An Exploration into the Effect of Advancing Technology on UX of Social Media Applications

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Abstract

While the development of technology and its impact on the social media space may seem unclear, one idea is widely agreed upon: The ways individuals use and interact with social media applications will change dramatically as technologies infiltrate the space. This study explored how evolving technologies will impact the user experience (UX) of social media applications. Three interviews were conducted with futurists and members of Elon communications faculty, as well as a thorough case study of Facebook's 2017 F8 conference. Findings suggest that evolving technology will rapidly transform the components of the UX framework and enhance consumer convenience, but may create challenges with corporate trust.

I. Introduction

Since the inception of the smartphone in the mid-1990s, the world of digital media has exploded in growth and continues to evolve at a frantic rate. The advancements in consumer technology have been principal driving forces behind the diversifying social media landscape. However, the rise of technologies like augmented reality, virtual reality, and artificial intelligence have prompted essential questions surrounding the effect of technological advancement on user experience and human culture as a whole.

When Facebook launched and quickly gained popularity in 2004, the social networking website altered the media landscape. Facebook set the bar for similar social media applications to provide new ways for users to engage with and connect to one another. Flash forward to 2017, the social media space has become congested with applications bidding to carve out their unique place in users' lives. As social media has gained more and more prominence in consumer culture, brands have recognized these channels as valuable marketing opportunities. This paper explored the impact evolving technology will have on the UX via social media applications, and how social media marketing will be affected by this change.

II. Literature Review

Social media can be defined as "the interactive platforms generated by mobile and web-based technologies on which individuals and communities can share, co-create, discuss, and modify user-generated content. Social media platforms can include blogs, content communities, social networking sites, virtual game worlds, and virtual social worlds" (Carr & Hayes, 2015). As advanced technologies continue to evolve, the UX of social media applications utilizing these technologies is bound to change. This literature review explored the brief, yet eventful history of social media, and discussed the conceptual framework of UX and its growing importance in application design. By examining the origins of social media, one will be able to gain a deeper understanding of where the field's future.

The History of Social Media: Four Big Players Enter the Space

The first social media platform, such as bulletin board systems, appeared in 1978 and offered simple text content posting and communication. After the World Wide Web gained traction in the 1990s, new-age social media applications like user forums allowed users to generate and publish personal content online (Carr & Hayes, 2015). Following the web's explosion in popularity, Palm Computing released the first mobile device capable of offering location-based services, the Palm VII PDA, in May 1999 (Kaplan, 2012). The device allowed users to obtain zip code-based information and browse the web, revealing the budding potential of mobile Internet connectivity.

Following such early advances in mobile computing, the world of mobile social media truly expanded when Apple released the iPhone in 2007, providing its now 100 million users access to more than 250,000 smartphone applications (Kaplan, 2012). Through harnessing the power of location-tracking technology and the flourishing network of mobile device owners, companies like Gowalla and Foursquare launched early mobile social media applications allowing users to "check in" at locations and share their visits with friends (Kaplan, 2012).

In the early 2000s, the term "Web 2.0" was coined to describe the internet's evolution from "static repository of information to a dynamic and interactive platform for collaboration using web functions, such as wikis, blogs, media sharing, and social networking sites" (Everett & Rivera, 2014). Rapid advances in communicative and information aggregation technologies allowed Web 2.0 to provide users with a more interactive experience than ever before. In 2004, Facebook was born as a social networking platform exclusively for college students. Since its inception, Facebook has garnered more than 1.15 billion active users, offering an incredibly efficient medium for sharing textual, photo, audio, and video content (Everett & Rivera, 2014). The social media website quickly penetrated the young adult market, revealing an early demand for mobile social media networks.

When Twitter entered the scene in 2006, it quickly gained popularity among internet users for its simple yet addictive micro-blogging interface. Through 140 character messages, users were able to share their everyday thoughts, opinions, and stories. Furthermore, with almost 200 million users worldwide and nearly 460,000 new accounts each day, Twitter continues to dominate the social media space and offers unique opportunities in news publishing (Lin, Hoffman, & Borengasser, 2013). Following Twitter, Instagram, a photo-sharing application, was launched in 2010, providing users an "instantaneous way to capture and share their life moments with friends through a series of (filter manipulated) pictures and videos" (Hu, Manikonda, & Kambhampati 2014). Instagram revolutionized photo sharing in the social media space, offering a platform dedicated to posting and sharing photo content through an individual's personal feed. The application didn't go unnoticed, gaining more than 150 million active users, with more than 16 billion photos shared so far. In 2012, Facebook bought Instagram, further solidifying its domination of the thriving social media world (Hu *et al.,* 2014).

In recent years a new trend in the social media space has emerged: ephemeral media sharing applications. Snapchat, a social media application, allows users to send text, photo, and video content that disappear after a short time to friends. Besides Snapchat, these new ephemeral social media applications include Yik Yak and Slingshot (Bayer, Ellison, Schoenebeck, & Falk, 2015). Conceptualized in 2012, Snapchat was one of the first social media applications designed to transmit content that disappears after a period of time predetermined by the user. Upon its growth in notoriety, Snapchat presents a level of novelty not available before in the social media space. In July 2014, Snapchat rolled out a new feature, geofilters, to the social media platform. Geofilters allow users to overlay location-based graphics on pictures or videos,

providing a fun way for users to share experiences with friends. With currently 158 million people using the app every day, Snapchat has become a prominent ephemeral social media application and continues to offer users exciting new features. (Bayer *et al.,* 2015)

Defining UX

User experience, referred to as UX, describes the ease of use and thoughtfulness of design regarding social media applications. "Ambient Media Today and Tomorrow" asserts that UX has four independent elements: branding, usability, content, and functionality (Lugmayr, Serral, Scherp, Pogorelc & Mustaquim, 2013). While the body of literature about the concept of UX is still growing, the framework remains an increasingly important aspect of social media application design. According to the website of Nielsen Norman Group, a leading UX research, training, and consulting organization, "True user experience goes far beyond giving customers what they say they want, or providing checklist features. In order to achieve high-quality user experience in a company's offerings, there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design." Nielsen Norman Group notes that exceptional user experience must meet the exact needs of the customer, and involve a level of simplicity, elegance, and joy (Nielsen Norman Group, 2016).

Advanced Technologies Emerge in Media and Consumer Culture

While technologies like augmented reality and the Internet of Things once seemed futuristic and incomprehensible, such advancements are beginning to emerge in the design of consumer products and social media applications. According to Centric Digital, augmented reality "allows us to use our devices as viewpoints for observing the world around us in real time, while receiving additional information superimposed on that real-world view" (Alvarez, 2017). Essentially, augmented reality overlays digital content onto a user's actual environment, and virtual reality completely immerses the user in a digital environment (Pavlik & Bridges, 2013).

About a year after Snapchat's addition of geofilters, the social media application became one of the first to use augmented reality technology in a new feature called Lenses (Bayer et al., 2016). Lenses allow users to overlay digital images and camera effects on pictures of themselves and others. Using facial recognition, the user's smartphone camera identifies his or her facial features and applies the chosen effect accordingly. As of late, users are even able to apply Lenses to their real world environments, genuinely meshing users' natural and digital realities into one interactive interface (Bayer et al., 2016).

The Internet of Things (IoT) is another advancement that has recently infiltrated the consumer technology market. The Internet of Things "incorporates billions of devices (such as cameras, sensors, RFIDs, smartphones, and wearables) that are owned by different organizations and people who are deploying and using them for their own purposes" (Georgakopoulos & Jayaraman, 2016). The Internet of Things is an invisible digital fabric of connected devices, such as smart wearables, fitness trackers, smart pills, and automobile sensors, allowing semi-autonomous and autonomous driving capabilities (Georgakopoulos & Jayaraman, 2016).

IoT-equipped smart home devices, such as Amazon's Alexa and Google Home, have recently entered the consumer tech market and gained attention for providing heightened convenience to users. These smarthome devices utilize the power of IoT to assist users with everyday activities—from ordering an Uber to adjusting the thermostat or playing a song—all through a central, internet-connected console. While the body of literature surrounding the IoT is minute, innovations like Amazon Alexa and Google Home show great promise concerning future applications of IoT in consumer products (Georgakopoulos & Jayaraman, 2016).

Advanced technology, such as augmented and virtual reality, artificial intelligence, and the Internet of Things, are beginning to emerge in products and services consumers use daily. However, in order to predict how the continued advancement of such technologies will affect the future of social media UX, it's crucial to gather deeper insights in this area of study.

The following three research questions were asked:

RQ1.How will advancing technologies continue to shape the UX of social media applications?

RQ2: What positive and negative implications might technological evolution have on the utility of social networking applications?

RQ3: How will the evolution and diversification of the social media landscape affect marketing?

RQ4: What opportunities might new technologies provide to marketers?

III. Methods

This research was conducted through three interviews with futurists and communications professionals, a case study on Facebook's F8 Conference, and secondary research collected from Pew Research Center's "Digital Life in 2025" report.

Informational Interviews

Informational interviews were conducted with two futurists and members of Elon communications faculty – Qian Xu and Janna Anderson. Xu's research interests center around the social and psychological effects of online technology regarding user perception, information seeking behaviors, and cognition. Her teaching expertise includes interactive media, social media strategy, and user experience. Xu's interview explored the framework of UX, including psychological elements involved and her predictions on how this framework will change with evolving technology.

Anderson is the director of the Imagining the Internet Center at Elon, an initiative that conducts research on the future of communicative technology. She is also a contract researcher for Pew Research Center's Internet, Science, and Technology Project, where she researched the future of 50 internet-related topics and co-authored several studies exploring the future of digital life. Anderson's interview delved into how social media is shaping the way consumers live, work, study, and recreate. She provided insights into the negative implications that may arise out of social media's growing capabilities.

Lastly, Tom Cheesewright is a renowned UK-based futurist and corporate consultant. Cheesewright is the founder of the consulting firm Book of the Future, which aims to help organizations see, share, and respond to the future. With nearly 14,000 followers on Twitter, he is an esteemed futurist and consultant in the communications field. He works with marketing agencies and brands to develop strategic campaign content with the future in mind. Cheesewright also created the Applied Futurist's Toolkit for marketing agencies, management consultants, accounting firms, and organizations of all kinds (personal communication, April 4, 2017).

Case Study: Facebook F8 Developers Conference

Since Facebook has proved to be a leader in social media innovation, we may predict the future of the social media landscape by examining its current development strategies. Throughout its existence, Facebook has led the charge for innovation in the social media world. The Facebook platform was the first of its kind, offering users the ability to browse and connect with friends' profiles online (McCole, Everett & Rivera, 2014). Since its rise to popularity, Facebook has remained at the forefront of emerging technology and a leader in the social media space. This case study looked at Facebook's F8 conference, an annual conference held by Facebook for developers and companies that build services and products around its website.

IV. Findings

Evolution of UX Framework based on an interview with Qian Xu

While UX is a relatively new construct in social media application design, the conceptual framework of UX has evolved slightly as applications have grown in structural complexity. According to Xu, "In the past, it [user experience] has just been about ease of use, but now with augmented and virtual reality . . . there is a learning curve involved with adapting these new technologies" (Xu, personal communication, April 12, 2017). Due to the infiltration of advanced technologies into social media apps, UX now involves many different aspects, including ease of use, usability, the satisfaction of the experience, and emotional response. Xu also noted that one of the challenges developers have faced with creating a positive UX is the hesitation associated with the learning curve of advanced features. However, despite any initial anxiety with learning how to use the new technology, Xu said, "Because of the application's novelty, users will not be afraid to actually overcome this learning curve to enjoy exploring something that is new and that doesn't exist already."

According to Xu, future UX design will require the incorporation of two aspects: hedonism and utilitarianism. Hedonism, defined as the "pursuit of pleasure" (Oxford Dictionary, n.d.) encompasses the fun, engaging, novel aspects of an application feature. An example of a social media feature with a large hedonic influence is Snapchat Lenses, which allows users to overlay virtual camera effects onto pictures. Conversely, utilitarianism is defined as something being designed to be useful and practical rather than attractive (Oxford Dictionary, n.d.). Facebook, for example, is most known for its features that boast utility. The platform was one of the first to allow users to interact with each other by posting on each other's walls, sending each other pictures, and even sending each other gifts. In addition, future application UX design will need to offer users value in order to push them over the learning curve. She said, "All of the augmented reality and virtual reality developments, as well as Facebook's live-streaming and 360-degree video, pose some sort of learning challenge users have to overcome. But because each of these advances will be able to introduce something new, the novelty of it will help alleviate anxiety and initial frustration with the interface."

Furthermore, Xu asserted that new application features must offer users something new to achieve longevity and retain positive UX. Additionally, she said an application that unveils a new feature that hadn't existed before has the "first mover advantage." Snapchat Stories are a prime example of this concept. Since Snapchat's feature provided users with a fun and useful capability that never before existed, it became popular quickly. She said, "When you think about the longevity of a product or a feature of an interface, if the novelty of it can actually last and continue to engage users, the technology may be able to survive long term." Using Snapchat as another example, she stated, "When Snapchat released Lenses and Geofilters, I played with them myself . . . Initially it was so fun . . . but unless Snapchat actually introduces something new or enhances the Lenses feature, then it may fizzle out because it offers nothing beyond the novelty" (Xu, 2017).

Xu also predicted that the future framework of UX would be driven by developers' ability to deliver enhanced connectivity to users. To illustrate this idea, she discussed Facebook's recent launch of its live streaming feature. Through Facebook Live, users can view news events as they happen, and contribute to the broadcast in real time by posting comments and sending emotions on the live stream. She said, "Live streaming seems to be pretty successful, and the fact that you can send the live emotions is going to provide a very integrated experience. It's going to change people's viewing habits." The feature is something new in the realms of social media, which is a reason it has seen so much popularity among users.

UX will continue to evolve as a new digital environment emerges with advancements in AR and VR. According to Xu, UX will not remain a 2-dimensional concept. She said there are multiple aspects associated with user experience, and emerging technology will bring new aspects and emphasize certain aspects that already exist. Xu said, "You will be able to find something different with UX for websites and UX for applications . . . you have to take into consideration the environment." As mobile-applicable advances take hold of social media application design, the construct of mobile UX is certain to change.

Implications for the future of Social Media UX

The internet will eventually become deeply ingrained in users' digital environment, to a point where users won't have to go on a laptop or smartphone to access information. Anderson said the information would soon be integrated into users' surroundings through AR glasses or lenses (Anderson, personal communication, April 12, 2017). To further examine what the future of social media UX may look like in

light of such advances, one must explore a case study surrounding the leader of technological innovation in the social media space – Facebook. As discussed in the literature review, Facebook was and remains a pioneering platform for users to post, share, and experience information and media. At the company's recent F8 Conference, CEO Mark Zuckerberg presented many groundbreaking developments involving technologies never before utilized in the social media space.

Zuckerberg first announced Facebook will launch a camera platform built on the capabilities of augmented reality. Developers will be able to create augmented reality masks and effects, and users will be able to use their smartphone camera to see these effects over their environment (Newton, 2017). Facebook will also be one of the first social media applications to integrate virtual reality into application design. The platform will roll out a supposedly "bold and bizarre" VR hangout app available on the Oculus Rift (Statt, 2017). Additionally, Facebook plans to use artificial intelligence algorithms to provide users with more useful capabilities. For example, the company is using AI to help devices understand what's being captured by the user's camera. From there, artificial intelligent algorithms will be able to identify a user's background in a photo and automatically blur the background in real time (Newton, 2017).

During the F8 conference, Zuckerberg unveiled a new 360 video camera called Surround 360. The camera will reach the consumer market in two versions – a smaller, more portable camera with six cameras, and a larger camera with 24 cameras (Statt, 2017). The cameras will be able to capture every dimension of the users' environment, allowing users to move anywhere so long as they are wearing the Oculus Rift VR headset (Statt, 2017).

The platform's plans go beyond the scope of augmented and virtual reality. Facebook also announced its working on a "brain-computer interface" that will allow users to type with their thoughts (Statt, 2017). Facebook officials refer to the technology as a "brain mouse for AR" and hope to make the interface a "speech prosthetic," where users will not have to move their hands to select a digital object – they will just think to do it (Statt, 2017). Among others, Facebook plans to explore technology that would allow users to hear through the skin, send and share VR experiences with friends, and create an "app store" featuring different bots, essentially automated messaging systems built to assist users with needs (Garun, 2017).

Although such promises seem enthralling, Anderson outlined how security concerns and user-related issues may slow the process of mass user adoption of these new technologies. She said that a significant reason people might be hesitant to adopt a new technology is trust. "There are trust issues," she said (Anderson, personal communication, 2017). "Part of this does have to do with the technology itself, and some of it has to do with human uses of the technology because people are trusting technology less." AI-equipped devices, for example, can perform a variety of functions for users, offering a level of utility not seen before in the consumer tech market. However, people are becoming weary of these smart devices collecting information they don't want collected, leading them to reject artificial intelligence as a useful technology (Anderson, 2017).

A concern that has already arisen from technology's impending influence in smartphone design is the risk of feeling that there is no escape from the flurry of augmented information and visuals (Anderson, 2017). To the user, being surrounded by a layer of digital information on top of his or her true environment may seem too overwhelming or over-stimulating. She added, "Virtual reality and augmented reality are going to make social media possibly more 'in your face,' which can be good if it's something you want, but bad if it's something you don't want." In addition, the constant evolution of social media platforms' complexity might be a driving force in turning previously enthusiastic users away. She said, "People might initially push back against it and try to get away from the technology . . . we see it a little bit already with the youth participation in Snapchat rather than Facebook. Snapchat has taken the place of email and Facebook, and now young people are only using Snapchat and texting because it's more private" (Anderson, 2017).

Although such predictions may seem less optimistic, Anderson asserted that technologies are likely to succeed in the framework of UX if they incorporate three features: low-friction communication, expediency of exchange, and high value proposition. She provided an example of the mass adoption of smartphones in the 2000s. "The smartphone was adopted more quickly than any technology before it because people saw the value in the technology," she said (Anderson, 2017). "Now, everyone wants to be connected all the time, and it doesn't have to do with the fact that they can just send text messages or call someone with it – it is incredibly versatile. Consumers saw the value in being able to access the internet from virtually any location" (Anderson, 2017). Xu and Anderson agree that expediency in each human-computer exchange is also an important factor. Xu said, "For mobile devices, you know that you are always on the go and your attention

span will be really short, so it's going to be important to take these into consideration when UX designers think about new apps and features in the future" (Xu, 2017).

Predictions for Future of Marketing Through Social

The social media field has undoubtedly become a gold mine for digital marketers. As the field continues to change in light of technological advancement, marketers will get the highest return on investment if they stay in tune with such changes (Cheesewright, personal interview, April 4, 2017). Tom Cheesewright, founder of the UK-based futurism consulting agency, Book of the Future, asserts, "It's two-way: Augmented reality and artificial intelligence will give advertisers greater insight into our behavior than ever before, though I believe this will be very permissions-driven." He continued, "Imagine walking into a high street store wearing future AR. You are greeted by a virtual shopping assistant who knows your entire on and offline shopping history with that brand. She knows what items are catching your eye. And an algorithm can calculate what level of discount might convince you to spend today and balance this with your historical brand loyalty."

Cheesewright believes the future of digital and traditional marketing will be highly personalized. He said Big Data and AI algorithms will provide more information about consumers than ever before, allowing marketers an enhanced understanding of consumers' desires and needs. He said that although this changing relationship may cause consumer privacy concerns initially, he is hopeful the future of social media marketing will find a balance between offering consumers convenience and trust. According to Cheesewright, "We are getting more and more conscious of the noise around the signal, which is why I believe digital ads will eventually be permissions-based. But there is a happy medium here: We are happy to get ads that are relevant, informative and entertaining. My hope is that better targeting improves return on investment, and that some of this return is re-invested in the quality of the advertising."

In terms of the future of marketing through social media, Anderson believes the concept of gamification will be heavily used in marketing strategy as consumers continue to form negative perceptions about in-your-face digital ads. However, she warned, "Trust is really important in offering value in gamification. People will sometimes throw trust out the window if they see value. They will do anything for that free Starbucks cup of coffee . . . A lot of the time, people want to get a deal, or they want to be one of the first to do something. Gamification does take advantage of those tendencies in a lot of ways" (Anderson, 2017). Still, she believes the concept of gamification will be instrumental in shaping social media marketing strategies due to its high level of user interaction and capacity to collect valuable consumer data.

V. Discussion and Recommendations for Further Research

Through exploring the insights of futurists as well as looking into Facebook's recent F8 developers' conference, this study has encouraged a nuanced understanding of how technology will affect the evolution of social media UX. When looking at insights gathered concerning how the concept of UX will evolve, three main takeaways have come to light:

- The UX paradigm has already evolved due to early advances in social media content and consumer engagement

- Successful future UX design will require the presence of two aspects: hedonism and utilitarianism; application features will only achieve positive UX and true longevity if they continue to offer users something that hasn't before existed

- The concept of UX will continue to evolve as advancing technologies give way to a new immersive digital environment

Xu asserted that UX is an ever-evolving concept. Although the UX framework is still in its infancy, the concept has already changed due to developments in technology. Furthermore, successful future UX design is predicted to be most successful if it contains a strategic balance of hedonism and utilitarianism. All interviewees agreed that user experience will continue to evolve at an increasingly rapid rate as advancing technology creates a digital environment.

Regarding the implications of the future of social media, the case study on Facebook's F8 conference and an interview with Anderson highlighted both hopeful and less hopeful possibilities:

- The future of social media will involve increased convenience and decreased privacy: augmented reality and virtual reality will create new digital hangout spaces; artificial intelligence and smart algorithms will assist in platform functions; and 360-degree video will allow users to create immersive, personalized experiences

- Challenges surrounding user privacy concerns and design issues may slow down user acceptance, affecting the continuum of technological advancement

- Consumer technologies that incorporate three features: low-friction communication, expediency of exchange, and high value proposition, will be most successful in long-term user acceptance and adaptation

Anderson stressed that evolving technology will continue to enhance the convenience and usability of different social media applications. However, these benefits will come with sizable threats – as IoT facilitates companies' accessibility to data, consumers may grow weary of corporations and the technologies they utilize. Furthermore, this loss of trust may slow user acceptance, creating a potential roadblock in the adaptation of advanced technology.

Finally, technological change will affect marketing through social media in two main ways:

- Marketers will feel increased need to balance personalization with user trust

- The concept of gamification will become instrumental in engaging consumers and heightening brand recognition

Due to foreseeable challenges with gaining and maintaining consumer trust, marketers must remain aware of consumers' attitudes before employing such technologies in marketing strategies. On the other hand, gamification may very well emerge as a strategic tool for marketers, as it has the ability to engage consumers through a novel interface. Strategies that incorporate trends, such as gamification, are likely to catch the attention of consumers, thereby heightening brand recognition.

VI. Conclusions

While the development of technology and its impact on the social media space may remain unclear to even the most knowledgeable futurists, one idea is widely agreed upon: The ways humans use and interact with social media applications will change dramatically as technologies infiltrate the space. Xu demonstrated that UX is a malleable and ever-changing construct that will evolve by social media design. In addition, while Facebook's F8 case study sheds light on the exciting developments emerging in social media, societal pushback and design limitations will likely slow the process of mass user adoption. Technologies offering low-friction communication and strong value proposition will be most successful in long-term user acceptance.

To tie these ideas together, the author used the application of marketing to demonstrate the implications of technological advancement in social media for the real world. Findings suggest the future of social media marketing involves heightened personalization and convenience, and gamification will become a useful component in reviving consumer engagement.

It's hard to predict how evolving technology will impact the ways in which consumers use social media applications. Further research should be conducted on the cognitive and behavioral effects of technological change on consumer-driven fields like social media.

The subject matter of this study included fairly predictable research limitations. The body of scholarly research regarding evolving technologies is still limited, so there was little access to background information that would provide a more sophisticated prior understanding of the topic. Similarly, the concept of UX is still fairly new and is emerging as an essential aspect of social media design. The evolution of social media will be important in solidifying the importance of this construct. However, due to the growing role of UX in the space, there is not much literature surrounding the framework as it fits into social media application design.

The future of evolving technology and its impact on social media are not widely understood due to cognitive limitations. Because of this, futurists and communications experts can only theorize how the field will evolve.

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