is not representative of the time taken by the majority of the participants. There are between one and four outliers in each of the experiences, the majority of the participants completed the VA experience in 75 to 600 seconds (up to ten minutes, see Figure 9) and the traditional experience in 60 to 400 seconds (up to seven minutes, see Figure 10).
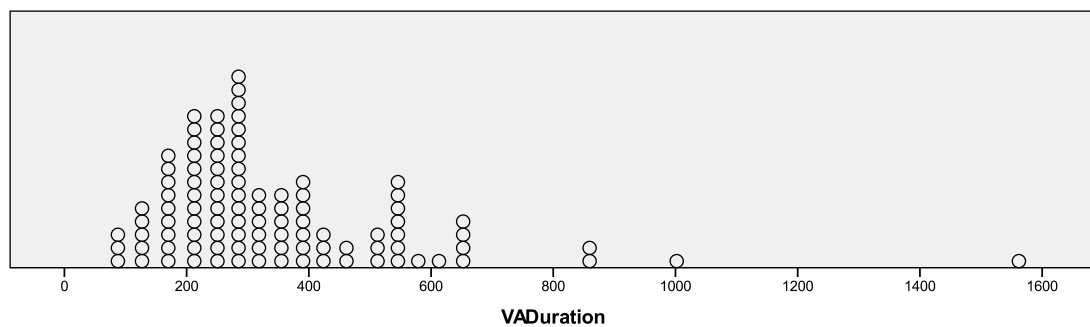

Figure 9. Virtual assistant individual experience duration.
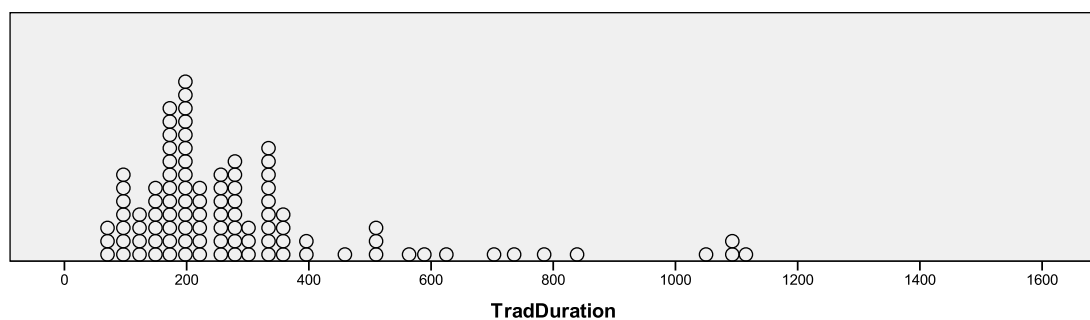

Figure 10. Traditional individual experience duration.

The standard deviation from the mean is similar for both experiences at three and a half minutes for the VA experience and just under four for the traditional experience. The overall experiment took an average of 13 minutes and 52 seconds to complete.

Trust

Hypothesis 1 stated that respondents will have higher trust for a switching experience that uses a virtual assistant to guide them through a complex online request when compared with a traditional linear online form. Trust was measured on Likert scale which was scored between 1 and 5 (1 = highest trust, 5 = lowest trust) the mean trust for all five questions was 2.152 with a standard deviation of 0.7231 for the VA experience and 2.150 with a standard deviation of 0.6352 for the traditional experience showing that both experiences were trusted by the participants and that there was a marginal difference in favour of the traditional experience, see Table 7 for a detailed breakdown of the measures. The only VA measure to outperform the traditional experience was 'overall confidence in the recommendations of the site' (mean of 2.21 for the VA experience and 2.25 for the traditional experience).

The effect size was small ($d = 0.0029$). Hypothesis 1 was tested using a paired *t*-test which showed that the difference between the two conditions was not significant ($t = .022$, $df = 99$, $p = .491$, one-tailed), therefore Hypothesis 1 is rejected.

Table 7

Trust Results (Bart, Shankar, Sultan, & Urban, 2005)

Trust Question	VA mean score	VA Std Dev	Trad mean score	Trad Std Dev
T1: This site appears to be more trustworthy than other sites I have visited	2.27	.8147	2.27	.7766
T2: The site represents a company or org. that will deliver on promises made	2.09	.7047	2.09	.7436
T3: My overall trust in this site is	2.16	.7878	2.15	.7437
T4: My overall believability of the informtion on this site is	2.07	.7946	2.03	.7348
T5: My overall confidence in the recommendationations on this site is	2.21	.9566	2.25	.8333

Figure 11 shows that the standard deviation of the trust measure in the VA condition is slightly higher than the traditional condition. The mean score from all 5 trust questions is 10.76 (SD = 3.6157) for the VA experience and 10.75 (SD = 3.1762) for the traditional experience.

Figure 11. Trust error bar chart.

Adoption

Hypothesis 2 stated that behavioural intent (adoption) will be higher for a switching experience that uses a virtual assistant when compared with a traditional linear online form. Adoption was measured on Likert scale which was scored between 1 and 5 (1 = highest intent, 5 = lowest intent) the mean behavioural intent for all five questions was 2.252 with a standard deviation of 0.8402 for the VA experience and 2.238 with a standard deviation of 0.7503 for the traditional experience showing weak but positive behavioural intention and that the virtual assisted conditions was slightly less likely to result in a positive behavioural intent, see Table 8 for a detailed breakdown of the measures. There is a slightly higher degree of range in the VA scores which can be seen in Figure 12.

The effect size was greater than the trust measure but still small ($d = 0.0176$). Hypothesis 2 was tested using a paired *t*-test which showed that the difference between the two conditions was not significant ($t = .141$, $df = 99$, $p = .444$, one-tailed), therefore Hypothesis 2 is rejected.

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Table 8

Adoption Results (Bart, Shankar, Sultan, & Urban, 2005)

Adoption Question	VA mean score	VA Std Dev	Trad mean score	Trad Std Dev
A1: I would purchase an item at this site	1.99	.8390	1.92	.7516
A2: I would recommend this site to a friend	2.12	1.0375	2.12	.8794
A3: I am comfortable providing financial and personal information on this site	2.19	.9178	2.14	.8530
A4: I would book mark this site	2.70	1.1146	2.78	1.0879
A5: I would register at this site	2.30	1.0147	2.25	.9679

Figure 12 shows that the total measure for the VA condition is higher (less positive) and the standard deviation of the adoption measure in the VA condition is slightly higher than the traditional condition. The mean score from all 5 adoption questions is 11.26 (SD = 4.2011) for the VA experience and 11.19 (SD = 3.7516) for the traditional experience.
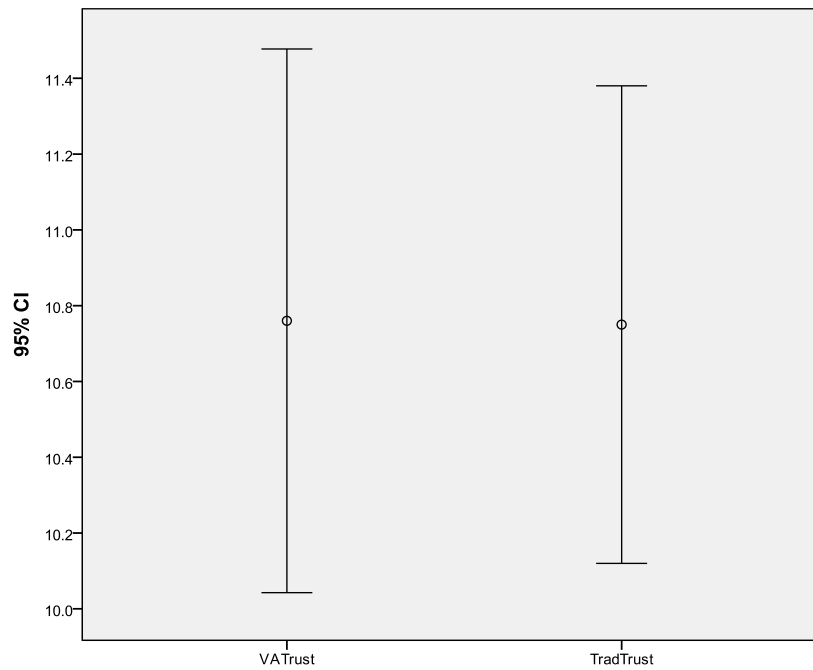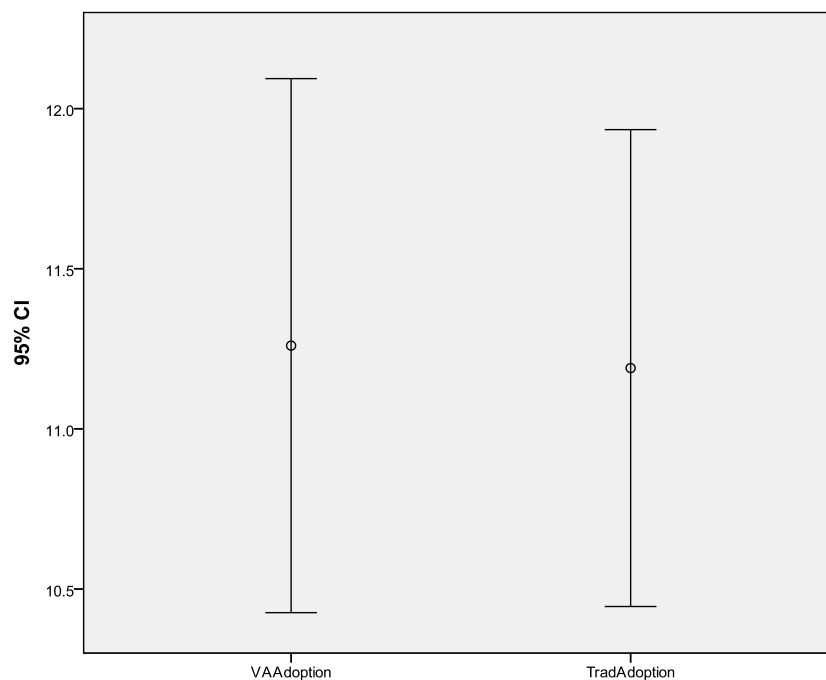

Figure 12. Adoption error bar chart.

A measure of efficacy was included in the questionnaire. It asked respondents to rate if 'the process was easy to complete' and if they were 'satisfied that [they] completed the process correctly'. The mean efficacy score for the VA condition was 3.91 (SD = 1.9233) and the score for the traditional condition was slight better at 3.68 (SD = 1.2861), see Figure 13. This shows that participants felt that both process were not easy to complete, and that there is no significant difference between both experiences (t = .962, df = 99, p = .169, one-tailed).
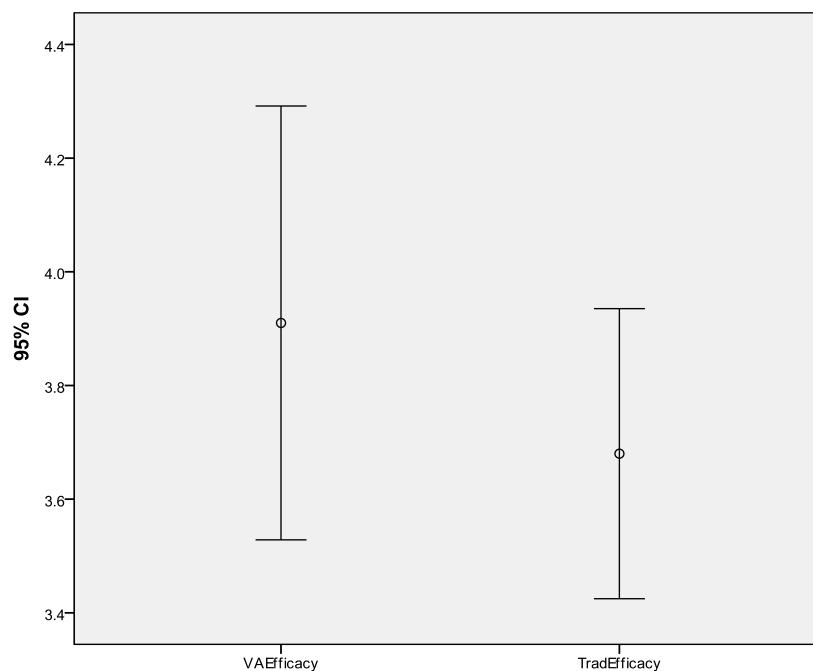
Figure 13. Efficacy error bar chart.

A question was included to gauge the self-reported preference between the two conditions. Ninety-eight participants answered the preference question, the results were analysed using the goodness-of-fit chi-squared test which assumes that there would be a 50:50 distribution predicted by the null hypothesis. Of the population 59.2% preferred the VA experience. The test showed that the virtual assistant was preferred over the traditional experience to a level that approaches significance $X^2(1, N = 98) = 3.306, p = .069$.

Table 9 shows the results of two multi-dimensional chi-squared tests on the relationship between gender and preference as well as order presented and preference. There was no relationship between experience preference and gender: $X^2(2, N = 94) =$

0.245, *p* = .621. There was also no relationship found between experience preference and the order in which each was completed by the participant: $X^2(2, N = 98) = 0.028$, *p* = .867.

Table 9

Preference Analysis:Chi-squared Cross Tab Gender-Preference and Order-Preference

	Male	Female	VA presented first	Traditional presented first
VA preferred	39	15	30	28
Trad preferred	27	13	20	20
Pearson chi-sq		.245		.028
Significance		.621		.867

Questionnaire Comments

Participants were given the opportunity to comment on each experience and after the preference question at the end of the experience. The comments are listed in full in Appendix E (VA comments), F (traditional comments), and G (final comments). There are 74 completed comments, 44 (59.5%) from participants that preferred the VA experience and 30 (40.5%) from participants that preferred the traditional experience.

The VA experience generated more comments than the traditional experience, 65 versus 54. The most common comments on the VA experience centred on the interactive capability of the avatar, navigation and the ability to answer additional questions. Table 10 is a list of common positive and negative comments organised by usability, avatar, user interface, chat and efficacy.

Table 10

Participant Comments

Theme/ Category	Positive Comments	Negative Comments
Usability	"simple and easy to use" "very easy to navigate" "Virtual assistant seems a little more personal" "I like Viv, its more user friendly and personal, the web form is too serious and texty"	"Initially I found it a little bit confusing to get start but once I did then it was fine" "the back button was confusing" "it wasn't completely clear to me as to what I actually needed to do"
Avatar	"much more friendly" "fun and easy" "the avatar site is friendlier to navigate through and describes each step in detail"	"I thought the helper was very child like, almost condescending to a savvy Internet user!" "Overall it was a good experience. Only thing was it all looked a bit childlike…" "I would have expected Vivian to move a little but that is a really minor point"
User interface	"the site was more appealing" "A prettier experience"	"The "talk to vivian" terminology is silly and a vaguely patronising, though the graphics are nice" "Found this layout to be too text heavy and a bit cartoonish… would have been less inclined to complete a purchase"
Chat capability	"the questioning was impressive" "liked the informal text from Vivian but felt it could be a bit shorter and snappier" "I liked the idea of kinda "talking" to someone"	"Some questions I asked didn't register with the assistant" "I expected more interactivity" "vivian did not answer any of my questions" "The "talk to vivian" terminology is silly and a vaguely patronising"
Efficacy	"you felt that Vivian was offering you a better deal" "[VA] made the process easier" "[VA] much more easy to use and understand" "feel that my new network was helping me even before I joined"	"I was less sure about what I was doing on this site - actually seemed to me that I had to think more" "I prefer the Vivian option but it is confusing at the moment"
Gaps	n/a	"I would have expected a voiceover to accompany the question" "The differences are aesthetic only and the expectation of the virtual assistant is

		much higher than the actual experience"

Discussion of Study 2

A significant finding from the online experiment is that the virtual assistant experience is preferred by the majority (59.5%) of the participants. However that preference is not supported buy the self reported measures of both trust and likely adoption. Hypothesis 1, which stated that trust would be higher for a switching experience that is mediated by a virtual assistant, was rejected as there was no significant difference between self reported trust for the VA and traditional experiences. Hypothesis 2, which stated that the purchase behavioural intent would be higher for a switching experience that uses a virtual assistant, was also rejected. Indeed, both measures showed that the virtual assisted experience was slightly less likely to be trusted and less likely to have a positive behavioural intent when compared with the traditional experience.

Efficacy was also measured in the self-reported questionnaire and it showed that both experiences scored poorly, with the VA trailing the traditional experience again. These results indicate that there may have been usability issues with both the experiment and the experience chosen as the context for the experiment. One participant commented that he "I fo[u]nd the chat bot thing a bit confusing. I didn't know what I was supposed to do sometimes". Overall confidence in the recommendations of the VA was very slightly higher when compared to the traditional experience which, given the usability issues in the test, is a positive indication that a VA could be effective.

Neither age nor gender had an impact on experience preference. A significant finding was that the order presented also did not have an impact on the result. It was predicted that there would be a significant learning effect from the first experience which would have a positive influence over the second and this was taken into account in the experiment design by randomising the order in which the experiences were presented. It is possible that the additional subject matter knowledge that the study population had would have had an influence over this result, the experience would need to be tested with a sample more representative of the general population to confirm if this is the case.

There have been many studies showing the effectiveness of avatars in improving trust and behavioural intent but no research has been undertaken to measure the effect a virtual assistant can have on the same two measures. There are indications that a virtual assistant can improve decision making, trust, adoption and they have been shown to benefit recall when used as pedagogical agents (Graesser, Jeon & Dufty, 2008; Patrick, 2002; Bart, Shankar, Sultan & Urban, 2005; Graesser, McNamara & Vanlehn, 2005). The findings of Study 2 do not support earlier research but as this approach is novel it should be viewed as the first step toward the development of a scientific method of testing the effectiveness of virtual assistants when deployed as supportive agents on commercial websites. From the open comments (Table 10 and Appendix E, F and G) it is clear that there was a positive reaction to using a VA with only two participants articulating an irrevocable objection to the concept.

Discussion

There is a consistent theme between both studies in this research. For the majority of participants there is a positive association with using a virtual assistant but usability issues negatively impacted the experience. Once a website design progresses from delivering simple text and input forms toward delivering a natural language interactive interface the expectations of the user increases substantially. The complexity of the scenario used in this online experiment and the lack of interactivity of the virtual assistant have negatively influenced the measures of trust and adoption. The comments received from the online study did not significantly reveal more issues than were collated during the usability test (Study 1) reinforcing Nielsen and Landauer's (1993) claim that most issues will be surfaced after approximately six test iterations. Given additional time and resource the experiment could have been redesigned to take full account of the results from Study 1. The order bias that was observed in Study 1 was not supported in the results of Study 2, which could be attributed to using a sample population that was more familiar with language, concepts and processes used in the experiment scenario.

Implications

The implications of the findings of both Studies are twofold; firstly, more testing is required before being able to ascertain if a virtual assistant has an impact on trust and behavioural intent. Secondly, user expectations of usability and interactivity are higher when presented with an interactive agent which poses a significant design challenge:

> "a prettier experience, however the assistant is very one dime[n]sional… I expected more interactivity and more flexibility…" (Participant 42).

A commercial rollout of a virtual assistant would need to be mindful of the above feedback by limiting the scope of a first iteration to focus more effort on populating the lexicon and ensuring that any usability issues are minimised.

It can not be assumed that a natural language interface is intuitive for the user. As was evident from the usability test many participants were completely stopped when presented with a speech bubble, an input box and an invitation to 'talk to Vivian'. Indeed, one user interpreted that invitation to 'talk' literally and expected that the

virtual assistant would speak and that they would be able to speak back. A simple training demo that could be played when the VA starts would be sufficient to show the user how to interact with the chat bot.

The design of the chat interface also requires careful planning and testing. Complex offerings that require verbose explanations are not supported easily by a chat interface. This experiment used two windows; a speech response bubble and an additional information window underneath the input bar (see Appendix I). Some participants in the usability test commented that they did not know where to look to get the information that they required. The challenge to mimic complex face-to-face communication processes with a chat bot should not be underestimated; in a sales flow a user question needs to be answered and an additional question has to be asked by the VA to progress to the next stage of the flow. If additional information is also required this complicates the process and will require careful interaction design development.

Results from this study indicate that it is too early to introduce a virtual assistant into a complex sales flow. It is recommended that a virtual assistant should be introduced first as an agent that can answer frequently asked questions about telecommunication service or the telco's website, it could easily co-browse with the user, moving them to a specific page to aid the completion of an established task. There are many positive comments that indicate that there is significant goodwill toward a virtual assistant: "I like Viv, it's more user friendly and personal, the web form is too serious and texty" (Participant 81).

Link to Previous Research

Secondary research indicated that a virtual assistant would improve the usability of a website by increasing the level of interaction (Zheng, McAlack, Wilmes, Kohler-Evans & Williamson, 2009; Graesser, Jeon & Dufty, 2008) and have a number of positive effects on a Web user's perception of trust (Bickmore & Cassell, 2001, as cited by Patrick, 2002) which would in turn positively influence behavioural intention (Bart, Shankar, Sultan, & Urban, 2005). Secondary research also indicated that participants would be predisposed toward interacting with a virtual assistant (Reeves & Nass, 1996).

Avatar appearance was identified as significant by Nowak and Rauh (2008). From the free text comments the avatar design appears to reveived had a mixed review. On the positive side: the "Virtual assistant seems a little more personal" (Participant 73). On the negative side: "looks unprofessional" (Participant 17) , "Found this… a bit cartoonish and therefore would have been less inclined to complete a purchase for real using this site" (Participant 79). The negative comments support Nowak and Rauh's (2008) finding that the more anthropomorphic a character is the higher its perceived credibility. But against the findings of Holzwarth, Janiszewski and Neumann (2006) this study did not show that the mere presence of an avatar would increase the effectiveness of a website.

The usability study revealed a strong relationship between the institutional reputation of the organisation/website and trust. On enquiring if the usability participants felt that they trusted the VA experience all mentioned that they trusted the company or brand and this appeared to have the highest influence on trust for the website, this supports Mayer, Davis and Schoorman (1995).

Avatars have been shown to have a positive impact on trust (Keeling, McGoldrick & Betty, 2010) and the relationship between trust and behavioural intent has also been established (Bart, Shankar, Sultan, & Urban, 2005) but there is no research on the impact that a virtual assistant can have on a commercial website. The fact that no such link has been supported by this novel experiment may be partially due to the usability issues with the experiment. The complexity of the scenario used combined with the problems highlighted in this section have impacted the resulting measures of trust, adoption and efficacy. A quotation from one of the participants adequately summarises the situation: "I prefer the Vivian option but it is confusing at the moment. The process is not as simple and easy to follow as the normal web form" (Participant Four).

Limitations

Whilst the design of the experiment was adequate (a within group experiment compensating for order bias) the most significant limitation was the complexity of the scenario that the participant was asked to undertake. A sales flow was chosen to limit the required size of the lexicon and to provide a commercial background to the

supportive activity. From the efficacy measure of both the traditional and the VA experiences it is clear that this type of sales flow is overly complex.

The personal detail forms that are present in a standard online purchase interaction were preserved in this experiment. It was anticipated that the capability of a VA to present the information in a piecemeal fashion would improve the usability of the experience. This resulted in participants working through a number of screens after selecting a package. There was no benefit gained by replicating this element of the flow, in another scenario this could have tested for abandonment but it was not possible to simulate this within this experiment. As no data was collected and no comments were received related to this part of the flow the personal detail forms could have been removed from the experiment.

The avatar was not animated, a single image was used throughout the process. To improve the sense of interactivity a number of expressions could have been developed and deployed according to type of response from the virtual assistant. Another significant issue with the virtual assistant was that its conversational capability was underdeveloped. Eighteen percent of participants that entered a comment mentioned that the VA was not able to answer their question:

> "Having the section at the start with "talk to vivian" is confusing when you need to press the Start link. No matter what you type in the box it keeps saying " i don't understand your request". This can be confusing for people who don't realise you need to click on the start link" (Participant 68).

The sample population used in this research was a segment of telecommunication employees. Their product knowledge and website experience resulted in an experiment population that had specific knowledge and experience possibly reducing the impact the virtual assistant had in simplifying the switching experience. It is recommended that a survey population more representative of the general population be used for subsequent research. There was also a gender imbalance in the population as the male to female ratio was 71:29. If the hypotheses were supported in this experiment the population bias would have a negative impact on the paired t-tests which assume that the population has a normal distribution.

Future Research

It is recommended that the same study design be applied to a simplified support scenario. For instance, an information search scenario could be used to test the efficacy of a virtual assistant. A participant could be given separate tasks to complete on a telco website, such as find out how to upgrade a phone, and then asked to perform the same task through a virtual assistant interface. This would also have the benefit of investigating the problem solving approach used by the participant.

Reeves and Naas (1996) indicate that we are predisposed to interact with digital media in a humanlike manner but that does not mean that a virtual assistant can be deployed without consideration for both usability and user training. Both will have to be carefully considered in subsequent research. It would also be advisable to include a baseline measure of computer self-efficacy. This could be used to cross-tabulate capability with measures of trust and adoption. It is clear that there is both the capability to develop interactive agents and the opportunity to deploy them effectively in the telecommunication industry but, as yet, there is no evidence that they can deliver significant improvements in customer support.

Conclusion

Telecommunication products and services are becoming increasingly complex. At the same time commercial drivers are pushing telcos to improve customer service without impacting their cost base. There is a significant opportunity for telecommunications operators to develop virtual assistants to solve problems and provide support to customers; whether it be to guide the customer through filling a form or find the latest smartphone and where it can be purchased. The aim of this study was to add to the body of knowledge in area of virtual assistance and to measure their effectiveness when deployed to deliver customer support in a commercial context.

Two hypotheses were tested in this study; H1 stated that respondents will have higher trust for a switching experience that uses a virtual assistant to guide them through a complex online request when compared with a traditional linear online form and H2 stated that behavioural intent will be higher for a switching experience that uses a virtual assistant when compared with a traditional linear online form. The hypotheses were tested by experiment. The experiment replicated a traditional online form and created an alternative version mediated by an interactive chat bot. It used mixed methods; a usability test followed by a within group online experiment completed by 103 participants. Neither hypothesis was supported by this study. While the experiment design was adequate the commercial scenario that was used and the implementation of the virtual assistant both had a negative impact on the outcome of the study.

The open comments included in the research questionnaire provided a fruitful source of user feedback and indicate there is scope to develop an effective virtual assistant to provide support to telecommunication customers. Some interesting findings on usability, deployment strategy and future research are uncovered and discussed. Further research is required to build on the preference result from this study showing that 60% of participants would prefer to interact with a virtual assistant.

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Appendix A - Usability Screens (Consent, Demographic & Background)

Consent Form

Researcher's Statement

We are asking you participate in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. This process is called 'informed consent'. You can print a copy of this form for your records.

Purpose of the Study

This is an experimental study into the use of a Virtual Assistants in telecommunications customer sales and support. A Virtual Assistant is a Web-based helper, normally presented as an avatar, designed to aid customers in answering product and service questions or help navigate a website. Virtual Assistants are sometimes referred to as a 'chat bots'.

This study is undertaken as part of a masters degree in Cyberpsychology and is supervised by the Institute of Art, Design and Technology, Dun Laoghaire. For further information about the course visit www.iadt.ie or for further information about this study contact phelim.may@gmail.com or grainne.kirwan@iadt.ie.

Alternatives to Taking Part in this Study

Participation in this study is completely voluntary, you may exit at any time and you are entitled not to answer any survey questions or questions put to you by the researcher.

Risks and Confidentiality

This study involves the use and rating of alternative Web experiences, it is not personal in nature and the subsequent questionnaire will be confined to your opinions of the experience only. All of the data collected will be anonymous and confidential, no personal information will be captured.

Study Procedures

If you agree to participate in this study you will be asked to work through two mock experiences related to switching a mobile telephone account to an alternative telecom operator (in this case the receiving operator is Vodafone, this is for illustration only). You will then be asked to rate your experience of each process via an online questionnaire. Your actions will then be played back to you and you will be asked questions by the researcher about your experience. No personal information will be captured during this process.

Please note that you need to be over 18 to complete this questionnaire. By clicking next you agree to the inclusion of your responses in this study and confirm that you are over the age of 18. It should take approximately 15 minutes to complete.

[Yes, I would like to take part]

Demographic Information

Please enter the following information before proceeding

Gender

○ Male ○ Female

Age Group

[⇕]

[Start the study]

Background Information Page

Imagine that you are a bill pay customer and have decided to move your account to Vodafone. You already have a mobile phone and have selected a basic call plan costing €20.33.

Now you are going to tailor the plan to your specific requirements by choosing from a number of package add-ons. Finally you will complete the form by adding your personal details. **Please note that this detail is not captured or stored, you may enter real or fictitious information**.

Click here to start

Appendix B – Usability Screens

This Appendix contains screenshots of the Questionnaire, Progress, Preference Question & Debrief.

Debrief

This study was designed to explore the viability of using a Virtual Assistant to deliver customer service to telecommunication service customers.

In this study we presented you with two ways of switching a mobile telephone account to an alternative vendor. One used a traditional Web form and the other was supported by a Virtual Assistant. We are testing if there is a significant difference in your opinion of the two experiences. We recognise and appreciate that this study required you to commit your free time and energy, thank you.

If you would like to get in contact with us, or ask a question about this survey please click on this link or e-mail phelim.may@gmail.com.

Appendix C – Usability Notes

List of Participants
10.00am…Female, 18-29 yrs, (novice internet experience)
11.00am…Female, 30-39 yrs, (expert internet experience)
12.00…Female, 40-49 yrs, (expert internet experience)
1.00pm…Male, 40-49 yrs, (expert internet experience)
2.00pm...Male, 40-49 yrs, (novice internet experience)
3.00pm...Male, 50-59 yrs, (novice internet experience)

Participant One

Female, 18-29 yrs, (novice internet experience)
Preference: traditional experience (inferred from comments, did not select question)
Order: VA followed by traditional
Open Question Traditional: none
Open Question ViV: "Step by step information about what I had to do before starting my order"
Open Question Comparison: "[traditional for was] easier to understand"

RTA Interview Notes:
- Lost on ViV - didn't know how to start the interaction, was completely stuck
- Participant had not purchased online before
- Term 'add-ons' was not understood
- Did not think that they could click the red buttons
- [Important] Trust was linked to the Vodafone brand name, it was more powerful than the online experience
- Didn't like the VA, it didn't seem real to Participant 1, commented that "it felt like spam" which may have been a response to the VA suggesting packages (or doing too much for the Participant)
- Did not view the information in the lower box (additional supporting information)
- Requested a "headline" for each section, possibly felt a bit lost and needed this for a bearing
- Was fustrated by the lack of an ability to go back "it wouldn't let me go back". This participant had a lower self-efficacy and was looking to go back to check their selection (that they had not done anything wrong)
- Liked the slider
- Commented that they "would not be comfortable buying from the VA"

Participant Two

Female, 30-39 yrs, (expert internet experience)
Preference: traditional experience
Order: VA followed by traditional
Open Question Traditional: "Seemed very straightforward to complete"
Open Question ViV: "Once I was told to press 'ask vivian' it was a lot more clear to complete the task"
Open Question Comparison: "The second [traditional] task seemed more professional and straight forward. Also more traditional and what I am use[d] to on a web site"

- Participant two was very meticulous in her approach to the task. Eye tracking did not work as the Participant had to move closer to the screen. VA screen text size was too small for this participant.

RTA Interview Notes:
- Clicked OK on red coloured link text (usage in this case)
- Input followed the text on the bottom of the screen
- Became stuck after inputing a response, user did not know that she either had to hit the return key on the keyboard or click the 'talk to vivian' button
- Up-sell attempt by the VA was
- Hesitated on the VA slider summary, found that there was a lot to take in
- Found the avatar offputting
- Less confident about interacting with the avatar
- Did not like the up-sell attempt

Participant Three

Female, 40-49 yrs, (expert internet experience)
Preference: VA experience (very strong preference)
Order: Traditional followed by VA
Open Question Traditional: none
Open Question ViV: none
Open Question Comparison: none

- Participant was a confident and heavy internet user, "I have the laptop open and check Google whenever I have a question I need answering"

RTA Interview Notes:
- Comprehensively completed the experiment, including personal details
- Commented that the 'would you bookmark' answer was not related to the experience, Participant did not use bookmarks at all
- Opted for Budget flow, understood it quickly and easily
- Positive free associations with VA: more personal, more fun, trusted
- Researcher probed the aspect of trust asking if the Participant felt that they

could trust the VA more but found that in an intended use scenario the user would look for HTTPS and see this as a symbol of trust

- User commented that they would like to review selections to check and may look to initiate a 'click to chat' IM session if one was available before completing the sale (unprompted)

Participant Four

Male, 40-49 yrs, (expert internet experience)
Preference: Traditional experience
Order: VA followed by traditional
Open Question Traditional: none
Open Question ViV: simple enough to navigate
Open Question Comparison: none

RTA Interview Notes:
- Got stuck initially with the VA, was able to work it out for himself (no researcher intervention)
- Moved to VA slider page very quickly and then chose to restart, felt that he may have done something wrong
- Had problems moving sliders initially (clicked without success)
- Got stuck on the 'choose' section, was not intuitive what he should do next, again worked out for himself that he could type 'choose' to continue
- Felt that the avatar did not make any difference to the experience
- Trust was no different between both experiences, participant felt that the brand name had precedence (mentioned that he would look for 'https' in the address)
- Preferred the traditional bar, "[it's] what I'm used to", participant had used online chat in the past
- Was comfortable with the navigation in the VA experience

Participant Five

Male, 40-49 yrs, (novice internet experience)
Preference: Traditional experience
Order: Traditional followed by VA
Open Question Traditional: none
Open Question ViV: I didn't feel that the optional add-ons were very clear on this site
Open Question Comparison: none

RTA Interview Notes:
- Was not sure what to do on the first VA page (chose the budget route)
- Used a mix of clicking text and text input

- Made much more specific selections (was thinking about switching at the time so had looked at each of the telco sites - switching mindset made for a more realistic approach to the test)
- Didn't know what to do on the first VA page
- Felt like he didn't get enough feedback from the VA
- Stated that he would prefer to have all of the options presented
- Thought that the VA looked good, also mentioned that it was a "more enjoyable experience dealing with it"
- Wanted to see a drop down for the DOB section
- Stated that is the VA improved that he would prefer to use it versus simply form filling

Participant Six

Male, 50-59 yrs, (novice internet experience)
Preference: VA exp. (unsure as changed mind post questionnaire, during the RTA)
Order: Traditional followed by VA
Open Question Traditional: THIS IS A REASONABLY GOOD SITE IN AS MUCH AS IT IS NOT TOO CONFUSING some other sites that I have been on tend to have a dizzying array of dropdown menus and they ask what I would feel are silly security questions like getting people to copy weird looking words
Open Question ViV: This was a small bit easier than the first one and the talk to vivian idea simplified things but that is not to say that the first process was bad, its just that the second one seemed easier.
Open Question Comparison: none

Participant 6 was not comfortable using the mouse (said that he only ever used a laptop trackpad). Was also considered and methodological in his approach to both experiences.

RTA Interview Notes:
- Text was too small for this participant
- Participant clicked the talk to vivian button before entering text, thought that this would progress the page. Had then to re-read
- Entered a flow that caused a bug in the VA flow to surface and the session was restarted
- Thought that the VA process was too fast and that this impacted negatively on his level of trust (observed self-efficacy was low)
- Did feel like he was talking to someone when interacting with the VA
- Prompted for improvement suggestions by the researcher: clearer at the start, separate box to show that you can click on text
- Wanted to be shown where to go next by the VA

Appendix D –Eye Tracking Results for Questionnaire

This appendix contains a gaze plot for four usability participants followed by a combined heat map. The gaze plots highlight interesting differences in the way the questionnaire was reviewed and completed.
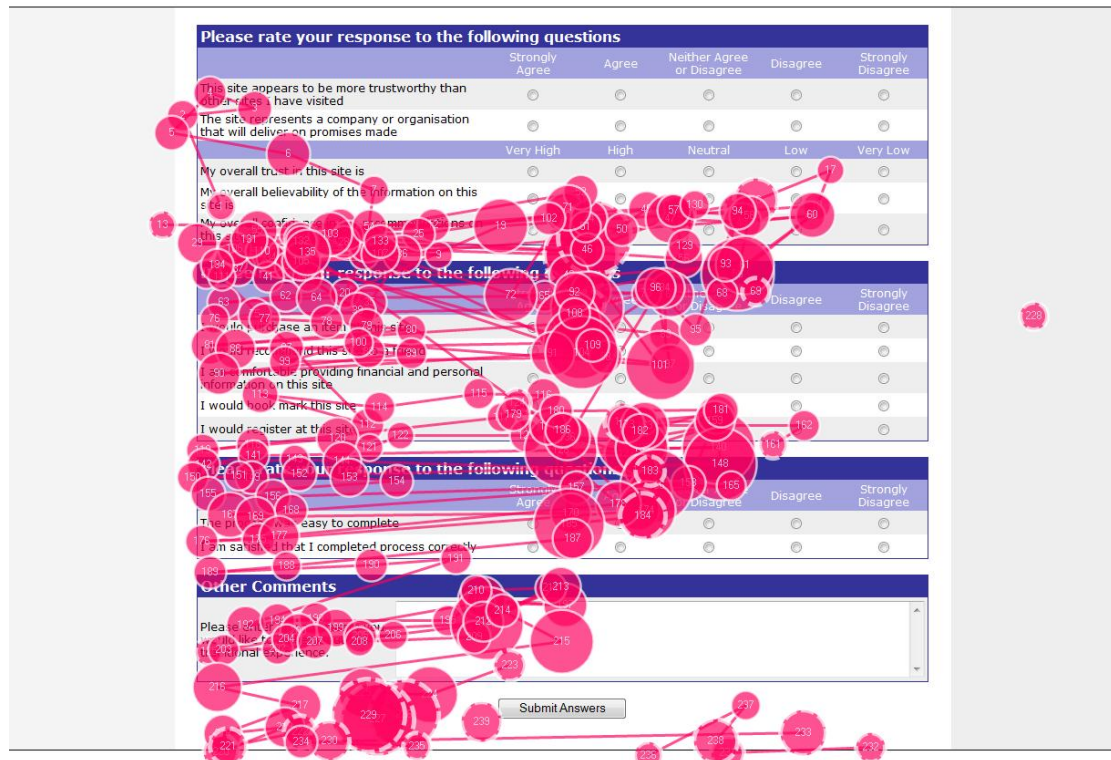
Appendix E – VA Experience Freetext Comments

Pref = Self reported experience preference, comments sorted in order of submission (Ptcpnt = Participant).

Ptcpnt.	Pref.	VA Experience Comments
2	Trad.	I think most people won't know how much data they use. The chat didn't work, I know it only a prototype but it could have been mocked up better. Would not suit all customers.
4	VA	I preferred this layout. However, I could not really get started. The instructions didn?t seem to match the process. I had to go back and start from the beginning a few times before i knew what i needed to do. Plus there was a lot of writing on each screen. The different font types and colours was also hard to read and cluttered looking. If the copy was shorter and clearer I think this option would be better. Vivian brings a more personal feel to the experience and it feels like someone is there throughout the process. If the copy was shorter and clearer I think this option would be better. Vivan brings a more personal feel to the experience and it feels like someone is there throughout the process.
5	Trad.	I was less sure about what I was doing on this site - actually seemed to me that I had to think more!!
8	Trad.	I was surprised by the price at the end of the process. It was not what I was expecting. Without using the slidebars myself, I felt I wasn't in control of the experience
9	Trad.	I just didnt get the point of vivian. I ignored her most of the time
10	Trad.	Seems pretty good, you could have a number of randomly based chacter's rather than just 1, vivian reminds me of some old granny or that.
12	VA	Will landline question be in final site? I work in Vodafone Retail and landline addons aren't valid anymore, they are included in minute bundles.
14	VA	this was a much better site and you felt that Vivian was offering you a better deal, even though it was the same deal, but she was offering you different options. The site felt much more interactive. I liked the way you could ask her questions throughout the process.
15	VA	hi The flow is fine, in fct I prefered it to the standard. But the chat bot dominates the page and I could find no reason to type anything inteh box once into the flow. Also was not sure on what to type at teh beginiing. if I were a customer I wouldnt try that hard and might go away elsewhere.
16	VA	excellent improvement
17	Trad.	The back button was confusing - it should go back to the directly previous step by default rather than presenting a load of options, especially when the pages aren't titled so you don't know which of the listed pages corresponds to which step The "talk to vivian" terminology is silly and a vaguely patronising, though the graphics are nice There aren't enough options on the sliders for them to feel dynamic - you need to have more than just a 0, 100 or 200 option, they should be in increments of at least 50 It's easy to forget what you're getting as standard with the basic tariff - it should be displayed at every step rather than just upfront on the first step i.e. "with Simply you get 100 minutes as standard, do you want to add some more?" In some places Vivian's hand obscures some of the text - looks unprofessional.
19	Trad.	When I asked Vivan "Do I get any further discount for signing up to ebilling?" I received the following reply - I'm glad you took the extra trouble to do that" so I asked again & Vivan replied that I am sorry I did not understand.
21	VA	Some questions I asked didn't register with the assistant other than that it was perfect
25	VA	simple and easy to use. /much better than a lot of sites i've used.

Ptcpnt.	Pref.	VA Experience Comments
26	VA	It asks for a mobile number as a contact number but I have alread given a number. Could this box not be filled in witht he number that I have given alread. If I want to give it a different number then I should be allowed change the number. It ask for gender after I used the prefix Mr. - should this not be filled in by the computer?
27	Trad.	I prefer a more direct set of questions. This style of site may help people who are completely unfamiliar with mobile contracts but how many of those are there out there any more? Overall; not a great experience.
29	VA	I thought it was a positive experience overall.
32	Trad.	I made a comment to Vivien before placing the order to recalculate the cost as it was too expensive, just to see if she would bring me back, as a customer i may change my mind and want to remove add ons etc She said 'sorry i cannot understand the last comment'. Im sure i can just click back, but if the avatar was clever enough to understand something like that and bring the customer back it would be a great customer experience.
35	VA	different as opposed to the last piece, but after first 2 screens felt more comfortable using it and the questioning was impressive. Would possibly be more of a help to infrequent PC or online users in the older age group as I felt it was hand holding me through the process. I would take the recommendations from the 2nd test example as been more suitable for me, as it questioned my usage. thank you
36	Trad.	The site did not provide information what was included in the VF Simply package. I didn't understand the benefit of having the "Ask Vivian" question field. In all cases you can progress by clicking on the highlighted links. I never got back to the very first page. Asking Vivian a question can in some cased stop your progress and bring you back to the starting point.
37	VA	The site was more appealing than the first site - I liked the idea of kinda "talking" to someone. However, when I started, and of the questions I asked, the answers I got did not make sence (guessing, this may be as the logic has not been activated as yet). It wasn't completely clear to me either, as to how many more pages I needed to complete (although I did see the tracker on the right later on).
38	Trad.	Initially I found it a little bit confusing to get start but once I did then it was fine. Also though it looks friendlier with the Vivian character I would prefrer the morre formal looking 1st option when placeing an order
40	VA	My view its too basis and assume that user/customer has a certain amount of knowledge. For example when it asks customer "How many gigabytes used each month". Also it needs to explain various highlighted options, for example at one stage it asks re usage and I wonder if customer would know if this is calls/SMS/minutes/bytes etc
42	Trad.	A prettier experience , however the assistant is very one dimesional and not able to address requests outside of the links available. I expected more interactivitiy and more flexibility especially at the summary page
46	VA	easy to use
49	VA	Its a great idea to have the customer personalise their own addons like this.
51	VA	Again the sliding bars do not give a gradual scale. Not sure if the option to type questions helped. I was slightly confused, so started again and used the highlighted options.
52	VA	I thought the add-on's suggested by vivian were a bit excessive compared to the usage levels i had selected, but overall a good experience, i like the slide rule graphic for selecting the level of add-on's
53	VA	This is vf website that I want to support! Excellent innovation and very easy to navigate
54	VA	Experience was good, the "Help" when choosing the add ons was more useful than trying to go through them individually. Typing "back" didn't allow you go back to the last screen as I assumed it would. When I chose usage, I was only asked about minutes, I was thinking about data usage.

Ptcpnt.	Pref.	VA Experience Comments
55	VA	This second option seemed much more friendly
56	VA	Got stuck very early on with the question around budget for additional services. I entered in "5" in the talk to Vivian field, was prompted to enter in more than ?10, entered in "15" and it didn't understand before moving on to the next question.
57	Trad.	Overall it was a good experience. Only thing was it all looked a bit childlike so maybe a bit more of a professional look, while still incorporating the virtual assistant, might be something to think about. Very clear and concise which I liked. User friendly also.
58	VA	perhaps the process and amount of questions could be a bit shorter, would be nice if avatar was dynamic (blink an eye;) when registration completed etc.
59	VA	this was more fun
60	VA	Generally a very easy process but found at the start that it wasnt clear what to do with the assistant at the outset. Before it moves into the flow, it might be better to explain what the assistant does and how to use immediately prior to going into the connection process.
61	VA	liked the informal text from Vivian but felt it could be a bit shorter and snappier in terms of being quick to read. Images could also be used for things such as teh security number on a credit card to help along the way. Simple step by step guide to the decision making process - big challenges which I would like to see in this site is being able to move back and forth and save my setting and return at a later stage so I can take the options away and compare with other offers in the market but come back to where I was so I dont have to record all teh options I have selected.
62	Trad.	it tokk a few minutes to work out waht to do
63	Trad.	I'd prefer to see all the possible options I have rather than guessing what is my current usage
66	Trad.	Did not like the fact that it says 'You can ask me questions at any time' and when you enter a question (I tried 3) it does not understand what you are saying. This is quite frustrating and would not give me confidence in the site. Other than that I do like the whole effect and think if it worked correctly it would be great as is very fast and very easy to use.
68	VA	Having the section at the start with "talk to vivian" is confusing when you need to press the Start link. No matter what you type in the box it keeps saying " i don't understand your request". This can be confusing for people who don't realise you need to click on the start link.
69	Trad.	Interesting concept, however it would not be to my personal tastes. This site assumes I don't know what to do, hence I need assistance at every step. entered a budget of 50 euro and the site selected a package for 50 euro, even though I may not have required XXX min and XXX data. Personally I prefer a slider option which links with budget, this way I can see how many texts, min etc I get before I hit my budget. Asking for a budget may be counter productive, I entered 50 however if I found a package that met my requirements for 25 I would be much happier. Also, I may specd more that 50 if I got additional products such as insurance, international calls etc.
70	VA	Again, the avatar site is friendlier to navigate through and describes each step in detail.
74	VA	This would be of great benefit to a lot of people trying to purchase or sign up for things online, as some sites tend to be confusing for certain groups of people. The process was smooth and easy to complete.
75	VA	Information and process flow was very clear and easy to fill in. Looks like something that would be very useful. One question - I asked Avatar at the end if price included VAT but it could not compute - just a minor point
76	VA	It was very easy to use and a number of good questions were asked ensuring there would be little bill shock etc.
77	VA	it was hard for me to find out my bill date but overall i found the process quiet easy

Ptcpnt.	Pref.	VA Experience Comments
78	Trad.	I thought the helper was very child like, almost condescending to a savvy Internet user!
79	Trad.	Found this layout to be too text heavy and a bit cartoonish and therefore would have been less inclined to complete a purchase for real using this site whereas I would have continued with the previous layout. Also on entering the second email address it proceeded without my entering it completely for the second time the field wouldnt allow me to type any more characters in that section. The previous layout was more streamlined and easier to follow as the questions as you followed them made sense, in the second layout the questions are listed and up to Vivian is also asking/advising what to do where to go which is distracting and confusing.
81	VA	I like the style of this, this is something we are really missing from VF.ie would be a great help for call volume reduction
82	VA	The avatar's hand covers some of the text of "landline" when the bars appear and it lists the add-ons. That's a bit annoying. The lay out of the bars screen made it look like I would be be paying ?12 per month for international calls even though the pointer was on zero. On the right-hand side of that screen, it should summarise the actual amount you will be charged. I know it is on the smaller square on the top right hand side but it would be good to also show those totals beside the tool bar At the beginning and at the end it asks your gender, may be that is only becuase this is a trial but it's not good to ask the same questions again.
83	VA	I would have expected a voiceover to accompany the questions. Also the start was a bit confusing as I thought the "Talk to Vivian" button would initiate the voiceover .. a silent experiece was ok but could be enhanced in the way ..overall it was a good experience with clear instruction for the most part.
84	VA	looked like it was more expensive, end package was going to cost me more per month than if I chose myself
86	VA	The intial set of questions used to tailor the package were very subjective. It might be usful to give some indication of what is meant by "a lot" or "a little". When I tried to "talk to Vivian" my question was ignored. This would be very frustrating if it happened for real or if there was no list of "nearest" answers or a way to break-out to interact with a real attendant. The avatar was "cartoonish" and while this might be friendly it felt a little informal for givng over financial information.
87	Trad.	There is nothing to say that the information provided is secure. I would only trust it based on the Vodafone Brand
88	Trad.	The site locks you into a set path which makes it very unclear what changes you are making and has no clear way of getting to the completion stage short of clicking random buttons
89	Trad.	The process was easy to complete but, to be honest, I thought that when I clicked 'Talk to Vivian' I would get a robotic voice.
90	VA	oVERALL, A VERY USEFUL SERVICE AND A GOOD EXPERIENCE. NAVIGATING USING THE BUBGET OPTION RATHER THAT THE USAGE SEEMED MORE INTUITIVE
92	VA	virtual assistant made the process easier
93	Not entered	Confusing start.same comments as thee first feedback on content. It might be better to have Viv at the bottom and not the top . She should be only referedd to when neccessary and notb in every instancve . This is not clear....
94	VA	IS QUIET DIFFERENT TO OTHER PROCESSES ONLINE AND MAKES IT FUN AND EASY
96	Trad.	That was a shockingly bad customer experience. I really disliked it, I never want to see Vivian again. I would not purchase from this site (Sorry to whoever designed it)

Ptcpnt.	Pref.	VA Experience Comments
97	VA	Did not offer me Passport immediately - had to click on "Talk to Viv" The total monthly cost is not altogether clear. Bottom right hand corner of the page seems to give an Add-ons total, I would presume that then I would add the 20.33 to arrive at a monthly total. Or is this figure actually the monthly total, including the add-ons? If so the text for this line should be reviewed.
98	Trad.	Not as user friendly as the first experience preferred the first one
100	VA	Definitely a better customer experience, more personal, inviting and helpful. Guidance through the steps definitely added to the experience

Appendix F – Traditional Experience Freetext Comments

Pref = Self reported experience preference, comments sorted in order of submission (Ptcpnt = Participant).

Ptcpnt.	Pref.	Traditional Experience Comments
4	VA	On the What you've choosen page, the minutes I selected did not match the minutes on this page for example I choose 350 minutes but it sayd 250 minutes on this page. On the credit card page. I am not sure what type 1 stands for under the card type? I thought this was confusing.
6	VA	I know this is only a test case, however I did not feel that the security was very strong around the purchasing of the goods. No verification was asked for, and I did not get the impression my information was encrypted
9	Trad.	pretty easy to use- no confusion.
10	Trad.	Prefferd the second way to be honest. Was more straight forward. Knew what I was getting into
14	VA	Overall the site was easy to navigate through. I was disappointed in the options available e.g. limited number of txt, minutes, and landline options. Because of this limited choice, I would not move provider as I feel as a low usage user I'm being forced into a higher cost package
19	Trad.	Very easy process excellent sit the only concern I would have is giving over credit card details there was no message reinforcing that my credit card details would not be used.
21	VA	No comments everything ran smoothly
25	VA	hard to know what package to take. same as any order site.
26	VA	Just Mobile is no longer a Mobile operator.
27	Trad.	Smooth, straight-forward, overall v good.
32	Trad.	The process is very clear, i especially liked the bill breakdown towards the end including the VAT.
35	VA	Few points - I use Amazon and Helly Hansen quite a lot for online purchases. I felt comfortable using this site, there was an easy flow to it. I will however throw out the following - we are relying on customers understanding their usage patterns etc i.e. minutes. might be more suited to a younger age profile, who are literate on phone usage etc. As this develops, have one or two customer case studies, that people can see otheres experience. On the tariff options maybe give consideration to all options been displayed when the customer opens this page. They then have to say no thanks as opposed to saying I did not see the drop down box at a later stage. I cant remember if I saw the SSL lock on the payment page, but I am comfortable making an online purchase on any site when I see this. Hope this helps Thank you
36	Trad.	I did find this way of guidance much easier and not as confusing as the "Ask Vivian" option
37	VA	Fairly straight-forward process - but I was not convinced that I had made the right choice of tariff plan for me. Hence, I would be more inclined to go instore and get advice there, before choosing to purchase online.

Ptcpnt.	Pref.	Traditional Experience Comments
38	Trad.	1) When choosing add-ons it 1st mentions Landline minutes but in the optins it then refers to Fixed Add-on , some peole may not get the connection between landline and fixed. Instead of referring to "Fixed 100 Add-on" why not say " Landline - 100 minutes Add-on" etc. 2) For mobile minutes and texts make reference that these extra minutes & texts are to other networks as minutes & texts to VF numbers are free anyway. 3) Data Add-on. I would say that customers would find it confusing to what is the between " 10GB Monthly data Add-on" and "Mobile Internet 1Gb" Add-on. Should they nit be just refreered to as teh same time but one is a 1GB add-on and teh other a 10GB add-on 4) When entering my DOB details why not have the boxes in teh in the format that we need the data to be entered a 2 digit box for day / 2 digit box for month/ then 4 digit box for year and all separated by "/". 5) Whew entering my landline contact details there should be a box for the the pre-fix and another box for teh actual number
40	VA	As its its a work in progress hard to rate for example there appears to be no checking in information submitted so can input any range of digits as a mobile number, date of birth could be 2012 etc. As part of add on i think it should say for mobile minute that same are for calls to non VF or to other mobile operators same as it does for SMS/text. Then nothing behind GPRS etc. Overall thou concept is very good.
42	Trad.	Long and drawn out with no intermediate steps on the level of benefit required, ie can't have 50 different values for the monthly bundle options
45	Trad.	This format is easier and more professional
46	VA	This is my second time using this and, I have to admit that Vivian version did feel more user friendly when I re-visited the site.
48	Trad.	There should be an option to opt out of the Simply Tariff and move into a better value tariff as the Add-ons are a little steep in price as compared to a better Vodafone Way tariff
51	VA	I'm a very hands on person and in general do not like using web pages to enter into agreements. The slide bars would suggest that you can use a sliding scale. However the this is not the case. I each slide option there are only 3 options. This annoyed me as it did not give me a sliding scale. The questions as to whether or not I am employed or not does not have the option for housewife/husband. What was clear was how much I was spending at each stage, but what was not clear was what was included in my basic bundle. I did not know if I needed to add extra txt or landline calls.
52	VA	My view on questions about trusting the site are based on past experience buying online from Vodafone, the site itself doesn't offer anything additional above what i would have seen or used before
53	VA	The experience that I just did is a not a true reflection of the VF website. The website itself is overloaded with information, is slow is not uder friendly and often throws up errors that make no sense. And I support it!
56	VA	Phone number field took a alpha character, so would question validation if it did this before entering credit card details
57	Trad.	Very straightforward and user friendly
58	VA	timeline on the top of the page is very useful and clear, form divided into sections so that customer knows clearly at what step they are so there is no confusion
59	VA	pretty unexciting
60	VA	Standard connections process - familar enough wtih the current flow so difficult to make any comparisons on
61	VA	The process is like many online shops - you need to be very observant as to what is next - some of the process asks you for the same info twice with no real benefit to anyone it seems. Messy trying to put add ons onto the product as it does not clearly explain what I need - Im meant to know!! It would drive me to call the contact centre or call into a shop at least once to confirm details on what I was ordering

Ptcpnt.	Pref.	Traditional Experience Comments
62	Trad.	I am not sure the slider is the best format
63	Trad.	I found I was asked about a lot of personal info: 3 different contact numbers, how long I have been living in the address provided,etc
69	Trad.	I prefer this option. May I suggest that similar to the Apple.com site you add a basket summary to the right that follows you down the option screen. This way a user can see a total when adding on data, text etc.
70	VA	After navigating through the Avatar enabled site, this seems quite sterile and unhelpful - although it obviously performs the same task. There doesn't seem to be any option to revisit what options you have selected. Overall I feel that this experience is more generic, whereas the Avatar enabled site goes above and beyond to help with the customer journey. For example an older person could easily navigate through the Avatar site, but maybe not this one.
71	Not entered	I much prefer the layout of this site
72	Trad.	contradiction on fuure contact options . tick the box if you want and the next box is tick the box if you dont want
74	VA	I would prefer using the chat bot, the 'traditional' experience appears confusing, and is simply not that straight forward.
75	VA	It felt like there was a lot more to fill in on this site and it was not as intuitive as the other site with Avatar. No comparison really - give me the Avatar site any day.
76	VA	There were no recomendations made, and the bill was 50 euro more expensive than previous test and you dont know what a small usage may be and you might be buying minutes etc that you dont need
77	VA	Again the bill date was not posted
79	Trad.	very straight forward and logical layout compared to other sites. On payment section if you intende using 'verified by visa' re think this as I've had many issues using this verification process when purchasing online with other sites
81	VA	I found this site very texty, not allot of visuals, which i think helps make it more user friendly.. i prefered the 1st site.
82	VA	when I added on the 1 GB bundle, it was not reflected in the box on the right-hand side but it was captured and appeared on the next screen. It didn't make a recommendation so for that question in the questionnaire I would have selected n/a if it was available. The site looks a little dull. I don't think the screens were laid out as clearly as the avatar site. But the avatar site did not included any options re marketing comms (it is in the non-avatar site)
83	VA	Ths time around there was alot more fields to fill in than the first experience as it seemed to take longer .. incorrect info could also be easily entered. I preferred the first experience
84	VA	There was no data option under the Data Add On section
86	VA	This was consdierably less guided than the avatar and unless you were familiar with on-line forms could be more confusing. However some of the sequencing was better on the traditional especially the sliders which were available for each bundle component as the selection was made. The finaincial information input screens were felt more formal than the avatar and becasue of this I felt more comfortable giving this information.
87	Trad.	It is a more professional looking site with the same ease of use as the first one. Again it does not state that the information provided is safe
88	Trad.	The site doesn't add up the data add on in real time like it does for minutes and texts. Going back to a previous screen to make one change means filling the entire page out again. The Contact Preference section uses alternating confusing language. (Tick the box if you don't want followed by tick the box if you want) Billing options: online billing option does not specify how long bills will be available online. 1 year, 2 years, forever?
89	Trad.	This felt like a standard online order completion

Ptcpnt.	Pref.	Traditional Experience Comments
92	VA	straightforward
93	Not entered	Need to double check the email address at point of capture Need to mention that we are charging for the paper billing Cant see the running tally when I scorll down the page Pre populate the address when already inpiutted. Whats the options on phones ?
94	VA	very easy process to follow and fill out
96	Trad.	That was a very good customer experience, really liked it, simple & straight forward.
97	VA	Data Add-on not included in monthly total Avatar site is a bit friendlier looking
98	Trad.	Easy to follow very userfriendly

Appendix G – Overall (Final) Freetext Comments

Pref = Self reported experience preference, comments sorted in order of submission (Ptcpnt = Participant).

Ptcpnt.	Pref.	Overall Comments
2	Trad.	Based on the fact that I'm tech savvy and know a lot about mobile tariffs, not sure how which I would prefer if I were not.
4	VA	I prefer the Vivian option but it is confusing at the moment. The process is not as simple and easy to follow as the normal web form.
9	Trad.	I fond the chat bot thing a bit confusing. I did n't know what I was supposed to do sometimes
14	VA	I tried to ask Vivian out for a date and I liked the answers she came up with. It brought a smile to my face. It was a more user friendly experience than the traditional web form. The colours also made it a more relaxing experience
15	VA	hard to choose from above, I would go with the VA, but ~I would prefere if she was minimised during the flow unless called upon. Also what value does she provide mid flow...what can be asked ??
25	VA	much more easy to use and understand.
32	Trad.	I just feel that perhaps the second version has a more professional feel to it and its straight forward whereas the Avatar i think as a customer might break at any moment. This may not be the case it just feels less like the current professional brand image we have.
33	VA	It is not very clear what questions Vivian can answer. Some example one the site might help
34	Trad.	The Virtual Assistant might put off people who just want to access the facts
35	VA	felt the recommendations by Vivian would be more accurate to my bill type.
36	Trad.	I didn't find the virtual assistant helpfull. It was more confusing then anything. Most of the time the questions you could ask Vivian were the options highlighted abvoe anyway. If you asked Vivian a question which was not highlighted above, it could confuse her and bring you back to the start.
38	Trad.	Although the Virtual Assistant looks more funlier and probably appelas to a younger audience I would prefer the more traditional web format when I am placing an order and enter my personal and finanical details
40	VA	Again just to repeat as its a work in progress difficult to rate, but I really like the idea/concept.
42	Trad.	The differences are aesthetic only and the expectation of the virtual assistant is much higher than the actual experience. From the experience the web forms provides a clearer path to the end point and the assistant in its current for serves only to sitract
44	Trad.	I did not find Vivian as user friendly to get the order process completed.
46	VA	Yes. I tested this yesterday and wasn't sure if I had any preference - I think the more traditional approach just felt more familiar. I decided to try it again today. While the ratings are not significantly different, I did find the 'Vivian' version to be more comfortable and user-friendly.
49	VA	I found Vivians responses a little too linear to deem her as a 'virtual' assistant. She needs to have more variable responses, if that makes sense. :)
51	VA	It's very clear what happens when you type a question. I could not tell if I got a response. If the response could be colour coded or speech bubble like on smartphones. That way you could see the conversation progressing.

Ptcpnt.	Pref.	Overall Comments
53	VA	Hire Vivian
58	VA	Vivian could be combined with traditional web form. I think the virtual assistant would be something that would definitely differentiate vodfone from other operators and it also provide positive customer experience. There are some points that are useful from both processes Avatar could be combied with timeline from traditional web form etc. Thank you
59	VA	just nicer to use
60	VA	Would prefer the flows with the (option) of the virtual assistant. If the VA was presented differently with an explanation of how/when to use before the flow it would be great
61	VA	Vivian leads you through an intuative process to sign up and gives you prompts where you may need help indeciding what you really need. the prompts work int eh real world with someone who does not know the telco industry and is looking for a phone that does 'stuff' that suits their needs and pricing. You need to know a lot and have carried out your analysis of your package requirements a lot more to enter the second process. First process with Vivian was simple and straight forward to complete and potentially would increase sales through the channel and reduce calls to contact centres.
66	Trad.	For reasons given before. The Vivian web said it would answer any questions, but if you asked a question it said it did not understand! I would prefer not to have this option if it did not work.
68	VA	I would use the VA but think the first page needs to be changed from the input bar with "talk to vivian" to just a "lets start" button and then use the talk to vivian system.
73	VA	Virtual assistant seems a little more personal.
76	VA	The assistant is excellent, but i still feel if i was moving network i would prefer to meet someone in a store.
77	VA	I found the iinteraction quiet easy and would preceed with the order.....
79	Trad.	Process using traditional web form had a more professional feel to it. The virtual assistant might suit a younger target market.
80	VA	think it was easier to use for none computer literate people
81	VA	I like Viv, its more user friendly and personal, the web form is too serious and texty.
82	VA	I would have expected Vivian to move a little but that is a really minor point. I think it looks good
84	VA	Bit of both
86	VA	The guided interaction has the potential to be a much better experience. It this was a switching expereice It would feel that my new network was helping me even before I joined. However it runs the risk of being "dumbed down" too much. I think that the balance needs to be shifted slightly back towards the traditional exspecially on the financial input screens.
87	Trad.	The first site looks very friendly but does not have a professional feel about it. The second sight gives a more business like vibe to it and is just as easy to use as the first
89	Trad.	I think I was confused by the Virtual Assistant as I expected a voice. Maybe Talk to Vivian could read Text Vivian or IM with Vivian??? As a result of this confusion, I found the traditional web form less confusing.
93	Not entered	Either but not one in preference for the other
95	Trad.	vivian did not answer any of my questions

Ptcpnt.	Pref.	Overall Comments
96	Trad.	Nobody... likes virtual assistance, they are patronising and an insult to our human intelligence.
97	VA	Not that much difference, but Virtual Assistant site looks friendlier.
98	Trad.	Preferred the traditional experience

Appendix H - Online Experiment Consent Form

Consent Form

Researcher's Statement

We are asking you participate in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study or not. Please read the form carefully. This process is called 'informed consent'. You can print a copy of this form for your records. **All participants who complete this study will be given the opportunity to enter a prize draw for a Samsung Galaxy Tab**.

Purpose of the Study

This is an experimental study into the use of a Virtual Assistant in telecommunications customer sales and support. A Virtual Assistant is a Web-based helper, normally presented as an avatar, designed to aid customers in answering product and service questions or help navigate a website. Virtual Assistants are sometimes referred to as a 'chat bots'.

This study is undertaken as part of a masters degree in Cyberpsychology and is supervised by the Institute of Art, Design and Technology, Dun Laoghaire. For further information about the course visit www.iadt.ie or for further information about this study contact phelim.may@gmail.com or grainne.kirwan@iadt.ie.

Alternatives to Taking Part in this Study

Participation in this study is completely voluntary, you may exit at any time and you are entitled not to answer any survey questions.

Risks and Confidentiality

This study involves the use and rating of alternative Web experiences, it is not personal in nature and the subsequent questionnaire will be confined to your opinions of the experience only. All of the data collected will be anonymous and confidential, no personal information will be captured.

Study Procedures

If you agree to participate in this study you will be asked to work through two mock experiences related to switching a mobile telephone account to an alternative telecom operator (in this case the receiving operator is Vodafone, this is for illustration only). You will then be asked to rate your experience of each process via an online questionnaire.

Please note that you need to be over 18 to complete this questionnaire. By clicking next you agree to the inclusion of your responses in this study and confirm that you are over the age of 18. It should take approximately 15-20 minutes to complete.

Yes, I would like to take part

79

Appendix I - Online Experiment Consent UI & Introduction

Online experiment – Revised UI design and introduction screen

Appendix J - Online Experiment Screens

This Appendix contains screenshots of the Background Info, Debrief and Completion Screens

Background Information (Second Experience)

You are halfway there. Now you will be asked to repeat the process using a different type of interaction.

Again, please imagine that you are a bill pay customer and have decided to move your account to Vodafone. You already have a mobile phone and have selected a basic call plan costing €20.33.

Now you are going to tailor the plan to your specific requirements by choosing from a number of package add-ons. Finally you will complete the form by adding your personal details. **Please note that this detail is not captured or stored, you may enter real or fictitious information**.

Click here to start

Debrief and Competition Entry

In this study we presented you with two ways of switching a mobile telephone account to an alternative vendor. One used a traditional Web form and the other was supported by a Virtual Assistant. We are testing if there is a significant difference in your opinion of the two experiences. We recognise and appreciate that this study required you to commit your free time and energy, thank you.

If you know of any friends or acquaintances that are eligible to participate in this study, please forward the link to that person. We request that you not discuss it with them until after they have had the opportunity to participate as prior knowledge of the process or questions asked during the study can invalidate the results. We greatly appreciate your support.

If you would like to participate in the prize draw for a Samsung Galaxy Tab then please enter your email address in the box below.

If you would like to get in contact with us, or ask a question about this survey please click on this link or e-mail phelim.may@gmail.com.

Competition Entry Details

Name [   ]
E-Mail Address [   ]

[Submit]

Competition Entered

Thank You
Thank you for submitting your details. You have been entered into the draw to win a Samsung Galaxy Tab.