Three Dimensional Product Presentation Quality Antecedents and Their Consequences for Online Retailers: The moderating Role of Virtual Product Experience

Abstract

This study investigates the impact of three dimensional (3D) product presentation quality (3D-Q) on attitude toward presented product and attitude toward website which in turn impact users'satisfaction. Therefore, this research developed a hypothetical online retailer website, which presents a variety of 3D laptops that allowsusers to control the content and form of the 3D flashes. We measured 3D-quality based on a multi-dimensional construct. In other words, we define and operationalize 3D-quality based on information quality, system quality, authenticity, and enjoyment (second-order). We employed a non-student sample (n=410) to collect the data. We find that 3D-quality determines perceptions of attitude toward presented product and attitude toward website, which in turn influence users' satisfaction. Furthermore, we find that virtual product experience moderates the relationships between attitude toward presented product, attitude toward website and users' satisfaction. Our studyprovides important implications for e-tailers.

Keywords: 3D virtual product experience, 3D-quality, attitudetoward product, attitude toward website, satisfaction, Jordan

Introduction

Increasingly, online retailing has been growing over the business field and representing a new platform for both customers and retailers to exchange different kinds of values (Hasan, 2016; Yoh et al., 2003). As stated by recent report from OC&C Strategy Consultants, PayPal and Google, in four highly developed countries namely the UK, US, Germany and China, online sales are more likely to enlarge to reach the level of £645bn by 2018 in comparison with£325 in 2015(Telegraph, 2015). Worldwide, according to report published in Statista (2016) for the global online retailing sales for the period between 2014 to 2020, online retailing sales were able to account about $1.55 trillion in 2015 and this number is expected to reach $3.4trillion by the end of 2019.

Indeed, online retailing has revolutionised the way that customers interact with retailers (Algharabat and Shatnawi, 2014; Algharabat and Zamil, 2013;Parket al.,

2016; Kim et al., 2011; Liao and Keng, 2013). As a competitive necessity, firms have extensively integrated online shopping and online retailing as an essential platform along with traditional brick and mortar stores (Algharabat and Shatnawi, 2014; Lee, 2012). Essentially, retailer firms are looking to have more opportunities to better match their customers' needs and wants, and enhance customer's loyalty, and accordingly, contributing to their brands identity and profitability. Together, such platforms can contribute to the customers' daily life by facilitating access to products, services and information without time and place restrictions (Bilgihan, 2016; Hung et al., 2012; Kokkinoua and Cranage, 2013; Lin and Lian, 2008; Zhu et al., 2013).

However, the successful implementation of online retailers largely depends on their ability to contribute to customers' attitudes and satisfaction toward both presented products and website as well(Luan et al., 2016; Chen et al., 2015). This needs to have further understanding about the main predictors of customer's attitudes and satisfaction. Theoretically, website quality represents one of the most fundamental aspects considered by customers to evaluate either the interface orconsumers' entire online shopping experience (Algharabat and Shatnawi, 2014; Luan et al., 2016). Further, there is always a necessity to explore the role of experience especially virtual product experience on the customer perception toward all aspects related to online shopping (Algharabat, 2016; Algharabat, 2014a; Algharabat and Shatnawi, 2014;Overmars and Poels, 2015; Lee, 2012;Luan et al., 2016).

Within the context of online shopping, we noticed that previous literature (Algharabat and Shatnawi, 2014; Algharabat and Zamil, 2013) has employed individual constructs to define and conceptualise 3D-quality (3D-Q) based on a uni-dimensional construct. Therefore, previous research did not get the chance to have a comprehensive definition and measure of 3D-Q. Previous research either described the characteristics of 3D-Q without attempting to link them together, or investigated the main antecedents of 3D-Q. Therefore, based on the prior classifications and the antecedents of 3D-quality (Algharabat and Shatnawi, 2014;

Algharabat and Zamil, 2013) we define 3D-quality as *'overall users perceptions of the excellence and effectiveness of an e-tailer's product presentation through its virtual store and often enhances information, system, authenticity, and enjoyment'*. Moreover, this paper aims to answer the following research questions: (i) what are the main dimensions of 3D quality. (ii) How 3D-Q affects attitude toward product, attitudes toward website which in turn impact users' satisfaction. (iii) To what extent virtual product experience moderates such relationships.

Importantly, there is a quite few studies that have examined the related issues of online shopping and retailing in Jordan (Algharabat, 2016; Algharabat, 2014a; Algharabat and Shatnawi, 2014). Indeed, Jordan is one of the highly evolved countries in terms of technology and Internet subscribing; for instance, the number of Internet subscribers has reached 5.7 million users in mid-2015 with penetration rate 73.6%. This is in addition to the fact that Jordanian people (Petra New, 2016). Further and according to IO, Hsoub (2016), the size of the Jordanian online relating sector was 0.21 billion. As well as, 1.6 million Jordanian customers who have used online shopping to purchase different kinds of products and services as reported by the same report of IO. Hsoub (2016). This means that online retailing in Jordan is a promising sector deserves further research and examination. Such studies of online retaking could provide more clues about the most important aspects that considered by customers in Jordan as a developing country especially in the fact that most prior studies of the related issues of online retailing have conducted within developed countries. Therefore, researchers were motivated to conduct their empirical study in Jordan.

Literature on Three Dimensional Product Presentation Quality
Website Quality
Previous research (e.g., Ahn et al., 2003; Ho et al., 2012; Wolfinbarger and Gilly, 2003) posit that e-shopping quality refers to the overall consumer perceptions of the excellence and effectiveness of an e-tailer's product and/or service offering

through its virtual store. Therefore, both the quality of website features and interface performance influence consumer's perception of Internet shopping.

Previous research assesses website quality based on interface or consumers' entire online shopping. For example, Loiacono, Watson, and Goodhue (2002) introduced the WebQual™ and identified twelve dimensions to measure website quality (informational fit-to-task, interactivity, trust, response time, ease of understanding, intuitive operations, visual appeal, innovativeness, flow/emotional appeal, consistent image, online completeness, and better than alternative channels). Kim and Stoel (2004) employed six dimensions to measure website quality (web appearance, entertainment, informational fit-to-task, transaction capability, response time, and trust). Yoo and Donthu (2001) introduced the SITEQUAL and measured website quality by conceptualizing four dimensions (ease of use, aesthetic design, processing speed, and security of personal and financial information). Zeithaml, Parasuraman, and Malhotra (2000) introduced the eSQ scale to measure website quality. The authors' scale consists of eleven dimensions (reliability, responsiveness, access, flexibility, ease of navigation, efficiency, assurance/trust, security/ privacy, price knowledge, site aesthetics, and customization/personalization). In line with Parasuraman, and Malhotra (2000), Parasuraman, Zeithaml, and Malhotra (2004) introduced the E-S-QUAL to measure online retail quality based on four dimensions (efficiency, fulfilment, system availability, and privacy).

Wolfinbarger and Gilly (2003) developed eTailQ, which measured consumers' perceptions of e-tail service quality. To develop the scale, the authors included eight factors (fulfilment/reliability, customer service, personalization, experiential/atmospheric, ease of use, informativeness, selection, and security/privacy) of website interface and marketing attributes. Wolfinbarger and Gilly's (2003) factors reduced into four dimensions: website design, security/privacy fulfilment/reliability, and customer service. Thus, it can be noticed that previous scales on website quality focused on the environment and interface (WebQual, SiteQual, eSQ), while the eTailQ scale focused on online retail service quality.

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3D Product Presentation Quality

Previous research on information system (IS) success model (DeLone and McLean 1992; DeLone and McLean, 2003) emphasises the importance of factors which often impact IS success (system quality, information quality, service quality, attitudinal outcomes and performance-related outcomes). However, within the context of online retailing, few attempts focused on measuring the quality of three-dimensional (3D) product presentation.

Previous research (Jiang and Benbasat 2005; Li et al. 2001; 2002; 2003; Suh and Lee 2005) on customer's online product experiences uses virtual reality (VR) techniques such as such 3D product presentation which enables consumers to visual inspection products which are simulated online with enlargement, zoom in or out on the product, rotate the product, and inspect the products functions. Li et al. (2001) defined virtual product experience (VPE) which is accompanied by 3D product presentation as the psychological and emotional states which consumers have once interact with products in a 3D environment. Therefore, according to Li et al. (2001, 2002, 2003) high quality of 3D product presentation often enhances consumers' ability to feel, touch, and try products on electronic websites. Thus, the main goals of the 3D product presentation are to help consumers to understand more about the product functionality, product performance and it allows consumers toevaluate the superiority of the product features. Furthermore, 3D product presentation often enhances consumers' attitudes, knowledge and purchase intentions (Hoch and Deighton 1989; Jiang and Benbasat 2005; Li et al. 2001; 2002; 2003; Suh and Lee 2005).

Li et al. (2001), in a qualitative study, identified five critical characteristics of 3D product presentation (active process, presence, involvement, enjoyment, and affordances) the authors posit that the higher the characteristics of 3D product presentation, the better the virtual experience derived from navigating a 3D product. Even though the authors identified (tele)presence as one factor which impact the quality of 3D experience, the authors were not able to institute any causal linkages with the protocol methodology. Therefore, Li et al. (2002) measured 3D VPEusing the notion of presence. The authors posit that high levels

of media characteristics considered the main enabler of the quality provided by the 3D product experience. Many researchers used the notion of telepresence to conceptualize consumers' experiences in online environments. For example, Coyle and Thorsen (2001) assert that high interactivity and vividness levels increase perceived telepresence of websites. Using an online advertising context, Klein (2003) posit that previous research (Coyle and Thorson, 2001; Novak, Hoffman, and Yung, 2000) did not study virtual product experiences but rather virtual websites experience. Therefore, Klein (2003) investigated the notion of telepresence with its underlying dimensions (user control and media richness) as the main enablers for VPE. The author investigates the impact of VPE (telepresence) on consumer responses (brand beliefs and attitudes) and finds that high level of user control and media richness enhances the quality of 3D virtual product.

Hopkins, Raymond and Mitra (2004) argued that Klein's (2003) study considered one of the few studies which investigated the impact of perceived telepresence, in an online advertising context. However, Hopkins et al. (2004) posit that Klein's (2003) study does not examine the role of involvement (as a characteristic of VPE) as recommended by Li et al.'s (2001) study and its relationship with perceived telepresence. The authors, therefore, measured VPE depending on the notion of telepresence which has been measured based on media richness but not interactivity. Therefore, according to Hopkins et al. (2004), high media richness quality is the main enabler of 3DVPE. Further, the authors did not consider involvement as a predictor forVPE, instead they test it as a moderator between perceived telepresence and consumer responses (i.e., attitude toward the advertisement, attitude toward the brand, and purchase intention).

Toward this end, Jiang and Benbasat (2005) classified VPE technology into two types; visual control (e.g., software which allows consumers to move, rotate, and zoom in and out a product's image, see it from different angles, distances, and perspectives) and functional control (e.g., software which enables consumers to sample different functions of products through their computers). Examples of functional control are the ability of the 3D product presentation to emit alarm

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sounds, through the movement of particular parts of the product, or through changes in the appearance of the product. Therefore, according to the authors, functional control includes how the 3D product presentation works, while visual control relates to how the 3D product presentation looks (i.e., the 3D product form). Moreover, the authors investigated the impact of visual and functional controls (as the main enablers of VPE) on products that have 3D visual appeal and contain varied functionality information. The authors find that high quality of visual and functional controls lead to higher perceived diagnosticity (the extent to which consumers believe the shopping experience is helpful to evaluate products) and flow (computer users' affective responses to computer usage, characterizing playfulness and exploration as defining characteristics of human–computer interactions).

Unlike Jiang and Benbasat's (2005) study which focused on the enablers of VPE using 3D product presentation, Jiang and Benbasat (2007a) investigated the impact of functional mechanisms (measured by interactivity and vividness of the online presented product) including static images, video-with-narration, video-without-narration, and functional control. Jiang and Benbasat (2007a) concluded that 3D product presentation, as a type of functional mechanism should be designed with high level of both interactivity (the way that consumers interact with 3D product) and vividness (the representational quality of how product information is conveyed to consumers) to achieve the virtual experience using 3D product presentations. However, Jiang and Benbasat (2007a) study did not employ the notion of telepresence, which prior research (Steuer 1992) has suggested to measure the enablers of VPE. The authors focused on vividness and interactivity as the main enablers of VPE. The authors justify this because the notion of telepresence seems to be less relevance and thus, it deals with the feeling of "being there" in a virtual environment (Steuer, 1992). However, Jiang and Benbasat (2007a) posit that their research centres on individual products, rather than an environment. Therefore, the authors replaced the notion of telepresence with the notion of compatibility (users' perceptions of the extent to

which a product experience is similar to or consistent with their physical product experience).

Algharabatand Dennis (2010) focused on users' ability to control the content and form of the 3D product presentation (interactivity), and their ability to change the colour of the 3D product presentation (vividness) as the main enablers of VPE. Algharabat and Shatnawi (2014) find that perceived usefulness (conceptualised as the degree to which a person believes that using 3D product presentation would enhance his/her shopping performance), perceived enjoyment and perceived social presence (conceptualised as having a sense of human warmth and sociability) are the main enablers of 3D-quality (3D-Q). Algharabat and Zamil (2013) posit that 3D-quality is enhanced by two enablers; 3D product presentation information quality and 3D product presentation system quality.

Therefore, it could be noticed that previous studies treated 3D-Q as a black box. For example, (i) we believe that previous studies still lack the chance to develop a comprehensive definition of 3D-Q and thus the main dimensions of 3D-Qhave not been investigated in a comprehensive way. All the previous attempts focused on defining the enablers of VPE created by 3D product presentation but not the main dimensions which impact the quality of the 3D product presentations. (ii) We noticed that extant literature on the 3D-Q area has used individual constructs to measure it. Notwithstanding, we believe that the dimensions of 3D-Q are still questionable. For example, should researchers depend solely on notions such as interactivity, vividness, visual control, functional control, functional mechanism, 3D information quality, 3D system quality, 3D usability and 3D enjoyment to measure 3D-Q or should they use a combination of them? Therefore, we aim to empirically answer this question.

To that end, we believe that previous literature in 3D-Q is very rare; accordingly, we explore the 3D-Q of online shopping websites. This argument comes after that 3D product presentation is often a part of online services provided by online retailers and, thus, the 3D-Q enhances the quality of the online shopping website. Recent studies have shown that website elements such as product visualisations, layout and colour may impact consumer evaluation of website quality (Algharabat

and Dennis, 2010; Valdez and Mehrabian, 1994; Van Rompay et al., 2005; Zhang et al., 2006).

Based on the previous categorizations of the antecedents of 3D-quality (Algharabat and Shatnawi, 2014; Algharabat and Zamil, 2013), we propose the following definition of 3D-quality *'overall user's perceptions of the excellence and effectiveness of an e-tailer's product presentation through its virtual store and often enhances information quality, system quality, authenticity, and enjoyment'*. We believe that this definition has not been tested in the earlier research, and, thus we expect that measuring 3D-Q based on the proposed definition as well as testing the moderating impact of virtual product experience will be the contributions of this research, an issue that has not been tested in any previous empirical study. Moreover, this paper aims to analyse how 3D-Q affects attitude toward product, attitudes toward website which in turn impact users' satisfaction, as well as to find out to what extent VPE moderates such relationships, another issue that has not been tested in any previous empirical study.

Research Model and Hypotheses

Dimensions of the 3D-Quality

Based on the recent studies (Algharabat and Shatnawi, 2014; Algharabat and Zamil, 2013) which measured 3D-Q based on its antecedents, we believe that the quality of 3D product presentation should be treated as a multi-dimensional construct rather than aunidimensional one.Therefore, it was important to capture the fundamental dimensions of the 3D-Q in order to enable customers to properlyvisualizethe targeted product, and accordingly, to help them evaluate the presented product and to make online purchase easier. Previous studies(e.g. Algharabat and Shatnawi, 2014; Algharabat and Zamil, 2013) on 3D-Q define and conceptualise 3D-quality based on one of the following constructs: 3D information quality, 3D system quality, perceived usefulness, perceived enjoyment and perceived social presence. However, the previous research did not attemptto produce a comprehensive combined scale, based on the above constructwhich can be used to measure the 3D-Q within the context of online

retailers. Accordingly, and as seen in Figure 1, 3D information quality, 3D system quality, 3D authenticity, and 3D enjoyment all were integrated as 3D-Q scale. The proposedscale in the current study, hopefully, will provide a clear picture to readers regarding the important dimensions of 3D-Q. We decided to include the above dimensions for the following reasons; (i) in line with previous studies, we adopted the notions of information quality and system quality to reflect the content and context of the 3D product presentation. (ii) We included the notion of authenticity to reflect the psychological aspect of users while dealing with the 3D product presentation. (iii) The enjoyment construct has been used to reflect the affective aspect which is expected to enhance hedonic users to navigate the 3D product presentation. To that point, we believe that the proposed dimensions not only cover what previous researchers investigated, but also they added more dimensions from different foci. Additionally, the proposed scale was adopted in the current study to verifythe causal paths between 3D-Q, attitude toward presented product and attitude toward website, which in turn influence consumers' satisfaction (see Figure 2).
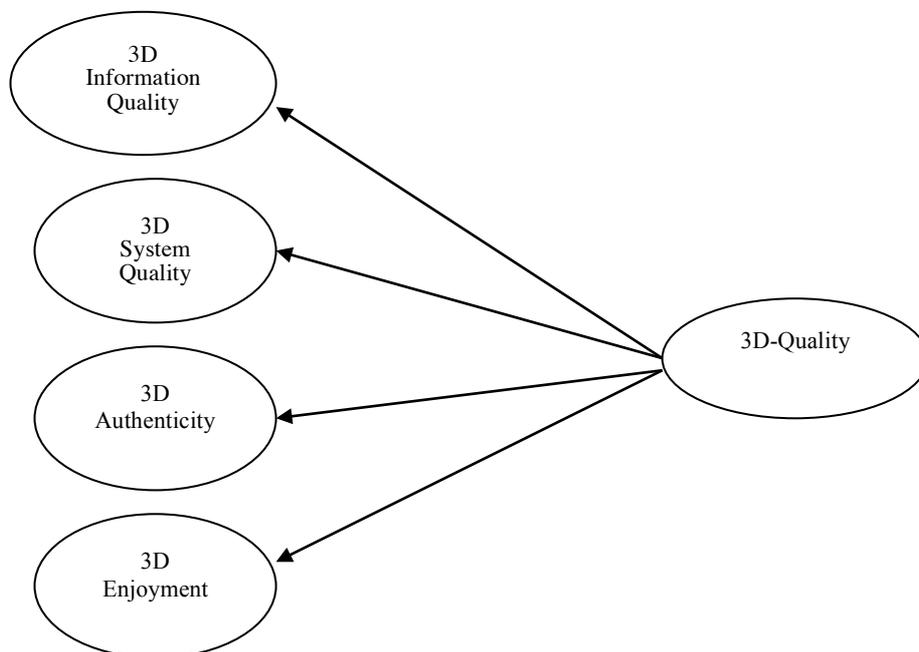

Figure 1.3. D-Quality Combined Scale: A Second Order CFA
Adapted from Algharabat and Dennis (2010); Algharabat and Zamil (2013);DeLone and McLean (1992, 2003), Fiore et al. (2005); Li et al. (2002, 2003)

3D Information Quality

Consumers often seek to have information about product. Thus, the Internet considers one of such sources, which often enhance consumers' virtual experience (Klein, 2003) in which consumers often interpret the web information similar to information obtained from their offline direct experience (Li et al., 2002).

DeLone and McLean (1992) define information quality as user's perception of the quality of outputs, which information system presented. Furthermore, the authors posit that relevance of information, timeliness of information, and accuracy of information are the main elements that should be used to measure information quality. Huh et al. (1990) assert that accuracy, completeness, consistency and currency of presented information are main dimensions to measure information quality. In the same context, Nelson et al.'s (2005) study adds a fifth element to the Huh et al.'s (1990) study, namely format, which related to the presentation layout of information outputs. However, McKinney et al.'s (2002) research is centered on website quality of information. To measure information quality, Zhilin et al. (2005) relied on usefulness of content, reliability, currency, accuracy, and adequacy of the presented information. Doll et al. (1994) assert that content, accuracy, format, ease of use, and timeliness are the main antecedents to measure information quality.

Jiang and Benbasat (2005) investigated the impact of visual control on website diagnosticity. The authors posit that visual control which allows consumers to view the 3D product presentation from different angles, to enlarge, to rotate, to move, and to zoom in and out a product's image, provides information about the presented product and thus this provide consumers with vivid information about the product. The authors assert that virtual control (measured with both virtual control and functional control) which depends on multimedia technology reflects the notions of interactivity and vividness (the quality of product presentation) which previous research (Li et al., 2002, 2003; Klein, 2003) employed to measure their impact, as enablers of VPE, and thus it is helpful to users to get relevant product information. The authors argued that more vivid 3D product presentation provides consumers with more information, more ability to examine the product,

stimulates more sensory channels, allows consumers to realistically perceive the product, and thus improves consumers' productunderstanding.

Li et al. (2002) posit that 3D product presentation enhances consumer information due to its characteristics and thus increase product knowledge. Li et al. (2003) assert that 3D product presentation enhances information seeking. Jiang and Benbasat (2007a) assert that using interactive technologies such as 3D product presentations enhance consumer's ability to understand more about information presented in the 3D presentation due to the ability of such technology to facilitate user's ability to "feel, touch, and try" the presented products (Jiang and Benbasat 2005, Li et al. 2001, Suh and Lee 2005). The authors stated that 3D product presentation enhances functional mechanismswith its main enablers; vividness and interactivity.

Jiang and Benbasat (2007b) relied on the theories of multimedia learning and active learning to investigate the impact of four types of product presentations (static pictures, videos-without-narration, videos-with-narration, and VPE) onconsumer actual knowledge and perceived knowledge. The authors posit that VPE which requires active learning and trail allows consumers to virtually feel, touch, and try products and it often enhances consumers understanding of the product features and performance. The authors assert that using 3D product presentation enhances website diagnosticity (defined as consumers' perceptions of the extent to which a particular website is helpful for them to understand products in online shopping (Jiang and Benbasat 2005; Kempf and Smith 1998).

Algharabat and Zamil (2013), define 3D information quality as the extent to which the 3D provides accurate, relevant, complete and precise information regarding the presented product. The authors state that 3D information quality should reflect the content and form of the presented product, which users look for. Furthermore, the authors posit that such information should help users to understand and evaluate the quality and performance of products sold online. Algharabat and Shatnawi (2014) investigated the impact of perceived usefulness, perceived social presence and perceived enjoyment on quality 3D-Q. The authors employed 3D technology in the online apparel industry and tested their model

using My Virtual Model™ technology. The authors find positive relationships between perceived usefulness and 3D quality. Therefore, we believe that information quality is a main dimension for the 3D-quality.
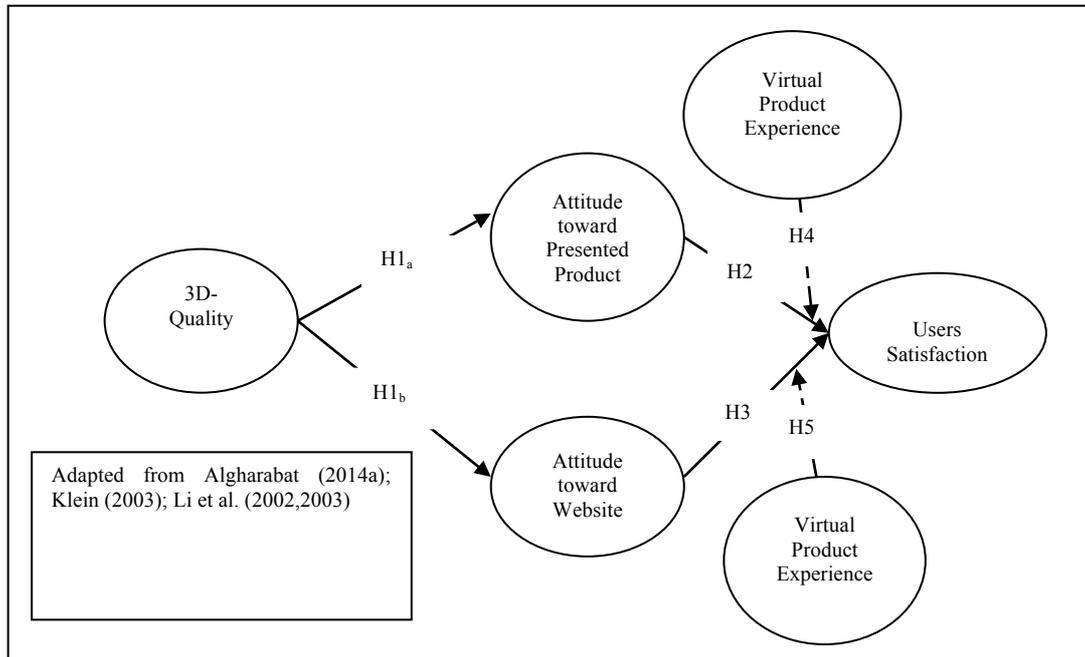
Figure 2. Conceptual Framework

3D System Quality

DeLone and McLean (1992) define system quality as individuals' perceptions of a system's overall performance. DeLone and McLean (2003) measured system quality via attributes such as ease of use, functionality, reliability, data quality, flexibility, and integration. Previous research studies (e.g., Eisenmann and Pothen, 2000; Nelson et al., 2005) assert the importance ofusability, visual design and ease of navigation as main elements of system quality.

The notion of interactivity has attracted the attention of many scholars (Sundar, 2004). Therefore, this concept has been defined and conceptualized in different ways (Sundar, 2004). For example, within the context of virtual reality, Steuer's (1992, p.84) define interactivity as "the extent to which users can participate in modifying the form and content of a mediated environment in real time".Therefore, according to previous research (i.e., Ariely, 2000; Klein, 2003) consumer ability to modify the VPE which is capsulated in the 3D product

presentation is explained by user control. Xu and Sundar (2014) defined interactivity of e-commerce website based on its functional features (e.g., flipping the product, sliding the product, rotating the product). The authors posit that the presence of such technology features, interface tools, allow users to interact with the interface or the system (Sundar, 2007). Sundar, Kalyanaraman and Brown (2003) assert that such interface tools often enhance information exchange between the user and the interface. Fiore et al. (2005) argue that 3D product presentation provides consumers withmany benefits such as; facilitating communications with the product, information customization, entertainment, and image manipulation.

Kim, Fiore and Lee (2007) indicate that 3D product presentation provides high level of image interactivity technology due to its ability to enlarge front views of products, zoomed-in or out, illustrate the presented products with different angles and from different distances. All these interactive features make consumers feel more control over the manipulationof the product image.Schlosser (2003) defined a particular type of interactivity, namely, object interactivity. The author argues that object interactivity focused on product features, but not website and found that object interactivity helps consumers to formulate mental imagery about the product consumption. Jiang and Benbasat (2005) have projected that consumers' ability to manipulate 3D product presentation allowsthem to control perspectives anddistances of product's appearance.

Algharabat and Zamil (2013) define 3D system quality as the extent to which the 3D is easy to use, user friendly, and well designed to navigate the presented product. Kim and Forsythe(2009) reflected 3D system quality by focusing on usefulness and ease of use of the presented products. Fiore and Jin (2003) posit that consumers' ability to manipulate 3D product presentation (i.e., to check the side and back views of the 3D product) often enhances visual sensory information. Kim et al. (2007) indict the positive relationship between 3D virtual model visual design and user's involvement with the presented product. Algharabat and Dennis (2010) postulate the importance of ease of use and control of 3D product presentation to enhance VE. Jiang and Benbasat (2007a) assert the

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importance of 3D interactivity in creating a diagnostic 3D product presentation. Therefore, we believe that system quality is a main dimension for the 3D quality.

3D Authenticity

In order to measure the quality of 3D product presentation, the presented products should be authentic. Algharabat and Dennis (2010) employed the notion of 3D authenticity to measure 3D VPE. According to Algharabat and Dennis (2010), 3D authenticity capturesconsumers' psychological statein a way that customers perceivethe virtual objectscomprised in the 3D over the virtual area as actual objects.This, in turn, provides customers withthe requested information regarding the products aspects clearly, and accordingly, empowering them to effectively understand and assess the significant dimensions of the 3D-Q and performance of the products that are promoted and traded electronically. Algharabat and Dennis (2010) assert that using the notion of telepresence does not reflect reality of the online 3D product presentation. Therefore, the authors defined and conceptualized VPE based on authenticity (consumers' sense of being in a simulated real world) of the 3D presentation depending on its enablers (control and vividness). Thus, 3D-Q should enhance users' ability to simulate their offline experiences. Therefore, we believe that authenticity is a main dimension for the 3D quality.

3D Enjoyment

The 3D enjoyment reflects users' enjoyment once navigating the 3D product presentation. The importance of this dimension has been posited in previous literature. For example, Shih (1998) posits that enjoyment is one of the main outcomes produced by navigating 3D product presentation. Li et al. (2001, 2002, 2003) postulate that feelings of pleasure produced by 3D product presentation often enhance users' evaluations of VE. Li et al.'s (2001) qualitative study shows that consumers ability to virtually modify products (i.e., changing product coloring) increase users' enjoyment. Fiore et al. (2005) asserted that high level of 3D product presentation often enhances experiential values. Kim and Forsythe (2007) posited the ability of 3D product presentation to enhance participants'

hedonic benefits. Algharabat and Dennis (2010) asserted that authenticity of the 3D product presentation leads to enjoyment. Therefore, we believe that enjoyment is a main dimension for the 3D-quality.

3D-Quality, Attitudetoward Product Presentation and Attitude toward Website

Jiang and Benbasat (2005) define attitude toward products as consumers' overall evaluations of products. Therefore, we measured attitude toward 3D presented product as affective and cognitive construct. Doing so would reflect users'believe that a 3D product presentation is an authentic one and, thus, will reflect their offline experience (i.e., the direct experience) (Jin, 2009;Kempf and Smith 1998; Smith, Feinberg, and Burns 1998; Smith, 1993). As a result, consumers will perceive product information thoroughly and favourably. 3D-Q often provides users with visual information (Kim and Lennon, 2008), which influence user's affective attitude and verbal information, which is expected to impact their cognitive attitudes and vice versa (Kim and Lennon, 2008).

Li et al. (2002, 2003) assert that 3D product presentation has a positive influence on brand attitudes, product knowledge and purchasing intention. Suh and Lee (2005) reported that a 3D product presentation has a significant impact on attitude toward product. Fiore and Jin's (2003) study reveals that using a highly interactive 3D product presentation has a positive influence on customers' attitude. Klein's (2003) research showed that high levels of users control (interactivity) and media richness (vividness) have a significant effect on the intensity of beliefs and attitudes. Coyle and Thorsen (2001) found that high level of vividness resulted in stronger attitudes toward website. Hopkins et al. (2004) state that perceived telepresence significantly affects attitude toward the brand and attitude toward the advertisement. Chen and Tan (2004) find that customer service quality directly influences attitude toward using virtual stores. Algharabat and Zamil (2013) find a positive relationship between 3D quality and attitude toward the presented product. Fiore et al. (2005) find that the interactivity nature of 3D product presentation enhances consumers' global attitudes toward online stores. Algharabat and Abu-ElSamen (2013) assert the importance of 3D product

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presentation to enhance users' attitude toward the product and the website. Algharabat (2014b) asserts that 3D product presentation impacts users' attitude toward online retailer. Algharabat (2016) posits the positive relationships between 3D product presentations and attitude toward websites (e.g., knowledge and entertainment). To that point we believe that building positive relationship between 3D-Q and attitude (toward the presented product and the website) is vital for e-retailers. Attitude toward the website will attract the attention of users and increase their cognitive and affective attitude toward the web which might end up with searching for more products and hence increase their purchase intensions and actual behavior. Therefore, we hypothesise:

H1a: There is a positive relationship between 3D-Q and attitude toward presented product.

H1b: There is a positive relationship between 3D-Q and attitude toward website.

Moderating Role of Virtual Product Experience on the Relationships between Attitude and Users Satisfaction

Previous research on VPE defines it based on different constructs (Serrano et al., 2013; Overmars and Poels, 2015). For example, Jiang and Benbasat (2005) defined and conceptualized VE based on perceived diagnosticity and compatibility. Algharabat and Dennis (2010) relied on the notion of authenticity (physical simulation of consumers' offline experience) to define VPE. Other scholars (Li et al., 2002; 2003; Klein, 2003; Suh and Lee, 2005) centred their efforts on the notion of telepresence (users' ability to be transformed into another area).

To that end, Algharabat (2014a) revised the extant literature and find a gap in conceptualizing and modeling VPE for the online retailers. The author suggests a combined VPE scale. Algharabat's (2014a) study based on previous research (Algharabat and Dennis, 2010; Klein, 2003; Overmars and Poels, 2015; Li et al., 2001, 2002, 2003; Jiang and Benbasat, 2005, 2007a, b) and definesVPE based on a multidimensional scale consists of diagnosticity, authenticity, compatibility, flow and enjoyment. Furthermore, Algharabat (2014a) argue that VPE reflects the

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direct experience, which users can find offline and that VPE helps users to imagine the illustrated product properly.

Therefore, we employed the construct of VPE, as conceptualized by Algharabat (2014a), as a moderator in this study. To the best of authors' knowledge, this is the first study, which investigates the moderating role of VPE on the relationship between attitude toward the presented product, attitude toward the website and users' satisfaction. We tried to revel the previous literature on the importance of online experience as a moderator. However, we find that previous literature measured online consumer experience rather than VPE (Gefen et al., 2003; Hoffman and Novak, 1996; Novak et al., 2000; Venkatesh et al., 2003). Further, previous literature examined online experience based on two levels (i.e., high or low). However, this research measured VPE as a continuous construct.

The existing literature (e.g., Petty, Cacioppo, and Schumann, 1983; RatneshwarandChaiken, 1991) on user's attitude indicates that the consumer's experience moderates attitude and the process by which it is formed. Therefore, it is expected that such overall evaluation and strengthsto be influenced by the level of consumer experience (Oliver, 1996). Fishbein and Ajzen (1975) posit that an individual's positive experience will have an important effect on his/her behavior.

Previous theories (i.e., attitude-formation theories) such as the elaboration-likelihood model (central route and peripheral route, Petty and Cacioppo, 1986; Petty et al., 1983) and the heuristic–systematic processing model (systematic process, heuristic process, Chaiken, 1980) emphasised on the importance of consumer experience to determine his/her attitude and that consumer's ability (i.e., knowledge and experience according to Alba and Hutchinson, 1987) and motivation impact the individual's attitude-formation. Therefore, once a person level of ability and motivation is high, then it is highly and likely to employ the central route or systematic process. Therefore, this approach ends up with a strong influence on behaviour.

On the other hand, ifaperson level of ability and motivation is low or even lack both of them, then his/her attitude is formulated based on the peripheral route or heuristic process. The elaboration-likelihood model and the heuristic–systematic

processing model offer reasons about the variation in strength of the relationship between attitude and behaviour. Therefore, it is expected that VPE moderates the relationship between attitude toward the presented product and users' satisfaction. Previous research investigated the moderating role of online experience. For example, Rodgers, Negash and Suk (2005) investigated the moderating role of online experience (conceptualised as knowledge stored in memory and decision-making ability) between online satisfaction and online loyalty. The authors find the relationship between online satisfaction and online loyalty is stronger for consumers with more online experience than for consumers with less online experience. Pappas et al. (2014) establish that experience is important in forming customers' perceptions, regarding their expectations from online retailers. Zhou et al. (2007) confirmed that higher experience increased satisfaction with online shopping. Gefen et al. (2003) tested the moderating effect of experience in online stores. Rodgers, Negash and Suk's (2005) study find that the relationship between online satisfaction and loyalty is moderated by online experience. The more experienced the users are, the stronger the relationship would be.

However, Yoon, Hostler, Guo and Guimaraes (2013) found that consumer online shopping experience does not have a significant effect on the relationship between customer satisfaction and customer loyalty. Venkatesh et al. (2003) identify user experience as a factor, which moderates the effect of effort expectancy on behavioural intention. Kwak, Fox, and Zinkhan (2002) posit that the adoption of e-commerce is influenced by the previous experience of individuals with the Internet. Thus,

H2: There is a positive relationship between attitude toward presented product and users' satisfaction.

H3: There is a positive relationship between attitude toward website and users' satisfaction.

H4a: Virtual product experience positively moderates the relationship between attitude toward the product and users' satisfaction.

H4b: Virtual product experience positively moderates the relationship between attitude toward the website and users' satisfaction.

Research Method

Stimuli and Interface Design

In order to validate the conceptual model and to verify the research hypotheses, we followed Algharabat (2014a) and Suh and Lee's (2005) and Park et al.(2008) methodologies in this research.Therefore, the researchers designed and customized an online shopping retailer which sells laptop.

We designed the website in a way that helps customers to monitor the content and formof the 3D.Indeed, byclicking on the 3D presented products, users were freely able to enlarge, minimize and rotate the 3D product presentations.Users were also allowed to select laptop's colour that they would like to see.Besides, we provided participants withthe related information of the presented 3D laptop features(i.e., weight, size, visual clarity, price, warranty, special effect features)so the features of the 3D were prepared to contribute to the way that customers can imagine and visualize the presented products properly, and accordingly, contributing to the customers' online shopping experience.

In fact, participants did not have anidea or previous knowledge about the designed website of the current study prior to using it. They even were not given any information regarding the brand name of the products sold in the website.Therefore, the researchers successfully prevent the influence of users' prior attitudes and experience as suggested byAlgharabat and Dennis (2010) and Fiore et al.(2005).Refer toAppendix A for screen shot of the 3D laptops.

Justifications for Using the Stimuli

In fact, we choose laptops as the main stimulus on this research due to their ability to be assessed, using 3D interface,based on significant featuresas well as their ability to be evaluated based on both kinds of features: experience (i.e. weight, visual clarity, and size)and search (i.e. special effect features, price, and warranty).Over the prior literature, Algharabat (2014a); Algharabat and Zamil(2013); Algharabat and Dennis(2010); Li et al.(2001); Suh and Lee(2005) have also adopted laptop products in their studies. Such of that, applying 3D

laptops was justified by Li et al. (2001) due to the fact that such product categories have an influence on the consumers'behavioursas well as their attitudes over the online area. In his study, Algharabat (2014a) also supported that either the customers' penchant or customers' orientationare largelyaffected by 3D laptops. Customers' satisfaction was noticed by Algharabat and Zamil(2013) to be affected by 3D laptops. Thus, 3D laptops were found to be appropriate product category to be tested and introduced to the current study' participants.

Sample and Procedures

In spite of the fact that probabilitysampling techniques (i.e. simple random sampling; the stratified sampling technique) characterizes with a higher degree of generalizability in addition to the lower extent of sampling bias, current study found applying such kind of samples inapplicable (Bhattacherjee, 2012). This is attributed to the fact that conducting such sampling technique requests number of conditions that do not exist in the current study population. Such of these conditions, this study was not able to find an inclusive and updated list of the online shoppers in Jordan. Accordingly, conductingany kind of random sampling techniques was not achievable (Castillo, 2009; Dwivedi et al., 2006). This, in turn, makes using convenience sampling technique more applicable in the current study (Bhattacherjee, 2012; Dwivedi et al., 2006; McDaniel and Gates, 2006). Additionally, by using convenience sampling, researchers were able to approach alarge number of Jordanian online shoppers with less time and cost (Bhattacherjee, 2012; Castillo, 2009; Wilson, 2006).

Moreover, over the prior literature, large number of studies have adopted the convenience sampling approach to reach the targeted respondents (i.e. Bryman and Bell, 2007; Castillo, 2009; Dean, 2008; Purwanegara et al., 2014; Wilson, 2006). Therefore, this research employed a non-student sample to conduct this research.

A sample size of 410 was applied to capture the requested data for the purpose of the current study.The sample was gender-balanced, half of the participants are males and the second half of them is female.The vast majority of participants were noticed withinthe age group of 24 and 50 years old. The largest part of those

participants (98%) stated that they have used online shopping, but they have not purchased form an online retailer after seeing their 3D presentations. To verify the generalizability of the current study results,a non-response bias test suggested byArmstrong and Overton's(1977) method of comparison was conducted via testingthe late responses with the early ones.The responses for both groups were found to be non-statistical different from each other (less than 0.05; for system quality, information quality, authenticity, enjoyment, attitude toward product presentation, attitude toward website, users' satisfaction and VPE).Accordingly, we believe thatthere is no concern regarding the non-response bias for the data collected in the current study.

The empirical data of the current study was collected over the Jordanian context, Middle East. As Arabic is the main language in Jordan, back translation method suggested by Brislin (1976) was conducted to avoid any problem for cultural and language problems.A small sample size comprising a number of staff who works in a public university in Jordan was employed to do a pre-test forthe data instrument of the current study (Bhattacherjee, 2012; Sekaran, 2003).

To identify the needed time for navigating each 3D product site, we adopted Zajonc's (2001) method which limits the navigation time up tofive minutes.At the beginning,participants were allowed to have a number of practice trialsto get used with the targeted websites. Then, the participants were told that the main aim of the current study is to examine the online shopping experience using a number of online retailers. After that participants were invitedto visit one of the website and to fill up the given questionnaire.

Pre-test

So as to empower potential users to virtuallyexperience the online products, two levels: high versus low were adopted to manipulate 3D-Q. Researcherscategorize high level of 3D-Q by having a high level ofinformation quality, system quality, authenticity and enjoyment. On the other hand, we categorize the low level of 3D-Q to be with low level of information quality, system quality, authenticityand enjoyment. Accordingly, two 3D sites were established. In the first one, users

were allowed to enlarge, minimize and rotate the laptop as well as to watch many components of these products using many colours(high level of information quality, system quality, authenticity and enjoyment).

Further, users were able to capture all the needed information regarding these laptops (i.e. size, prices). In the second website, users were not able to capture the prior features (i.e., enlargement, zoom out, rotating the product, seeing different colours and having the required information) and thus this website represents low level of information quality, system quality, authenticity and enjoyment. A pre-test was conductedwith a number of non-student convenience sample (n = 50, staff at public university in Jordan). Using 7-point scale, those participants were invited to rank several 3D-Q according to their information quality, system quality, authenticity and enjoyment of laptops.

Manipulation checks were employed to judge if the participants observe the variation between different conditions for each construct either high or low. Followed by each level, participants were presented the forthcoming statements [i] The3D provides accurate information about the laptops, [ii] The 3D provides relevant information about the laptops, [iii] The 3D provides complete information about laptops, [iv] The 3D provides precise information about laptops, [v] The 3D is easy to use, [vi] The 3D is user friendly, [vii] The 3D is well designed to navigate, [viii] The 3D is convenient to access, [ix] The 3D presentation is helpful for me to understand the quality of the product, [x] The 3D lets me feel like I am holding a real laptop and rotating it, [xi] The 3D lets me feel like I am dealing with a salesman who is responding to my orders, [xii] The 3D lets me see the laptop as if it was a real one, [xiii] I find my experience with this website interesting, [xiv] I find my experience with this website enjoyable, [xv] I found my visit to this website entertaining, and [xvi] I found my visit to this website pleasant.

According to the outcomes of thepre-test, participants were observed to be able to perceive 3D-Q at different levels. Indeed,3D laptop website characterized by a high degree ofinformation quality, system quality, authenticity and enjoyment was perceived as being significantly providing a high qualityin comparison to the 3D

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laptop website with low level of information quality, system quality, authenticity and enjoyment (M $_{high}$ 3D-Q = 6.55, M $_{low}$ 3D-Q = 1.44; F 1, 49 = 116.4, p <0.001).

Construct Operationalisation

At the beginning, researchers were telling the staple respondents that the current research aims to measure 3D-Q in online retailers. Seven point Likert scale ranging from"strongly disagree" to "strongly agree" was used to measure the scale items adopted in the current study questionnaire (see Table 1).

The authenticity (AUTH)construct was measured by four items extracted from the scale proposed by Algharabat and Dennis' (2010). Information quality (INFO) and system quality (SQ) were tested by four items for each of one of them and these items based on scale proposed by Algharabat and Zamil (2013) and adopted from DeLone and McLean (1992, 2003). Enjoyment (ENJ) was tested using four items formulated in a modified version based on scale ofKoufaris (2002) and Ghani and Deshpande (1994). A scale proposed byVan der Heijden et al. (2001), Grazioli and Jarvenpaa (2000), and Coyle and Thorson (2001) was used to test customers' attitudes toward products (ATPP).

For attitude toward the website (ATTW), we used three items from Almendrosand Garcia (2015) and Castaneda et al. (2009). To measure satisfaction (SAT) we used three-item modified version of McKinney et al. (2002), Wixom and Todd (2005) and Algharabat and Zamil (2013). Finally, to measure virtual product experience, we used Algharabat's (2014a) four-item scale.

Table 1: Research Construct Operationalisation

Construct/Items	Author (s)
3D Information quality (INF1-INF4)	
INFO1: 3D provides accurate information about the laptops	Algharabat and Zamil (2013); DeLone and McLean (1992, 2003)
INFO2: 3D provides relevant information about the laptops	
INFO3: 3D provides complete information about laptops	
INFO4: 3D provides precise information about laptops	
3D System quality (SQ1-SQ4)	Algharabat and Zamil (2013);

SQ1: The 3D is easy to use	DeLone and McLean (1992; 2003)
SQ2: The 3D is user friendly	
SQ3: The 3D is well designed to navigate	
SQ4: The 3D is convenient to access	
3D Authenticity (AUTH1-AUTH4)	Algharabat and Dennis (2010)
AUTH1: The 3D presentation is helpful for me to understand the quality of the product	
AUTH2:The 3D lets me feel like I am holding a real laptop and rotating	
AUTH3:The 3D lets me feel like I am dealing with a salesman who is responding to my orders.	
AUTH4:3D let me see the laptop as if it was a real one.	
Enjoyment (ENJ1- ENJ4)	Koufaris (2002); Ghani andDeshpande (1994)
ENJ1: I find my experience with this website interesting.	
ENJ2: I find my experience with this website enjoyable	
ENJ3: I found my visit to this website entertaining	
ENJ4: I found my visit to this website pleasant	
Satisfaction (SAT1-SAT3)	Algharabat and Zamil (2013); McKinney et al.(2002); Wixomand Todd (2005)
SAT1: All things considered, I am very satisfied with 3D product presentation	
SAT2: All things considered, I am very pleased with 3D product presentation	
SAT3: My interaction with 3D product presentation has been satisfying	
Attitude toward website (ATTW1-ATTW3)	Almendros and Garcia (2015); Castaneda et al. (2009)
ATTW1: Good/Bad	
ATTW2: Unfavorable/Favorable	
ATTW3: Negative/Positive	
Attitude toward presented product (ATPP1-ATPP3)	Van der Heijden et al. (2001); Coyle and Thorson(2001); Grazioli and Jarvenpaa (2000)
ATPP1: I would have positive feelings towards buying a product from this site	
ATPP2: The thought of buying a product from this website is appealing to me	
ATPP3: It would be a good idea to buy a product from this website	
Virtual Product Experience (VPE1-VPE4)	Algharabat (2014a)

VPE1: The 3D presentation is helpful for me to evaluate the product	
VPE2: The 3D presentation is helpful for me to understand the performance of the product	
VPE3: Evaluating the product on this website is compatible with how I evaluate products in physical stores	
VPE4: Evaluating the product on this website fits well with the way Ilike to evaluate products in physical stores	

Results

By using three statistical tools; SPSS 17, Smart PLS and AMOS 17, the proposed constructs and their measurement items were tested to validate the conceptual model and to examine the research hypotheses. Accurately, we used a combination of SPSS 17, SmartPLS, and AMOS 17;all variables were subjected to the univariate Skewness and Kurtosis tests and were noticed to be within their recommended levels.

Normality

Researchers employed skewness and kurtosis approachmethod to attain adequate level of normal distribution for the data collected in the current study and preventing a violation problems as well (Byrne, 2010; Hair et al., 2010; Kline, 2005; Tabachnick and Fidell, 2001). By returning to the AMOS21 output file, all variables were found to have an acceptable value of skewness and kurtosis. For instance, values of skewness were noticed all to be less than 3 point, which is acceptable as recommended by Kline (2005) and West et al. (1995). As for kurtosis, all values in this regard were also noticed within their recommended level by less than 8.

Measurement Models

Both reliability and exploratory factor analysis were conducted so as to verify the structure and dimensionality of the proposed constructs.All constructs items were able to have a loading above 0.4 as well as statistical results approved that there is no overlapping between these items.

In the first stage of the structural equation modelling analyses, measurement model was tested using AMOS 17.0. Thefocal construct of 3D-Q was considered as a second-order construct where INFO, SQ, AUTH, and ENJ all were treated as its first-order factors measures using their respective indicators. The initial results of the measurement model indicted that the model does not fit well as some of the fit indices (i.e. Goodness-of-fit index [GFI] = 0.751 and root mean square error of approximation [RMSEA] = 0.095) were not found to be within their recommended level (Hair et al., 2006). Therefore, the measurement model was highly requested to be revised and purified. According to Byrne (2010); Hair et al.(2006); and Holmes-Smith et al. (2006), a number of criteria were adopted to improve the model fitness such of that researchers had a closer look at standardised regression weights (factor loading), modification indices, and standardised covariance matrix. Accordingly, researchers were able to identify the most problematic items (11 items) and the decision was made to remove all of these 11 items. Then, the revised version of the measurement model was tested again and as presented in Figure 2 and Table 3, all fit indices yielded in this time
 (i.e.χ^2 = 185.508, df = 98, and χ^2/df = 1.893; comparative fit index [CFI] = 0.950, goodness-of-fit index [GFI] = 0.948, Tucker–Lewis index [TLI] = 0.952, incremental fit index [IFI] = 0.961, and root mean square error of approximation [RMSEA] = 0.047) were found to have values within their threshold level. Thus, supporting the model fitness for the measurement model of the second-order factor, therefore, the set of fit indices reported is consistent with Hu and Bentler's (1999) recommendations. The path coefficients between the indicators and their respective first-order factors were significant at α = 0.05 level.

In addition, as seen in Figure 3, with a value less than α = 0.05, INFO, SQ, AUTH, and ENJ all have a significant path with 3D-Q. The analysis supports the operationalisation of 3D-quality as a second-order factor consisting of its four factors (INFO, SQ, AUTH, and ENJ). Besides, as seen in Table 2, all factors were able to have adequate average variance extracted (AVE) value (higher than 0.60) as well as composite reliability (CR) value (higher than 0.70). Thus, both CR and AVE for all constructs matching their recommended standards (Fornell and

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Larcker, 1981; Kandemir, Yaprak and Cavusgil, 2006). This is in addition to the fact that all factors have an alpha coefficient value above 0.70 as suggested by Nunnally (1978).

$\chi^2 = 185.508$, df = 98;χ^2/df= 1.893; CFI = 0.95; GFI = 0.948; TLI = 0.952; IFI = 0.961; RMSEA = 0.047.

*p< 0.05; ** p <0.01; *** p <0.001*
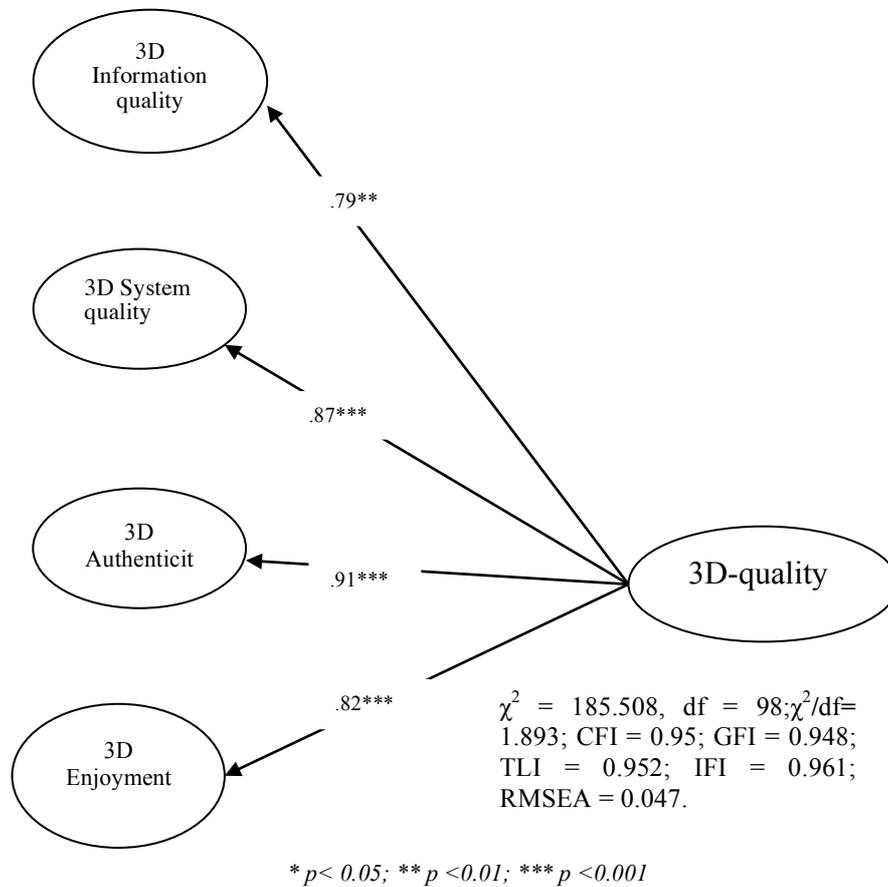
Figure 3. Second-order Factor analysis of 3D-Quality dimensions

Furthermore, the values of AVE for all constructs were found to be higher thanthe squared correlation coefficients for the corresponding constructs which supports the discriminate validity(Anderson and Gerbing 1988; Voss, Spangenberg and Grohmann, 2003).

Table 2.CFA: Using a Second-Order Conceptualisation of 3D-Quality

Indicator	Direction	Construct	Standardised Loading	SE	t-value	P	CR	AVE %	MSV
INFO1	←	INFO	0.92						0.145
INFO2	←	INFO	0.84	0.043	12.547	***	0.94	78.4	
INFO3	←	INFO	0.88	0.067	11.984	***			

INFO4	←	INFO	0.90	0.031	15.275	***			
SYS1	←	SYS	0.88						0.560
SYS2	←	SYS	0.89	0.078	13.240	***	0.94	81.09	
SYS3	←	SYS	0.95	0.053	16.034	***			
SYS4	←	SYS	0.88	0.052	12.350	***			
AUTH1	←	AUTH	0.90						0.56
AUTH2	←	AUTH	0.89	0.079	14.311	***	0.95	83.32	
AUTH3	←	AUTH	0.95	0.033	16.248	***			
AUTH4	←	AUTH	0.91	0.082	14.321	***			
ENJ1	←	ENJ	0.88						0.493
ENJ2	←	ENJ	0.87	0.101	10.316	***	0.91	77.45	
ENJ3	←	ENJ	0.89	0.121	10.814	***			

Notes: The respective items for INFO, SYS, AUTH, and ENJ are numbered serially

Table 3 presents the correlation between the four different variables and also establishes the discriminant validity on this basis.

Table 3. Discriminant Validity of 3D-quality

Variable	INFO	SYS	AUTH	ENJ
INFO	**0.89**			
SYS	0.30	**0.90**		
AUTH	0.25	0.26	**0.91**	
ENJ	0.23	0.34	0.15	**0.88**

Note. The numbers in diagonal line are the average variance extracted by each construct. The numbers above the diagonal show the squared correlation coefficients between the constructs

CFA (on all five latent factors: 3D-Q, ATPP, and ATTW, SAT and VPE) model fit deemed to be acceptable on the basis of a set of fit indices (χ^2 = 535.452, df = 314; and χ^2/df = 1.705),comparative fit index [CFI] = 0.942, goodness-of-fit index [GFI] = 0.921, Tucker–Lewis index [TLI] = 0.934, incremental fit index [IFI] = 0.952, and root mean square error of approximation [RMSEA] = 0.042) consistent with Hu and Bentler's (1999) recommendations. Furthermore, Table 4 shows standard error (SE), t-value, composite reliabilities, AVE and MSV.

Table 4. Results of the CFA within the Five Latent Factors

Indicator	Direction	Construct	Standardised Estimate	SE	t-value	P	CR	AVE	MSV
3D-Q1	←	3D-Q	0.78						0.666
3D-Q2	←	3D-Q	0.87	0.069	12.607	***	0.91	72.04	
3D-Q3	←	3D-Q	0.91	0.069	13.386	***			
3D-Q4	←	3D-Q	0.82	0.062	11.106	***			
ATPP1	←	ATPP	0.94						0.246
ATPP2	←	ATPP	0.84	0.071	11.412	***	0.92	75.06	
ATPP3	←	ATPP	0.87	0.075	11.425	***			
ATTW1	←	ATTW	0.80						0.424
ATTW2	←	ATTW	0.81	0.074	7.914	***	0.90	68.16	
ATTW3	←	ATTW	0.88	0.067	8.767	***			
SAT1	←	SAT	0.92						0.569
SAT2	←	SAT	0.89	0.096	13.657	***	0.91	76.44	
SAT3	←	SAT	0.88	0.090	11.927	***			
VPE1	←	VPE	0.85	0.054					0.666
VPE2	←	VPE	0.87	0.071	10.235	***	0.94	79.82	
VPE3	←	VPE	0.91	0.76	8.262	***			
VPE4	←	VPE	0.94	0.65	12.230	***			

Table 5 shows discriminant validity through Pearson correlation between constructs against the square roots of AVE across diagonal, which all improved to be acceptable.

Table 5. Internal Consistency and Discriminant Validity of Constructs

Construct	1	2	3	4	5
1. 3D-Quality	**0.85**				
2. ATTW	0.25	**0.87**			
3. ATPP	0.15	0.38	**0.78**		
4. SAT	0.30	0.42	0.20	**0.87**	
5. VPE	0.14	0.25	0.17	0.41	**0.89**

Note: The figures under the diagonal are the Pearson (R) correlations between the variables. Diagonal elements are square roots of average variance extracted.

Common Method Bias

So as to avoid any concern regarding common method bias as the current study data is self-reported (Bhattacherjee, 2012; Podsakoff et al., 2003), researchers employed Harman's single-factor (Harman, 1976). Harman's single-factor test is highly adopted and recommended to examine common method bias as reported by Malhotra et al. (2006) and Podsakoff et al. (2003). Therefore, the removable items of eight constructs (system quality, information quality, authenticity, enjoyment, attitude toward product presentation, attitude toward website, users' satisfaction and VPE) were subjected to the Harman's single-factor. All of the subjected items have been loaded to exploratory factor analysis and an unrotated factor solution was employed for this purpose. According to the main empirical; findings extracted, emerging single factor did not exist in addition to the fact that 44.355 percent of variance was accounted by the first factor. This value is not more than 50 percent as highly recommended in the study of Podsakoff et al., (2003). Therefore, it could clearly assure that the current study data is free of any problems regarding the common method bias.

The Structural Model

To test the structural model, we followed up three stages (see Table 6). Stage one tests Model 1, which represents the conceptual framework without the moderating variable (VPE). Model 2 represents the conceptual framework including the moderating variable. Model 3 is the full model that includes the interaction effectof attitude toward presented product and virtual product experience on user satisfaction as well as the interaction effect of attitude toward website and VPE on user satisfaction. We employed a bootstrapping method (500 times) that used randomly selected subsamples to test the PLSmodel. Using this method improves the assessment of (non)-direct effects, the comparison of effects, and the evaluation of the coefficient of determination (Streukens and Leroi-Werelds, 2016).

Model 1 fit measures indicated acceptable agreement with the covariance in the data (χ^2 = 541.856, df = 267, χ^2/df = 2.029; CFI = 0.92; GFI = 0.91; AGFI = 0.90;

TLI = 0.92; IFI = 0.90; and RMSEA = 0.049). The results of the hypothesis testing support all postulated paths for H1–H4. We found that 3D-Q was positively associated with ATPP (β = 0.59, p <0.001) and ATTW (β = 0.69, p <0.001). Furthermore, we found that ATTP positively impacts satisfaction (β = 0.40, p <0.001) and ATTW positively impacts satisfaction (β = 0.25, p <0.001).

Model 2 fit measures indicated acceptable agreement with the covariance in the data (χ^2 = 963.952; df = 368; χ^2/df = 2.619; CFI = 0.90; GFI = 0.91; AGFI = 0.90; TLI = 0.91; IFI = 0.90; and RMSEA = 0.054). The results of the hypothesis testing support all postulated paths for H1–H4. We found that 3D-Q was positively associated with ATPP (β = 0.58, p <0.001) and ATTW (β = 0.67, p <0.001). We found that ATPP positively impact user'ssatisfaction (β = 0.32, p <0.001) and ATTW positively impact user'ssatisfaction (β = 0.39, p <0.001). Furthermore, we find that VPE has no significant impact on satisfaction (β = 0.04).

To test Model 3, we used Partial Least Squares (PLS) with SmartPLS software program (this combined method of using AMOS and PLS has been used by Yoon et al. (2013). We followed Chin et al.'s (2003) suggestion to test for the interaction effects using PLS. Results confirm that VPE moderating H4a and H4b.

Table 6. Results for the structural models

Construct	Model 1	Model 2	Model 3
Direct effect			
3D-Q→ATTP	0.59***	0.58***	0.54***
3D-Q→ATTW	0.69***	0.67***	0.67***
ATTP→SAT	0.40***	0.32***	0.34***
ATTW→SAT	0.25***	0.39***	0.38***
VPE→SAT		0.04	0.02
Interaction effect			
VPE★ATTP→SAT			0.10*
VPE★ATTW→SAT			0.15*
R^2			
ATTP	0.30	0.33	0.35
ATTW	0.48	0.45	0.48
SAT	0.47	0.48	0.48

Discussion

This study investigates the impact of 3D product presentation quality on attitude toward presented product and attitude toward website which in turn impact users' satisfaction. Furthermore, we investigated the role of VPE as a moderator between attitude and user'ssatisfaction. Based on the fact that previous research treated 3D-Q as a unidimensional construct (Algharabat and Shatnawi, 2014; Algharabat and Zamil, 2013), and in order to conceptualise and to define 3D-Q, we established a combined scale (second-order) treating the 3D-Q construct as a multi-dimensional one. Our results supported the combined scale and therefore we believe that 3D-Q is a multi-dimensional construct and therefore the using of the current combined scale should reflect the main dimensions for the 3D-Q.

Therefore, 3D-Q scale should reflect information quality, system quality, authenticity constructs. We expect that 3D-Q dimensions will enhance customers' ability to evaluate the quality of the presented product and it increases users' ability to learn more about the product. To that end, enjoyment is considered an important dimension in measuring 3D-Q, since this dimension focuses more on the enjoyment part of the 3D-Q, and we believe that many users might come to visit a website which has a 3D product presentation for the sake of fun.Ourresults express that the combined 3D-Q scale possesses strong psychometric properties, suggesting that information quality, system quality, authenticityand enjoyment constitute four independent yet correlated dimensions of the 3D-Q construct.

Therefore, it could be noticed from the second-order analysis (Figure 3) of 3D-Q dimensions that authenticity has the strongest impact on creating 3D quality. Algharabat and Dennis (2010) assert the importance of this construct to reflect real simulation of the offline products.Furthermore, it is highly significant for online retailers who intended to invest on the 3D technology to focus on designing the proper 3D product presentation to be perceived as actual objects. In other words, authenticity of the 3D product presentation enhances users' perceptions of its quality.Therefore, authenticity of 3D product presentation increases 3D-Q. Furthermore, this result is supported by Algharabat's (2014a) study which

identified authenticity as a main dimension of VPE. The author asserts that the quality of 3D product presentation is restricted to its authenticity.

We find (see Figure 3) that system quality is the second important dimension for creating 3D-Q. Therefore, the 3D product presentation should be designed to reflect users' ability to easily zoom in or out on the 3D product presentation, their ability to rotate it and control the form and content of it. This dimension will enhance users' perceptions of the 3D quality. This result has been confirmed within previous 3D-Q literature. For example, Algharabat and Zamil (2013) measured 3D-Q using 3D system quality. The authors posit that easy to use, user friendly, and navigation are the main attribute which a 3D product presentation should have to reflect 3D system quality. Moreover, this result comes in accordance with Algharabat and Shatnawi (2014) results which assert that ease of use is a main determinant for 3D-Q.

We find that enjoyment (see Figure 3) counts for the third important dimension which impact 3D-Q.Therefore, the 3D product presentation should be designed to enhance users' ability to feel the enjoyment which comes from manipulatingthe 3D product presentation (i.e., its colours and zoom in or out)and thus enhances their enjoyment.This result comes in accordance with Algharabat and Shatnawi (2014) results which identifiedperceivedenjoymentas a main determinant for 3D-Q. This result also comes in line with Algharabat's (2014a) study which identified enjoyment quality as a main dimension of VPE.

We find (see Figure 3) that information quality is the least important dimension for creating 3D-Q. Therefore, the 3D product presentation should be designedto introduce different, relevant, sufficient and accurateinformation about the presented product.This result has been confirmed within previous 3D-Q literature. For example, Algharabat and Zamil (2013) measured 3D-Q using 3D information quality. The authors posit that information quality reflects information relevancy, sufficiency, accuracy and currency which are the main attribute of 3D information quality. Moreover, this result comes in accordance with Algharabat and Shatnawi (2014) results whish assert that ease of use is a main determinant for 3D-Q.

The results of this research supported the hypotheses (H1a and H1b) that 3D-Q has a significant impact onusers' attitudes toward the presented product and users' attitude toward the website which utilize the 3D technology (Model 1). According to the path coefficient analyses, we find that 3D-Q was proven to be the most significant factor predicting attitude toward website with acoefficient value of 0.69 with R^2-value of 0.48. 48% of attitude toward website total varianceis explained by 3D-Q. That means users' how to find a highquality 3D product presentation often formulate a positive attitude toward the online retailerwebsite. This could be attributed to the ability of a 3D product presentation with its different dimensions (authenticity, system quality, information quality and entertainment) to reflect a high quality of the 3D which in turn impacts users' attitude toward online retailer website. Therefore, online retailers who design the 3D-Q properly to reflect its dimensions are expected to enhance users' attitude toward the website. This result comes in accordance with previous studies, which assert the importance of ease of use and usefulness on users' attitude (Davis, 1989). Coyle and Thorsen (2001) found that high level of vividness resulted in stronger attitudes toward website.

Another result shows that the relationship between 3D-Q and attitude toward the presented product comes as second important path coefficient. We find that attitude towardpresented product with acoefficient value of 0.59 and R^2 of 0.30 in Model 1. 30% of attitude toward presented product total varianceis explained by 3D-Q.That means users how to find a high quality 3D product presentation often formulate a positive attitude toward the presented product. This could be attributed to the ability of a 3D product presentation with its different dimensions (authenticity, system quality, information quality and entertainment) to reflect a high quality of the 3D which in turn impact users' attitude toward the presented product. This result is supported by previous findings (Algharabat and Zamil, 2013; Li et al., 2002, 2003; Klein, 2003; Fiore and Jin, 2003; Suh and Lee, 2005), which posit the positive relationship between 3D product presentation and attitude toward product.

Our results show that attitude toward website and attitude toward the presented product are significantly impacting users' satisfaction.According to the path coefficient analyses; we find that attitude toward presented product is proven to be the most significant factor predicting users'satisfaction with acoefficient value of 0.40, followed by attitude toward website, which counts for 0.25, with R^2 of 0.47. That means users who have positive overall evaluation (cognitive and affective) of the presented 3D product tend to be satisfied. On the other hand, users who have positive attitude toward the website also have the feelings of being satisfied. This result comes in accordance with previous research on 3D field (Algharabat and Zamil, 2013). The above results show that a well-designed 3D presentation not only creates positive attitude toward the website but also toward the product which end up with users' satisfaction. Therefore, online retailers should aim to build users attitude, which is expected to lead to users' satisfaction. Therefore, our results confirm the positive relationships between attitude toward presented product and users' satisfaction (H2), and attitude toward the website and users' satisfaction (H3).

This paper explores themoderating effect of virtual product experience on the relationship of attitude toward presented product and user's satisfaction, and attitude toward the website and user's satisfaction. The findings indicate that VPE moderates the relationship of attitude toward presented product with satisfaction (H4), as well as, the relationship of attitude toward website with satisfaction (H5). The full model (see Model 3), which discusses the interaction effect of the moderator shows that satisfaction, the dependent construct, has R^2 value of 0.48 indicating that the model accounts for 48% of the variancein the dependent construct. The inclusion of the interaction terms between attitude toward website and user's satisfaction raises the R^2 value of satisfaction variance to 0.48 in Model 3. While R^2 value for attitude toward the presented product increased to 0.35 in Model 3. These R^2 values for the path coefficients are all significantat the 0.05 level or below.

According to Baron and Kenny (1986) a moderator is a variable that affects the strength or direction of a relationship between an independent construct and a

dependent construct. First, the impact of VPE on the strength of the relationship between attitude toward website and users' satisfaction (the slight increase of R^2 from 0.47 to 0.48) and between attitude toward presented product and users' satisfaction (slight increase of R^2 from 0.30 to 0.35) can be seen by examining the explained variance and does show strong influence of the moderator on the strength of the relationship. Therefore, the slight increase does not show strong influence of the moderator on the strength of the relationships.

Second, moderation of the direction of the relationship is detected by looking at the interaction effects. The significant regression coefficient for the interaction terms (with path coefficient 0.15 and is significant at 0.05 level) indicates that VPE positively impacts the relationship between attitude toward website and users' satisfaction. Similarly, the significant regression coefficient or the interaction terms (0.10) does support the positive direction of the relationship between attitude toward the product and users' satisfaction by the moderator.

The above results show that VPE is shown to positively moderate the relationship between attitude toward website and users' satisfaction as well as attitude toward presented product and users' satisfaction. Thus, with the increasing level of VPE, it becomes more influential towards generating users' satisfaction with the online retailer.

Implications for Theory

To the best of the authors' knowledge, the findings of the current study advance the existing research on 3D-Q by making the following important contributions to the research literature. First, unlike previous studies on 3D-Q, the current research integrated the main elements, which enhance the quality of 3D product presentation, in a mediated computer environment, to measure 3D-Q. Furthermore, we focused on 3D information system to reflect the ability of the 3D interface to measure functional tools, which often reflected by the interactivity and vividness tools of the 3D interface to communicate information properly to consumers. 3D system quality used in this context to reflect ease of use, user friendly, and well designed to navigate the presented product. Furthermore, we

employed the notion of authenticity to reflect the ability of the 3D product interface to communicate a real product which consumers can find both online and offline. To that end, our findings, also, indicate the importance of enjoyment as a main dimension which enhances consumers' perceptions of the quality of the 3D interface. The above dimensions of 3D-Q have been derived from the existing literature which has not combined them together and thus, our results indicate their importance. We believe that our suggested scale reflects many important dimensions which previous scholars did not explain the way we did. For example, previous research (Li et al., 2001, 2002, 2003) on VPE posits the importance of telepresence to measure the quality of the 3D product presentation. However, to do so some researchers focused on manipulating the level of interactivity measured by user control (Klein, 2003), others (Hopkins et al., 2004) focused on manipulating levels of vividness, measured by media richness but not interactivity, to measure telepresence. Furthermore, other researchers cantered their efforts toward measuring the quality of the 3D interface via notions such as functional mechanisms (Jiang and Benbasat 2007a) measured via vividness and interactivity and they ignored the notion of telepresence. Others (Jiang and Benbasat, 2005) focused on the notion of virtual control (measured with both virtual control and functional control). To that end we believe that our combined scale dimensions focused on interactivity tools, which illustrated by Xu and Sundar (2014), and vividness tools, which explained by Jiang and Benbasat (2007a). Thus, we believe that 3D information quality has the ability to communicate, verbally and non-verbally, the proper information regarding the 3D interface to consumers. Moreover, 3D system quality is another important dimension for the 3D interface which previous research has not discussed. Therefore, we employed this construct and adapted Algharabat and Zamil (2013) and DeLone and McLean's (1992, 2003) scales to measure it. Therefore, we believe that previous studies neither tested our scale nor introduced such a combined scale to measure 3D-Q. Therefore, this study introduced a new measurement scale for 3D-Q.

Second, another contribution of the current study to the literature is building an empirical connection between the impact of 3D-Q on users' attitude toward presented product and their attitude toward the website, which have not empirically tested. Third, previous research has not tested VPE (as a continuous construct) as a moderator within the context of online retailers. Fourth, this study tested the impact of 3D-Q on users'attitude toward presented product and attitude toward the website. Fifth, we have introduced new factors such as 3D-Q, and VPE, which have been examined within new context. Sixth, new relationships have been examined within the context of non-western one. Seventh, we provided a contribution to the IS and marketing fields by combining different theories. Finally, the design of this research considered another contribution, the way which we designed the 3D interface enable us to test the relationships among the proposed constructs which was not possible in previous studies which attempt to measure the quality of 3D interface.

Implications for Practice

Results from this paper provide practitioners and marketing managers with information for deploying 3D-Q dimensions on online retailers' websites, and their implementations. The dimensions of 3D-Q shed a light on the main aspects which online retailers should focus on. Therefore, online retailers who are using 3D product presentation should increase users' knowledge and experience by focusing on developing and designing the 3D interface to reflect; (i) genuine authentic simulation of the offline product, (ii) system quality in which the 3D interface should achieve ease of use, user friendly, and design attribute, (iii) the 3D interface should reflect a high level of enjoyment, and (iii) the information about the 3D product should be designed to introduce different, relevant, sufficient and accurate information about the presented product. Thus, this study informs e-retailers of the importance of the above dimensions on creating 3D-Q. Therefore, this study suggests that e-retailers put efforts into designing and developing the above dimensions to reflect high quality of 3D product presentation.

Online retailers using 3D product presentation should focus on the importance of having 3D interface, which is usable and provide users with the needed information about the product. Furthermore, designing the 3D interface should reflect its authenticity and it should provide users with certain level of enjoyment via the rotation, zoom in or out and changing the colour of the presented product. 3D-Q often enhances the e-shopping environment (Khakimdjanova and Park 2005; Park, Stoel and Lennon 2008).

The results of this study provide practitioners with more information on which to base their decisions for 3D-Q design and implementations in their e-commerce websites. For example, providing users with a high quality 3D interface leads to create positive relationships with attitude toward website as well as attitude toward the presented product provides users with positive evaluations for both the online retailers' website and the presented product which use 3D technology. Thus, it is expected that online retailers should focus on the main elements which impact developing users' attitude. This is expected to take a place as long as online retailers investigate the cognitive, affective and conative elements of their customers while they browse online. This can be achieved via understanding the needs and interests of individual users or user groups, and user shopping experience and interests. Furthermore, adding 3D-Q dimensions enhance users' overall experience.

The relationship between attitude toward website and user's satisfaction as well as the relationship between attitude toward the presented product and user's satisfaction give more insights for marketing managers. For example, users who have positive attitude (toward the web or/and toward the presented product) tend to be more satisfied about the website. Therefore, online retail managers should understand the main elements, which create user's satisfaction as a result of using novel stimulus. This satisfaction might differ from country to another. Thus, managers should continuously conduct customer satisfaction surveys in order to recommend new and novel designs for the 3D product presentation and increase user satisfaction with the websites. Online retailers who employ the 3D

technology will gain a distinctive advantage, be better positioned to compete and, thus, assist consumers through the online shopping experience.

Limitations and Future Research

The following limitations of the current study should be kept in mind. First, the hypothetical online retailer, which we designed, focused solely on laptop industry. Second, this study only focused on the viewpoints of 410 sample size that uses online retailers in Jordan, Middle East. This means that the investigation of therelationship between 3D-Q, attitude toward the website, attitude toward presented product, anduser'ssatisfaction are only basedon the perspectives of Jordanian users. Thus, results may have been different from the perspective of various western context backgrounds.

Third, this study lacked sufficient empirical research to support the fact that VPE positively moderates the relationship between, attitude toward the website and user's satisfaction as well as attitude toward presented productand user's satisfaction.We recommend that researchers investigate the impact of 3D-Q on trust and purchase intention with the existence of the VPE as a moderator.

Conclusion

This research aims to assess the moderating effect of VPE on the relationship between attitude toward website and user satisfaction as well as attitude toward presented product and user satisfaction. As expected, the results clearly confirmed the relationship between attitude toward website, attitude toward presented product and user satisfaction with the website which has 3D technology. Close to 48% of the variance in customer satisfactioncan be explained by attitude with the website and product as measuredhere. The results, second-order, show that effective 3D-Q has a significant impact enhancing attitude (toward website and product), which in turn directly affects customer satisfaction with the website. Further, virtual product experience is shown to positively moderate the relationship between attitude toward website and satisfaction with the website. Moreover, results found that virtual product experience positively moderates the

relationship between attitude toward presented product and satisfaction with the website.

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Appendix A