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Influential Factors In Consumer's Adoption Of Innovative Products

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**INFLUENTIAL FACTORS IN CONSUMER'S ADOPTION OF
INNOVATIVE PRODUCTS**

by

MAHDOKHT KALANTARI

DISSERTATION

Submitted to the Graduate School

of Wayne State University,

Detroit, Michigan

in partial fulfillment of the requirements

for the degree of

DOCTOR OF PHILOSOPHY

2018

MAJOR: INDUSTRIAL ENGINEERING

Approved By:

Advisor

Date

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DEDICATION

I have many people to thank for where I am today; my mom who has always inspired me with her hard work and determination; my dad who is not with us anymore, and I would like to hear his voice one more time more than anything. He

always taught me to follow my heart no matter where it took me;

My lovely husband, Mani, who has always been supportive of my goals and the one who has shown me the way whenever I felt lost; our amazing daughter,

Elina, who reminds me every day why I want to be a better person;

And Dr. Chelst who has been a great mentor and a supportive advisor and as I

always refer to him, my American dad.

ACKNOWLEDGMENTS

I would like to thank Dr. Abhijit Guha whose guidance and supervision helped me learn more about research methodologies in the marketing field and conduct an interdisciplinary research.

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CHAPTER 1 “INTRODUCTION”

Research Motivation

With the start of the “Standards and Accountability movement” in the United States in 1990s, U.S. states initiated efforts to design standards that outline the expectations from students at each level. Following this movement, a report was published in 2004 by Archive Inc. which showed that American high school graduates do not meet college and employer expectations in terms of their skills and knowledge. This report triggered an educational initiative in the United States in 2004 called “The Common Core Standards Initiative” that was sponsored by the National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO). According to the mission statement of the Common Core Standards Initiative, the ultimate goal of this initiative is to "provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them" (Murphy & Conklin, 2014). This document also states that “the standards are designed to be robust and relevant to the real world”.

Common Core standards detail expectations from K-12 students in English language, arts, and mathematics. The mathematics standards aim to achieve greater focus and coherence in the curriculum. Mathematics and ELA Standards were

released in June 2010, and a majority of states adopted the standards in the following months.

Applied Math Practices for the 21st Century (AMP21) is a non-profit developer and provider of math curriculum that is aligned with the eight Standards for Mathematical Practice in the Common Core State Standards. The AMP21 team has published two math textbooks for high school classes. Their recent curriculum development efforts focus on middle school topics central to proportional reasoning: percentages, rates, ratios and proportions. AMP21 has a collection of middle school math activities that are designed by a group of middle school teachers under the supervision of faculty members from education and engineering departments at Wayne State University in order to help students improve their aptitudes and attitudes towards mathematics. These activities are blended in authentic and real-world decision contexts and are in line with Common Core Mathematical Practices standards. They are basically designed with the goal to help students think critically and develop a problem-solution mindset. AMP21's math activities cover a wide range of real decisions such as selecting the best deal in a sale, forecasting the time to complete reading a novel, selecting chores to perform to earn money, saving for an expensive game, or developing a nutritional diet. They challenge students to apply the necessary mathematical concepts to make good decisions. Outside of personal decisions, students are introduced to problems such as water conservation, repairing

roads and creating teams. This package includes short, medium, and long activities and can be a supplement to any middle school math textbook. Each activity comes with a teacher's guide that includes a reference to specific Common Core Standards.

Furthermore, the AMP21 team have recently developed a textbook called "From Percentages to Algebra" in order to answer the common question asked by many students about math: "When will we ever use this?" This textbook is comprised of 15 examples that are designed to explore different ways of working with percentages. All 15 examples use percentages to make decisions in a meaningful context. At the end of the examples, simple project ideas are presented for collecting data related to the example content. AMP21 has a website where the stand-alone activities are uploaded, and information for purchasing the percentages book is provided. Their goal is to maximize the number of new teachers that download the materials from the website and use them as well as the number of teachers and parents who purchase the percentages book.

Since the start of their initiative, the AMP21 team has been interested in reaching out to a wide network of middle school teachers in America in order to disseminate their educational materials and encourage teachers to use these materials in classrooms.

The purpose of this research is to support the efforts of the AMP21 team in promoting their activities and textbook and to facilitate the diffusion of these innovative educational materials among middle school math teachers.

In order to do this, online communities were deemed to be appropriate platforms for creating a social network of teachers and disseminating the new activities for the following reasons:

- 1) These communities could be used for informing teachers of the educational materials provided by AMP21.
- 2) Through these communities, the AMP21 team could keep in touch with teachers in order to support them in using the activities and examples in their classrooms. They could also solicit feedback from teachers about the existing activities as well ideas for new activities.
- 3) These communities provide platforms for teachers to communicate with each other and get engaged in the discussions initiated by AMP21 or other teachers. They could also support each other and share best practices of incorporating AMP21 activities in classrooms.
- 4) Online communities are cheap and provide the team with fast and easy reach to new members.

Therefore, a research project was set out in the area of customer engagement in Online Brand Communities (OBCs) in order to come up with effective strategies to

get teachers engaged in AMP21 online communities and encourage them to adopt the educational materials provided by this team.

The literature of customer engagement in OBCs shows a lack of real-world studies that analyze the effectiveness of different strategies on actual customer engagement behavior. Rather, research studies in this area have investigated the engagement drivers through surveys and analyzed self-reported data of participants' engagement behavior. A unique aspect of this research is that it is longitudinal in nature, and it provides the reader with access to observed data of individual's actual behavior.

Research Methodology

In the first step, a general review of Online Brand Communities and best practices for creating and managing successful OBCs was conducted. For the purpose of this research, social media based communities were chosen because of their lower cost and better reach. The platform used for creating AMP21 online communities was Facebook groups.

Four different Facebook groups were created so that different strategies could be used to compare the results and engagement level in each group. Teachers were recruited in these groups through AMP21 workshops, distributing flyers in math conferences, mailing flyers to middle schools, and spreading the word through math leaders and influentials. Free access to activities on the AMP21 website was only

granted to teachers in the Facebook groups as an initial motivation for them to join. In order to introduce the AMP21 offerings better and get teachers acquainted with this initiative, 87 posts were sent to each group in the timespan of 6 months before the engagement experiments started.

Meanwhile, a thorough literature review was performed to identify the underlying drivers of customer engagement in OBCs. The objective of the review was to pick appropriate and relevant drivers and try them out in the AMP21 Facebook groups in order to analyze their effectiveness. Out of the identified drivers in the literature, reputation systems which are a type of moderation tool are chosen to find out if they are effective in increasing teachers' engagement in Facebook groups. Research shows that the type of online community (brand-created vs. brand-created) could moderate the relationship between different reputation systems and customer engagement in online communities. Therefore, hypotheses are proposed to compare different reputation systems and the possible moderation effect of online community type on customer engagement. One study is designed and carried out through surveys on Amazon Mechanical Turk. The results are analyzed using ANCOVA. This study shows that reputation systems are different in terms of their effectiveness on consumer engagement, and semi-distributed reputation systems are in general more effective than other systems. Moreover, the results show that centralized reputation systems work better in brand-created online communities

whereas distributed reputation systems work better in consumer-created online communities.

With these findings, the main engagement experiment was carried out in the Facebook groups in order to find possible differences between reputation systems and their effectiveness on teachers' engagement. This study did not generate a considerable level of engagement, and the limited data that resulted from this study made the analysis quite difficult.

One possible explanation for the limited success in engagement experiments in Facebook groups was the small size of the communities and the very low percentage of active contributors within the communities. Therefore, another research endeavor was started to grow the size of the communities and attract new members to the AMP21 Facebook groups. For this purpose, Referral Reward Programs (RRPs) were used as a means for new members to spread the word to their friends and colleagues and encourage new members to join. A literature review on the effects of rewards on the customer likelihood to participate in referral programs led to different hypotheses about the effect of reward choice and reward type (cash vs. in-kind) on referral likelihood. It is also suggested that gender moderates the relationship between these variables and the referral likelihood. In order to validate these hypotheses, first, a study was designed and carried out through surveys on Amazon Mechanical Turk website. The results of this study were analyzed using ANOVA.

This study confirmed that gender moderates the relationship between both reward choice and reward type and the referral likelihood. After that, the main referral experiment was repeated on Facebook where a considerable effect was observed for provision of reward choice; however, this referral program did not bring enough members to get the online community size to a self-sustaining critical mass. Afterwards, a third study was conducted in the context of online training in order to increase the number of individuals who register for the course through a referral program; however, after 4 months of running the study, it did not generate enough data that could be analyzed.

Although these studies did not quite achieve their goals in terms of diffusion of AMP21 educational materials, they generated a general interest in understanding consumer's decision making when it comes to adopting new innovations. Since the most prominent context for diffusion of innovations is technological innovations, a research study was then conducted to understand the factors that affect consumer's adoption of a particular type of wearable technology: Augmented Reality Smart Glasses (ARSGs). This study was carried out through a survey of students of a North American university in the context of adopting Microsoft HoloLens. Multiple regression analyses was applied to analyze the results of the survey. The results show that factors such as perceived usefulness, image, ease of use, and descriptive norms

positively impact the adoption intention; however, technology risks are negatively related to adoption intention.

Significance of the Research

One of the unique aspects of this research is that it is longitudinal in nature, and the data obtained from this research is the observed data of individual's actual behavior rather than self-reported data about their likelihood of engagement in OBCs and participation in Referral Reward Programs.

The hypotheses tested in these experiments (both in the engagement and referral experiments) are novel and grounded in well-known psychological theories. By recruiting participants in multiple groups, it is possible to test different engagement and incentive strategies and compare the results and identify the most effective strategy.

To the best of the author's knowledge, this is the first study in the form of a controlled experiment where there is a one-to-one relationship between the engagement data and the download data that can be gathered from the participants.

This research has important implications for companies who have social media presence and are looking for best practices to increase their customer base, engage their customers, and encourage new purchases. It could also be used by administrators in Online Brand Communities to help better manage the conversations in order to increase engagement and sustain their communities.

Organization of the Dissertation

The dissertation is organized as follows:

The purpose of chapter 2 is to discuss best practices for creating online brand communities and the challenges involved with this process. In this chapter, Online Brand Communities (OBCs) are introduced as a subcategory of Online Communities of Consumption (OCCs). It will be discussed why these communities are important for brands in order to communicate with their customers and keep them engaged. After that, OBCs that are grounded in social media platforms such as Facebook and their benefits will be discussed. Afterwards, efforts and challenges of creating AMP21 online communities on Facebook will be explained. Then, it will be discussed how this research connects engagement on Facebook with website visits and downloads as well as the types of posts that were sent to the Facebook groups in the initial stage.

Chapter 3 addresses the whole research study on engagement in Online Brand Communities. After providing the definition of engagement and engagement in OBCs, why customer engagement in OBCs is of special importance for brands is discussed. Then, with a review of the engagement literature, drivers of OBC engagement are identified, and reputation systems are chosen as the main independent variable for the engagement study. Afterwards, two different studies will be presented to test the effectiveness of different reputation systems on customer

engagement in OBCs as well as the moderating effect of community type (brand-created vs. consumer-created).

ANCOVA is used to analyze and report the results of the first study. Since the second study did not generate the expected results, a discussion of challenges in this study is provided.

The goal of chapter 4 is to address the experiments on referral reward programs that were carried out in order to design more efficient RRP and increase the size of the AMP21 online communities. After a discussion about diffusion of innovations and Word-of-Mouth (WOM) marketing, Referral Reward Programs (RRPs) are introduced as a means for growing customer base and attracting new members to the Facebook groups. First, a review of the literature leads to hypotheses about different reward structures on the effectiveness of the referral programs. Then, these hypotheses are tested using three different studies. ANOVA is used to analyze the results of the first study. The results of the second and third study were reported with descriptive statistics since the number of participants was small.

Chapter 5 discusses the research study of consumer's adoption of Microsoft HoloLens. After a general introduction of wearable technologies and Augmented Reality Smart Glasses (ARSGs), a review of the literature of technology acceptance is provided. Various factors such as technology benefits, technology characteristics, technology risks, and norms are identified and suggested to have an effect on

consumer's adoption decision. Then, a study is presented in order to test the proposed hypotheses. Results are analyzed using multiple regression analyses. Next, a discussion of results along with the contribution of research and managerial implications is provided.

Chapter 6 presents conclusions, contributions of the research and an agenda for future research.

CHAPTER 2 “ONLINE BRAND COMMUNITIES”

The purpose of chapter 2 is to present the efforts that were made to create the AMP21 online communities, recruit teachers to them, and create appropriate and relevant content to be posted regularly in these communities. In order to get the reader familiar with the concepts provided in this chapter, the discussion starts with a general introduction to Online Brand Communities (OBCs) as a subgroup of Online Communities of Consumption (OCCs), and why these communities are important for brands. Then, OBCs that are based in social media platform such as Facebook will be discussed. The rest of the chapter explains the efforts and challenges of creating Facebook groups for the AMP21 initiative, recruiting teachers to these groups, connecting these groups to the AMP21 website, and creating content for these groups.

What are Online Communities of Consumption (OCCs)?

The ubiquity of internet and the technological advancements has led to an unprecedented growth of online communities. The proliferation and popularity of these communities has facilitated communications with consumers as well as disseminating information about brands and products; therefore, these communities have increasingly captured the attention of companies and marketing professionals.

Online communities are created in a virtual setting through the aggregation and communications between individuals who share common interests (Yen, Hsu, &

Huang, 2011). Members of online communities seek to achieve personal as well as shared goals with other members (U. M. Dholakia, Bagozzi, & Pearo, 2004). In these virtual communities, the communications and interactions between the community members are at least partially internet-mediated (Füller, Jawecki, & Mühlbacher, 2007).

Online Communities of Consumption (OCCs) are a subgroup of online communities that are typically structured around consumers' shared interest in particular consumption activities. For our research purposes, we use the definition of OCCs provided by R. V. Kozinets (1999) who describe these communities as “affiliative groups whose online interactions are based upon shared enthusiasm for, and knowledge of, a specific consumption activity or related group of activities.” [p.254]. In other words, OCCs include consumers who have a shared interest and commitment in a particular class of products, brands, activities, consumption behaviors, and/or ideologies (Muniz & O'guinn, 2001; Schouten & McAlexander, 1995). Through these communities, individuals can connect with likeminded people to share their consumption experiences as well as obtain purchase advice from other members (Pai & Tsai, 2016). It should be mentioned that OCCs are not necessarily homogeneous; rather, what connects the members in these communities is their shared enthusiasm for consumption behaviors, brands, products or services.

Typology of Online Communities of Consumption

Canniford (2011) provided a detailed discussion on the typology of consumption communities. He categorized Consumption Communities into subcultures of consumption, online brand communities, and consumer tribes. Other researchers have also studied various types of OCCs, such as brand communities (Muniz & O'guinn, 2001; Stokburger-Sauer, 2010), subcultures of consumption (Schouten & McAlexander, 1995), peer-to-peer support communities (Mathwick, Wiertz, & De Ruyter, 2008), innovation communities (Gebauer, Füller, & Pezzei, 2013), and tribes (Cova & Cova, 2002).

Broadly speaking, OCCs are either structured around a specific brand or around a common product/activity. Brand communities can be either company-initiated or consumer-initiated (Jang, Olfman, Ko, Koh, & Kim, 2008). Examples of successful brand communities are Apple User Groups, Harley Owners Group, Oracle Community, international fan-created LEGO Users Group Network (LUGNET), My Starbucks Idea, and Sephora's BeautyTalk. The second group of OCCs are built around a common product category such as biking, golf, online gaming, traveling, music, food, etc. Good examples of such communities include Yelp, TripAdvisor, Steam, AllMusic, and GolfWRX.com.

For the purpose of this research, we focus on Online Brand Communities (OBCs); however, our findings can be generalized to other Online Communities of

Consumption. Traditionally, brand relationship was predominantly a flow of information from brands to consumers; however, the emergence of online brand communities has demonstrated the potential benefits of communications among consumers (McWilliam, 2000). Since members in an online brand community share interests in the brand's goods and services, their interaction mainly consists of exchanging information about products and services, expressing passion and love for the brand, sharing brand-related consumption experiences and stories, sharing symbolic interpretations, sharing ideas for product modifications and new product developments, and asking and answering brand-related questions.

Online Brand Communities have rapidly become important sources for consumption-related information. Since knowledge and information about brands and products can be rapidly disseminated through these communities and influence consumers' choices and decisions, researchers have shown a growing interest in understanding the dynamics of consumer engagement in these communities.

The Importance of Online Brand Communities

Research has shown that successful brand communities can lead to substantial marketing and financial values for the firms. An IBM survey of 1,709 CEOs shows that these communities are the "second most important means by which they will engage customers in the future" [(Manchanda, Packard, & Pattabhiramaiah, 2015),

p.1]. Therefore, executives are willing to invest more in creating and managing online communities.

A review of the literature of OBCs shows that firms can obtain multiple benefits from their online customer communities. These communities provide an interactive and low-cost channel through which brands and marketers can communicate with their customers and share information and promotional messages regarding the brand and its products (Andersen, 2005; U. Dholakia & Bagozzi, 2001; Jang et al., 2008; Porter & Donthu, 2008; Wellman et al., 1996). The social interactions and communications that occur between members of online brand communities will ultimately strengthen the customers' relationships with the brand (Andersen, 2005; U. M. Dholakia et al., 2004; Jang et al., 2008; McAlexander, Schouten, & Koenig, 2002; Muniz & O'guinn, 2001; Stokburger-Sauer, 2010). Furthermore, participation in OBCs can help integrate customers into the brand identity and consequently influence their attitude towards the brand and enhance their loyalty (Algesheimer, Dholakia, & Herrmann, 2005; Andersen, 2005; Casaló, FlaviáN, & GuinalíU, 2010; De Valck, Van Bruggen, & Wierenga, 2009; Dwyer, 2007; Kuo & Feng, 2013; McAlexander et al., 2002; Muniz & O'guinn, 2001; Stokburger-Sauer, 2010; Thompson & Sinha, 2008). Another important aspect of brand communities that make them highly important in marketing is their influence on customers' preferences and choices. Since members in a brand community consistently

exchange their consumption experiences and opinions about products and services, they can influence other members' choices and preferences (Carlson, Suter, & Brown, 2008; Casaló et al., 2010; U. Dholakia & Bagozzi, 2001; Jang et al., 2008; Laroche, Habibi, & Richard, 2013; McAlexander et al., 2002; Miller, Fabian, & Lin, 2009; Muniz & O'guinn, 2001; Thompson & Sinha, 2008). Previous research also provides a clear answer for the important question: "does customer engagement in online community have financial implications for the firm?" This line of research confirms that customers' participation in OBCs leads to higher engagement with the brand and ultimately increases their economic activity with the firm (Franke & Piller, 2004; Manchanda et al., 2015; Porter & Donthu, 2008). Another important advantage of online communities for brands is providing a rich source of marketing research data (Jang et al., 2008; Porter & Donthu, 2008). Customers share a good deal of useful information such as opinions and feedback about products or services, their consumption behavior, and suggestions for product improvements (Muniz & O'guinn, 2001). Marketers and managers can analyze this data in order to develop new products, improve their existing products, and better understand their customer preferences (Dinhopl, Gretzel, & Whelan, 2015; Habibi, Laroche, & Richard, 2014; R. Kozinets, 2007; Pai & Tsai, 2016; Williams & Cothrel, 2000). Finally, community members can generate positive Word-Of-Mouth for the brand and its products (Porter & Donthu, 2008).

Despite all the aforementioned research that points at the importance and positive consequences of OBCs for brands, there is a noticeable gap in the literature about best practices for facilitating these communities and fostering consumer-brand relationships (Stokburger-Sauer, 2010).

Social Media Based OBCs

The progressive growth of social media platforms and their “inhabitants” as well as the increasing influence they have on every aspect of consumer’s decision making has prompted increased attention among academics and practitioners to brand communities that are based in social media platforms (Pai & Tsai, 2016). Since social media platforms provide good means for building customer-brand relationships, the social media based OBCs are ideal for sharing valuable and relevant content, communicating shared meanings and values with consumers, and encouraging customer engagement with brands (Habibi et al., 2014).

The following factors differentiate social media based OBCs from other OBCs (Habibi et al., 2014):

- 1) The initial cost for creating these communities is lower since most social media platforms are free.
- 2) These communities have a better reach since there are already an enormous number of users on social media platforms and it takes little effort for these users to join a brand community. This has made it easier

for brands to have communities with millions of members. Furthermore, these communities might not require high brand involvement.

- 3) It is easier for brands to reach out to potential customers who do not own the brand products through these communities since everyone can easily follow a brand on social media platforms.
- 4) Most of the community members in social media based OBCs use accounts that reveal their real identities whereas in other OBCs, it is common for members to use pseudonyms. This has an effect on the dynamics of the relationships among the community members as well as the customer-brand relationships.

These unique features have motivated researchers to study the social media based OBCs separately.

Facebook Groups as OBCs

In the past decade, there has been a considerable growth in the number of Online Brand Communities on Facebook which helped consumers and brands to communicate (De Vries & Carlson, 2014). One of the popular features of the social networking site Facebook is 'Facebook Groups'. This application allows an unlimited number of members to join groups that are in line with their interests and communicate with other group members by posting content and commenting on other posts (Casteleyn, Mottart, & Rutten, 2009; N. Park, Kee, & Valenzuela, 2009).

Members and administrators of Facebook groups can post texts, links, photos, videos, files, and polls. There are 3 different privacy settings for Facebook groups: public, closed, and secret. In closed and secret groups, members' activities are not visible to public, and they are only visible to other group members. Not only members can communicate with each other through commenting on posts on group walls, they can also use Facebook messenger to chat with other members privately.

Since Facebook groups provide the ability to easily recruit members and share information and spread messages about a special-interest topic with ease and speed, they offer a promising platform to brands in order to build online communities, have multidirectional communications with their consumers, build consumer-brand relationships, engage consumers at a personal level, and launch viral marketing campaigns (Chu, 2011; Holzner, 2008; N. Park et al., 2009)

For the purpose of this research, Facebook groups have been utilized as the main platform for building online communities for AMP21. More details about the reasons why Facebook groups have been chosen as well as the member recruitment methods are discussed in the next section.

Building Online Communities for AMP21

As mentioned earlier, Facebook groups were used as the main platform for AMP21 online communities in this research. In order to be able to run controlled experiments with regards consumer engagement, 4 different groups were created on

Facebook. At the initial stage and before the start of the experiments, all the groups were set to public in order to increase visibility and attract a higher number of members. Once the experiments started, the group privacy settings were set to be closed for the following reasons:

- 1) In closed groups, only members of the group can see the content that is posted in the group; therefore, their privacy is protected. Furthermore, since different strategies and manipulations were used in each group later on, researchers could make sure that members of each group would not be exposed to the strategies used in other groups which could lead to confusion and could potentially undermine the effectiveness of the research.
- 2) Outsiders of a closed group can see the list of members who are in the group. This is particularly helpful in recruiting new members because if they see their friends are already in the group, they are more likely to join.
- 3) Unlike secret group, closed groups are searchable for public; therefore, if somebody is looking for groups that are related to math education, they would be able to find this group. This facilitates recruiting the right audience for the groups.

All the groups were named Applied Math Practices (AMP21). Figure 1 shows the cover photo that was used for all the groups.



Figure 1: Cover photo for the teachers' Facebook groups

The following group description was used for all the groups:

“This is a group for middle school math teachers. We will post free math activities every two weeks. These activities are blended in real-world contexts and are aligned with Common Core Standards. You can share your own activities and experiences. Please feel free to invite your colleagues who can benefit from these activities. Learn more about us at: <http://www.appliedmathpractices.com/>”

Moreover, all the groups’ contents posted by the admin were completely similar across all the groups. The reason for that was that any meaningful differences between the groups should have been related to the different engagement strategies and not the group content. The only exception for that was the posts related to the experiments which were different depending on the treatment to which each group was assigned.

In the following section, benefits and challenges of using Facebook groups for the purposes of this research will be discussed.

General Challenges of Starting a New OBC

Research shows that many online communities fail to take off the ground once they are created (Garnefeld, Iseke, & Krebs, 2012; Yen et al., 2011).

According to Resnick et al. (2012), new online communities face the following challenges:

Finding a Useful Niche

Online communities should provide services and experiences that their potential members want. Getting involved in an online community has some costs (time, effort, learning social norms, getting integrated) and benefits (information, social connection, sense of identity) for the members, and they should find the net utility to be positive in order to get engaged in the community. The following decisions are critical in the community's success to find a useful niche:

- 1) Defining the scope of the community: what purposes does the community have? What topics should be covered? What type of audience should be targeted? What activities and contributions should be encouraged? This scope might evolve over time.
- 2) Deciding the extent to which the online community should be compatible and integrated with other sites.

- 3) Deciding how the content, the people, and the activities within the online community should be organized and moderated. The moderation strategies will be further discussed in the next chapter.

Outperforming Competitors

In many cases, potential members of a new online community have other options to engage and interact online for the same purposes; therefore, online communities should convince them that they get more utility out of engaging in their community comparing to the competitors.

One strategy that might be appealing to many potential members and save them time is to establish the online community in a social networking site such as Facebook and LinkedIn. Since many people are already on these sites and check them regularly, it makes sense to save them time and effort by creating the online communities within these websites instead of making them log in to a different website.

Furthermore, online communities should have core selling propositions that differentiates them from their current and future competitors, such as: special topic, specific group of participants (e.g. professionals), different activities and communication tools, or specific set of community norms.

Getting to a Self-Sustaining Critical Mass

Many people only value an online community and are willing to join it after it gets to a critical mass. There are two main reasons why an online community would provide less value at the initial state:

- 1) Prospective members look for content and interaction opportunities that are only available once the online community gets to a critical mass.
- 2) At the initial state, many online communities do not have articulated purposes, interaction norms and moderating strategies in place.

Moreover, in online communities where a network effect (network externality) is present, the utility of the online community is dependent on the number of its members.

Unfortunately, there is little empirical research to-date about the challenges of new online communities.

Initial Challenges for Creating an Online Community for AMP21

Following the above discussion about the challenges of creating a new online community, the main expected challenges for AMP21 online community were as follows:

- 1) Communicate the value proposition to prospective users
- 2) Overcome the competition, and
- 3) Get to a self-sustaining critical mass in the online community

Communicate the Value Proposition to Prospective Users

The value proposition for AMP21 is quite unique, and the creators and developers of AMP21 do not know of other similar educational materials for middle school classes that apply mathematics to real-world problems in quite the same way as AMP21 activities do. AMP21 activities focus on developing applied mathematical modeling skills by using authentic problem contexts. All of these activities have the following attributes:

- 1) They have clear connections to the real world.
- 2) Someone has used the approach to solve a similar issue.
- 3) They require more than a few minutes to solve.
- 4) They do not restrict numbers, whether givens or solutions, to integer values.
- 5) They allow student collaboration.
- 6) They require student reflection on the problem and its solutions.

The initial challenge in communicating the value proposition to prospective users was to emphasize the uniqueness of these educational materials and the “real-world” aspect of them. The phrase “real-world” could sometimes be misinterpreted by teachers and parents because when problems from middle and high school mathematics books speak of “real-world”, they often describe nothing more than what can be seen or touched or simply measured. Textbooks still use contexts that

would have been equally relevant 150 years ago. They compare heights and shadows of people and flagpoles. They are filled with diverse people and/or vehicles traveling at different speeds who are either on a path to collide or pass.

The AMP21 approach is to design decision contexts that have current relevance. As a result, the contexts offer opportunities for students to discuss aspects of the problem beyond just how to find the one right answer. For example, they may work on a multi-faceted plan of chores in order to earn enough to buy a hot new game or to select foods based on different nutritional content. AMP21 helps students develop conceptual understanding of ratios and proportions while also developing fluency in carrying out procedures to solve problems involving proportional relationships. AMP21 challenges students to apply proportional reasoning to make real decisions such as "which is the best sale price on candy bars based on their size" or "which is the better data plan based on their usage". Students make sense of proportional relationships in problem situations and consider the units involved. They are also asked to explain the meaning of a situation and explain correspondences between tables, graphs, verbal descriptions and equations. By defining authentic problem contexts in real-world terms, the application to real life is simple. AMP21 problems are designed to encourage student consideration of a myriad of different professions, all of which can be improved through mathematics.

Overcome the Competition

Another challenge for attracting members to the AMP21 online community was for the team to compete with other competitors who already had an established audience base online. The math-related online communities that have already reached the critical mass are more likely to attract new members since these members have a better opportunity to communicate with other individuals and get the information they need. Furthermore, individuals have a limited time to spend in online communities, and if they are already participating in other math-related online community, it would be difficult to convince them that joining another community is worth their time.

A common challenge in promoting educational materials is the fact that prospective users come across various options, and it takes them time and effort to explore these options and realize which one best meets their needs. Unlike many other products, it would be very difficult to push new educational materials to prospective users unless they are actively searching for materials that have similar value propositions and are willing to spend the required time and effort to test out these materials.

Get to a Self-Sustaining Critical Mass

The third challenge in creating an online community for AMP21 was to reach out to the community of middle school math teachers and recruit them in order to

get to a self-sustaining critical mass in the online community. Of course, one of the advantages of the AMP21 online community is that this community provides access to educational content that is valuable to prospective members in and of itself and hence does not necessarily require a critical mass to attract new users. In other words, teachers could benefit from downloading the activity files without communicating with other members or having to comment on other's posts; nevertheless, having a large audience-base signals value and quality to prospective users.

It is always helpful to target the type of audience who are intrinsically interested in the community's offerings and hence would be more likely to contribute and attract other members to the community. In order to find the right audience, the following methods were used as part of the recruitment process:

- 1) Distributing flyers in AMP21 teacher workshops
- 2) Distributing 250 flyers in the annual conference of National Council of Teachers of Mathematics (NCTM)
- 3) Distributing 100 flyers in the Minnesota Council of Teachers of Mathematics (MCTM)
- 4) Mailing flyers and sample activities to 1618 schools in Michigan, 848 schools in Ohio, 307 schools in Indiana, and 421 schools in California
- 5) Spreading the word through influential math leaders in certain Michigan school districts

The advantage of the first two methods was that teachers who participate in career development workshops and conferences are generally looking for ways to improve their teaching methods and are therefore more receptive to new educational materials comparing to other teachers.

According to Resnick et al. (2012), there are two approaches that help with the initial hurdle of growing new online communities. The first approach is to make the online community more attractive for the members who join at the early stages. The other approach is to leverage the early members to attract new members.

In line with the first approach, the following strategies were used to attract early members:

- 1) The flyers that were distributed at the NCTM conference as well as the flyers that were mailed to schools in Michigan indicated monetary incentives (a \$5 or \$10 Amazon gift card) for teachers that would join the AMP21 online community within a limited time frame. Once teachers joined the Facebook groups and signed up on the website, the Amazon gift cards were emailed to them within 2-3 business days.
- 2) Group members were often asked to post their own “real-world” activities. They were also encouraged to send their feedback about the AMP21 activities by indicating that they can have an impact on the future of math education in middle school classes by providing their inputs. These types

of “User-Generated Content” are also in line with the second approach and would add value to the group content and could potentially have an impact on attracting new members to the groups.

- 3) At the very early stages of the groups, new members were mentioned and welcomed individually on the groups’ walls.
- 4) Members were encouraged to suggest new topics for math activities that the AMP21 team could develop. They were told that they would be acknowledged if these activities would be published by AMP21 team.
- 5) The admin of the groups posted bios of the AMP21 team and the papers that they published in order to signal the quality of the AMP21 offerings and the level of professionalism in designing the activities.

In line with the second approach, Referral Reward Programs were launched in all the groups in order to motivate the existing members to invite their friends and colleagues to the groups. These referral programs will be discussed in more details in chapter 4.

Benefits and Challenges of Using Facebook Groups as Online Communities

As previously mentioned, Facebook groups were chosen as the main platform for building an online community for AMP21.

The following considerations were taken into account for choosing Facebook groups for this research:

- 1) Currently, Facebook is the forerunner among the social networking platforms with more than 2 billion active users ("Global social networks ranked by number of users 2018," 2018). This means that many of the prospective users of AMP21 materials are already on Facebook. This reduces the effort of joining the AMP21 online community as prospective users can easily join groups by clicking a button. In order to confirm this for the community of middle school math teachers, short surveys were distributed among teachers in the AMP21 workshops. The results of these surveys indicated that most teachers have active accounts on Facebook and regularly check their Facebook notifications.
- 2) As discussed before, Facebook groups provide the necessary features of an online community since members can contribute to the group's content by posting as well as communicate with other members through commenting or sending personal messages.
- 3) With Facebook groups, even if group members do not open the group page and check the posts regularly, depending on their notifications settings, they receive notifications when there are new activities in the group. This increases the probability of members' engagement in the groups.
- 4) Facebook groups enable displays of memberships that are visible to non-members, and people can see if their friends are part of the group which

makes them more likely to join. According to Resnick et al. (2012), this leads to bootstrapping.

- 5) Depending on the group's privacy settings, members of a Facebook group can share the group's content with their social network outside the group. This can speed up the diffusion of brand's contents and promotional messages.
- 6) Depending on the group's privacy settings, members of a Facebook group can take the initiative and invite their friends to the group. This helps with the brand's recruitment efforts and expanding the community's size.
- 7) Using closed Facebook groups provides the researchers with the ability to run controlled experiments where multiple groups could be managed as different treatments and their contents would only be visible to group members that are carefully recruited.

The use of Facebook groups as a platform for AMP21 online community also introduces the following potential problems and challenges in the context of this research:

- 1) Facebook is used by many users mainly for its fun and entertaining aspects; therefore, groups with educational purposes might have a hard time engaging their members in discussions and group activities. In a study to understand the effectiveness of Facebook groups on teaching,

Yunus and Salehi (2012) concluded that Facebook users value this website mostly for socializing rather than educational purposes.

- 2) Similar to other social networking sites, a high percentage of Facebook users spend more time lurking and reading other people's posts rather than actively posting themselves (Pempek, Yermolayeva, & Calvert, 2009).
- 3) Another issue with using Facebook groups for this research is the lack of tools that help the group admins organize discussions in a thread-like format. In Facebook groups, new items show up at the top of the group page while older items move down; however, new comments or reactions to an old item could also push it to the top of the list. This organization algorithm is not ideal for an educational online community where posts could be better organized by subject. One possible solution to this problem is using the search bar which is basically an internal search engine for retrieving information from the group. Group members can find specific posts by searching for key words that they are interested in.

For the purpose of this research, middle school math teachers were recruited in 4 different Facebook groups. AMP21 team members also joined the groups in order to be able to monitor and manage the conversations. Table 1 shows the number of members recruited in each group to date.

Table 1: Number of members in each of the teachers' Facebook groups

Group Name	Number of Members (excluding AMP21 team)
Group #1	90
Group #2	89
Group #3	93
Group #4	121
Total	393

In the next section, the plans for reading data from Facebook API and storing it for further analysis will be discussed.

AMP21 Website

AMP21 has a website¹ where users can learn more about this initiative and get access to the materials provided by the AMP21 team. This website has information about the AMP21 team, AMP21 textbooks, high school and middle school programs, and teacher workshops.

For the purpose of this research, middle school activities were uploaded under the middle school programs menu. These activities are not open to the public, and only research participants can access these materials by signing up on AMP21 website. The public middle school page includes descriptions about AMP21 middle school activities and how they offer problems in real-world contexts. A sample

¹ www.appliedmathpractices.com

activity is uploaded on this page so that all the website visitors can see a sample of AMP21 offerings for middle school classes.

On the private middle school pages, each activity is accompanied by a teacher's notes and an activity profile that shows a summary of the activity. Figure 2 shows a screenshot from the website that includes the uploaded files for one activity.

Teachers could easily download each file by clicking on it. The plugins used on the website show the total number of downloads for each file. They also record logs for each user. These logs show the files that each user downloads and the date of each download. Another plugin called WassUp tracks the links that each logged-in user has visited at any certain time.

New activity files were uploaded on the website every other week. Once new files were uploaded, Facebook members were notified.

The screenshot shows the AMP21 website interface. At the top, there is a navigation bar with the AMP21 logo and links for HOME, ABOUT US, BOOKS, and OUR PROGRAMS. Below the navigation bar, the page title is 'Activity 1: Accident Rates'. The main content area features an 'Activity Profile' box with the following details:

Activity Profile					
Title: Accident Rates					
Grade level: 6			Time needed: 30 Minutes		
Common Core State Standards for Mathematics: 6.R.P.A.3*					
Focus Question: What is the safest route?					
Materials Required: None					
Checklist:					
Internet	Data Collection	Decision Making	Hands-on	Graph	Table
					✓

* Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Students calculate the number of accidents at each intersection to find the safest route.

[Accident Rates \(word\)](#)
[Accident Rates \(pdf\)](#)
[Accident Rates- Teacher Notes \(word\)](#)
[Accident Rates- Teacher Notes \(pdf\)](#)

Figure 2: Activity files uploaded in the private middle school page

Connecting Facebook Groups to AMP21 Website

The main objective of the research is to study the effects of teacher engagement in Facebook groups on their download behavior on the website; therefore, it is important to design the platforms in a way that one-to-one relationship can be made between Facebook group members and logged-in users on the website.

As discussed before, 4 Facebook groups were created and members were randomly recruited into one of these groups. If an individual requested membership in more than one group, their request would only be accepted for one group that was

randomly picked. Every time the group admin received a request, the new member would be cross referenced across all the groups in order to make sure they do not already belong to another group.

In order to be consistent across all platforms, 4 separate private pages were created on the AMP21 website for uploading middle school activities. All these pages had the same content and same set of files. The only difference between them was the page address and the access permissions. Each of these pages would only be accessible by members of one of the Facebook groups.

The recruitment flyers only included information and links of the Facebook groups. Once teachers joined the groups, the top post would explain that the activities can be accessed from the AMP21 website. In each group, a different link would take the teachers to one of the 4 private middle school pages on the website. In order to get access to the private page, teachers would have to fill out a form with the following information:

- Name (as listed on Facebook profile)
- Gender (optional)
- Job title
- Email
- City their school is located
- State

- Current grade level they are teaching
- How did they hear about AMP21 (email from friend/ colleague, flyer, invitation on Facebook, Mail package, etc.)
- Years of experience teaching math (optional)
- Age (optional)

If users gave names that were not found on Facebook groups, they were contacted to clarify their Facebook username. After submitting the form, each user received a unique username and password that would give them access to one of the private middle school pages.

The above method for giving access to teachers helped make a connection between the engagement behaviors and download behavior of each individual teacher.

Table 2 and Figure 3 show a summary of the data pertaining to teachers in Facebook group #1:

Table 2: Data about teachers in Facebook group #1

Table 2.a

Gender	
Female	74
Male	16

Table 2.b

Platform	
Joined Facebook Only	44
Joined both Facebook and Website	46

Table 2.c

State	
Michigan	30
California	9
Ohio	5
Minnesota	1
Indiana	1

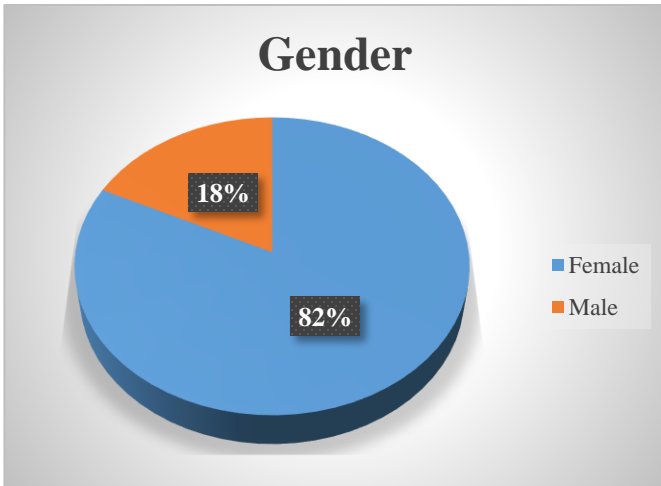


Figure 3.a

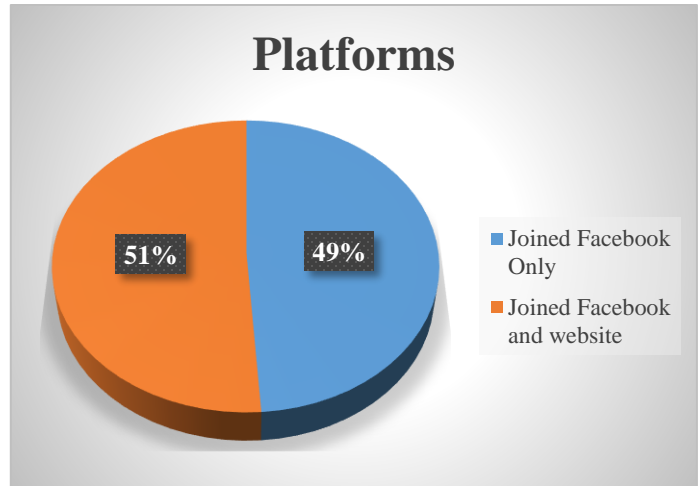


Figure 3.b

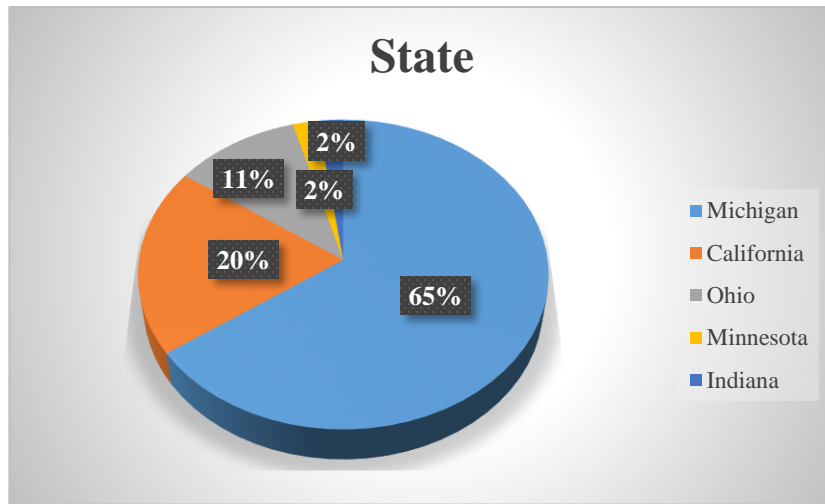


Figure 3.c

Figure 3: Data about teachers in Facebook group #1

Table 3 and Figure 4 show a summary of the data pertaining to teachers in Facebook group #2:

Table 3: Data about teachers in Facebook group #2

Table 3.a

Gender	
Female	63
Male	26

Table 3.b

Platform	
Joined Facebook Only	37
Joined both Facebook and Website	52

Table 3.c

State	
Michigan	32
California	7
Indiana	2
Minnesota	2
Other	9

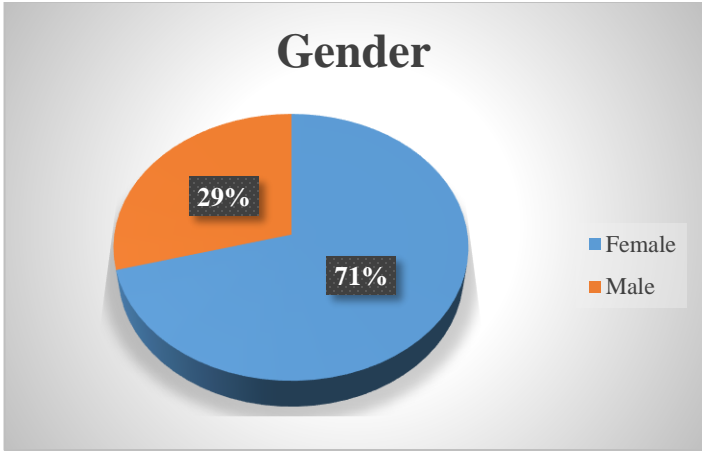


Figure 4.a

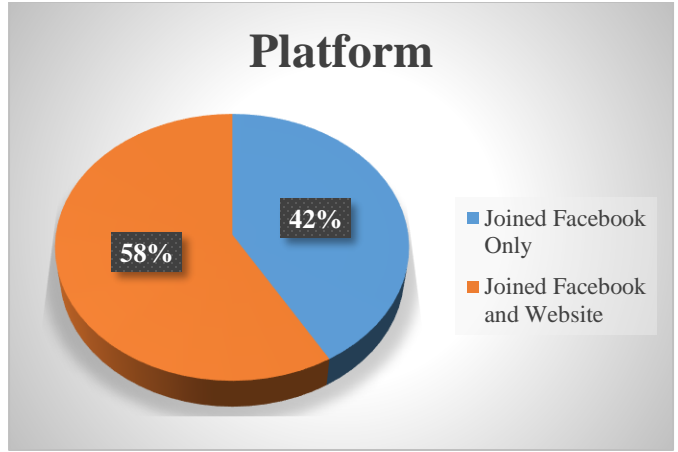


Figure 4.b

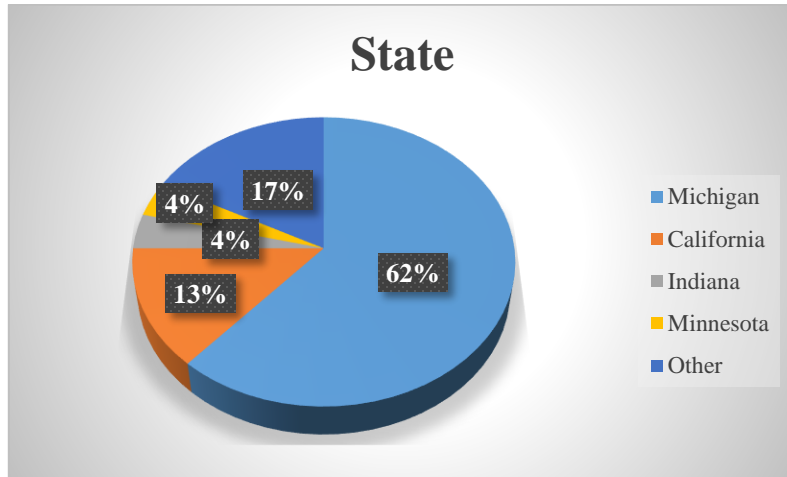


Figure 4.c

Figure 4: Data about teachers in Facebook group #2

Table 4 and Figure 5 show a summary of the data pertaining to teachers in Facebook group #3:

Table 4: Data about teachers in Facebook group #3

Table 4.a

Gender	
Female	73
Male	20

Table 4.b

Platform	
Joined Facebook Only	37
Joined both Facebook and Website	52

Table 4.c

State	
Michigan	29
Ohio	7
Minnesota	4
California	3
Nevada	2
Iowa	2
Arizona	1

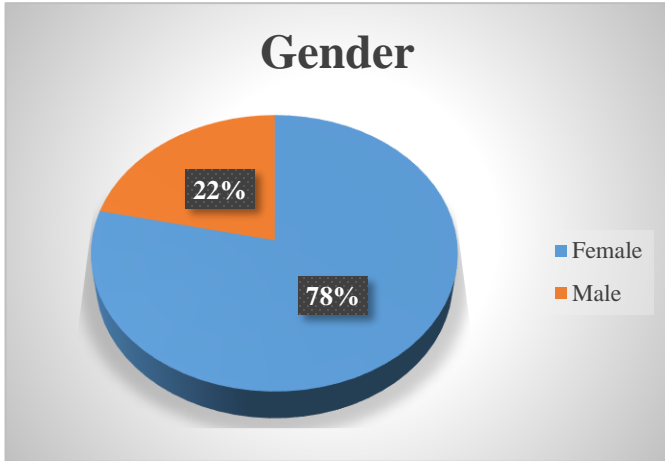


Figure 5.a

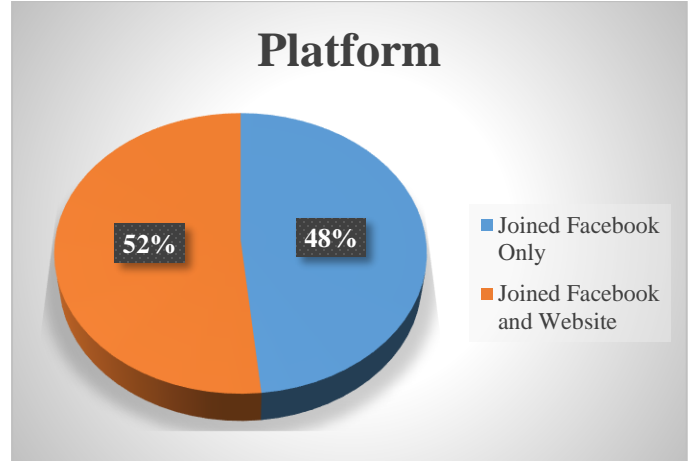


Figure 5.b

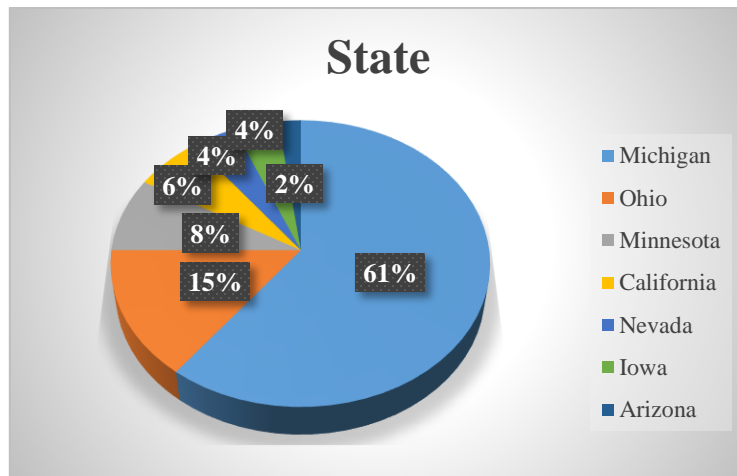


Figure 5.c

Figure 5: Data about teachers in Facebook group #3

Table 5 and Figure 6 and show a summary of the data pertaining to teachers in Facebook group #4:

Table 5: Data about teachers in Facebook group #4

Table 5.a

Gender	
Female	97
Male	24

Table 5.b

Platform	
Joined Facebook Only	67
Joined both Facebook and Website	54

Table 5.c

State	
Michigan	29
Ohio	7
Minnesota	4
California	3

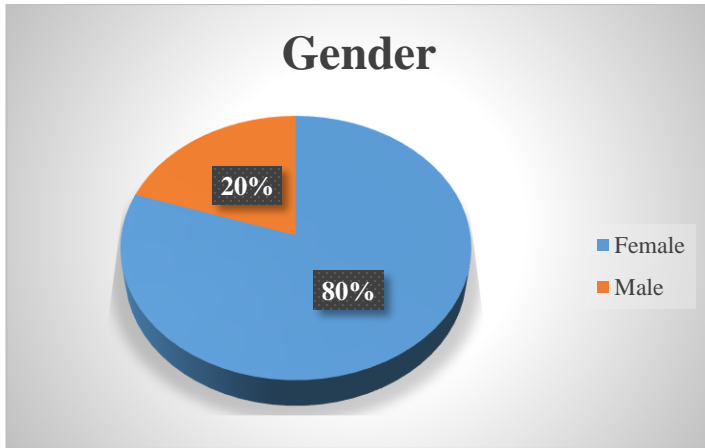


Figure 6.a

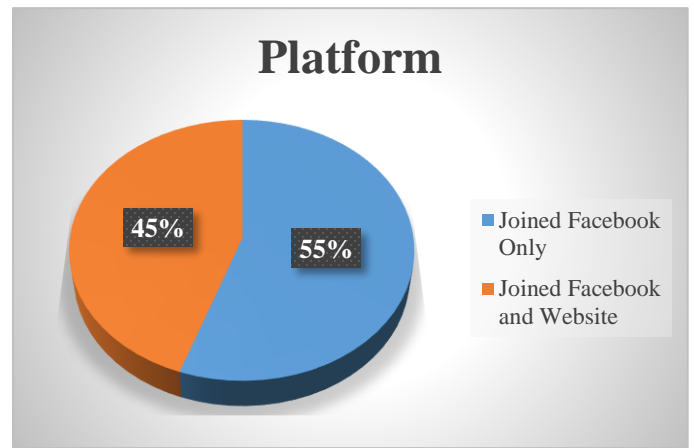


Figure 6.b

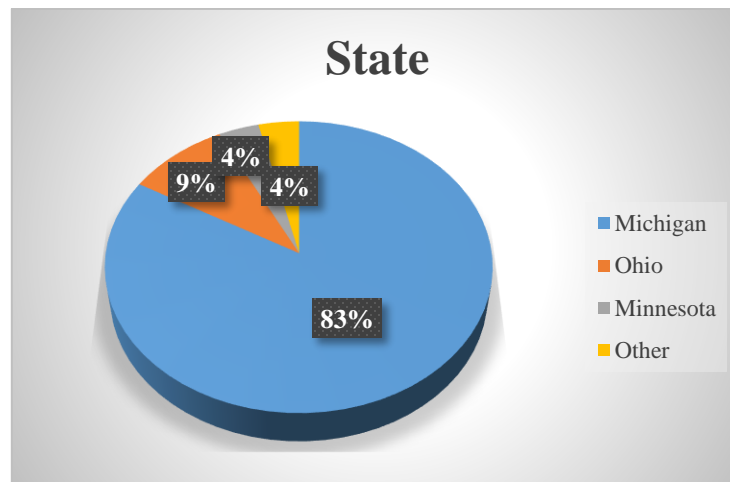


Figure 6.c

Figure 6: Data about teachers in Facebook group #4

Table 6 shows a summary of the data about recruitment methods across all 4 groups:

Table 6: Data about recruitment methods across all groups

Recruitment Method	Number of Teachers recruited in all groups	Percentage
Mail package	92	45.3%
Email from friend/colleague	57	28.1%
NCTM Conference 2016	19	9.3%
Invitation on Facebook	10	5%
Other	25	12.3%

It is important to note that the above data only shows the channels of recruitment for the teachers who signed up on the website and not the teachers who only joined the Facebook groups. Assuming that the percentages from *Table 6* hold across all the Facebook members, *Table 7* shows the estimated number of teachers recruited through each method across all the groups:

Table 7: The estimated number of teachers across all the groups

Recruitment Method	Estimated number of Teachers recruited in all groups
Mail package	178
Email from friend/colleague	110
NCTM Conference 2016	36
Invitation on Facebook	20
Other	49

Considering that 3294 mail packages were sent to schools across different states, the success rate of this recruitment strategy was slightly above 5%. The flyers

distributed in the NCTM conference on the other hand led to a success rate of more than 14% which can emphasize the importance of face-to-face marketing strategies.

In the next section, a thorough discussion will be provided about the content that were posted in AMP21 Facebook groups before the engagement experiments.

Different Types of Facebook Posts

Since AMP21 was an unknown brand for most of the teachers who joined the Facebook groups, it was important to get them acquainted with the brand and its offerings before focusing on different strategies to motivate their engagement. Teachers would not be convinced to participate in the group and get involved in the discussions if they did not know the brand or trusted its value offering.

In order to get the ball rolling and warm up conversations in the groups, different topics were posted in these groups. Contents were posted a few times a week, and they were similar across all the groups. The following lists all the different types of posts:

- 1) Welcoming new members by mentioning their names and asking them to introduce themselves
- 2) Introducing AMP21 team members, their expertise, and relevant background
- 3) Notifying members about the new activities posted on the website

- 4) Suggesting discussion topics for classrooms that were relevant to rates, ratios, and percentages in different real-world contexts
- 5) Discussing recent uses of rates, ratios, and percentages in media and news
- 6) Recommending math books and resources that offered real-world contexts
- 7) Recommending resources for teacher development (e.g. incorporating social media in classrooms)
- 8) Asking for teachers' feedbacks on different topics (group posts, experience with activities, examples for different scenarios, etc.)
- 9) News and updates about AMP21 workshops
- 10) Comics and funny posts related to math
- 11) Math contests

In total, 87 posts were sent to each group in the timespan of 6 months (April 2016 to August 2016) before the start of the research experiments.

AMP21 Twitter and Pinterest Accounts

In order to extend the reach to middle school teachers across different social media platforms, Twitter and Pinterest accounts were created for AMP21; however, these accounts were not used for the experiment purposes.

In the Twitter profile, the following posts from Facebook groups were modified and posted:

- Notifying about new activities on the website
- Recommending math books and resources that offered real-world contexts

Moreover, relevant tweets from math leaders and math-related accounts with a high number of followers were retweeted using hashtags such as “real-world math”, “middle school math” and “math activities”.

In the Pinterest account, some of the AMP21 activities were shared in the form of pins that redirected users to the Facebook groups. The AMP21 Pinterest profile also featured pins related to real-world math and middle school math activities from other Pinterest accounts.

Home-Schooling Project

In parallel to the project that involved middle school math teachers, two closed Facebook groups were created that targeted parents of homeschooled and non-homeschooled middle school students. The main purpose of this side project was to identify any meaningful differences between parents’ groups and teachers’ groups in terms of interests and the level of engagement.

It was expected to see higher levels of engagement, especially with the homeschooling parents since they actively seek for educational materials online and are intrinsically more involved with educational materials as a product category.

Both parents' groups were named "When Will I Ever Use This?" Figure 7 shows the cover photo that was used for these groups.



Figure 7: Cover photo for the parents' Facebook groups

The following group description was used for these groups:

“PLEASE READ BEFORE YOU JOIN

WHO ARE WE?

Applied Math Practices (AMP21) is a non-profit provider of math curriculum at Wayne State University, Detroit, MI: <http://www.appliedmathpractices.com/>.

We provide FREE and self-paced mathematics activities for middle school students.

OUR MATERIAL:

We have a collection of more than 30 supplemental activities that relate to rates, proportions and ratios. We will post one of these each week. Some of these activities are:

- Working with Data on Nutrition Labels*
- Accident rates at Intersections*
- Exercise Away Big Mac*
- Managing a Lemonade Stand.*

We also post articles and/or news pieces that can help adults explain to middle school students the relevance of these topics to different real-world contexts.

CONTACT US:

If you have any questions, please email us at: mahdokht.kalantari@wayne.edu. Please feel free to share your own activities and experiences with other members in the group.”

Moreover, all the groups’ contents posted by the admin were completely similar across both groups. Similar to the teachers groups, one of the main challenges for developing the parents’ groups was to a self-sustaining critical mass. In order to find the right audience for these groups, the following methods were used as part of the recruitment process:

- Announcements in other homeschooling groups on Facebook
- Posts on Wayne State Academica
- Distributing flyers and networking at the “NOT Back to School Picnic and Resource Fair”
- Asking teachers in the teachers’ Facebook groups to share the group links with their students’ parents
- Word-of-Mouth through homeschooling parents that collaborated on the project
- Creating a Pinterest board for parents and directing them to the groups
- Sharing the groups’ links through the newsletter of a middle school in the city of Farmington Hills, MI

Table 8 shows the number of members recruited in each group to date.

Table 8: Number of members in the parents' Facebook groups

Group Name	Number of Members (excluding AMP21 team)
Group #1	156
Group #2	66
Total	222

The top post in both groups asked group members to complete a very short survey. The survey asked the following questions:

- Name as listed on Facebook profile
- Gender (optional)
- Email address
- City
- State
- If members are parents or teachers
- How they heard about the group
- Age (optional)

93 members of group #1 and 60 members of group #2 completed the survey.

Table 9 shows a summary of the data pertaining to members in group #1:

Table 9: Data about members in parents' group #1

Table 9.a

Gender	
Female	89
Male	4

Table 9.b

State	
Michigan	84
Missouri	5
Kansas	1
New York	1
Ohio	1
Illinois	1

Table 9.c

Status (could choose more than one)	
Parent	53
Homeschooling parent	45
Teacher	9
Other	7

Table 9.d

How they heard about the groups? (could choose more than one)	
Friends/ family	39
Invitation on Facebook	31
Wayne State Academica	32
Pinterest	0
Math teacher at my kid/s' school	0
Other	1

Table 9.e

Age (optional)	
Under 30	3
31-40	23
41-50	51
51 or more	13

Table 10 shows a summary of the data pertaining to members in group #2:

Table 10: Data about members in parents' group #2

Table 10.a

Gender	
Female	3
Male	56
Prefer not to answer	1

Table 10.b

State	
Michigan	55
Illinois	1
New Jersey	1
New York	1
Maryland	1
Pennsylvania	1

Table 10.c

Status (could choose more than one)	
Parent	38
Homeschooling parent	19
Teacher	9
Other	7

Table 10.d

How they heard about the groups? (could choose more than one)	
Friends/ family	4
Invitation on Facebook	8
Wayne State Academica	16
Pinterest	8
Math teacher at my kid/s' school	14
Other	15

Table 10.e

Age (optional)	
Under 30	4
31-40	24
41-50	20
51 or more	8

In the next section, a discussion will be provided about the content that were posted in the parents' Facebook groups to analyze engagement.

Different Types of Facebook Posts in Parents' Groups

In order to get the members acquainted with AMP21 and warm up conversations in the groups, different topics were posted in these groups. Contents were posted a few times a week, and they were similar across both groups. The following lists all the different types of posts:

- 1) Welcoming new members to the group and updating them about group activities
- 2) Activity files and descriptions
- 3) Examples of real-world applications of math at home from homeschooling parents
- 4) Sharing materials from other websites that could be helpful for homeschooling parents in areas other than math (printable materials, books, movies, etc.)
- 5) Parenting articles particular to parents of middle schoolers
- 6) Recommending math books and resources that offered real-world contexts
- 7) Discussing recent uses of rates, ratios, and percentages in media and news
- 8) Math contests

In total, 79 posts were sent to each group in the timespan of 8 months (July 2016 to February 2017).

CHAPTER 3 “ENGAGEMENT IN OBCs”

Definition of Engagement

In the past decade, the concept of customer engagement has evolved and attracted the interests of academicians and marketing experts due to its importance in today’s changing business dynamics. Before delving deeper into the discussion about customer engagement in online brand communities and its significance for brands, it is important to pay attention to customer engagement and its definition as a separate construct.

Brodie, Hollebeek, Jurić, and Ilić (2011) define customer engagement as a “psychological state, which occurs by virtue of interactive customer experiences with a focal agent/object” [p.258].

The concept of customer engagement does not limit consumers to their traditional roles anymore. Today, consumers are key actors in the value-creation process by actively expressing their needs, contributing to product development, and providing feedback on the different aspects of product and service delivery (Angela Hausman, Kabadayi, & Price, 2014).

Some researchers have conceptualized engagement as a unidimensional construct either from a cognitive, behavioral, or emotional aspect. For example, Van Doorn et al. (2010) posit that customer engagement should be discussed from a behavioral perspective that investigates the relationship between customers and

brands that result from motivational drivers. They believe that this relationship is not limited to transactions, and they define Customer Engagement Behavior (CEB) as “customer’s behavioral manifestations that have a brand or firm focus, beyond purchase, resulting from motivational drivers” [p. 254].

Contrary to this unidimensional conceptualization, many researchers have predominantly incorporated multiple dimensions such as cognition, emotion, and behavior in their proposed constructs and drew on the literature of relevant fields to provide a more comprehensive definition for customer engagement. Hollebeek (2011) defined engagement as “the level of a customer’s motivational, brand-related, and context-dependent state of mind characterized by specific levels of cognitive, emotional, and behavioral activity in brand interactions” [p.6]. Higgins and Scholer (2009) applied regulatory engagement theory in their research and defined engagement as “a state of being involved, occupied, fully absorbed, or engrossed in something—sustained attention” [p. 102].

Mollen and Wilson (2010) define engagement as a concept that goes beyond customer’s involvement in the sense that it encompasses an active relationship between customers and an engagement object like the brands, the product, or the brand’s website.

Brodie et al. (2011) provided a comprehensive review of the conceptualizations of customer engagement in the social science, management, and marketing academic literatures.

The bottom line of many of the research studies is the motivational nature of customer engagement with the brands (Higgins & Scholer, 2009; Patterson, Yu, & De Ruyter, 2006; Vivek, Beatty, & Morgan, 2012). These motivations and the known antecedents of customer engagement will be further discussed in this chapter. The next section will discuss the definition of customer engagement in the context of online communities in social media platforms.

Customer Engagement in Online Communities

Social media based Online Brand Communities are the most popular platforms in which customers can get engaged with brands. In fact, the important role of social media in today's business-customer relationships has increased the importance of the customer engagement concept (Gummerus, Liljander, Weman, & Pihlström, 2012). After a brief review of the various definitions and conceptualizations of customer engagement that were implemented in the literature, it is important to discuss customer's engagement in online brand communities as this particular type of engagement is the focus of the current research.

Social media platforms provide a great opportunity for brands to communicate with their customers. Brands can leverage these platforms as a channel to easily

reach out to a large network of existing and potential customers and to collaborate and have a two-way conversation with them (Angela Hausman et al., 2014; De Vries & Carlson, 2014). Customer's engagement in online brand communities not only involves their interactive relationship with the brand, but according to Algesheimer et al. (2005), it also explains their "intrinsic motivation to interact and cooperate with community members" [p.21]

Consumer's engagement with brands in online platforms is commonly referred to as online engagement (Cvijikj & Michahelles, 2013), and the measures that are utilized to quantify and manage engagement depend on the characteristics of the platform (Lehmann, Lalmas, Yom-Tov, & Dupret, 2012).

As discussed in chapter 2, Facebook is one of the most appealing platforms for brands to create online brand communities and communicate with their customers and hence was used as the main platform for the present research. Based on the engagement possibilities provided by Facebook, most of the research studies that investigated customer engagement in Facebook brand communities used likes, comments, and shares (Cvijikj & Michahelles, 2013; De Vries & Carlson, 2014; Gummerus et al., 2012; Luarn, Lin, & Chiu, 2015), frequency of online community visits (Gummerus et al., 2012), and interaction duration (Cvijikj & Michahelles, 2013) to measure online engagement in Facebook brand communities. Researchers

have also categorized customers based on their level of activities and participation in the online communities (Bejtagić-Makić, 2013).

Activities such as liking and commenting strengthen the bonds between customers and brands, and signal customers' attitudes toward brands to their social network and other Facebook users (Angela Hausman et al., 2014). Through these activities, customers can influence their peers' attitudes towards a brand either in a positive or negative way. Moreover, research shows that likes can help brands with increasing brand awareness and customer engagement which lead to a higher return on investment (Barnard & Knapp, 2011).

The measures that are used in the present study for operationalizing customer engagement with the AMP21 online communities on Facebook will be discussed in the next section.

Engagement Measures for the AMP21 Online Community

As discussed in chapter 2, closed Facebook groups were used as platforms for AMP21 online communities. Based on the characteristics of closed groups in Facebook, the following measures are defined to track and manage engagement in the AMP21 online communities:

Breadth of Engagement

In this research, breadth of engagement refers to the total number of posts, likes, and comments from each group member throughout the timespan of the study. These

measures were also used in the research study of Brech, Messer, Vander Schee, Rauschnabel, and Ivens (2017) in a similar context of engagement in social media brand pages of higher education institutions.

The reason that number of likes was chosen as an appropriate measure for this study is that likes indicate that the message content is interesting and may lead to more users paying attention to the message and reading it (Luarn et al., 2015). Comments are even more visible than likes in the sense that they convey the users' thoughts and opinions in a clearer manner and provide a means for conversations and communication within the brand community. Furthermore, Facebook algorithm pushes the posts that receive likes and/ or comments further up in the stream of a group's posts.

It is important to note that posts in a closed group cannot be shared outside the group; therefore, number of shares has not been included in this engagement category.

Depth of Engagement

The depth of engagement refers to the average length of comments from each user under any of the group posts. For the purposes of this research, length of the comments suggest how much time and energy each user has invested in order to share their thoughts and opinions with the AMP21 team and other group members.

Frequency and Recency of Engagement

This measure refers to the frequency and recency of user's participation in liking, commenting, or posting to the group. These measures are chosen because they indicate if a member is consistently getting engaged in the group.

Inviting New Members

This measure refers to the number of new members that each existing group member invites to the group. This action helps the AMP21 brand expand its audience base and reach out to more teachers.

Since this research also aims to identify the relationship between engagement in online communities and website visits, the following measures are used to track the teachers' behavior on the AMP21 website. It is noteworthy that only data about teachers who registered on the website and therefore logged in with their username and password could be tracked for the following measures:

Frequency of Website Visits

This measure refers to the frequency of website visits by teachers.

Number of Files Downloaded

This measure refers to the total number of files downloaded by teachers.

Number of Activities Downloaded

This measure refers to the number of activities that have been downloaded by the teachers. The reason this measure could be different from the number of files

downloaded is that most of the activities have more than one file uploaded on the website (PDF vs. Word version, and teacher's guide files).

The next section will discuss why customer engagement in OBCs is important for brands.

The Importance of Engagement in Online Brand Communities

Customer engagement in online brand communities has several benefits for brand. These benefits will be discussed in this section:

- 1) In OBCs, customers get engaged in conversations with brands as well as other customers in order to express their opinions about the brands and their different products (McAlexander et al., 2002). These conversations are a form of Word-of-Mouth (WOM) which are powerful marketing tools for brands in order to increase customer awareness and expand their customer base (Buttle, 1998; Yen et al., 2011). More discussions about Word-of-Mouth marketing will be provided in chapter 4.
- 2) Research shows that customer engagement is a good predictor of customer loyalty (Bowden, 2009). Customers who get engaged with brands in online communities are on average more loyal to the brand.
- 3) Customer's engagement in online brand communities strengthens the relationship between customers and brands and ultimately leads to higher

customer satisfaction (Angela Hausman et al., 2014; Gummerus et al., 2012).

- 4) Engagement plays an important role in the process of customer's purchase decision making and leads to increased sales (Cvijikj & Michahelles, 2013; Godes & Mayzlin, 2004; Hollebeek, Glynn, & Brodie, 2014).
- 5) Customers who get engaged with online brand communities tend to have better contributions to value co-creation processes and have valuable inputs that can be used for product development (Hollebeek et al., 2014; Nambisan & Baron, 2007; Prahalad, 2004).
- 6) Engagement is crucial for sustaining online brand communities. Furthermore, one of the important factors that can keep an online community viable is having a large enough audience base (Jang et al., 2008).

Customer engagement has also been one of the most important research priorities identified by the Marketing Science Institute in the past few years. In their paper, Maslowska, Malthouse, and Collinger (2016) provided a holistic review on the customer engagement ecosystem and indicated a need for better understanding the customer engagement phenomena both from theoretical and empirical standpoints.

Looking at the outcomes of customer engagement in online brand communities and its importance in brand performance, it is crucial for brands to understand the drivers of engagement in order to provide the right infrastructure and content for these communities and develop effective strategies to manage them. The next section discusses the antecedents of customer engagement in online communities.

Drivers of Engagement in Online Communities

It is vital for brands to understand the underlying factors that drive customer engagement in online communities in order to effectively increase engagement and enhance their long-term relationships with their customers through these communities.

The literature of marketing, management, and social sciences provide an extensive review of the drivers of customer engagement in online brand communities. The following drivers have been identified based on a review of the literature:

- 1) **Functional benefits:** One of the most important drivers of customer engagement in online brand communities is the functional benefits that customers derive from joining and participating in such communities. Depending on the brand and the general content of OBCs, community members might look for the following functional benefits when deciding to join OBCs:

- a. Information-based support: In some OBCs, customers are interested in the cumulative expertise of community members and the informational content of the community (Cvijikj & Michahelles, 2013; Dessart, Veloutsou, & Morgan-Thomas, 2015; Y. Wang & Fesenmaier, 2003). In these communities, customers look for information about brands and products, purchase recommendations, problem solutions, and product usage tips (Bejtagić-Makić, 2013; De Vries & Carlson, 2014; U. M. Dholakia et al., 2004; Muniz & O'guinn, 2001; Wirtz, Den Ambtman, et al., 2013; Yen et al., 2011; Zaglia, 2013). Customers' perceptions of the credibility and relevancy of the information provided by the community strengthen their relationship with the community. Moreover, when community members perceive the community information as beneficial, they are more likely to reciprocate and contribute valuable information to the community (Pai & Tsai, 2016).
- b. Entertainment value: Depending on the brand and its offering, customers might be interested to derive entertainment value from joining and participating in OBCs (Bejtagić-Makić, 2013; Cvijikj & Michahelles, 2013; De Vries & Carlson, 2014; Dessart et al.,

2015; U. M. Dholakia et al., 2004). The entertainment value goes beyond the utilitarian benefits of interacting with other community members and addresses the mere enjoyment of doing so (Pai & Tsai, 2016).

- c. Networking: In some OBCs, the opportunity to get access to a wide network of experts and/ or like-minded individuals is an important motivations for customers to get engaged in the community (Dessart et al., 2015).
- d. Incentives: Some customers might be interested in OBCs in order to take advantage of discounts, promotional offers, sweepstakes and coupons that are specifically offered to community members (Bejtagić-Makić, 2013; Cvijikj & Michahelles, 2013; Dessart et al., 2015; Yen et al., 2011). It is important to note that monetary incentives might only be effective for short-term participation and could have a “crowding-out effect” on customers’ motivation to participate in OBCs in the long term (Wirtz, Den Ambtman, et al., 2013).

2) Brand identification: Brand identification explains how consumers associate their identity with their perception of the brand identity (Wirtz, Den Ambtman, et al., 2013). Since this social construct increases

customers' intrinsic motivation to interact with like-minded community members, it is considered as an important driver for engagement with online brand communities (Algesheimer et al., 2005; Dessart et al., 2015; Zaglia, 2013). Moreover, when brands carry a symbolic meaning (e.g. Apple or Harley Davidson), customers might use the brand's online community to express their devotion to the brand (Wirtz, Den Ambtman, et al., 2013). It is noteworthy that brand identification could also be an outcome of the engagement behavior. Customers who get engaged with an OBC tend to identify more with the community and the brand as well.

- 3) Social enhancement: One of the main drivers of customer engagement in OBCs are the social benefits that customers gain through communicating and building relationships with other community members (Dessart et al., 2015; U. M. Dholakia et al., 2004; Y. Wang & Fesenmaier, 2003). The interactions among community members strengthen their bonds which leads to stronger identification with the brand community (Wirtz, Den Ambtman, et al., 2013). According to (R. Baumeister, 1998), individuals contribute to online communities in order to enhance their social status and ultimately gain approval from other community members. The more customers perceive that they can derive social enhancement values from an online brand community, the more likely they are to get engaged in that

community (De Vries & Carlson, 2014). Another aspect of social enhancement value involves understanding one's social identity through memberships in social groups, social interactions, gaining recognition from other group members, and deriving a sense of belonging (Bejtagić-Makić, 2013; U. M. Dholakia et al., 2004; Van Doorn et al., 2010).

- 4) Moderation: The strategies that are implemented in order to moderate and manage the online communities have an important effect on customer's engagement in these communities (Wise, Hamman, & Thorson, 2006; Yen et al., 2011). Many online communities rely on a variety of norms that would in fact define the "rules of the game" and can guide the community members in terms of doing the appropriate behavior and avoiding harmful messages. What's even more, these norms define "valuable content" and "valuable contributors" for the online brand communities.
- 5) Satisfaction: Research shows that cumulative customer satisfaction resulting from customer's purchase and consumption experiences with the brand leads to higher engagement with online brand communities (Brodie et al., 2011; Dessart et al., 2015; Van Doorn et al., 2010). As discussed before, customer's satisfaction is not only a driver for the engagement behavior, it is also an outcome of the engagement behavior.

- 6) Trust: An important driver of customer engagement in OBCs is customer's trust in a brand which refers to their perception of reliability in interacting with the brand and believing that the brand considers their best interest in its offerings. (Brodie et al., 2011; Dessart et al., 2015; Van Doorn et al., 2010).
- 7) Providing help and feedback: An important motivation for many customers to join OBCs and participate in them is providing help to other community members as well as providing constructive feedback to brands about their offerings (U. M. Dholakia et al., 2004; Y. Wang & Fesenmaier, 2003; Yen et al., 2011). This will in turn help customers to enhance their social image within the OBCs and get recognition from their peers.

In addition to the aforementioned drivers of engagement, researchers have identified different factors that can moderate the relationship between these drivers and customer engagement in OBCs. The following moderators have been discussed in the engagement literature:

- 1) Product involvement: The intensity of customer's participation in OBCs depends on their involvement with the brand and/ or the product. Involvement refers to customer's level of interest in the brand/ product and addresses how much the brand/ product is relevant to the customer based on their goals and values (Mittal, 1995). Customers with higher

product-involvement are more likely to get engaged in the OBCs (Brodie et al., 2011; Wirtz, Den Ambtman, et al., 2013)

- 2) Product complexity: Product complexity could moderate the effect of the drivers on customer engagement in OBCs. When a product is complex, customers are more compelled to acquire information about the product from the community (Wirtz, Den Ambtman, et al., 2013).
- 3) Customer expertise (mavenism): Customers with different expertise and knowledge about a brand and its products are different in the type of information they look for in OBCs as well as the way they process the information they receive; therefore, customer expertise can moderate customer engagement in OBCs (Dessart et al., 2015; Wirtz, Den Ambtman, et al., 2013). This concept has also been modeled as customer's self-efficacy in previous research studies (Pai & Tsai, 2016) which refers to "the judgments of one's capability to organize and execute the courses of action required to produce given attainments" [(Bandura, 1997), p.3].
- 4) Membership duration: The duration of time that a customer has been a member of an OBC could moderate their engagement behavior. OBC newcomers usually visit the community to seek information and fulfill their own needs, but over time, they can make more meaningful

relationships within the community and participate in OBC activities in order to benefit other members in the community (Pai & Tsai, 2016).

Figure 8 shows the drivers and moderators of engagement in online brand communities.

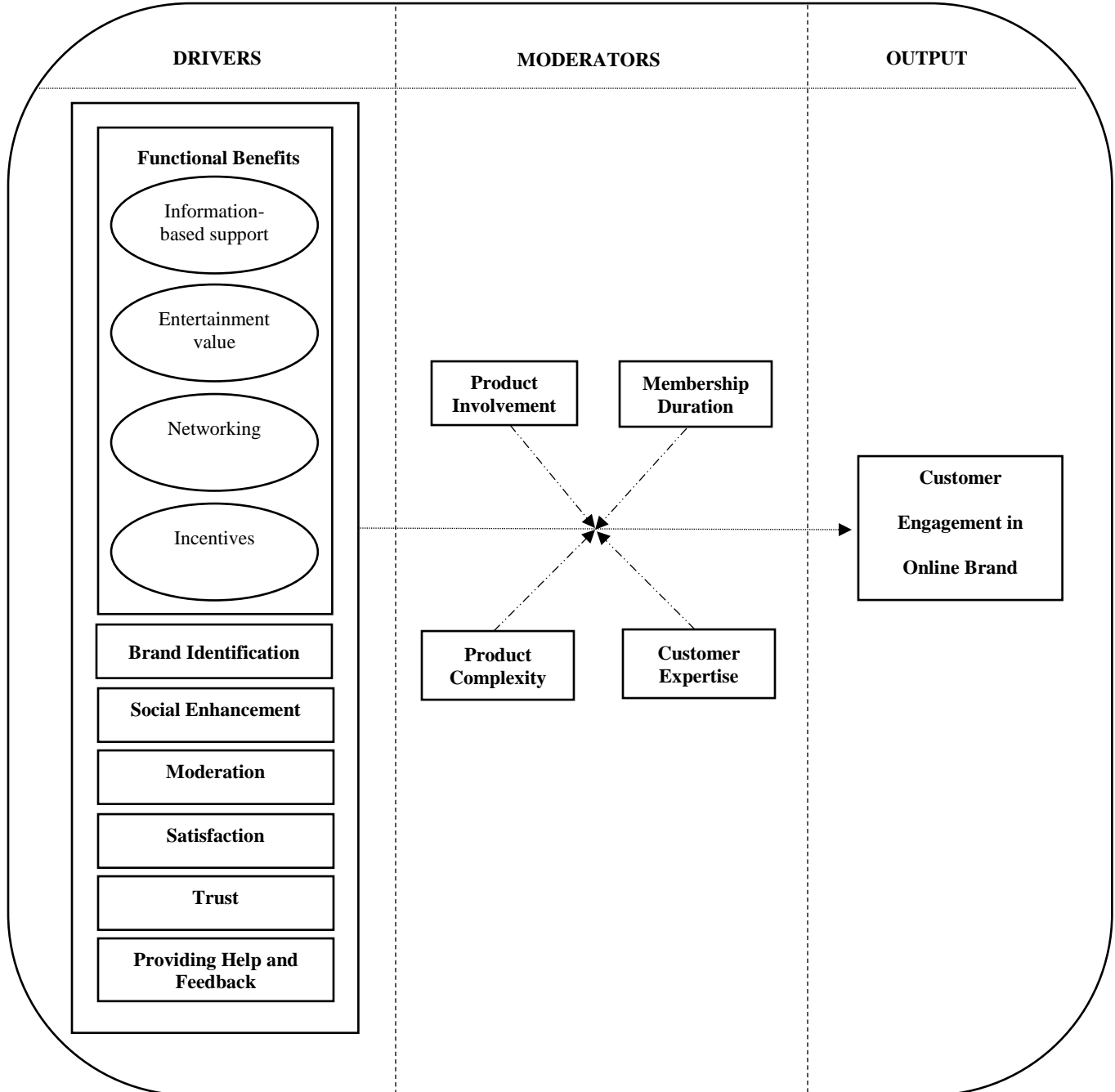


Figure 8: Drivers and moderators of engagement in OBCs

One of the challenges for many businesses who have OBCs is identifying and prioritizing the important attributes that will lead to vibrant and sustainable

communities which have been proved to enhance business's performance (Manchanda et al., 2015).

For the purpose of this research, the goal is to increase teacher engagement in the AMP21 Facebook groups. It is important to choose an engagement driver which is appropriate in the context of an online community for educational materials that can be easily manipulated and emphasized in these groups so that the effect of the driver can be analyzed more accurately and reliably on teachers' engagement behavior. Therefore, moderation systems has been chosen as the independent variable which can be reinforced in Facebook groups and influence how teachers participate in groups' discussions.

One of the many forms of moderation systems in OBCs are reputation systems where community contributors receive scores based on the type and quality of their contribution (Chen, Xu, & Whinston, 2011). Many online communities such as Reddit, Slashdot, Epinions, and Stack Overflow are moderated using reputation systems. Although previous research has identified moderation as an important engagement antecedent, there is a lack of sufficient empirical research in this area, and most of the arguments that have been proposed are conceptual (Yen et al., 2011).

For the purpose of this research, reputation systems are utilized in order to moderate the AMP21 Facebook groups.

In the next section, a taxonomy of reputation systems based on governance strategies will be provided.

Taxonomy of Reputation Systems

Hendrikx, Bubendorfer, and Chard (2015) define reputation systems as systems that work by “facilitating the collection, aggregation and distribution of data about an entity, that can, in turn, be used to characterize and predict that entity’s future actions” [p. 184]. In simpler words, community members can refer to reputation scores as an indication of other member’s status in the community as well as their contribution quality and trustworthiness to share credible information. The more credible and high quality a member’s contributions are, the higher the reputation they can develop over time within the community. Hendrikx et al. (2015) have provided a thorough taxonomy of reputation systems based on 14 different characteristics such as data aging, data filtering, evaluation, control, governance, entities, presence, etc. In this section, a discussion of governance strategies in reputation systems will be provided. Governance strategies describe the authority through which the reputation systems are controlled and the reputation scores are assigned to community members. Hendrikx et al. (2015) categorize governance strategies into two groups:

- 1) Centralized: In centralized reputation systems, “a centralized group or organization manages the system” [p. 191].

- 2) Distributed: In distributed systems, “multiple entities working together, often with no centralized management” [p. 191] manage the system.

There are also other online communities that are managed using a semi-distributed reputation system where multiple entities work together along with a centralized management in order to manage the system. In these communities, the general guidelines and the score structure is designed by a centralized entity (e.g. community owner), and multiple entities such as community members can also provide their inputs in order to influence a specific member’s reputation score.

Conceptual Framework and Hypotheses

The Effect of Reputation Systems on Customer Engagement Motivation

As discussed in the previous section, in OBCs with centralized reputation systems, defining and assigning the reputation scores and acknowledging members’ contributions falls under the responsibility of a central entity which is usually the owner of OBC. Therefore, the main feedback that customers receive for their contributions is from this central entity. Previous research shows that member’s perception of the online community leader support affects their willingness to contribute to the community (Wiertz & de Ruyter, 2007; Ye, Feng, & Choi, 2015; Yu & Chu, 2007).

Some research studies have emphasized the similarities between employee behavior and customer behavior (P. K. Mills & Morris, 1986; Yen et al., 2011).

These similarities led the author to investigate the literature of organizational behavior and the effect of supervisor support on employee behavior in organizations. One theory that seemed to fit the context of this research was the perception of organizational support theory. This theory posits that an individual's perception of the organizational support and supervisor support can predict their behavior in an organization (Eisenberger, F., & Vandenberghe, 2002). In a study to understand member contribution in online knowledge communities, Ye et al. (2015) drew on the organizational support theory and suggested similar constructs called perceived leader support and perceived recognition from leader. They concluded that community members who perceive support and recognition from the community leader are more likely to get engaged in activities that would benefit the community such as knowledge contribution. Perceived leader support describes how community members think of the community leader in terms of helpfulness, caring about their contributions and feedback, and considering their goals and values. Perceived recognition from leader describes how community members perceive their contributions to influence their image and prestige to the community leader.

Considering the above discussion, it is expected that using centralized reputation systems (as opposed to no moderation strategies) in online brand communities will increase customer's likelihood to get engaged in the community activities:

H1: Using centralized reputation systems (vs. no moderation) will increase customer's engagement likelihood in the online community activities.

In online communities where distributed reputation systems are used, each member receives feedback about their contributions from other community members with no centralized management monitoring this process. Therefore, one could expect that members' perceptions about their status in the community and how they identify themselves as part of this social group could impact their behavior in the community. This assumption led the author to further investigate theories that explain interpersonal communications and relations in social groups. One theory that seemed to fit quite well with the context of this research was the social identity theory.

The social identity theory was first presented by Henri Tajfel and John Turner in 1979 (Tajfel & Turner, 1979). Social identity refers to the aspect of an individual's self-concept that is influenced by their membership in a social group. The social identity theory suggests that when membership in a social group modifies an individual's self-identity, it can impact their behavior. First of all, this theory could explain why consumers join Online Brand Communities in the first place. According to Brogi (2014) and Habibi et al. (2014), consumers join online brand communities partly because they can classify themselves as specific social groups and establish a social identity that is a part of their self-concept. Secondly, the social identity theory

could also explain why individuals get engaged in online communities. Several research studies have confirmed the influence of social identity and peer support on participation in online communities (Bagozzi & Dholakia, 2002; Burnett, 2000; U. M. Dholakia et al., 2004; Miller et al., 2009). According to Wellman et al. (1996) and Burnett (2000), a sense of social identity and peer support are even more important motivators for participating in online communities than the informational value that these communities provide.

When an OBC is moderated with a distributed reputation system, members receive scores and are ranked based on other members' perceptions of their contribution; therefore, it seems highly plausible that members would engage in the community to receive approval from other members and enhance their status within the community. This indicates that the social identity theory could be used to explain engagement in OBCs with a distributed reputation system. In another study, Ye et al. (2015) used social exchange theory (Blau, 1964) to explain knowledge sharing motivation in online knowledge communities. According to social exchange theory, when an individual's contributions are honored and appreciated by the community, their status in the community increases (Y. Wang & Fesenmaier, 2003), and a feeling of indebtedness is created in the individual. This feeling will in turn motivate individuals to reciprocate and contribute valuable content such as high quality information to the online community and be more willing to help others. Hence, it

is expected that using distributed reputation systems (as opposed to no moderation strategies) in online brand communities will increase customer's likelihood to get engaged in the community activities:

H2: Using distributed reputation systems (vs. no moderation) will increase customer's engagement likelihood in the online community activities.

In semi-distributed reputation systems, a centralized management and multiple entities within a community collaborate to manage the online community. These systems can benefit from the advantages of both the centralized and distributed reputation systems.

The main advantage of the centralized systems is the existence of an established structure and norms that provide guidelines for community members for what is considered valuable and high quality contribution. Since the rules and guidelines in these systems are clear and ideally not subjective and equal for everyone, members can internalize and accept them easier (Yen et al., 2011). Moreover, without a centralized management, participation in online communities could lead to chaos (Rothaermel & Sugiyama, 2001). The main advantage of the distributed reputation systems is that their dynamics could better trigger the sense of social identity in individuals and motivate them to seek higher prestige and status within the community members by increasing and improving their contributions. Hence, drawing on perception of organizational support theory and social identity theory, it

is expected that semi-distributed reputation systems could outperform both centralized and distributed systems in motivating online community members to get engaged in the community.

H3: Using semi-distributed reputation systems (vs. centralized reputation systems) will increase customer's engagement likelihood in the online community activities.

H4: Using semi-distributed reputation systems (vs. distributed reputation systems) will increase customer's engagement likelihood in the online community activities.

Based on the above discussion, having reputation systems of any kind is expected to increase the engagement level in online communities as opposed to no moderation at all; however, important questions arise here, such as: are all these reputation systems equally effective? Which one of these reputation systems could lead to higher engagement? To answer this question, it should be noted that online brand communities have different characteristics that could impact the effectiveness of reputation systems on the engagement level. In the following section, one of these characteristics will be discussed.

Reputation Systems and Community Type

Online brand communities could be categorized based on different characteristics. One of these characteristics refers to the entity that owns and runs an

online community. Some of the OBCs are created by brands in order to reach out to existing and potential customers, communicate with them, share informational and promotional messages about the brand and its offerings with them, and ask for customer feedback and insights. Other OBCs are created by consumers who are enthusiastic about the brand and would like to connect with other like-minded consumers in order to share information about the brand and its offerings, share consumption experiences, provide recommendations, and solve problems.

According to D. Lee, Kim, and Kim (2011), OBCs that are consumer-created generate greater social identification motives between their members. Since social identity theory is the fundamental basis for the effectiveness of distributed reputation systems, it is expected that distributed reputation systems outperform centralized reputation systems in consumer-created OBCs:

H5: Using distributed reputation systems (vs. centralized reputation systems) will increase customer's engagement likelihood in consumer-created online brand communities.

Unlike consumer-created OBCs, the communications in the brand-created OBCs are usually between the firm and the consumers. Consumers typically join a brand-created online community in order to receive updates, news, and promotional offers from the brand; therefore, it would be more effective if the community is moderated by the brand as a central entity:

H6: Using centralized reputation systems (vs. distributed reputation systems) will increase customer's engagement likelihood in brand-created online brand communities.

In order to test these hypotheses, two studies are designed and carried out. The first study is carried out through a survey where respondents are recruited on Amazon Mechanical Turk website. The purpose of this study is to analyze the effects of using different reputation systems on the engagement likelihood of members of a Facebook group that belongs to a well-known brand that offers healthy recipes for busy people. This study was carried out before the main experiment on Facebook in order to validate the hypotheses and get a better sense of engagement drivers. The second study is carried out in 3 of the teachers' Facebook groups to understand the effects of different reputation systems on teachers' engagement in these online communities as well as their download behavior on AMP21 website.

In the following sections, more details about each study including the data gathering procedures, design of the experiment, measures and constructs, data analysis, and results will be discussed.

Study 1

Data Gathering Procedure

Participants for this study are recruited through Amazon Mechanical Turk website² run by Amazon.com. MTurk is a very well-known crowdsourcing website that provides businesses and researchers with the opportunity to have access to an on-demand and scalable workforce. Many of the researchers in the fields of psychology, behavioral economics and consumer behavior use MTurk to recruit participants for their studies.

Users on MTurk are either requesters or workers. Requesters post their tasks (which are surveys in the case of this study) known as HITs (Human Intelligence Tasks) on MTurk. Workers will complete the tasks if they meet the requirements and are interested in taking the tasks. Once workers complete the HITs, they will be paid for their participation.

In order to make sure that MTurk workers make an appropriate participant pool for research studies, some of the researchers have started to investigate the characteristics of MTurk participants compared to traditional participants. Goodman, Cryder, and Cheema (2013) found many similarities between MTurk participants and traditional samples. Many of the researchers who have studied the characteristics of MTurk workers highly recommended MTurk as a participant pool

² <https://www.mturk.com>

for behavioral studies. For example, Buhrmester, Kwang, and Gosling (2011) believe that the reliability of the data obtained from MTurk participants is not different from the data obtained from traditional samples. They further suggested that it is more likely to obtain even higher quality results from MTurk participants if they are paid reasonably. To that point, participants who were recruited for this study were paid slightly above the average amount that was paid to MTurk workers during the time of the study for similar tasks with similar durations. Paolacci, Chandler, and Ipeirotis (2010) also indicated that MTurk has practical advantages such as fast recruitment, subject identifiability and pre-screening, and participants' heterogeneity and diversity. Another interesting point that is mentioned in their study is that MTurk participants are driven by both extrinsic and intrinsic motives to perform tasks.

With all that being said, participants recruited from Amazon Mechanical Turk share enough characteristics with the population of decision makers that this research targets and are therefore deemed as an appropriate participant pool for this study. Participants were 18 years or older and were located in the US. The following qualifications were used to select participants to make sure they are experienced with MTurk tasks and pay attention to survey questions:

- Have an approval rate of 97% or higher for all the previous tasks
- Have 100 or more approved tasks

The only information they received about the task was through the description as follows:

“Give us your opinion about participation in a Facebook group where people share healthy food recipes.”

They were also informed that the survey would take approximately 20 minutes to complete.

Design of the study

For the purpose of this study, a fake Facebook group is created with dummy users added to the group. This group is dedicated to a fake brand called “Healthy Recipes for Busy People”. Participants in the study are informed that they will be asked questions about this group that is formed around sharing quick and healthy food recipes for busy people. This particular context is chosen because it shares the following similarities with math educational materials:

- In both contexts, individuals join the online brand community because they are intrinsically motivated to improve their knowledge about a particular topic.
- In both cases, the materials (products) that are shared are in the form of files, texts, videos, pictures, and links, and are free of charge.
- In both contexts, all group members can contribute relevant content to the group that generates value for other members.

It is important to note that participants were not directed to the groups and did not have access to the group link. In fact, they were just shown screenshots of the group in the survey.

In the beginning of the survey, participants were asked if they actually have active Facebook accounts. They were excluded from the study if they did not. Then, they were asked if they have ever been a member of a Facebook group and were familiar with the dynamics of these groups, such as posting content, posting files, commenting, participating in polls, inviting friends to groups, etc. If they answered “no” to this question, they were excluded from the study.

Three variables were believed to have an impact on the engagement intentions of the participants. These variables are: participants’ interest in healthy recipes as a product category, participants’ involvement with Facebook, participants’ participation in Facebook, and ease of use of Facebook as an online social media platform. The next set of questions in the survey were related to the control variables.

The items used for involvement with Facebook were adapted from Beatty and Talpade (1994). Participant’s participation in Facebook has been operationalized via three items developed by Malciute and Chrysochou (2012). Furthermore, six items for ease of use were used in the study that were adapted from Davis (1989). Cronbach's alpha test was used for calculating the scale reliabilities. The items used for interest in healthy recipes were adapted from Laurent and Kapferer (1985).

Table 11 shows the scale items for control variables, their references, and the resulting Cronbach's alpha for each scale.

Table 11: Scale items for control variables

Measure	Reference	Items	Reliability
Involvement with Facebook	Beatty and Talpade (1994)	<ol style="list-style-type: none"> 1. In general, I have a strong interest in Facebook. 2. Facebook is very important to me. 3. Facebook matters a lot to me. 4. I get bored when other people talk to me about Facebook. (reverse) 5. Facebook is relevant to me. 	0.73
Participation in Facebook	Malciute and Chrysochou (2012)	<ol style="list-style-type: none"> 1. I consider myself an active user of Facebook. 2. I log into Facebook every day. 3. I spend long periods of time on Facebook. 	0.84
Ease of Use of Facebook	Davis (1989)	<ol style="list-style-type: none"> 1. Learning to use Facebook is/was easy for me. 2. It is easy to get Facebook to do what I want it to do. 3. It is clear and understandable how to use Facebook. 4. Facebook is flexible to interact with. 5. It is easy to become skillful at using Facebook. 6. In general, I find Facebook easy to use. 	0.75
Interest in healthy recipes	Laurent and Kapferer (1985)	<ol style="list-style-type: none"> 1. I attach great importance to keeping a healthy diet. 2. One can say that talking and learning about healthy food recipes interests me a lot. 3. Healthy and quick food recipes is a topic which leaves me totally indifferent. (reversed) 	0.81

In this experiment, a 2×4 between-subjects design is applied. The first independent variable is community type (brand-created community vs. consumer-created community), and the second independent variable is moderation strategies (no moderation, centralized, semi-distributed, and distributed).

Participants in the brand-created community treatments are told that the Facebook group that they see in the screenshots is owned and administered by the brand itself, while the participants in the consumer-created community treatments are told that the Facebook group is owned and administered by enthusiastic

consumers and fans of the brand. Figure 9 shows a screenshot from the group description that is shown to participants in the condition with brand-created communities.



Figure 9: Group description for the brand-created Facebook group

Figure 10 shows a screenshot from the group description that is shown to participants in the condition with consumer-created communities.



Figure 10: Group description for the consumer-created Facebook group

All the participants are then provided with a couple of screenshots from the group in order to get familiar with the group and its contents. They are asked to carefully read through all the information that is presented to them. The screenshots include the group cover photo, description, and some of the posts and comments.

Figure 11 shows a screenshot that includes one of the group posts with a recipe.

RECENT ACTIVITY

 ▼

Recipe of the Day: Slow-Cooker Pork Taco;

Start the meat in a slow-cooker before you go out for the day and come home to tender, flavorful pork tacos. Or, if you don't want to wait, make this recipe in a Dutch oven in half the time.

Directions:
Put the ancho and pasilla chiles and the garlic in a bowl; add 2 to 3 tablespoons water. Microwave on high until soft and pliable, 2 to 3 minutes. Stem and seed the chiles; peel the garlic. Transfer the chiles and garlic to a blender... [See More](#)



 Like  Comment  Share

58 people like this.

20 shares

RECENT GROUP PHOTOS [See All](#)



Figure 11: A group post containing a recipe

Figure 12 shows another group post that includes the post and its comments.



Figure 12: One of the group posts and its comments

Depending on the moderation treatment that the participants belonged to (centralized, semi-distributed, and distributed), they were also shown other screenshots that showed how the groups are moderated.

In the treatments with a centralized reputation system, participants were told that a central entity (the admin of the group) devised the reputation system for the group and moderates the group content and conversations between the group members. This central entity periodically chooses and introduces the members with highest contributions based on predefined activities such as: posting helpful tips and recipes,

participating in discussions, sharing group's posts, and inviting new members to the group. Figure 13 shows the description of the centralized reputation system.



Figure 13: Description of the centralized reputation system

Figure 14 shows the post where members with highest contributions were introduced to the community using the centralized reputation system.

Hey everybody, we've got good news!
 Here are the GRAND CHEF winners from April: Cliff Jackson with 233 points and Avery Herbert with 212 points.
 Congratulations guys! We all appreciate your contribution to our community of healthy food lovers.



Like Comment

29

Maddie Morson Awesome! Congratulations guys 😊
 Unlike · Reply · 3

Tammi Daniell Congrats, I really liked your lentil soup recipe Cliff 😊
 Unlike · Reply · 2

Abby Dane well deserved! I learned a lot from Cliff and Avery. Way to go guys!
 Unlike · Reply · 1

Write a comment... 📷 😊

Figure 14: Best contributors in groups with centralized reputation system

In the treatments with a distributed reputation system, participants were told that all the group members are admins and have the admin's authorities and can contribute to moderating the group contents. All the members can periodically participate in nominating and voting for members who they perceive to have the highest contributions in the group based on activities such as: posting helpful tips and recipes, and participating in discussions in a helpful and respectful manner. Figure 15 shows the description of the distributed reputation system.



Figure 15: Description of the distributed reputation system

Figure 16 shows the post that announces the call for nominations in the groups with distributed reputation systems.



Figure 16: Nominations in the groups with distributed reputation systems

Figure 17 shows the poll results for groups with distributed reputation systems.



Figure 17: Poll results in the groups with distributed reputation systems

Figure 18 shows the post that announces the winners (nominees with the highest number of votes) in the groups with distributed reputation systems.

Here are the GRAND CHEF winners from April: Cliff Jackson with 57 votes and Avery Herbert with 53 votes. Congratulations guys! We all appreciate your contribution to our community of healthy food lovers.



Figure 18: Best contributors in groups with distributed reputation system

In the treatments with a semi-distributed reputation system, participants were told that the group has one admin; however, all the group members could have input in terms of managing the conversations and feedback about the group content. It is the admin who defines the reputation system and the score structure for the group. S/he periodically nominates members with highest contributions based on the predefined score structure, and then the members vote for these nominees based on

their perceptions of the value of their contributions. Figure 19 shows the description of the semi-distributed reputation system.

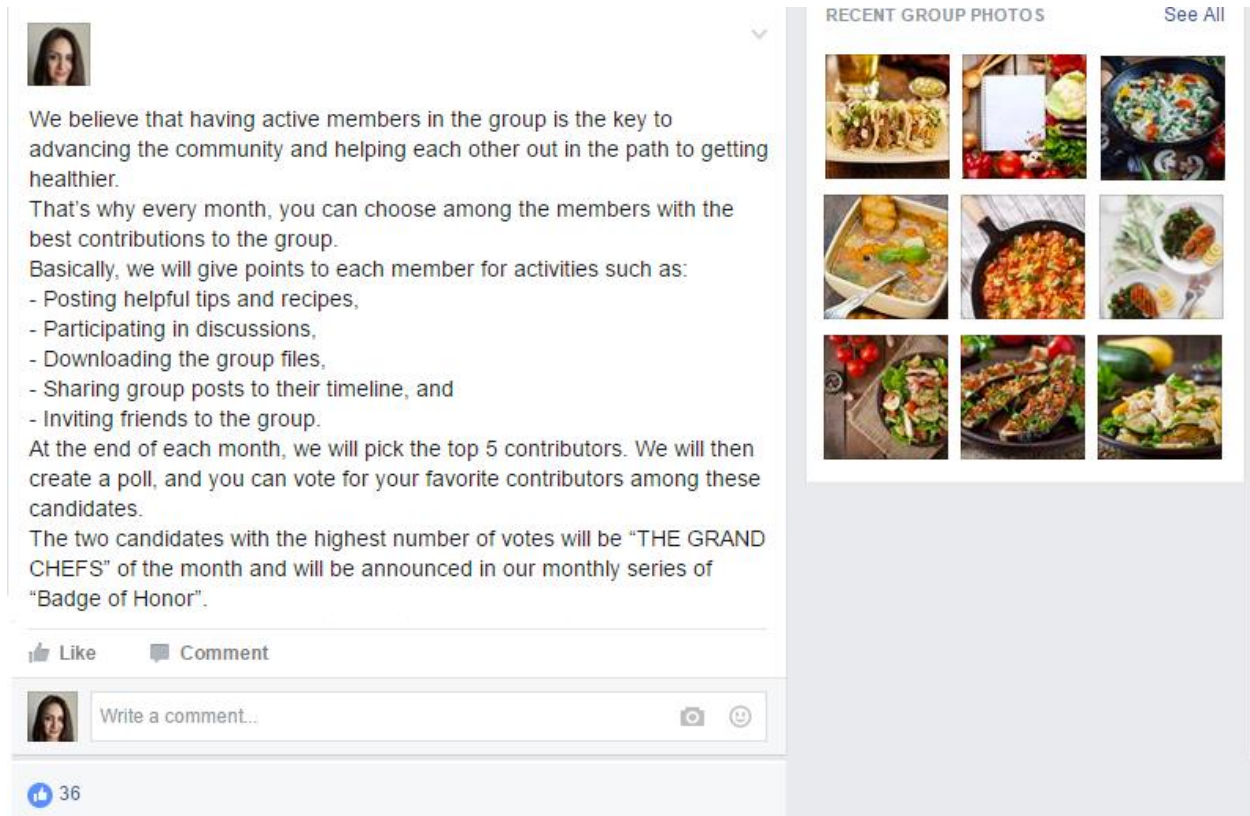


Figure 19: Description of the semi-distributed reputation system

Figure 20 shows the nominations that are announced by the admin along with their votes in the groups with semi-distributed reputation system.



Figure 20: Member votes in semi-distributed reputation systems

Figure 21 shows the post that announces the winners (nominees with the highest number of votes) in the groups with semi-distributed reputation systems.



Figure 21: Best contributors in semi-distributed reputation system

After reading the information about the group and the reputation systems, participants were asked about their likelihood of participating and getting engaged in the group activities. The 7-point Likert type items (1=very unlikely, 2=moderately unlikely, 3=slightly unlikely, 4=neither likely nor unlikely, 5=slightly likely,

6=moderately likely, and 7=very likely) used for measuring participant's engagement intentions were adapted from D. Lee et al. (2011).

A summary of the engagement intention items and the resulting reliability scores are depicted in Table 12.

Table 12: A summary of the engagement intention items

Measure	Items	Reliability
Consumers' online brand community engagement intention (adapted from D. Lee et al. (2011))	1) Actively participate in any types of group activities (reading posts, posting recipes, leaving comments, liking or sharing the posts, inviting friends to the group) 2) Actively read the group's posts 3) Actively post recipes or other information about healthy diet to the group 4) Actively participate in group discussions (commenting) 5) Actively like or share posts in the group 6) Invite other friends to the group 7) Provide new information about the group and its posts to other people outside the group 8) Support other members in the group 9) Say positive things about the group to other people outside the group 10) Recommend the group to anyone who sought their advice about healthy diet 11) Encourage other people outside the group to go on a healthy diet 12) Not hesitate to refer other people to the group	0.85

The complete survey instruments for all treatment groups can be found in Appendix A.

Results

A total of 894 participants completed the survey on Amazon Mechanical Turk. The participants who did not respond correctly to the attention check questions and those who finished the survey in less than 5 minutes were excluded from the study; therefore, 57 respondents were excluded and a total of 837 responses were analyzed. Table 13 shows a summary of the demographics of the participants whose responses were included in the analysis.

Table 13: Demographic table for participants in study 1

Gender	Percentage	Number
Male	49.82%	417
Female	49.94%	418
Other	0.23%	2
Age	Percentage	Number
18-21 years old	5.85%	49
22-30 years old	44.09%	369
31-40 years old	29.63%	248
41-50 years old	10.99%	92
50+ years old	9.32%	78
Education	Percentage	Number
Less than high school	0.6%	5
High school completion	8.48%	71
Some college	26.4%	221
Associate's degree	9.32%	78
Bachelor's degree	33.69%	282
Master's degree	14.34%	120
Professional degree	6.09%	51
Doctorate degree	1%	8

Checking the ANCOVA Assumptions

Participants' engagement intention was analyzed with the analysis of covariance (ANCOVA). In order to use the aforementioned control variables (involvement with Facebook, participation in Facebook, ease of use of Facebook, and interest in healthy recipes), the following ANCOVA assumptions should be checked to make sure that these variables qualify as control variables for the study:

- 1) The covariates have been measured prior to the intervention or experimental manipulation: The questions about control variables were asked before participants were introduced to the Facebook groups and were subjected to different treatment groups.
- 2) Covariates are not highly correlated to each other:

In order to determine the correlations between covariates, Pearson's product-moment correlation measure was used. Table 14 shows the results of this test.

Table 14: Correlation measure for control variables

Pearson Correlations				
	Involvement with Facebook	Interest in healthy recipes	Participation in Facebook	Ease of use of Facebook
Involvement with Facebook	1	-.027	.923**	.921**
Interest in healthy recipes	-.027	1	-.053	-.024
Participation in Facebook	.923**	-.053	1	.815**
Ease of use of Facebook	.921**	-.024	.815**	1

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

Looking at the Pearson correlation coefficients, it can be seen that involvement with Facebook, participation in Facebook, and ease of use of Facebook are highly correlated. This makes sense because individuals who spend more time on Facebook and take part in different activities in pages and groups are more involved with Facebook and find it easier to use. Therefore, for the purpose of this research, only participation in Facebook is considered for further analysis because it is more relevant to the context of this research. The other covariate that will be considered in the analysis is interest in healthy recipes as it was not correlated to any other variables.

3) Independence of the covariates and treatment effects:

To test the independence of the covariates and the treatment variables we run an ANOVA for each covariate. We choose the covariate as the dependent variable and the treatment variables as fixed factors to see if the covariate is roughly equal across all levels of the treatment variables.

For participation in Facebook, the results of the ANOVA test can be seen in Table 15.

Table 15: Independence of participation and the treatment variables

Tests of Between-Subjects Effects					
Dependent Variable: Participation in Facebook					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	239.430 ^a	8	29.929	36.027	.000
Intercept	999.628	1	999.628	1203.324	.000
Community Type	1.072	1	1.072	1.290	.256
Moderation	5.504	4	1.376	1.657	.158
Community Type * Moderation	1.575	3	.525	.632	.594
Error	687.838	828	.831		
Total	22818.143	837			
Corrected Total	927.268	836			

a. R Squared = .258 (Adjusted R Squared = .251)

Since the interaction term is not significant ($F(3,828)=0.632, p>0.05$), the participation levels are not significantly different in the treatment groups.

For interest in healthy recipes, the results of the ANOVA test can be seen in Table 16.

Table 16: Independence of interest and the treatment variables

Tests of Between-Subjects Effects					
Dependent Variable: Interest in Healthy Recipes					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	182.120 ^a	8	22.765	36.358	.000
Intercept	820.399	1	820.399	1310.274	.000
Community Type	.368	1	.368	.588	.443
Moderation	3.168	4	.792	1.265	.282
Community Type * Moderation	3.624	3	1.208	1.929	.123
Error	518.434	828	.626		
Total	18194.701	837			
Corrected Total	700.554	836			

a. R Squared = .260 (Adjusted R Squared = .253)

Since the interaction term is not significant ($F(3,828)=1.929$, $p>0.05$), the interest levels are not significantly different in the treatment groups.

4) Homogeneity of regression slopes:

The results for the homogeneity of regression slopes for participation in Facebook are shown in Table 17:

Table 17: Homogeneity of regression slopes for participation in Facebook

Tests of Between-Subjects Effects					
Dependent Variable: Engagement Intention					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1011.838 ^a	16	63.240	690.695	.000
Intercept	1.400	1	1.400	15.285	.000
Community Type * Moderation	.119	7	.017	.182	.989
Community Type * Participation in Facebook	.000	1	.000	.003	.960
Moderation * Participation in Facebook	.246	3	.082	.893	.444
Community Type * Moderation * Participation in Facebook	.525	3	.175	1.900	.128
Error	75.079	820	.092		
Total	23973.763	837			
Corrected Total	1086.917	836			

a. R Squared = .931 (Adjusted R Squared = .930)

Since all the interaction terms are non-significant, the assumption of homogeneity of regression slopes is not violated for this control variable.

The results for the homogeneity of regression slopes for interest in healthy recipes are shown in Table 18:

Table 18: Homogeneity of regression slopes for interest in healthy recipes

Tests of Between-Subjects Effects					
Dependent Variable: Engagement Intention					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	994.269 ^a	16	62.142	550.001	.000
Intercept	.752	1	.752	6.659	.010
Community Type * Moderation	1.113	7	.159	1.409	.198
Community Type * Interest in Healthy Recipes	.010	1	.010	.091	.763
Moderation * Interest in Healthy Recipes	.630	3	.210	1.859	.135
Community Type * Moderation * Interest in Healthy Recipes	.771	3	.257	2.276	.078
Error	92.648	820	.113		
Total	23973.763	837			
Corrected Total	1086.917	836			

a. R Squared = .915 (Adjusted R Squared = .913)

Since all the interaction terms are non-significant, the assumption of homogeneity of regression slopes is not violated for this control variable.

5) Homogeneity of variances:

For testing this assumption, Levene's test for equality of error variances is used. This method tests the null hypothesis that the error variance of the dependent variable is equal across groups. Table 19 shows the results of this test. Since the significance value of the test (0.793) is greater than 0.05, the assumption of homogeneity of variances is not violated.

Table 19: Levene's test results for testing homogeneity of variances

Levene's Test of Equality of Error Variances ^a			
Dependent Variable: Engagement Intention			
F	df1	df2	Sig.
.554	7	829	.793

Since participation in Facebook and interest in healthy recipes meet all the criteria to qualify as control variables in this study, they are included as covariates in the ANCOVA analysis.

Main ANCOVA Analysis

The dependent variable is participant's engagement intentions (a scale of 1 to 7 with 1 meaning "very unlikely to get engaged" and 7 meaning "very likely to get engaged"). The fixed factors are moderation strategy (centralized, semi-distributed, distributed), and community type (brand-created, consumer-created). The significance level was chosen to be 0.05. Table 20 shows the descriptive statistics of the ANCOVA analysis.

Table 20: Descriptive statistics for the ANCOVA analysis

Descriptive Statistics				
Dependent Variable: Engagement Intentions				
Moderation	Community Type	Mean	Std. Deviation	N
Centralized	Consumer-created	4.9454	1.22529	106
	Brand-created	5.4116	.97623	101
	Total	5.1729	1.13245	207
Control Group	Consumer-created	4.3135	.95480	112
	Brand-created	4.4836	1.24557	99
	Total	4.3933	1.10142	211
Distributed	Consumer-created	5.5374	.82562	100
	Brand-created	5.0997	1.15131	104
	Total	5.3143	1.02620	204
Semi-Distributed	Consumer-created	6.0137	.58776	108
	Brand-created	6.0321	.55149	107
	Total	6.0228	.56874	215
Total	Consumer-created	5.1891	1.12826	426
	Brand-created	5.2707	1.15242	411
	Total	5.2291	1.14024	837

Table 21 shows the results of the main ANCOVA analysis.

Table 21: Main ANCOVA analysis

Tests of Between-Subjects Effects						
Dependent Variable: Engagement Intentions						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1041.775 ^a	9	115.753	2120.577	.000	.958
Intercept	1.723	1	1.723	31.566	.000	.037
Participation in Facebook	51.130	1	51.130	936.688	.000	.531
Interest in Healthy Recipes	33.433	1	33.433	612.489	.000	.425
Community Type	.048	1	.048	.887	.347	.001
Moderation	.971	3	.324	5.929	.001	.021
Community Type * Moderation	.577	3	.192	3.523	.015	.013
Error	45.142	827	.055			
Total	23973.763	837				
Corrected Total	1086.917	836				

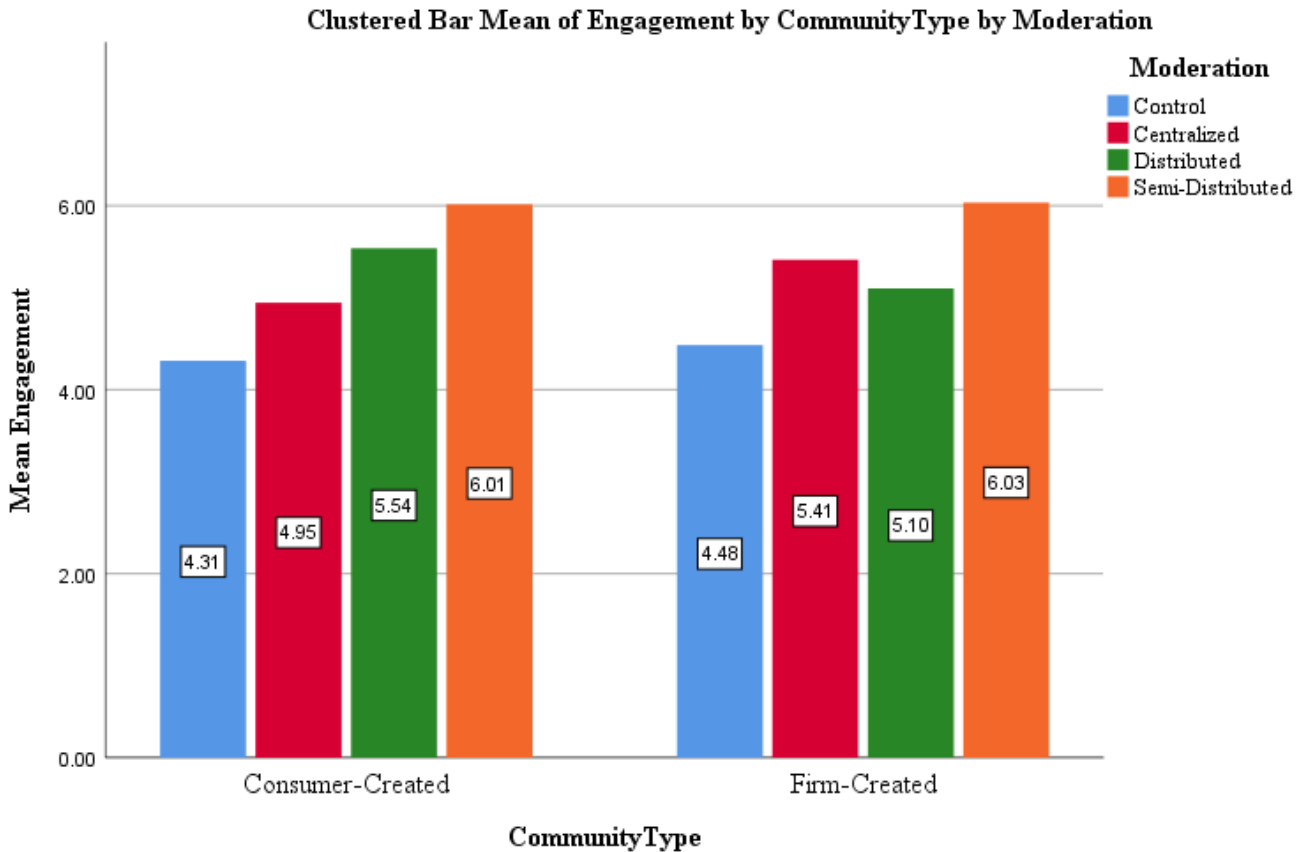


Figure 22: Results of study 1

The results show that there is a significant main effect for participation in Facebook ($F(1,827)=936.688, p<0.05$) and interest in healthy recipes ($F(1,827)=612.489, p<0.05$). As participant's participation level in Facebook increases, their engagement intentions in the OBC increases. Moreover, as participant's interest in healthy food recipes increases, their engagement intention in a Facebook group with similar context increases. This is consistent with previous

findings that was previously discussed in this chapter (Brodie et al., 2011; Wirtz, Den Ambtman, et al., 2013).

The main effect of moderation strategies was found to be significant ($F(3, 827) = 5.929, p < .05$).

Table 22 shows the adjusted means for the main effect of moderation strategies after taking into account the effect of the covariates.

Table 22: Adjusted means for moderation strategies

Estimates				
Dependent Variable: Engagement Intentions				
Moderation	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Centralized	5.220 ^a	.016	5.189	5.252
Control Group	5.103 ^a	.017	5.068	5.138
Distributed	5.222 ^a	.016	5.190	5.254
Semi-Distributed	5.290 ^a	.017	5.256	5.324

a. Covariates appearing in the model are evaluated at the following values:
Participation in Facebook = 5.1141, Interest in Healthy Recipes = 4.5718.

Table 23 shows the pairwise comparisons between the moderation strategies based on the adjusted means. Sidak correction has been used for confidence interval adjustment.

Table 23: Pairwise comparisons between moderation strategies

Pairwise Comparisons						
Dependent Variable: Engagement Intentions						
(I) Moderation	(J) Moderation	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
Centralized	Control Group	.117*	.024	.000	-.025	.120
	Distributed	-.002	.023	1.000	-.062	.059
	Semi-Distributed	-.069*	.024	.021	-.132	-.007
Control Group	Centralized	-.117*	.024	.000	-.120	.025
	Distributed	-.119*	.024	.000	-.123	.025
	Semi-Distributed	-.187*	.026	.000	-.190	-.038
Distributed	Centralized	.002	.023	1.000	-.059	.062
	Control Group	.119*	.024	.000	-.025	.123
	Semi-Distributed	-.068*	.024	.024	-.130	-.006
Semi-Distributed	Centralized	.069*	.024	.021	.007	.132
	Control Group	.187*	.026	.000	.038	.190
	Distributed	.068*	.024	.024	.006	.130

Based on estimated marginal means

*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Sidak.

Looking at the significance values from Table 23, it can be concluded that engagement intention was significantly greater for all the moderated groups (centralized=5.220, distributed=5.222, semi-distributed=5.290) compared to the control group (5.103) where there was no moderation in the online brand community; therefore, the hypotheses H1 and H2 could be confirmed. Furthermore, engagement intention was significantly greater for the groups with semi-distributed reputation system (5.920) than the groups with centralized (5.220) and distributed (5.222) reputation systems; therefore, the hypotheses H3 and H4 could be confirmed.

The ANCOVA results in Table 21 also shows that the main effect of moderation systems is moderated by community type ($F(3,827)=3.523, p<0.05$). This finding can be further analyzed by testing the hypotheses H5 and H6.

In order to test the hypothesis H5, a t-test is performed using the adjusted means given in Table 24 to find any possible significant differences for centralized reputation system in different community types.

Table 24: Adjusted means for different treatment groups

Community Type * Moderation					
Dependent Variable: Engagement Intentions					
Community Type	Moderation	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Consumer-Created	Centralized	5.183 ^a	.023	5.138	5.227
	Control Group	5.089 ^a	.023	5.154	5.245
	Distributed	5.247 ^a	.023	5.201	5.293
	Semi-Distributed	5.292 ^a	.023	5.271	5.362
Brand-Created	Centralized	5.258 ^a	.023	5.213	5.304
	Control Group	5.119 ^a	.024	5.119	5.214
	Distributed	5.197 ^a	.023	5.152	5.242
	Semi-Distributed	5.288 ^a	.024	5.217	5.310

a. Covariates appearing in the model are evaluated at the following values: Participation in Facebook = 5.1141, Interest in Healthy Recipes = 4.5718.

The following depicts the t-test used to compare the means of centralized reputation system in consumer-created communities and brand-created communities:

$$t = \frac{5.258 - 5.183}{0.023 \times \sqrt{\frac{1}{101} + \frac{1}{106}}} = 23.45$$

Since $t_{0.05,205} = 1.645$, and $23.45 > 1.645$, the null hypothesis of equality of means can be rejected. Therefore, it can be concluded that centralized reputation systems have a significantly greater impact in increasing engagement intention in brand-created online communities (5.258) comparing to consumer-created online communities (5.183); therefore, hypothesis H5 could be confirmed.

In order to test the hypothesis H6, a t-test is performed using the adjusted means given in Table 24 to find any possible significant differences for distributed reputation system in different community types.

The following depicts the t-test used to compare the means of distributed reputation system in consumer-created communities and brand-created communities:

$$t = \frac{5.247 - 5.197}{0.023 \times \sqrt{\frac{1}{100} + \frac{1}{104}}} = 15.52$$

Since $t_{0.05,202} = 1.645$, and $15.52 > 1.645$, the null hypothesis of equality of means can be rejected. Therefore, it can be concluded that distributed reputation systems have a significantly greater impact in increasing engagement intention in consumer-created online communities (5.247) comparing to brand-created online communities (5.197); therefore, hypothesis H6 could be confirmed.

The same t-test is then performed to compare the means of semi-distributed reputation system in consumer-created communities and brand-created communities:

$$t = \frac{5.292 - 5.288}{0.023 \times \sqrt{\frac{1}{107} + \frac{1}{108}}} = 1.275$$

Since $t_{0.05,202} = 1.645$, and $1.275 < 1.645$, the null hypothesis of equality of means cannot be rejected; therefore, there is not a significant difference between community types when semi-distributed reputation systems is used in these communities.

Study 2

Data Gathering Procedure

Study 2 was planned to be launched in 3 of the AMP21 Facebook groups (group #1, group #2, and group #3). Members in these Facebook groups who were primarily middle school math teachers would then be the participants in this study. As previously mentioned in chapter 2, the number of members in these groups were 90, 89, and 93 respectively. When teachers were recruited to these Facebook groups, they were told that data about their behavior would be gathered for research purposes; therefore, when this study was launched, they were not aware that the moderation systems are part of a research study so that their behavior would not be influenced by that.

Design of the Study

The purpose of study 2 is to validate some of the findings from study 1 and compare the effectiveness of different reputation systems on engagement level. Since AMP21 Facebook groups were owned by the AMP21 team, they would be considered brand-created OBCs. The plan was to run group #4 without any reputation systems so it would be considered as the control group. A few months after the groups were created, group members in group #1, group #2, and group #3 were informed about the reputation systems that was going to be launched in their groups. In group #1, the admin who is a member of AMP21 team posted about the centralized reputation system. In this system, group members were told that they would be given points for activities such as:

- Posting new activities and helpful math-related content
- Commenting and participating in discussions
- Sharing group posts
- Inviting their friends and colleagues to the group

They were told that every month, the admin would announce 2 members with the highest contributions according to the point system in the monthly series of “Badge of Honor”.

In group #2, all the members of the Facebook group were granted the role of admin by the AMP21 team so the group could be moderated through a distributed

reputation system. They were informed that they can all contribute in managing and moderating the group. They were also asked to nominate the teachers that they perceive to have the highest contributions each month and vote for the members who were nominated, so that the best contributors could be acknowledged every month.

In group #3, the admin who was a member of the AMP21 team informed the group members that every month, the top 6 contributors of the group would be introduced based on activities such as:

- Posting new activities and helpful math-related content
- Commenting and participating in discussions
- Sharing group posts
- Inviting their friends and colleagues to the group

Then, all the members could vote for their favorite member among these 6 candidates so that they would be acknowledged in the monthly series of “Badge of Honor”. Group members were also encouraged to send their feedback about group policies, group contents, and discussion dynamics to the admin. In this way, group #3 would be moderated through a semi-distributed reputation system.

As discussed previously in this chapter, teachers’ engagement is measured through breadth of engagement, depth of engagement, frequency and recency of engagement, and number of new invites to the group. This plan for data gathering is using Facebook API and the httr package in R programming language.

Results

As previously discussed in chapter 2, 87 posts were sent to each of the Facebook groups in the timespan of 6 months including the posts that announced the reputation systems. Group members were encouraged to get engaged in the group activities by posting discussion topics about rates, ratios, and percentages in different real-world contexts, discussing recent uses of rates, ratios, and percentages in media and news, asking for teachers' feedbacks on different topics (group posts, experience with activities, examples for different scenarios, etc.), comics and funny posts related to math, and math contests.

Surprisingly, all this effort led to a very low level of engagement in all the groups. The small number of data points due to low engagement made the analysis difficult, and meaningful differences could not be found between groups in terms of members' engagement. Moreover, the low engagement level made it difficult to find the relationship between engagement in Facebook groups and website visits and download. Therefore, in this section, only descriptive data about engagement and website visits will be provided.

Table 25 provides statistics about engagement in each group.

Table 25: Engagement statistics for teachers' Facebook groups

Group Name	Posts with likes		Average # of user likes per post	Posts with comments		Average # of user comments per post	# of new invitations through Facebook	# of members who invited
	Number	Percentage of Total		Number	Percentage of Total			
Group #1	39	45%	1.36	6	7%	1.83	7	5
Group #2	21	24%	1.33	3	3%	3.33	0	0
Group #3	32	37%	1.66	6	7%	1.33	8	1
Group #4	27	31%	1.74	5	6%	1.6	3	2

The data provided in Table 25 shows the very limited success of the engagement experiment in Facebook. Although the percentage of the posts that were liked were considerably higher than those which generated comments, likes do not represent engagement as strongly as comments. Even looking at likes as engagement indicators, the average number of likes per post were less than 2 across all the group. The percentage of posts that led to comments was also very low. In three of the groups, the average number of comments per post was less than 2. In group #2, the average number of comments per post was 3.33. This was due to one post receiving 9 comments which increased the average comparing to other groups. The percentage of members who voluntarily invited other members to the groups through Facebook invitation was also relatively low and ranged between 0% to 5% in all the groups.

Table 26 shows the statistics for number of members from each Facebook group who visited the website 1 or more times.

Table 26: Statistics for members who visited the website

		Statistic
Number of members who visited the website	Group#1	8
	Group#2	30
	Group#3	22
	Group#4	20

Table 27 shows the statistics for number of downloads from the website categorized by members of each Facebook group.

Table 27: Statistics for number of downloads from the website

	Group	Statistic	Std. Error	
Number of Downloads	Group#1	Mean	5.13	3.303
		Median	1.50	
		Variance	87.268	
		Std. Deviation	9.342	
	Group#2	Mean	11.80	2.848
		Median	4.50	
		Variance	243.338	
		Std. Deviation	15.599	
	Group#3	Mean	14.05	3.622
		Median	6.00	
		Variance	288.617	
		Std. Deviation	16.989	
	Group#4	Mean	8.45	3.435
		Median	2.00	
		Variance	236.050	
		Std. Deviation	15.364	

Table 28 shows the statistics for number of activities downloaded from the website categorized by members of each Facebook group.

Table 28: Statistics for number of activities downloaded from the website

	Group	Statistic	Std. Error	
Number of Activities	Group#1	Mean	3.1250	1.35538
		Median	1.5000	
		Variance	14.696	
		Std. Deviation	3.83359	
	Group#2	Mean	6.3667	1.37839
		Median	3.0000	
		Variance	56.999	
		Std. Deviation	7.54976	
	Group#3	Mean	7.0000	1.59137
		Median	3.5000	
		Variance	55.714	
		Std. Deviation	7.46420	
	Group#4	Mean	4.3500	1.43137
		Median	1.5000	
		Variance	40.976	
		Std. Deviation	6.40127	

Table 29 shows the statistics for frequency of website visits categorized by members of each Facebook group.

Table 29: Statistics for frequency of website visits

	Group	Statistic	Std. Error	
Frequency of Website Visits	Group#1	Mean	1.3750	.26305
		Median	1.0000	
		Variance	.554	
		Std. Deviation	.74402	
	Group#2	Mean	1.6000	.20678
		Median	1.0000	
		Variance	1.283	
		Std. Deviation	1.13259	
	Group#3	Mean	2.2273	.38887
		Median	2.0000	
		Variance	3.327	
		Std. Deviation	1.82396	
	Group#4	Mean	1.8000	.60524
		Median	1.0000	
		Variance	7.326	
		Std. Deviation	2.70672	

Discussion of Challenges in the Facebook Experiment

Despite all the effort that was made to get the teachers in the AMP21 Facebook groups to participate in discussions and get engaged in different group activities, little success was achieved in doing so. There could be various reasons that study 2 did not lead to the results that were expected. The following reasons could partly explain the low level of engagement in the AMP21 Facebook groups:

Using Facebook as the OBC Platform

As previously discussed in chapter 2, many of the Facebook users value this website for socializing and entertaining purposes (Yunus & Salehi, 2012), and they may not be equally motivated to participate in educational groups and discussions.

Getting to a Self-Sustaining Critical Mass

Research shows that many online communities fail because of low contribution levels and an inadequate number of members who contribute actively to these communities (Garnefeld et al., 2012; Yen et al., 2011). Previous research suggests that on average, 80%-90% of the community members are “lurkers” which means they only consume the content in the community without actively contributing (Garnefeld et al., 2012; Nonnecke & Preece, 2001). On the other end of the spectrum of users, there are active and regular contributors who only account for approximately 1% of the community. Other research studies show even a smaller percentage of active contributors (Füller et al., 2007). Considering that the AMP21 Facebook groups have about 100 members more or less, one would expect to see no more than a couple of members getting engaged in these groups. Therefore, one issue that needs to be addressed is the size of these online communities and strategies to grow them over time. Getting to a self-sustaining critical mass not only increases the number of active contributors in these groups, but also makes these groups more appealing for new members to join.

Based on the above discussion, next chapter discusses strategies for growing the online community size for AMP21 through Word-of-Mouth marketing and referral programs.

CHAPTER 4 “REFERRAL REWARD PROGRAMS”

Research Background

As previously discussed in chapter 3, one of the challenges that prevented the AMP21 Facebook groups from taking off was the small size of the groups that led to insufficient number of active contributors. Therefore, this chapter addresses the efforts that were made in order to attract new members to these groups and grow the size of the AMP21 online communities.

In order to achieve this goal, it seems appropriate to have a short review of the theory of diffusion of innovations because this theory seeks to explain how innovations and information disseminate throughout a population over time. Since the educational materials from AMP21 are considered innovative in the sense that they only include real-world applications of math, this theory could be beneficial in coming up with strategies to attract new members to the Facebook groups and disseminate these math activities.

Diffusion of Innovations

In 1943, Ryan and Gross (1943) published their research on the diffusion of hybrid seed corn in Iowa. This study became the foundation for what was later called the *diffusion of innovations*. E. Rogers (1995) defines diffusion as “the process by which an innovation is communicated through certain channels over time among the

members of a social system” [p.5]. In this process, messages that are conveyed through these communication channels are concerned with new ideas.

Rogers framed the process of diffusion of innovations as a 5 step decision process consisting of the following stages:

- 1) Knowledge: Exposure to the innovation and acquiring knowledge about its functionality.
- 2) Persuasion: Forming an attitude toward the innovation.
- 3) Decision: Making the choice to either adopt or reject the innovation.
- 4) Implementation: Putting the innovation into use.
- 5) Confirmation: Seeking reinforcement for the adoption decision (positive or negative).

A vast majority of the diffusion research has been founded on the traditional diffusion model developed by Bass (1969). This fundamental model relies on the assumption that the adoption decision for each individual in the population can be influenced in two ways:

- 1) Mass media channels or advertising: these channels transmit messages through mass medium, such as television, internet, newspapers, radio, etc. Companies use these channels to reach a broad range of audience.
- 2) Interpersonal channels or Word-of-Mouth (WOM): this involves an information exchange process between two or more individuals in which

an adopter persuades those who have not yet adopted to adopt the innovation. The main difference between Word-of-Mouth and advertising is that Word-of-Mouth efforts are initiated by customers whereas advertising efforts are initiated by the companies.

Since the publication of Bass model, diffusion scholars have attempted to re-examine the underlying assumptions that shaped the concept and structure of the classic diffusion models. These studies have generated a significant body of literature that addressed diverse issues in the diffusion topic. An extensive review of the diffusion literature can be found in the studies published by Mahajan, Muller, and Bass (1990), Valente and Rogers (1995), Wejnert (2002), E. M. Rogers (2010), and Peres, Muller, and Mahajan (2010).

Understanding the dynamics of diffusion is crucial for firms that decide to launch new products and/or services into the market; specially, it helps them maximize the rate of adoption by the targeted individuals.

In the next section, a detailed discussion will be provided about Word-of-Mouth as one of the main communication channels through which information about innovations propagates.

Word-of-Mouth

Word-of-Mouth (WOM) has traditionally been recognized as an important tool among firms for expanding customer base and increasing profits. WOM is basically

a linkage between customer satisfaction and new customer acquisition. When customers are satisfied with a product/ service, they start exchanging information with other people in their social network which may lead to convincing them to try the product/ service themselves. Before further discussion about WOM is provided, it is important to define the boundaries of the definition of Word-of-Mouth.

Traditional Word-of-Mouth as conceptualized by Katz and Lazarsfeld (1955) and Granovetter (1973) means face-to-face communication among customers in order to exchange information about products/ services; however, technological developments lead to an expansion in this definition over time. Nowadays, people can exchange a great deal of information easily through emails and mobile communication. Another channel of communication that is also relevant to this research setting as previously discussed in chapter 2 and chapter 3 is online communities. Information exchange through online communities are very similar to traditional Word-of-Mouth except for the fact that individuals can share information anonymously in these communities, and the nature of communications can be one-to-many (Godes et al., 2005). In this research, the definition of Word-of-Mouth includes all the above communication channels between existing customers and potential customers.

Over time, Word-of-Mouth has dominated advertising and traditional forms of communication in terms of effectiveness, and the number of customers that find ads

useful, interesting and effective has fallen considerably in the past decade (Keller & Berry, 2003; Nail, 2005). Researchers have also shown that customers acquired through WOM communication are less likely to churn comparing to the customers acquired through traditional marketing channels. These customers are also more likely to influence and introduce other new customers (Jeonghye Choi, 2009; Trusov, Bucklin, & Pauwels, 2008; Villanueva, Yoo, & Hanssens, 2008). Furthermore, customers that are acquired through WOM tend to yield more revenue for the firm (Villanueva et al., 2008).

It is for these reasons that researchers and practitioners have shown increasing interest in WOM as a customer acquisition tool and an alternative to traditional marketing methods (Godes & Mayzlin, 2009; R. Iyengar, Van den Bulte, & Valente, 2011; Trusov et al., 2008)

Literature of diffusion has primarily focused on traditional Word-of-Mouth which naturally occurs among consumers because of their experience and satisfaction with a product/ service. This type of Word-of-Mouth is also called “organic” or “endogenous” Word-of-Mouth. There is also another type of Word-of-Mouth which is initiated and engineered by firms. This type of Word-of-Mouth is usually called “brand-created” or “stimulated” or “exogenous” Word-of-Mouth in the literature. As Godes and Mayzlin (2009) put it, brand-created Word-of-Mouth is a combination of traditional advertising and organic Word-of-Mouth. In fact, this

type of WOM is initiated by firms and then implemented by customers. To encourage the spread of this type of Word-of-Mouth, firms try to take actions that will increase the number of conversations about their product/ service instead of just hoping that satisfied customers would spread the word for them. Godes and Mayzlin (2009) suggested that running a WOM campaign can affect the customer behavior by either raising awareness about the product/ service or increasing the expected utility of the product/ service. Running a WOM campaign is especially effective for products with initial low awareness level which is also the case in this research.

WOM campaigns are mainly in the form of one of the following categories (Trusov et al., 2008):

- 1) Viral marketing: these campaigns usually involve creative and informative messages that are designed to be forwarded by their receivers.
- 2) Referral programs: these programs are around incentivizing existing customers to refer their friends and families.
- 3) Community marketing: these are generally online communities that are designed to gather individuals that are likely to discuss and share information about a product/ service.

There are conflicting views about the effectiveness of brand-created WOM in comparison to organic WOM. Researchers such as Trusov et al. (2008) and Van den Bulte, Wuyts, Dekimpe, Gijbrecchts, and Pieters (2010) have raised the question

whether brand-created WOM is less effective than organic WOM. The main reason for this concern is that brand-created WOM is usually encouraged by incentives which may undermine the true value and trustworthiness of customer recommendations. Contrary to these arguments, there are studies that have confirmed the benefits of these campaigns. For example, Schmitt, Skiera, and Van den Bulte (2011) have shown that in a referral program, customers who have been referred by others are in average 16% more valuable than customers who have not been referred by others. These findings highlight the importance of research in the area of designing effective and efficient Referral Reward Programs.

In the next section, a brief introduction of Referral Reward Programs (RRPs) will be provided, and some of the previous studies that aimed to increase the effectiveness of these programs to diffuse a product/ service will be presented.

Referral Reward Programs

Referral Reward Programs (RRPs) have been used by many industries over the years as a way to spread Word-Of-Mouth and increase consumer's awareness about their products. The ultimate goal of RRP campaigns is essentially expanding the customer base.

In these programs, customers are encouraged to recommend a product or a service to their family and friends by being offered different types of rewards, such as cash, gift cards, discounts, vouchers, and free product samples. Since promotional

efforts through RRP are targetable and cost-effective, these programs are regarded as powerful tools for customer acquisition in comparison to traditional marketing efforts.

Although Word-of-Mouth is still communicated through customers, these programs provide the firms with the opportunity to stimulate and monitor the spread of Word-of-Mouth. That is why RRP are also known as firm-generated Word-of-Mouth.

According to Schmitt et al. (2011), all the RRP have 3 characteristics in common. First, in every RRP, Word-Of-Mouth is stimulated and managed by the firm. Second, the concept of these programs is based on the interconnections between the existing customers and the non-customers in their social network. Finally, in all of these programs, firms incentivize the existing customers to attract new customers.

Many firms have run RRP in order to spread the word about their products/services. Examples of successful RRP can be seen in the campaigns that were run by PayPal, Dropbox, and Microsoft's search engine, Bing. The following is a brief review of these referral programs:

PayPal's Referral Program

In the early 2000s, PayPal ran a successful referral program in order to grow their user base. In this program, they literally paid people to invite their friends to

use PayPal. If an existing PayPal user referred a friend, both sides would receive \$10 once the friend would sign up and open a new account. According to PayPal’s COO, David O Sacks, “PayPal acquired 1 million users by March 2000 and 5 million by summer 2000” by introducing this program.

Dropbox’s Referral Program

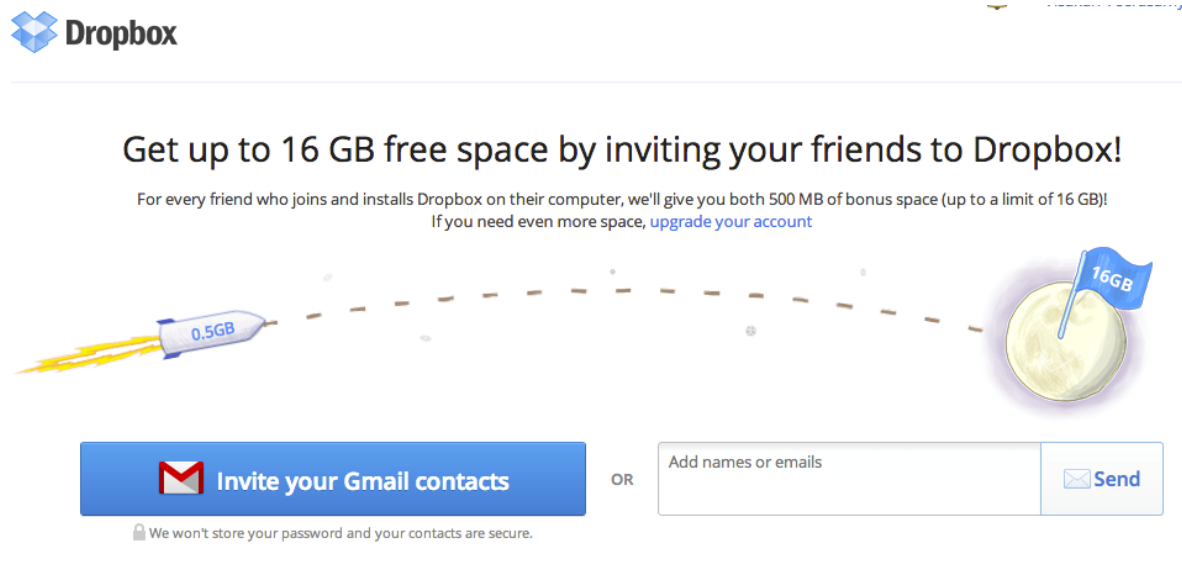


Figure 23: Dropbox Referral Program

Inspired by PayPal’s referral program, Dropbox started a double-sided incentive referral program that is now known as one of the most successful referral programs (Figure 23). The main difference was that instead of paying their users, they offered both sides 500 MB of free space (up to 16 GB). According to Dropbox’s co-founder and CEO, Drew Houston, this program increased their sign-ups by 60% permanently.

Microsoft Bing's Rewards Program

This program was launched by Microsoft in 2010 in an effort to encourage web surfers to use the Bing search engine. In this program, users get points for each search they do on Bing search engine, and eventually they can redeem their points to get rewards such as coupons, gift cards and sweepstakes (Figure 24). If the users refer their friends, and their friends join the program and get to a certain point, the main user will be rewarded with Bing points. There is no need to buy anything to get the points and there are no extra fees included in this program.

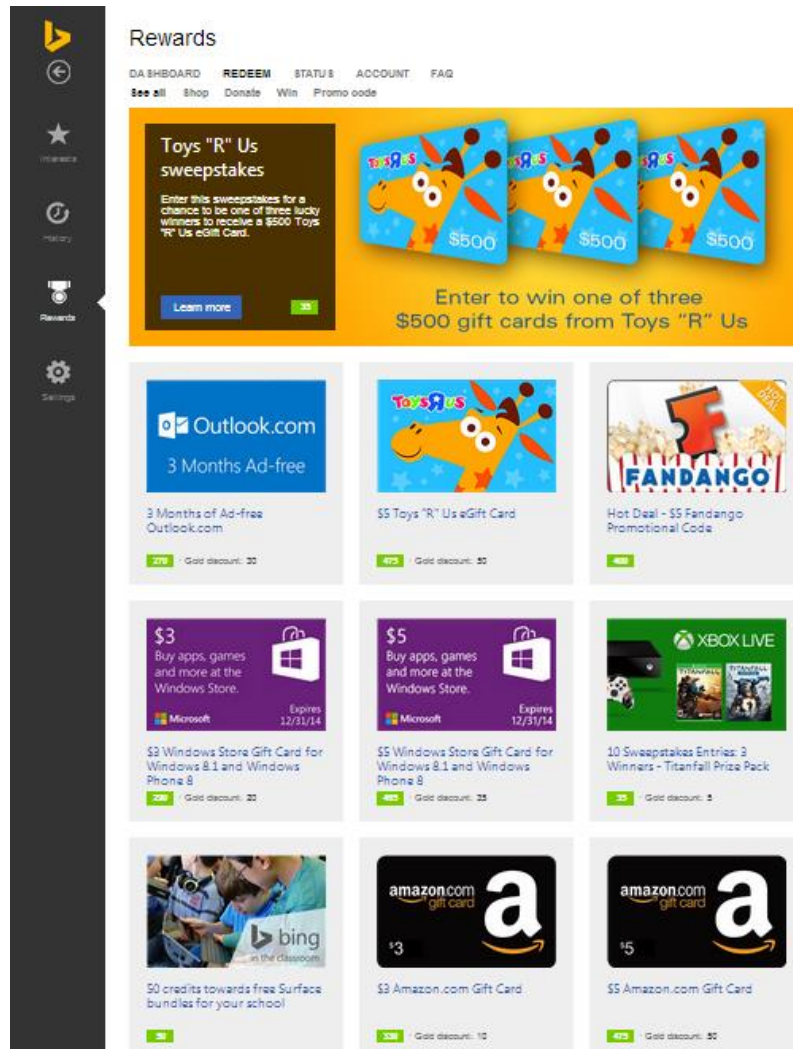


Figure 24: Microsoft Bing's reward dashboard

There have been many other successful referral programs that helped firms expand their customer base which emphasizes the importance of these programs as a customer acquisition tool.

Although there are many studies showing the effectiveness of RRP in marketing efforts, and researchers believe that there will be an increasing trend of using these programs by firms, there is still relatively limited research in the literature in this area (Ryu & Feick, 2007).

As discussed earlier, every Referral Reward Program consists of customers who are supposedly satisfied with their experience with the firm's product or service, an incentive to encourage the transition of Word-Of-Mouth, and the receivers of the referral who are usually families, friends, and acquaintances of the existing customers. Referral receivers will in turn decide whether or not to accept the referral and purchase the product or use the service.

There are different factors that can decide the success of a Referral Reward Program. Firms hope to increase the number of referrals sent by their customers as well as the number of new customers that are acquired through these programs. Therefore, it is interesting to study the different factors that can help in designing a more efficient RRP.

Since RRPs are mainly designed around incentives, it is reasonable to assume that incentives have the most prominent impact on the decisions of referral senders and referral receivers in these programs. The literature of RRPs has several examples of studies that have tested the effects of incentives on customer behavior.

It seems intuitive that offering higher incentives in an RRP would increase the willingness of customers to refer the product/ service to other individuals in their network; however, many researchers have shown that there are circumstances where this is not necessarily the case. For example, Wirtz, Orsingher, Chew, and Tambyah (2013) analyzed the effect of incentives and tie strength on the likelihood of making

a referral. The results of their experiments indicated that referral senders were concerned about referral receivers' perception of them in the presence of referral rewards. This concern would be more serious for weaker brands and stronger ties.

This shows that customers care about their relationships with referral receivers as well as the incentives they get in these programs. In fact, each relationship has a perceived social cost associated with it that customers take into account when they make decisions about sending referrals. Several other studies confirm these findings. For example, Jin and Huang (2013) found out that monetary rewards did not perform as well as in-kind rewards for weak brands in RRP because when the recommendation is ill-justified, the perceived social cost of making a recommendation is higher.

Some of the RRP researchers suggested solutions to overcome this problem. For example, Jin and Huang (2013) found out that offering a sufficiently large monetary reward can increase the willingness of customers for sending referrals even when the recommendation is ill-justified. In another study, Ryu and Feick (2007) showed that when either the brand or the social tie between referral sender and referral receiver is weak, it is more effective to offer the reward to the referral sender whereas for strong ties and strong brands, it will be more effective to offer the receivers some reward as well.

These findings highlight the social aspect of Referral Reward Programs. Besides the monetary benefits of these programs, customers are concerned with the well-being of the people in their social network and their perception of the recommendations they make. Therefore, researchers have tried to make suggestions to help customers enjoy their rewards while simultaneously alleviate their concerns about their relationships. One of the well-known solutions for these concerns is rewarding the referral receivers as well as the referral senders. Ahrens, Coyle, and Strahilevitz (2013) conducted a large-scale field experiment with the members of Ebates website in order to understand the effect of incentive size, incentive receiver, and the incentive equity between the sender and the receiver on referral effectiveness. They described effectiveness as the number of referrals sent and the number of new members acquired through the referral program. They realized that incentive equity increased the number of referrals sent. They also concluded that an increase in the overall incentive (total of sender and receiver) will increase the effectiveness of the referral program regardless of the shares being equal or not. In another study, Shi, Hong, Huang, and Wang (2012) conducted a survey among 1020 undergraduate students in China to test the effect of referral rewards and social distance on the willingness to make referrals and the likelihood of accepting a referral. The results of their experiments show that referral senders are more willing to share the referral rewards with people who are socially closer to them.

The counterintuitive results of offering incentives in Referral Reward Programs has inspired this research to study the psychological effects of incentives on human motivation and performance more carefully. The goal of this study is to design incentives that better encourage customers to refer products/ services to other individuals in their network.

In the next section, a more detailed discussion about incentives and their psychological effects on human motivation and performance will be presented. Then, gender differences in their reaction to incentives will be discussed. Using the relevant literature in psychology and behavioral economics, hypotheses will be proposed that aim to analyze the effects of gender and incentives on customer's recommendation behavior.

The Effect of Incentive Design and Gender on Recommendation Behavior

Incentives and Their Effects on Human Motivation and Performance

For long, incentives (esp. financial incentives) have been known as effective tools for increasing intrinsic motivation and improving human performance (Awasthi & Pratt, 1990; Bonner & Sprinkle, 2002; Fehr & Falk, 2002; Jenkins Jr, Mitra, Gupta, & Shaw, 1998). The literature suggests two broad classes of motivation for performing a task:

- *Intrinsic motivation*: this happens when someone performs a task without any extrinsic rewards, just because that person is interested in the task or enjoys doing it.
- *Extrinsic motivation*: this happens when someone performs a task just because it leads to receiving extrinsic rewards.

Contrary to common beliefs and prior studies about the positive effects of incentives on motivation and performance, there are many studies in the literature that suggest that in the long term, extrinsic rewards have a “crowding-out” effect on intrinsic motivation (Bénabou & Tirole, 2005; Deci, 1971, 1972; Fehr & Falk, 2002; Kruglanski, Friedman, & Zeevi, 1971; Lepper, Greene, & Nisbett, 1973). This “crowding-out” effect can especially be observed when individuals are being incentivized to perform an altruistic or a pro-social task.

Two explanations have been mentioned in the literature for the crowding-out effect of extrinsic rewards. Each of these explanations address one important psychological theory:

- 1) According to Frey (1994), getting extrinsic rewards to perform a task makes individuals feel that they are under control; therefore, according to self-determination theory, extrinsic rewards can diminish the feeling of autonomy and self-determination which are the basis for self-motivation.

2) According to self-attribution theory, when individuals do not receive rewards for their actions, they tend to attribute their actions to their own interests and motivation (Lepper et al., 1973). Once rewards are introduced, they create doubts for individuals about the true motives of their actions (Bénabou & Tirole, 2005). This will in turn diminish the intrinsic motivation of performing that action over time.

Different types of incentives may affect the intrinsic motivation differently; therefore important distinctions must be made among these incentive types. Looking at the literature, it is obvious that the crowding-out effect has mostly been attributed to monetary incentives. Other types of incentives like verbal reinforcement as studied by Deci (1971) or in-kind rewards as studied by Heyman and Ariely (2004), Lacetera and Macis (2010), and Jin and Huang (2013) are not reported to decrease the intrinsic motivation. In fact, they had a positive effect on intrinsic motivation in some of the studies in the literature.

The literature of Referral Reward Programs also includes studies that show the negative effects of monetary incentives on referral likelihood in different settings (Jin & Huang, 2013; Y. Sun, Dong, & Du, 2013). These studies have motivated the research studies that will be discussed in this chapter where the goal is to come up with incentive structures that would help alleviate the crowding-out effect and increase the likelihood of sending referrals. Though, one question arises in designing

incentives for Referral Reward Programs: will all the individuals react similarly to a particular reward strategy? What individual attributes will moderate the effect of incentives?

A few papers in the literature have addressed customer characteristics in the context of RRPs. For example, Walsh and Elsner (2012) have studied the role of customer type on the number of referrals being made, the number of purchases from a firm, and the customer life-time value. They categorized customers into 2 main groups: mavens and non-mavens. Mavens are in fact more knowledgeable about products and different aspects of the market. They are also more likely to get engaged in discussions with other customers about products and market information. Walsh and Elsner (2012) concluded that market mavens send more referrals in comparison to non-mavens, and they also tend to purchase more.

Another important customer attribute that can affect their reaction to incentives is gender. This particular variable is of special interest in this research context because the teaching profession in the United States middle schools is mainly dominated by women; however, gender differences have been vastly understudied in the literature of brand-created WOM and Referral Reward Programs.

Gender differences in their reaction to incentives

The literature of the behavioral economics discipline supports the idea of gender differences in financial decision making and attitude towards money. Spreckelmeyer

et al. (2009) found that men and women react differently to different reward types. Major (1989) suggested that men and women are different in their perception entitlement to receive monetary compensation for their performances. Lacetera and Macis (2008) were among the researchers that worked on the effect of extrinsic rewards on intrinsic motivation. They found that the “crowding-out effect” of extrinsic rewards for a pro-social behavior is stronger for women compared to men.

There are also studies in the diffusion domain that suggest gender differences in their attitude towards adoption. Wolin and Korgaonkar (2003) suggested that males tend to have a more positive view about web advertisements and they are more likely than women to shop online. Kempf and Palan (2006) found that the gender of the WOM communicator along with argument strength affect the brand evaluations by customers. In another study, Slyke, Bélanger, Johnson, and Hightower (2010) found that gender moderates the influence of customer beliefs on intentions to adopt a product/ service.

Another reason that makes gender an appropriate independent variable for a behavioral experiment is that it is an easily identifiable individual attribute with much data available, and hence, it is an easy-to-use segmentation variable; however, other variables such as risk-taking attitude or customer type (maven or non-maven) are difficult to articulate.

All this being said, studying gender differences is very likely to pay off in terms of designing a better RRP that will lead to growing the AMP21 online communities and faster diffusion of AMP21 math activities.

In the next section, different methods for designing more efficient Referral Reward Programs will be suggested. Two hypotheses based on self-determination theory and self-attribution theory will be proposed in order to analyze the effects of gender and incentives on customer's decision to recommend a product/ service. Next, different experiments will be presented to test the validity of these hypotheses. The results of these experiments will help in designing more efficient referral reward programs especially when the gender distribution among the target customers is highly unequal, or when the products are gender-specific.

Conceptual Framework and Hypotheses

The Effect of the Provision of Reward Choice on Customer's Referral Likelihood

According to self-determination theory, experience of autonomy helps people feel that they are in control of their actions. This will in turn increase their intrinsic motivation to pursue an action that interests them. One of the situations that can give an individual the feeling of autonomy is the provision of choice (Botti & Iyengar, 2006). According to Zuckerman, Porac, Lathin, and Deci (1978), increasing an individual's options and choices will increase their intrinsic motivation to pursuit the given activities.

There are many other studies in the literature that also support the idea that provision of choice increases an individual's sense of personal control (Rotter, 1966; Taylor, 1989; Taylor & Brown, 1988) and intrinsic motivation (DeCharmes, 1968; Deci, 1980; S. S. Iyengar & Lepper, 1999; Patall, Cooper, & Robinson, 2008).

The benefits of providing individuals with the opportunity to choose among alternatives can also be applied in the context of Referral Reward Programs. In this case, customers can have more than just one choice of rewards for sending a referral to a friend. This will not only create a sense of autonomy for the individuals, but also according to Feehan and Enzle (1991), choice of rewards can prevent the undermining effect of extrinsic rewards on intrinsic motivation that was found out by Deci (1971).

The main question that needs to be answered is how the effectiveness of this choice as an intrinsic motivation differs between males and females.

In their seminal paper, Cross and Madson (1997) explained some of the basic behavioral differences between men and women in terms of the structure of the self. They suggested that in an individualistic culture like the United States, men tend to have an independent self-construal whereas women tend to have an interdependent self-construal. They explained that when asked to evaluate themselves on different attributes, "men are more likely to evaluate themselves positively on dimensions related to independence (e.g., power and self-sufficiency), whereas women are more

likely to evaluate themselves positively on dimensions related to interdependence (e.g. likability or sociability)” [p.9]. Being that, men define themselves more as autonomous individuals compared to women (Kemmelmeyer & Oyserman, 2001; Lykes, 1985; Markus & Oyserman, 1989). That is why this research suggests that men are more likely to appreciate the provision of reward choice in a Referral Reward Program and be encouraged to send a referral to a friend. As Cross and Madson (1997) suggest, in women “positive feelings about the self should in some part derive from the development and maintenance of close relationships and from participation in the well-being of close others” [p.11]. Therefore, it is expected that as much as rewards and the provision of choice can increase the likelihood of sending a referral, a woman’s intention to refer a product to a friend stems more from the motivation of helping others.

It is important to mention that Cross and Madson’s paper is part of a research dialogue about the models of the self. In the same year that they published their paper about self-construal and gender, R. F. Baumeister and Sommer (1997) published a commentary paper in response to Cross and Madson. The essential point of their paper is that both men and women are interdependent when it comes to social relations. The only difference is that women tend to care more about maintaining close dyadic relationships whereas men are more socially oriented toward larger groups. In other words, the reason why men tend to care more about independence

and separateness is their desire for power in a broader social sphere. The hypothesis about the provision of reward choice in this research is based on the framing of Baumeister and Sommer because their explanation for gender differences in the context of social relations is more comprehensive.

Thus, the following hypothesis is proposed:

H1: Gender moderates the relationships between provision of reward choice (vs. no choice) and referral likelihood. (H1a) For men, provision of reward choice (vs. no choice) will increase referral likelihood relatively more. (H1b) For women, provision of reward choice (vs. no choice) will either increase referral likelihood relatively less or not increase referral likelihood.

The Effect of Reward Type (In-Kind vs. Cash) on Customer's Referral Likelihood

Many researchers in the fields of psychology and behavioral economics have investigated the effects of cash and monetary incentives on human motivation and performance when it comes to pro-social and altruistic activities (Bénabou & Tirole, 2005; Gneezy & Rustichini, 2000; Lacetera & Macis, 2008; Mazar, Amir, & Ariely, 2008; Mellström & Johannesson, 2008). The results of these studies show that offering monetary incentives for pro-social and altruistic activities will make individuals doubt the real motivation behind their actions and think that they are just motivated by the money. Therefore, in the long run, their intrinsic motivation will decrease and they will be less inclined to perform these activities.

The interesting point is that this finding goes beyond the pro-social and altruistic activities. Gneezy and Rustichini (2000) investigated the contradicting claims about the effects of incentives on human motivation. In one of their experiments, they asked the participants to answer to an IQ test, a task which is not a pro-social or altruistic activity. Yet, the results confirmed the crowding-out effect of monetary incentives.

Heyman and Ariely (2004) who were motivated by Gneezy and Rustichini, examined the relationship between forms of compensation and task performance. The task that they asked the participants to perform was not altruistic or pro-social, rather it was a repetitive task of dragging a subject to a specific location on a computer screen. The results of their experiments show that participants who received gifts as compensation attributed their efforts to altruistic motives, and participants who were compensated with cash, attributed their efforts to reciprocation motives. Jin and Huang (2013) drew on Heyman and Ariely's theory and discussed the effectiveness of cash vs. in-kind rewards in an RRP context. They found out that in a situation where the recommendation is not justified, participants have a higher perception of the social costs of monetary incentives; therefore, in these situations, monetary incentives lead to less recommendations in comparison to in-kind rewards.

Although many studies in the literature have discussed the different effects of monetary vs. in-kind rewards, there has not been a focus on investigating the moderating effect of gender on the effectiveness of different types of incentives.

As mentioned before, there is convincing evidence in the literature that shows men and women react differently to different types of incentives. Looking from a pure psychological perspective, Spreckelmeyer et al. (2009) performed fMRI recording on men and women in the anticipation phase of rewards. The results of their study showed that men react faster when they anticipate monetary rewards in comparison to when they anticipate social rewards, but there was not a significant difference in reaction times for women in anticipation of either reward. They also found that “men were more strongly affected by the magnitude of the anticipated reward than women, reacting faster to cues signaling high levels of reward than low levels”.

Major, McFarlin, and Gagnon (1984) investigated gender differences in their sense of personal entitlement through two lab experiments. They found out that women paid themselves less than men for a fixed amount of work when they did not have access to social comparison information, and they also performed better than men for a fixed amount of money. They based the explanations for their findings on prior research of Lenney (1977) and Major and Deaux (1982) who argued that with identical performance, women tend to evaluate their performance lower than men.

Major et al. (1984) also indicated that their findings could be explained by the perspectives provided by Crosby (1982) and Kahn, Krulewitz, O'Leary, and Lamm (1980) that “women may value money less and interpersonal relationships more than men”.

By combining the aforementioned perspectives about incentive types and gender differences about their attitude towards incentives, this research aims to investigate the moderating effect of gender on the effectiveness of different incentive types in a Referral Reward Program.

Thus, the following hypothesis is proposed:

H2: Gender moderates the relationships between reward type and referral likelihood.

(H2a) For men, provision of cash reward (vs. in-kind reward) will increase referral likelihood relatively more. For women, provision of cash reward (vs. in-kind reward) will either increase referral likelihood relatively less or not increase referral likelihood.

(H2b) For women, provision of in-kind reward (vs. cash reward) will increase referral likelihood relatively more. For men, provision of in-kind reward (vs. cash reward) will increase referral likelihood relatively less or not increase referral likelihood.

In order to test these hypotheses, three studies are designed and carried out. The first study is carried out through a survey where respondents are recruited on Amazon Mechanical Turk website. The purpose of this study is to analyze the effects of provision of reward choice as well as different reward types on the referral likelihood. This study was carried out before the main experiment on Facebook in order to validate the hypotheses and make sure these reward strategies increase the effectiveness of a referral program. The second study is carried out in 3 of the teachers' Facebook groups in order to attract new members and increase the size of these online communities. Another study is designed and carried out in a different context which is Referral Reward Programs in an online course. The purpose of this study is to see if the results of other studies could be replicated in a different setting.

In the following sections, more details about each study including the data gathering procedures, design of the experiment, measures and constructs, data analysis, and results will be discussed.

Study 1

Data Gathering Procedure

Participants for this study were recruited through Amazon Mechanical Turk website. They were 18 years or older and were located in the US. The following qualifications were used to select participants to make sure they are experienced with MTurk tasks and pay attention to survey questions:

- Have an approval rate of 97% or higher for all the previous tasks
- Have 100 or more approved tasks

The only information they received about the task was through the description as follows:

“Give us your opinion about customers' attitudes towards referral reward programs.”

They were also informed that the survey would take approximately 25 minutes to complete.

Design of the Study

In the beginning of the survey, participants were provided with basic information about a reputable online shopping website that works with the most popular retailers in North America, and their customers receive cash-back for purchases they make on this website. Then, they are told that this website is planning to run a referral program to grow their customer base.

In this experiment, a 2 (gender: male, female) × 5 (reward strategy: no reward, one cash reward (\$10 Amazon gift card), choice of cash rewards (\$10 Amazon gift card, \$10 Target gift card, \$10 Best Buy gift card, \$10 Home Depot gift card, and \$10 Macy's gift card), in-kind reward (a chocolate box), one cash reward (\$20 Amazon gift card)) between-subjects design is applied.

Based on the treatments that the participants belonged to, they were shown screenshots of the referral program from the website. Figure 25 shows a screenshot that includes the referral page on the website for the group with choice of rewards:



Figure 25: Screenshot from the referral page on the website

After reading the information about the website and looking at the screenshots, participants were asked about the likelihood of participating in such a referral program if they were a customer of the website.

The reason that the number of reward choices in the choice condition has been limited to 5 is that having too many choices can be confusing and demotivating (Botti & Iyengar, 2006; S. S. Iyengar & Lepper, 2000). The way these rewards are picked is also very important in terms of their effect on the result of the experiment. According to Botti and McGill (2006), choosers and non-choosers' satisfaction differs only when the options are more differentiated; however, when the options are less differentiated, choosers are as satisfied as non-choosers. For this reason, items that are picked should be obviously differentiated in their value and utility.

In this research design, the concept of illusory perception of choice suggested by Feehan and Enzle (1991) is used. The illusory perception of choice means that although participants are given the chance to choose among different alternatives, the alternatives are designed in a way that the best option stands out and that participants would choose the supposedly best alternative which is the same reward that is used in the condition with no choice. This means that one of the alternatives stands out in an obvious way so that it is the rational choice among other alternatives. The effectiveness of applying this method would be twofold. First, when an alternative clearly stands out among other alternatives, there is a higher probability that choosers are more satisfied than non-choosers according to Botti and McGill (2006). Secondly, this method rules out the possibility that participants are motivated because of the utility of the reward rather than the provision of reward choice.

Different pre-tests were run to finalize the 5 reward choices. In this set of choices, one of the options is an Amazon gift card which dominates the other options in terms of value and utility because of the convenience and variety of the goods and services that Amazon.com provides. The results of the pre-tests showed that most individuals (91.67%) find the Amazon gift card to be the most appealing choice in this set. Therefore, in the condition with no choice, participants are also offered a \$10 Amazon gift card.

Another condition with one cash reward is also proposed in this study. In this condition, participants are offered only an Amazon gift card with \$20 value. The reason for adding this condition is to test whether the provision of reward choice can help firms encourage their customers to spread the Word-Of-Mouth with less monetary value. The final group are told that they receive a chocolate box for participating in the referral program. The idea of offering a chocolate box as an in-kind reward is adapted from the study of Heyman and Ariely (2004). The chocolate box that is offered has a value of approximately \$10.

After reading the information and looking at the screenshots, participants were asked to indicate the likelihood of someone like them participating in this referral program on a rating scale of 0 (certainly will not recommend) to 100 (certainly will recommend). This scale is adapted from the study of Jin and Huang (2013). Two other questions were also asked about the referral likelihood of participants.

Participants had to answer the questions on a 7-point Likert scale (strongly disagree-strongly agree). These questions are designed by the author. Cronbach's alpha test was used for calculating the scale reliabilities.

Next, participants in the groups that were offered rewards (all the groups except the control group) were asked two questions about their perceptions of having a choice when it comes to rewards. These questions were asked in order to check if the choice manipulation has worked in the group where participants had more than one reward option. Both questions were designed by the author of this dissertation, and participants had to answer them on a 7-point Likert scale (strongly disagree-strongly agree for the first question, and not at all-a very large amount for the second question). Table 30 shows the items for referral likelihood and perception of choice along with the resulting Cronbach's alpha and the source for each item.

Table 30: Scale items for referral likelihood and perception of choice

Measure	Items	Source	Reliability
Referral Likelihood	<p>1. How likely would a man/woman like you be to participate in this referral program? (a rating scale of 0 (certainly will not recommend) to 100 (certainly will recommend))</p> <p>2. I believe a man/ woman like me would refer a friend to this website. (7-point Likert scale: strongly disagree-strongly agree)</p> <p>3. Indicate your willingness to participate in such a referral program. (a scale of 1 to 7 with "1" meaning "not at all willing" and "7" meaning "very willing")</p>	<p>Jin and Huang (2013)</p> <p>Proposed by the author</p> <p>Proposed by the author</p>	0.805
Perception of choice	<p>1. I feel that this website provided their customers with choices and options in terms of selecting their reward. (7-point Likert scale: strongly disagree-strongly agree)</p> <p>2. How much choice do you think the customers have in selecting their reward for referring a friend? (7-point Likert scale: not at all- a very large amount)</p>	<p>Proposed by the author</p> <p>Proposed by the author</p>	0.89

The complete survey instruments for all treatment groups can be found in Appendix B.

Results

A total of 320 participants completed the survey on Amazon Mechanical Turk. The participants who did not respond correctly to the attention check questions and those who finished the survey in less than 5 minutes were excluded from the study; therefore, 33 respondents were excluded and a total of 287 responses were analyzed.

Table 31 shows a summary of the demographics of the participants whose responses were included in the analysis.

Table 31: Demographic table for participants in study 1

Gender	Percentage	Number
Male	50.52%	145
Female	49.48%	142
Other	0%	0
Age	Percentage	Number
18-21 years old	6.62%	19
22-30 years old	48.78%	140
31-40 years old	27.53%	79
41-50 years old	9.76%	28
50+ years old	7.31%	21
Education	Percentage	Number
Less than high school	0.35%	1
High school completion	9.06%	26
Some college	29.27%	84
Associate's degree	9.41%	27
Bachelor's degree	42.51%	122
Master's degree	6.97%	20
Professional degree	1.05%	3
Doctorate degree	1.39%	4

Participants' referral likelihood was analyzed using the analysis of variance (ANOVA). Table 32 shows the descriptive statistics for each treatment group in this study.

Table 32: Descriptive statistics for each treatment group

Descriptive Statistics				
Dependent Variable: Referral Likelihood				
Group	Gender	Mean	Std. Deviation	N
\$10 gift cards with choice	Female	67.7	25.9	29
	Male	87.3	16.4	40
	Total	79.1	22.9	69
\$10 gift card with no choice	Female	70.4	21.7	37
	Male	76.9	26.6	46
	Total	74.0	24.6	83
Control Group	Female	42.0	23.1	43
	Male	38.3	19.8	25
	Total	40.6	21.9	68
In-Kind reward	Female	82.9	19.3	36
	Male	70.4	22.5	31
	Total	77.1	21.6	67
Total	Female	64.5	27.2	145
	Male	71.6	27.4	142
	Total	68.0	27.5	287

The analysis for the effect of reward choice on the referral likelihood has been done separately from the analysis for the effect of reward type on the referral likelihood.

ANOVA Results for Analyzing the Effect of Choice on Referral Likelihood

The dependent variable is participant's referral likelihood (a scale of 0% to 100% with 0 meaning "certainly will not recommend" and 100 meaning "certainly will recommend"). The fixed factors are reward strategy (\$10 gift card with no choice, a choice between five \$10 gift cards), and gender (male vs. female). The significance level was chosen to be 0.05.

For testing the assumption of homogeneity of variances, Levene's test for equality of error variances is used. As previously discussed in chapter 3, this method tests the null hypothesis that the error variance of the dependent variable is equal across groups. Table 33 shows the results of this test. Since the significance value of the test is greater than 0.05, the assumption of homogeneity of variances is not violated.

Table 33: Levene's test results for testing homogeneity of variances

Levene's Test of Equality of Error Variances ^{a,b}					
		Levene Statistic	df1	df2	Sig.
Referral Likelihood	Based on Mean	1.716	5	214	.132
	Based on Median	1.118	5	214	.352
	Based on Median and with adjusted df	1.118	5	168.192	.353
	Based on trimmed mean	1.488	5	214	.195
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.					
a. Dependent variable: Referral Likelihood					
b. Design: Intercept + Rewards + Gender + Rewards * Gender					

Table 34 shows the results of the ANOVA analysis.

Table 34: Results of the ANOVA analysis

Tests of Between-Subjects Effects						
Dependent Variable: Referral Likelihood						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	68200.021 ^a	5	13640.004	26.550	.000	.383
Intercept	853843.084	1	853843.084	1661.993	.000	.886
Rewards	55683.607	2	27841.803	54.194	.000	.336
Gender	2920.686	1	2920.686	5.685	.018	.026
Rewards * Gender	4415.606	2	2207.803	4.297	.015	.039
Error	109941.718	214	513.746			
Total	1115822.360	220				
Corrected Total	178141.739	219				

a. R Squared = .383 (Adjusted R Squared = .368)

Figure 26 shows the differences of referral likelihood among groups with different reward strategies for different genders.

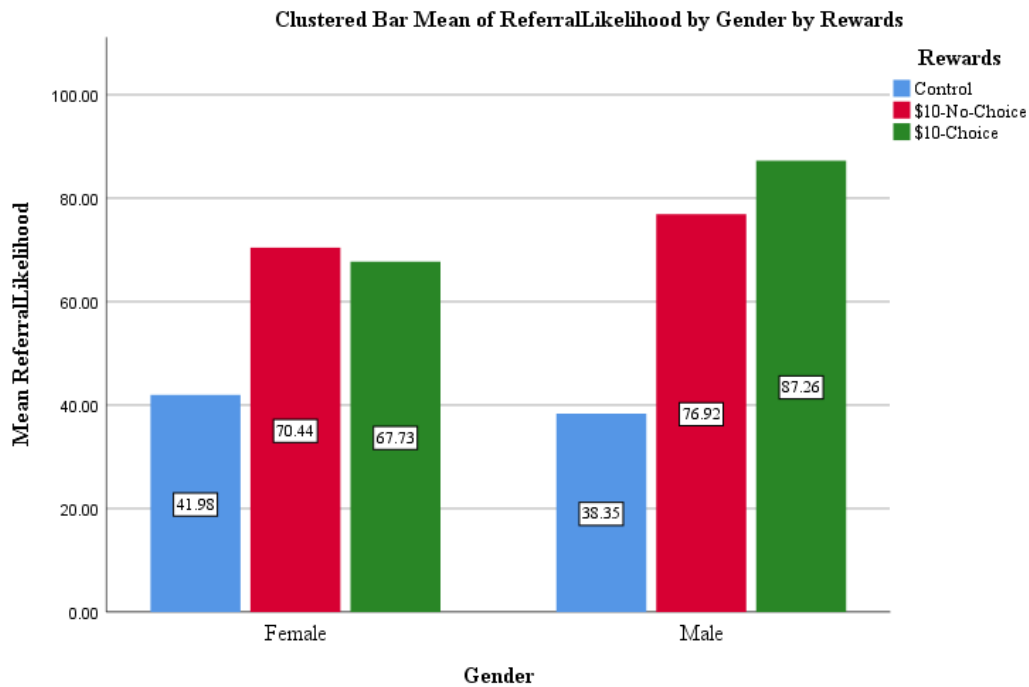


Figure 26: Referral likelihood for different reward strategies

The results show that there is a significant main effect for reward strategy ($F(2,214)=54.194, p<0.05$) and gender ($(F(1,214)=5.685, p<0.05)$). The interaction between reward strategy and gender was also found to be significant ($F(2,214)=4.297, p<0.05$). Therefore, it can be concluded that gender moderates the relationship between reward strategy (choice vs. no choice) and participant's referral likelihood.

Table 35 shows the estimated marginal means for the main effect of reward strategy.

Table 35: Estimated marginal means for the main effect of reward strategy

Estimates				
Dependent Variable: Referral Likelihood				
Rewards	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
\$10 gift card with choice	77.496	2.764	72.048	82.944
\$10 gift cards with no choice	73.677	2.503	68.744	78.610
Control group	40.163	2.850	34.545	45.781

Table 36 shows the pairwise comparisons between different reward strategies.

Table 36: Pairwise comparisons between different reward strategies

Pairwise Comparisons						
Dependent Variable: Referral Likelihood						
(I) Rewards	(J) Rewards	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
\$10 gift cards with choice	\$10 gift card with no choice	3.819	3.729	.667	-5.155	12.792
	Control group	37.333*	3.970	.000	27.778	46.888
\$10 gift card with no choice	\$10 gift cards with choice	-3.819	3.729	.667	-12.792	5.155
	Control group	33.514*	3.793	.000	24.386	42.643
Control group	\$10 gift cards with choice	-37.333*	3.970	.000	-46.888	-27.778
	\$10 gift card with no choice	-33.514*	3.793	.000	-42.643	-24.386
Based on estimated marginal means						
*. The mean difference is significant at the .05 level.						
b. Adjustment for multiple comparisons: Sidak.						

Looking at the significance values from Table 36, it can be concluded that referral likelihood was significantly greater for groups with rewards (\$10 gift card with choice=77.496%, \$10 gift cards with no choice=73.677%) than the control group (40.163%) where there were no rewards offered.

As mentioned before, the Table 34 shows that gender moderates the relationship between reward strategy (choice vs. no choice) and participant's referral likelihood. This finding can be further analyzed by testing the hypotheses H1a and H1b.

In order to test the hypothesis H1a, a t-test is performed to find any significant differences between reward strategies for men. Table 37 shows the statistics pertaining different reward strategies (choice vs. no choice) for male participants.

Table 37: Statistics for different reward strategies for male participants

Group Statistics					
	Reward	N	Mean	Std. Deviation	Std. Error Mean
Referral	\$10 gift card with no choice	46	76.9150	26.59225	3.92081
Likelihood	\$10 gift cards with choice	40	87.2645	16.36762	2.58795

Table 38 shows the results of the independent samples t-test that was used to compare the means of different reward strategies (choice vs. no choice) for male participants.

Table 38: T-test to compare different reward strategies for male participants

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Referral	Equal variances assumed	5.874	.018	-2.134	84	.036	-10.34950	4.84970	-19.99367	-.70533
Likelihood	Equal variances not assumed			-2.203	76.088	.031	-10.34950	4.69790	-19.70600	-.99300

Since the significance value for the Levene's test for equality of variances is less than 0.05, the null hypotheses of equality of variances is rejected, and the second

row in Table 38 should be addressed to read the results of the t-test. The significance value for the t-test is less than 0.05 which shows that the mean referral likelihood for males who have been offered a choice of rewards is statistically significantly greater (87.26%) than the mean referral likelihood for males who were only offered one gift card option (76.91%). Therefore, hypothesis H1a is confirmed.

In order to test the hypothesis H1b, a t-test is performed to find any significant differences between reward strategies for women. Table 39 shows the statistics pertaining different reward strategies (choice vs. no choice) for female participants.

Table 39: Statistics for different reward strategies for female participants

Group Statistics					
	Reward	N	Mean	Std. Deviation	Std. Error Mean
Referral Likelihood	\$10 gift card with no choice	34	69.7103	21.96479	3.76693
	\$10 gift cards with choice	29	67.7276	25.92723	4.81457

Table 40 shows the results of the independent samples t-test that was used to compare the means of different reward strategies (choice vs. no choice) for female participants.

Table 40: T-test for different reward strategies for female participants

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Referral Likelihood	Equal variances assumed	.395	.532	.329	61	.744	1.98271	6.03256	-10.08013	14.04555
	Equal variances not assumed			.324	55.217	.747	1.98271	6.11309	-10.26711	14.23253

Since the significance value for the Levene's test for equality of variances is more than 0.05, the null hypotheses of equality of variances cannot be rejected, and the first row in Table 40 should be addressed to read the results of the t-test. The significance value for the t-test is greater than 0.05 which shows that there is not a significant difference between then mean referral likelihood for females who have been offered a choice of rewards (67.73%) and the mean referral likelihood for females who were only offered one gift card option (69.71%). It can also be seen that contrary to the hypothesis, the provision of choice slightly reduced the average likelihood of referral in females. Therefore, hypothesis H1b could not be confirmed.

ANOVA Results for Analyzing the Effect of Reward Type on Referral Likelihood

The dependent variable is participant's referral likelihood (a scale of 0% to 100% with 0 meaning "certainly will not recommend" and 100 meaning "certainly will recommend"). The fixed factors are reward type (\$10 gift card with no choice (cash

reward), a chocolate box (in-kind reward)), and gender (male vs. female). The significance level was chosen to be 0.05.

For testing the assumption of homogeneity of variances, Levene's test for equality of error variances is used. Table 41 shows the results of this test. Since the significance value of the test is greater than 0.05, the assumption of homogeneity of variances is not violated.

Table 41: Levene's test results for testing homogeneity of variances

Levene's Test of Equality of Error Variances ^{a,b}					
		Levene Statistic	df1	df2	Sig.
Referral Likelihood	Based on Mean	1.104	5	212	.359
	Based on Median	.822	5	212	.535
	Based on Median and with adjusted df	.822	5	176.980	.535
	Based on trimmed mean	1.004	5	212	.416
Tests the null hypothesis that the error variance of the dependent variable is equal across groups.					
a. Dependent variable: Referral Likelihood					
b. Design: Intercept + Reward Type + Gender + Reward Type * Gender					

Table 42 shows the results of the ANOVA analysis.

Table 42: Results of the ANOVA analysis

Tests of Between-Subjects Effects						
Dependent Variable: Referral Likelihood						
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	60528.904 ^a	5	12105.781	23.554	.000	.357
Intercept	843484.949	1	843484.949	1641.183	.000	.886
Reward Type	54176.444	2	27088.222	52.706	.000	.332
Gender	536.600	1	536.600	1.044	.308	.005
Reward Type * Gender	3322.186	2	1661.093	3.232	.041	.030
Error	108957.257	212	513.949			
Total	1078099.727	218				
Corrected Total	169486.161	217				

a. R Squared = .357 (Adjusted R Squared = .342)

Figure 27 shows the differences of referral likelihood among groups with different reward types for different genders.

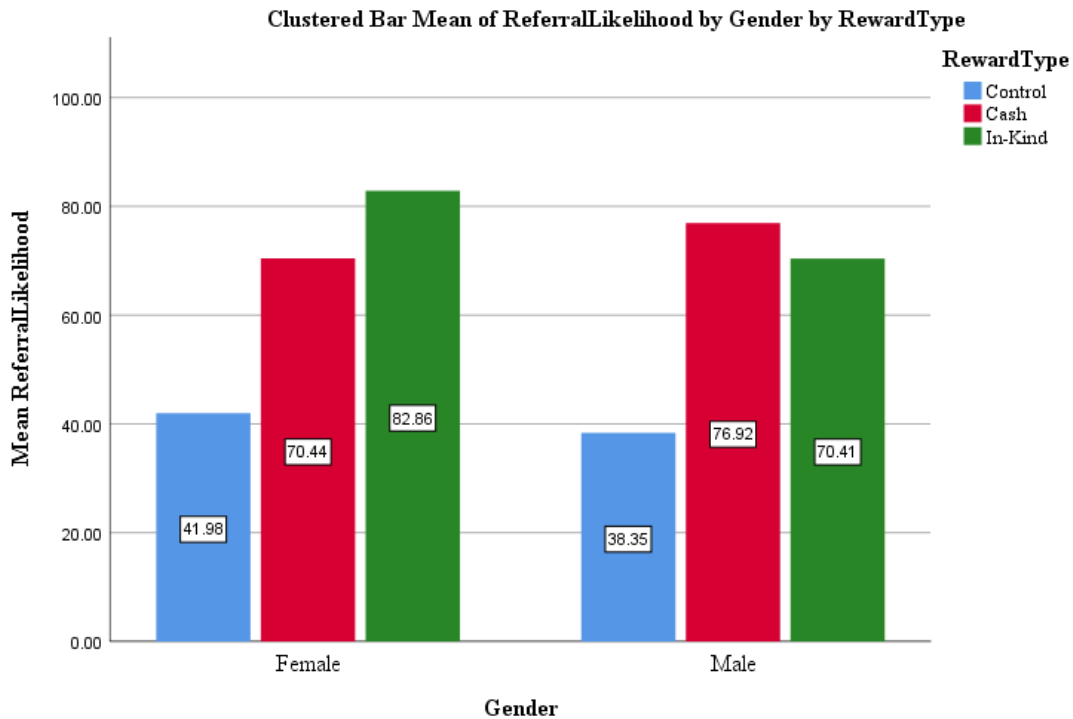


Figure 27: Referral likelihood for different reward types

The results show that there is a significant main effect for reward type ($F(2,212)=52.706, p<0.05$). The interaction between reward type and gender was also found to be significant ($F(2,212)=3.232, p<0.05$). Therefore, it can be concluded that gender moderates the relationship between reward type (cash vs. in-kind) and participant's referral likelihood.

Table 43 shows the estimated marginal means for the main effect of reward type.

Table 43: Estimated marginal means for the main effect of reward type

Estimates				
Dependent Variable: Referral Likelihood				
Reward Type	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Cash	73.677	2.503	68.743	78.612
Control group	40.163	2.851	34.543	45.783
In-Kind	76.638	2.777	71.164	82.113

Table 44 shows the pairwise comparisons between different reward types.

Table 44: Pairwise comparisons between different reward types

Pairwise Comparisons						
Dependent Variable: Referral Likelihood						
(I) Reward Type	(J) Reward Type	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for Difference ^b	
					Lower Bound	Upper Bound
Cash	Control group	33.514*	3.794	.000	24.383	42.645
	In-Kind	-2.961	3.739	.814	-11.960	6.038
Control group	Cash	-33.514*	3.794	.000	-42.645	-24.383
	In-Kind	-36.475*	3.980	.000	-46.055	-26.896
In-Kind	Cash	2.961	3.739	.814	-6.038	11.960
	Control group	36.475*	3.980	.000	26.896	46.055
Based on estimated marginal means						
*. The mean difference is significant at the .05 level.						
b. Adjustment for multiple comparisons: Sidak.						

Looking at the significance values from Table 44, it can be concluded that referral likelihood was significantly greater for groups with rewards (cash=73.677%, in-kind=76.638%) than the control group (40.163%) where there were no rewards offered.

As mentioned before, the Table 42 shows that gender moderates the relationship between reward type (cash vs. no in-kind) and participant's referral likelihood. This finding can be further analyzed by testing the hypotheses H2a and H2b.

In order to test the hypothesis H2a, a t-test is performed to find any significant differences between reward types for men. Table 45 shows the statistics pertaining different reward types (cash vs. in-kind) for male participants.

Table 45: Statistics for different reward types for male participants

Group Statistics					
	Reward Type	N	Mean	Std. Deviation	Std. Error Mean
Referral Likelihood	Cash	46	76.9150	26.59225	3.92081
	In-Kind	31	70.4119	22.49488	4.04020

Table 46 shows the results of the independent samples t-test that was used to compare the means of different reward types (cash vs. in-kind) for male participants.

Table 46: T-test to compare different reward types for male participants

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Referral Likelihood	Equal variances assumed	.240	.626	1.118	75	.267	6.50306	5.81720	-5.08540	18.09153
	Equal variances not assumed			1.155	71.083	.252	6.50306	5.62992	-4.72245	17.72858

Since the significance value for the Levene's test for equality of variances is greater than 0.05, the null hypotheses of equality of variances could not be rejected, and the first row in Table 46 should be addressed to read the results of the t-test. The significance value for the t-test is greater than 0.05 which shows that although the mean referral likelihood for males who were offered an in-kind reward is greater (76.91%) than the mean referral likelihood for males who were offered a cash reward

(70.41%), the difference between the two means is not statistically significant. Therefore, hypothesis H2a could not be confirmed.

In order to test the hypothesis H2b, a t-test is performed to find any significant differences between reward types for women. Table 47 shows the statistics pertaining different reward types (cash vs. in-kind) for female participants.

Table 47: Statistics for different reward types for female participants

Group Statistics					
	Reward Type	N	Mean	Std. Deviation	Std. Error Mean
Referral Likelihood	Cash	37	70.4395	21.67991	3.56415
	In-Kind	36	82.8647	19.35031	3.22505

Table 48 shows the results of the independent samples t-test that was used to compare the means of different reward types (cash vs. in-kind) for female participants.

Table 48: T-test to compare different reward types for female participants

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Referral Likelihood	Equal variances assumed	.515	.475	-2.581	71	.012	-12.42526	4.81424	-22.02459	-2.82594
	Equal variances not assumed			-2.585	70.484	.012	-12.42526	4.80668	-22.01072	-2.83980

Since the significance value for the Levene's test for equality of variances is more than 0.05, the null hypotheses of equality of variances cannot be rejected, and the first row in Table 48 should be addressed to read the results of the t-test. The significance value for the t-test is less than 0.05 which shows that the mean referral likelihood for females who have been offered an in-kind reward (82.86%) is significantly greater than the mean referral likelihood for females who were offered a cash reward (70.44%). Therefore, hypothesis H2b is confirmed.

Study 2

Data Gathering Procedure

Study 2 was launched in 3 of the AMP21 Facebook groups (group #1, group #2, and group #3). Members in these Facebook groups who were primarily middle school math teachers would then be the participants in this study. As previously mentioned in chapter 2, the number of members in these groups were 90, 89, and 93 respectively. When teachers were recruited to these Facebook groups, they were told that data about their behavior would be gathered for research purposes; therefore, when this study was launched, they were not aware that the referral reward program are part of a research study so that their behavior would not be influenced by that.

Design of the Study

The purpose of study 2 is to grow the size of AMP21 online communities through referral reward programs. The results from study 1 were used to design more

efficient referral reward programs. In order to validate some of the findings from study 1, a few months after the groups were created, group members in group #1, group #2, and group #3 were informed about AMP21 referral reward programs. They were told that AMP21 is looking for ways to spread the word about the Facebook groups, and if they have friends/ colleagues who can benefit from the math materials, they can easily go to a survey link and refer their friends.

Group #1 was planned to be the control group, and the members were not offered any rewards for participating in the referral program. In group #2, members were told that if they invite their friends/ colleagues to the group, they would receive a \$10 Amazon gift card through email as a token of appreciation. In group #3, members were told that if they invite their friends/ colleagues to the group, they would receive a \$10 gift card of their choice. The gift card options that were offered were: Amazon, iTunes, eBay, Newegg, and Google Play. The reason these options were picked was that these gift cards were for exclusive online shopping, and they were among the limited number of online shopping gift cards that came in a \$10 value. Members were then given a link to the referral survey where they could provide AMP21 team with their friends/ colleagues' contact information. They were also asked about their gender in the survey. The complete referral survey instruments for all the groups is provided in Appendix B.

The referral program was run for 2 weeks. Table 49 shows the number of referrals by men and women in each group.

Table 49: Number of referrals in each Facebook group

Group Name	Reward Strategy	# of members in the group	# of members who saw the referral posts		Number of referrals made by males and females		
			Male	Female	Male	Female	Total
Group #1	No rewards (control group)	90	10	42	2	1	3
Group #2	\$10 Amazon gift card (no choice)	89	7	25	0	9	9
Group #3	Choice between five \$10 gift cards	93	8	34	8	8	16

In order to discuss the results of Table 49, it is more appropriate to consider the number of members who saw the referral posts during the 2-week time frame rather than the total number of members in each group. The reason is that if the members did not see the posts, they were not aware of the referral program and could not be considered as the research participants in this study. In group #1, only 5.8% of the members who saw the referral posts participated in the referral program, and a very low percentage of females (2.38%) participated in the referral program comparing to males (20%). In group #2, 28.12% of the overall members who saw the referral posts participated in the referral program. There were no male participants, whereas 36% of females participated. In group #3, 38.1% of the members who saw the

referral posts participated in the referral program. In this group, 100% of the males who saw the posts participated in the program comparing to 23.5% of the females who took part in the program.

In group #1, 3 participants made 5 referrals out of which 3 new members accepted the referrals and joined the group. In group #2, 9 participants made 11 referrals out of which 2 new members accepted the referrals and joined the group. In group #3, 16 participants made 21 referrals out of which 7 new members accepted the referrals and joined the group.

The relative success of the referral reward program in group #3 (the group with choice of rewards) in terms of the number of participants particularly with regards to male participants could be attributed to the rewarding strategy. This could further validate the hypotheses H1a and H1b that suggest gender moderates the relationship between reward strategy (choice vs. no choice) and referral behavior. However, special caution should be taken in interpreting the results of this study. “Seeing” posts on Facebook does not mean the same thing for all the participants. Sometimes when individuals see a group post, they don’t have the chance to read it carefully, and they just scroll by the message. Ideally, this experiment should be repeated with a larger population in different contexts to see if the same findings still hold.

For this reason, another study of referral reward strategies and reward types is designed and carried out in a different context with the hope to get more participants involved. This study will be discussed in more detail in the next section.

Study 3

Data Gathering Procedure

The referral experiment in AMP21 Facebook groups was designed and carried out for 2 main purposes:

- 1) Increase the size of the online communities by attracting new members through the referral program
- 2) Validate the hypotheses H1a and H1b in a real context rather than survey questions with hypothetical scenarios

Looking at the number of accepted referrals, it can be inferred that the size of the communities did not grow enough to get to a self-sustaining critical mass; however, findings suggested that provision of reward choice could have a positive effect on the referral behavior especially for the male participants. In order to further validate this hypothesis, study 3 was designed and carried out in a different setting that could potentially generate enough data to make statistical analysis more meaningful. Researchers in this study teamed up with the owners of an online training called “Landing a Career with LinkedIn”. This online training is designed for individuals who would like to design a compelling LinkedIn profile to stand out.

It also helps them utilize advanced search methods to connect with influencers and career opportunities. This online training has 8 modules that overall take about 1 hour to complete. The author launched a referral reward program in this training in order to increase the number of individuals who register for it.

Initially, students from the college of engineering and business school at Wayne State University received emails about this online training. The information about the training was also posted on different professional groups on LinkedIn and Facebook. Furthermore, a LinkedIn ad campaign was run for 10 days to promote the online training. The recipients were informed that for a limited time, a substantial introductory discount is being offered on this training, and they can sign up for only \$10 (a \$60 value). They were also informed that an exciting incentive program is offered within the course for those who sign up and invite their friends to sign up too.

Once individuals signed up and started the training, they could see the link and the information for the referral program at the end of the first and last module of the training. They were told that it would not take more than 5 minutes of their time to invite their friends. They were also informed that the course team is offering exciting incentives that will be sent to them once their friend(s) register for the course.

In the next section, the design of the study is explained in more detail.

Design of the Study

This study was designed slightly different from the Facebook study. First of all, participants could invite up to 3 friends within the referral survey and as many friends as they wanted outside the survey (through email, social media, etc.) with the unique code they were given. They were told that they will be rewarded up to 3 times based on the number of their friends who register for the course. According to Bauermeister et al. (2012), this strategy is more effective in terms of motivating people to refer more individuals. The purpose of this experiment is to check the validity of hypotheses H1a, H1b, H2a, and H2b.

When participants clicked on the referral link, they were randomly assigned to one of the following four treatment groups:

- 1) Participants in this group were offered a \$10 Amazon gift card. They were told if someone registers for the course using their unique code, they would earn a \$10 Amazon gift card through email. If others would register with their code, they could earn up to 2 additional gift cards.
- 2) Participants in this group were offered a choice between 5 different \$10 gift cards: Amazon, eBay, Google Play, iTunes, and Newegg. They were told if someone registers for the course using their unique code, they would earn the \$10 gift card of their choice through email. If others would register with their code, they could earn up to 2 additional gift cards.

- 3) Participants in this group were told that if someone registers for the course using their unique code, they will receive the "Job Searching with Social Media for Dummies" e-book through email. If others would register with their code, they could earn up to 2 additional popular and highly-rated business e-books (the names of these books were not revealed to them). These e-books are considered in-kind rewards that are likely to be relevant to individuals who want to optimize their LinkedIn profile. The value of these e-books are roughly \$10.
- 4) Participants in this group were shown 5 different business e-books: "Job Searching with Social Media for Dummies", "How Successful People Think", "Get Big Fast and Do More Good", "The 4-Hour Workweek", and "The 7 Habits of Highly Effective People". They were asked to rank these e-books based on their preferences. They were told that if someone registers for the course using their unique code, they will receive the e-book that they ranked first through email. If others would register with their code, they could earn up to 2 additional e-books that they ranked 2nd and 3rd. This treatment group was designed to see if the combination of choice and in-kind rewards would have a bigger positive impact on the participants' referral behavior.

In the referral survey, participants were asked about their relationship with each individual that they referred. They could choose any of the following descriptions for their relationships: “very close”, “close”, “casual”, “acquaintance”, and “distant acquaintance”. Researchers hoped to also analyze the moderating effect of tie strength on the referral behavior. This idea was adapted from the research study of Ryu and Feick (2007) who suggested that effect of offering rewards on referral behavior is moderated by tie strength.

The full survey instruments for all the 4 treatment groups are provided in Appendix B.

In the next section, the results of study 3 will be discussed.

Results

Although the information about the course was sent to more than 2500 students at Wayne State and potentially 1000 individuals on other platforms, only 35 people registered for the online training over the course of 5 months. These individuals received biweekly emails from the course team that encouraged them to participate in the referral program.

Out of these 35 registered users, only 7 clicked on the referral link. 3 of these individuals closed the referral page after they saw the rewards that were offered (one of them was in the \$10 Amazon gift card group, and the other 2 were in the group with the choice of e-books). The other 4 referrals were each from a different

treatment group; therefore the number of referrals made in the treatment groups were equal. Out of the 4 referrals made, only one individual accepted the referral and registered for the course.

Since the number of participants in this study was way lower than expected, the results are very difficult to interpret. It is not easy to decide whether the rewards that were offered were picked appropriately either because only 7 people opened the referral link. Therefore, this study did not achieve its goals in terms of validating the suggested hypotheses in this chapter. Other experiments need to be designed and carried out in other contexts with more participants in order to get better results that could be interpreted.

CHAPTER 5 “DIFFUSION OF TECHNOLOGICAL INNOVATIONS- EXPLORING THE EARLY ADOPTERS OF AUGMENTED REALITY SMART GLASSES”

Research Motivation

In the previous chapters, diffusion of innovations and consumer’s adoption of innovations was discussed in the context of innovative educational materials that addressed real-world applications of math; however, the most prominent context for diffusion of innovations in today’s business world are technological innovations. This chapter showcases a separate research project that aims to understand the diffusion of a particular category of technological innovations, namely wearable devices. The efforts in this research project led to the publication of four papers. Two of those papers were incorporated in this chapter (Kalantari, 2017; Kalantari & Rauschnabel, 2018).

Wearable devices have emerged as rapidly developing technologies that have the potential to change people’s lifestyles and improve their wellbeing, decisions, and behaviors as well as enhance core business processes. However, the adoption of these devices has been relatively slow when compared to mainstream technologies such as smartphones. Hence, manufacturers and designers show a growing interest to understand the influential factors in adopting these technologies. This will help them improve the features and desirability of these devices in order to wow the consumers and win them over. Researchers in various disciplines have studied

consumers' adoption of wearable technologies, such as smart glasses and smartwatches using different theories and methodologies; however, not much research has been done to understand how consumers react to wearable technologies that mix virtual and real worlds in glasses-like wearable devices. Drawing up on various technology acceptance and media theories, this chapter proposes a model that is developed to understand how people react to Augmented Reality Smart Glasses (ARSGs) using the example of Microsoft HoloLens.

Introduction to Wearable Technologies

“Wearable technologies”, “wearable devices”, or simply referred to as “wearables” are smart electronics or computers that are incorporated into different types of accessories as well as items of clothing and can be worn on or attached to the body (Wright & Keith, 2014). These devices are designed to provide the users with an integrated and seamless experience that has long been expected from the computers.

The main functionality of wearable devices is to help consumers achieve a state of connected-self by using sensors and software that facilitate data exchange, communication and information access in real-time. For this reason, wearable devices are a big part of the Internet of Things (Castillejo, Martínez, López, & Rubio, 2013; Hiremath, Yang, & Mankodiya, 2014; A. Sun, Ji, Wang, & Liu, 2016; Swan, 2012; X. Wang, 2015).

Compared to smart phones and laptop computers, wearable devices offer consumers more convenience. This convenience can be attributed to their light weight, accessibility, possibility to use while the user is in motion, possibility to use non-keyboard commands such as voice and hand gestures, and providing the user with control. These devices are not generally perceived as “technology”, but many consumers also consider wearables as “fashion” or “fashnology” (Rauschnabel, Hein, et al., 2016). Wearables could also surpass smart phones and laptop computers in performance and hence can potentially replace these technologies in the future. Therefore, there has been an increase in consumer’s awareness and knowledge about these devices as well as developer’s inclination to release new wearable devices to the market (S. Park, Chung, & Jayaraman, 2015).

Wearable technologies have a large number of potential benefits that can dramatically change the landscape of societies and businesses. These devices can improve individuals’ wellbeing and help them make better and more informed decisions. For example, using wearables in medical centers could improve the accuracy of the health information acquired and hence improve the success of medical procedures and patient’s safety. Wearing health and fitness devices can lead to individual’s healthier behavior and consequently, a significant decrease in healthcare costs. In sports, wearables are used in a new emerging practice called physiolytics which links wearable devices with data analysis to provide quantitative

feedback in order to monitor and improve sport's performance (Wilson, 2013). Wearables also provide great benefits in terms of assistive services for the disabled community who have limited ability to operate technological devices. Another great benefit of using wearable technologies is the improved safety and security of children and elderly.

Wearables can also play an important role in improving core business processes and saving companies millions of dollars by increasing efficiency in manufacturing, service industries, and retail. Using wearables as hands-free guidance tools can help improve the production rate in manufacturing companies (Abraham & Annunziata, 2017). Wearables can speed up real-time access to information in order to enhance decisions and actions in service industries. In retail, using wearable devices can create better customer experience, expedite purchasing, provide customers with better access to deals, and give them more real-time input that they can use to make purchasing decisions. In general, wearables can be used as evolutionary tools for training the workforce. They can also be used to provide remote customer service and technical support to solve customers' problems more efficiently.

Despite all the advantages of wearables, and the fact that these devices are perceived to be the next generation of core products in the IT industry (Chang, Lee, & Ji, 2016), their adoption has been slower than expected.

Wearables cover a wide variety of devices such as smartwatches, smart glasses, activity trackers, head-mounted displays, contact lenses, smart garments, smart jewelries (e.g. smart rings), headbands, bracelets, etc. Examples include Google Glass, Microsoft HoloLens, Apple Watch, Pebble Smartwatch, Fitbit fitness tracker, Oculus Rift virtual reality goggles, 9Solutions Real-Time Locating Systems, iKey wearable keyboard, and so on. Wright and Keith (2014) provide more extensive details on different types of wearable devices and the major players in the market.

Wearables have a wide range of applications both for individuals and enterprises. Their various uses include communication, information, education, entertainment, fitness and health tracking, navigation, gaming, and assistive services. One of the important applications of wearables is in marketing. These devices can be used to monitor information about users and their surroundings; therefore, they can collect data about consumer's purchase behavior, hobbies, activities, and location. Companies highly value this information since it gives them consumer insights that they can use to enhance customer experience.

As the importance of wearables is expected to increase rapidly due to their aforementioned benefits, consumers' empowerment, and technological advancements, it is critical to identify the underlying factors that drive consumers' decisions to adopt these devices. This knowledge will provide wearable designers and manufacturers with helpful insights about the important features and capabilities

that should be incorporated in these devices in order to win over the consumers. It will also help marketers come up with more efficient messages to promote wearables in marketing campaigns so that they can address consumers' main needs and concerns. Various disciplines have studied the facilitators and barriers to the adoption of wearable devices using different theories and approaches.

The wearable technology market is growing rapidly and is expected to be the next megatrend that will dramatically reshape the way we live and do business.

The Cognizant market research (Bhat, Badri, & Reddi, 2014) indicates that the market for wearable electronics worldwide is expected to cross US\$8 billion in 2018 which shows a compound annual growth rate of 17.7% from 2013 to 2018. The largest market share can be attributed to consumer applications (US\$2 billion in 2012) whereas a 21% annual increase from 2013 to 2018 is also expected for industrial applications. Furthermore, the entire wearable devices market is expected to cross US\$14 billion by 2018 which marks a compound growth rate of more than 18% from 2013. Wearable devices are predicted to have an accelerating penetration rate that accounts for 46% of the total addressable market by 2018. Predictions also indicate that the healthcare sector will continue to be the dominant sector in the wearable technology market (Wright & Keith, 2014). Another industry forecast by CCS Consulting (Spencer, 2014) predicts that the smartwatch shipments alone will exceed 68 million devices in 2018 compared to 4 million in 2013.

Despite all the hype and enthusiasm about wearable devices, these technologies have not yet gone mainstream. A PricewaterhouseCoopers (PwC) survey shows that 59% of the respondents expressed concerns about these technologies. Although consumers acknowledge that wearables offer enormous potential and endless opportunities, they are not convinced that these technologies will have an added-value for them. Many people believe that these devices are luxurious toys that do not have a meaningful application and hence are dispensable. Therefore, researchers and industry experts are interested to explore consumers' adoption decision process and determine the factors that can motivate individuals and businesses to adopt and use wearable devices (M. Leue & Jung, 2014; Rauschnabel & Ro, 2016).

Augmented Reality Smart Glasses

Recently, manufacturers announced their efforts to enter consumer markets with a novel technology that is termed 'Augmented Reality Smart Glasses' (ARSGs), which – broadly speaking – realistically integrates virtual objects into a user's view field in glasses-like devices. According to Craig (2013), Augmented Reality (AR) is defined as a "medium in which digital information is overlaid on the physical world that is in both spatial and temporal registration with the physical world and that is interactive in time" [p.20]. For example, smartphone users can use the Wikitude smartphone app and view a famous building. Wikitude then automatically includes relevant Wikipedia information in the user's view field. Thus, in contrast to virtual

reality (VR)³, augmented reality (AR) is not closed off from reality, but melds the real and virtual worlds together (Javornik, 2016a; Scholz & Smith, 2016).

Current developments in IT aim at combining AR with wearables in glasses-like devices. Microsoft HoloLens, Google Glass (now: Project Aura), EverySight Raptor, ODG R-7 and Epson Moverio are prominent examples of these developments, and Samsung, Zeiss, Amazon and other firms have filed patents for and announced the launch of smart glasses. While Google Glass, one of the first ARSGs that were commercially launched, has received a lot of media attention, its success in consumer markets was limited. However, recent studies suggest that other devices such as Microsoft HoloLens are much more promising due to their holographic possibilities. In contrast to Google Glass, HoloLens does not have just one prism that overlays information; HoloLens realistically integrates 3D information into a user's perception of the real-world.

AR has been studied and applied in various contexts, such as tourism (Jung, Chung, & Leue, 2015), museums (M. Claudia tom Dieck & Jung, 2015), retailing (Rese, Baier, Geyer-Schulz, & Schreiber, 2017; Spreer & Kallweit, 2014), and others (Javornik, 2016a, 2016b; Stockinger, 2016).

³ With VR-devices (e.g. Oculus Rift), users immerse themselves in a virtual world that shuts out the external environment, totally immersing the user in the virtual reality.

Research Questions

There is still a lack of understanding about the factors that drive consumer's acceptance and resistance to ARSGs. This is probably due to the novelty of AR in general and ARSGS in particular, but as initial research suggests, it may also be due to the fact that the existing theories are difficult to apply to ARSGs. Thus, in order to extend the understanding of consumers' adoption of ARSGs, the following two research questions are aimed to be answered using Microsoft HoloLens, the first commercially available holographic ARSG:

Research question 1: How do consumers perceive ARSGs, in particular Microsoft HoloLens?

Research question 2: Which factors influence the adoption of ARSGs, in particular Microsoft HoloLens?

In order to answer these research questions, first, the relevant literature on technology acceptance and ARSGs consumer research will be reviewed. Based on this review, a framework is proposed that consists of various benefits, risks, technology factors and norms as antecedents to ARSG adoption. Then, the proposed model will be tested using the example of Microsoft HoloLens.

Literature of Technology Acceptance Research

Since the advent of computer technologies, researchers have been studying the dynamics and the influential factors on individual's acceptance of information technologies.

In the literature of wearable technology adoption, different theories have been applied in order to understand the underlying factors that influence consumers' decisions to adopt these devices. Researchers have used the Technology Acceptance Model or TAM (Jaewon Choi & Kim, 2016; Chuah et al., 2016; Kwee-Meier, Bützler, & Schlick, 2016; Rauschnabel & Ro, 2016), the Unified Theory of Acceptance and Use of Technology or UTAUT (van Heek, Schaar, Trevisan, Bosowski, & Ziefle, 2014; L.-H. Wu, Wu, & Chang, 2016), Unified Theory of Acceptance and Use of Technology 2 or UTAUT2 (Gao, Li, & Luo, 2015; Gu, Wei, & Xu, 2016), Theory of Planned Behavior or TPB (Turhan, 2013; L. Wu, Li, & Fu, 2011), Uses and Gratifications Theory or U> (Rauschnabel, He, & Ro, 2016; Rauschnabel, Hein, et al., 2016), and Diffusion Innovation Theory (L.-H. Wu et al., 2016).

Although the aforementioned various theories and approaches have been applied in different research studies, the Technology Acceptance Model (TAM) has received the highest level of attention and application among the researchers (Davis, 1989;

King & He, 2006). Therefore, this theory is discussed in more details in the next section.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) that was proposed by Davis (1989) is one of the most highly validated and influential models among scholars who have investigated the consumer's acceptance of technological innovations in various contexts (Ayeh, Au, & Law, 2013; King & He, 2006). Davis (1989) proposed two factors that could jointly affect consumer's behavioral intention to accept and use new technologies: perceived usefulness and perceived ease of use. He defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance", and perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort" [Davis, (1989), p.320]. Figure 28 presents the TAM model. Furthermore, many studies indicate that perceived usefulness partially mediates the relationship between perceived ease of use and behavioral intention.

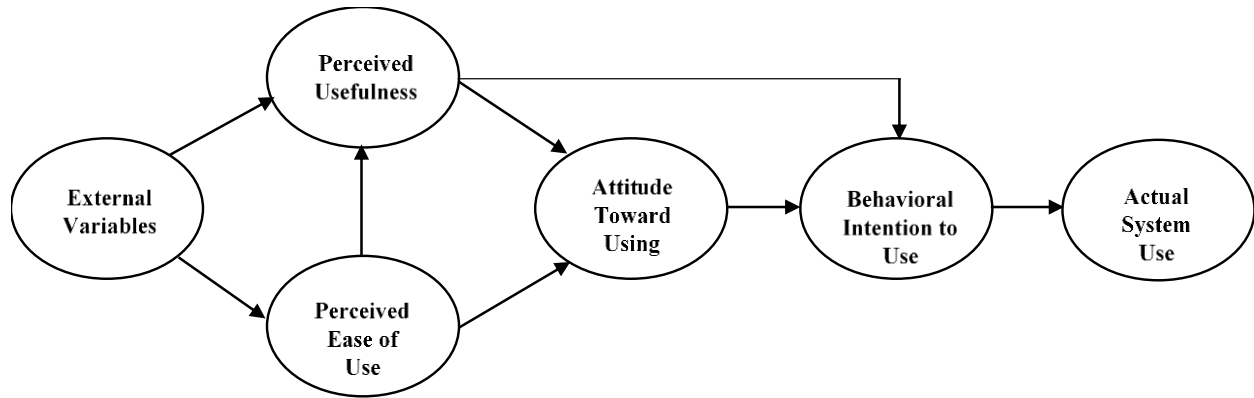


Figure 28: Technology Acceptance Model (Davis et al. (1989))

According to the TAM, when users perceive a technology or service to be easy to operate, they form a belief that the technology is useful, and hence, their attitude towards the technology will be positive. Of course, this could be a challenge in the diffusion of wearable devices as this market is still in its nascent stage, and these devices may be perceived as complex by many users.

A closer look at the literature of wearable technology adoption shows that the majority of researchers in the field have utilized the TAM framework for their analysis (Arvanitis et al., 2011; Chae, 2009; Chang et al., 2016; Cheng & Mitomo, 2017; Jaewon Choi & Kim, 2016; Chuah et al., 2016; Hein & Rauschnabel, 2016; Hwang, Chung, & Sanders, 2016; Kim & Shin, 2015; Krey et al., 2016; Kwee-Meier et al., 2016; H.-M. Lee, 2009; M. Leue & Jung, 2014; Nasir & Yurder, 2015; Rauschnabel & Ro, 2016; Spagnolli, Guardigli, Orso, Varotto, & Gamberini, 2014). However, many of these researchers have deemed it necessary to extend this model by incorporating external variables such as perceived enjoyment, perceived

aesthetics, and perceived comfort in order to improve the explanatory power of the model. Particularly, wearable technologies have different characteristics that can influence the adoption behavior; therefore, it is important to identify appropriate external variables that can explain consumer's decision in adopting these technologies (M. Claudia tom Dieck & Jung, 2015). According to Ayeh et al. (2013), adding external variables that are context-specific will make the TAM framework more applicable to different technological contexts.

In this research study, TAM is used as the main framework, and it is further extended by including factors that are specifically relevant to the context of ARSGs. Particularly, as discussed before, TAM is extended and applied to ARSGs by integrating benefits, risks, technology factors, and social norms.

Prior Research on ARSGs

Scholars from various disciplines, including engineering (Behzadan, Timm, & Kamat, 2008; Chi, Kang, & Wang, 2013), business (Rauschnabel & Ro, 2016), MIS (Ernst, Stock, & dos Santos Ferreira, 2016), tourism (Jung et al., 2015), and others have studied various aspects and applications of ARSGs. For the purpose of this research, studies that focus on consumer acceptance are particularly important. Table 50 summarizes these studies.

Table 50: Prior consumer- and acceptance research on ARSGs

Study	Research Questions	Theory	Findings
Rauschnabel, Brem, and Ivens (2015)	How does personality relate to consumer's reaction to Google Glass?	Big five theory, technology acceptance research	Personality predicts awareness of google glass and moderates the relationship between TAM-related factors and ARSG adoption.
Rauschnabel and Ro (2016)	What drives the adoption of Google Glass?	Technology acceptance research	Perceived usefulness, ease of use, injunctive norms, and consumers' level of technology innovativeness drive consumers' evaluation and intended adoption of Google Glass.
Eisenmann, Barley, and Kind (2014)	How do consumers react to Google Glass?	Exploratory case study	The study explores various facets of consumers' reactions to Google Glass, including design, functionality, barriers, and potential use cases, among others.
Ernst et al. (2016)	Do consumers intend to substitute real objects with virtual, holographic ones?	Technology Acceptance Research	Substituting real things with holograms makes consumers more likely to adopt ARSGs because it makes ARSGs more useful and enjoyable.
Stock, dos Santos Ferreira, and Ernst (2016)	Do health risks and enjoyment influence the intended use of HoloLens?	Technology Acceptance	The negative effect of health risks on the intention to use HoloLens is not significant. However, higher levels of health risk lead to lower levels of perceived enjoyment, a predictor of intended use of HoloLens.
Weiz, Anand, and Ernst (2016)	Do perceived usefulness and injunctive norms determine the adoption of Google Glass?	Technology Acceptance	There was no direct effect of injunctive norms on actual usage of Google Glass, but they were indirectly related via perceived usefulness.
Hein and Rauschnabel (2016)	Can ARSGs be used in enterprise social networks?	Technology acceptance research on an individual and firm-level.	The authors provided a conceptual model that identifies firm-level and individual-level factors that affect the implementation and individual's active and passive use of ARSGs in enterprise social networks.
Rauschnabel, Hein, et al. (2016)	Are ARSGs fashion or technology?	Technology acceptance research, fashion research, categorization research.	Most consumers perceive ARSGs as a combination of fashion and technology (Fashionology). Categorization is driven by familiarity with ARSGs in general.
Hein, Jodoin, Rauschnabel, and Ivens (2017)	How do consumers evaluate the societal consequences of ARSGs?	Exploratory	This study identifies several societal benefits and risks that drive consumers anticipated and desired diffusion of ARSGs.
M. C. Leue, Jung, and tom Dieck (2015)	How does Google Glass enhance visitors' learning outcomes in art galleries?	Exploratory	Interviews with participants indicated that Google Glass enhances the learning outcomes of visitors by making connections between art pieces and providing a deeper perspective as well as helping the visitors personalize their tours based on their interest in specific themes.
M Claudia tom Dieck, Jung, and Han (2016)	What are the requirements of visitors of museums and art galleries for the development of wearable ARSGs applications?	Exploratory	Study findings reveal that the important factors in developing and implementing wearable AR applications in museums and art galleries are: content requirement, functional requirement, comfort, experience and resistance.

Model Development

A review of the literature of wearable technology adoption helps in identifying the important factors that can influence consumer's adoption decision. Some of these factors are the fundamental constructs of the technology acceptance theories such as TAM, UTAUT, UTAUT2 and TPB. Others are external variables that were incorporated in these models with an attempt to improve their predictive power. According to a literature review by Kalantari (2017), these factors could be categorized into 5 different groups: perceived benefits (Perceived Ease of Use, Perceived Usefulness, price value, hedonic motivation), technology characteristics (perceived quality, perceived aesthetics, perceived comfort, perceived compatibility, visibility), social influences (social norms and image regulation), individual characteristics (socio-demographic variables, product involvement, technology innovativeness, technology self-efficacy, personality traits) , and perceived risks (performance, security, environmental, physical, social, financial).

In this section, a more detailed discussion will be provided about some of these factors such as Perceived Usefulness (PU), Perceived Ease of Use (PEOU), hedonic motivation, norms (injunctive and descriptive), technology risk, privacy risk, and image. These factors are relevant to the context of ARSGs and are incorporated in the model that will be proposed. It should be noted that in this study, Perceived Ease

of Use will be considered a technology characteristic, and image is considered a benefit of using the ARSGs.

Benefits from Using

In the developed model, 3 benefits from using ARSGs are proposed to have a positive impact on consumer's intention to adopt ARSGs: Perceived Usefulness, hedonic motivation, and image.

Perceived Usefulness

As mentioned previously, Perceived Usefulness (PU) is a fundamental construct of the Technology Acceptance Model. PU is defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” [Davis, (1989), p.320].

PU has been repeatedly found by the majority of research studies to have a significant effect on consumers' attitudes towards wearable technologies and their behavioral intention to use them. This finding has been replicated in various contexts, such as: smartwatches (Jaewon Choi & Kim, 2016; Kim & Shin, 2015; L.-H. Wu et al., 2016), smart clothing (Chae, 2009; Hwang et al., 2016; Spagnolli et al., 2014), mobile fitness devices (L. Wu et al., 2011), and wearable commerce (Gu et al., 2016).

ARSGs, including HoloLens, can be used in various ways to increase a user's efficiency in accomplishing their tasks. For example, HoloLens can be used for

getting step-by-step remote instructions from an expert on a variety of issues from home repair to medical instructions. HoloLens can also be used to build different types of 3D holographic models in the physical space for various design purposes. Another application of HoloLens is helping users visualize how new furniture and/or decorations will look like in their homes. HoloLens can also substitute physical screens and monitors as users can have a number of virtual screens with different sizes (Ernst et al., 2016). The other advantage of HoloLens in comparison to physical screens is that users can watch movies or browse the internet on virtual screens no matter where they are in their homes and/or offices. Therefore, the following hypothesis is proposed:

H1: Perceived usefulness is positively related to consumer's intention to adopt ARSGs.

Hedonic Motivation

One of the fundamental variables of the UTAUT2 model is hedonic motivation. Venkatesh, Thong, and Xu (2012) define hedonic motivation as “the fun or pleasure derived from using a technology” [p.161]. Common TAM variables such as PU and PEOU are known to be extrinsic motivations for adopting a new technology that solely reflect its performance outcomes. Davis, Bagozzi, and Warshaw (1992) argued that intrinsic motives such as perceived enjoyment could also affect the adoption behavior. They defined perceived enjoyment as “the extent to which the

activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated” [p. 113]. Hedonic motivation or perceived enjoyment is particularly important because intrinsic motivation is known to have a stronger effect on individual’s behavior compared to extrinsic motivation. Many researchers have also confirmed perceived enjoyment to be a powerful predictor of the behavioral intention to adopt technologies in various settings (Ha, Yoon, & Choi, 2007; Moon & Kim, 2001; Rheingans, Cikit, & Ernst, 2016; Stock et al., 2016). Their results indicate that people want to use certain technologies both because they enjoy the experience and because they find those technologies to be useful in their lives.

M. Leue and Jung (2014) used enjoyment in their extended TAM model to find out the basic requirements for a GPS-based augmented reality application to be accepted by tourists. They found out that enjoyment is one of the primary antecedents of perceived usefulness and perceived ease of use, which in turn influences attitude, behavioral intention to use and actual usage. Jaewon Choi and Kim (2016) found a positive relationship between perceived enjoyment and the intention to use smartwatches. Furthermore, their analysis revealed that certain individual characteristics such as need for uniqueness and high level of vanity would lead individuals to perceive smartwatches as more enjoyable. Yang, Yu, Zo, and Choi (2016) also suggested that the importance of perceived enjoyment would vary

between the actual users and the potential users, and potential users cared more about the utilitarian purposes rather than enjoyment. Rauschnabel, He, et al. (2016) suggested that in the situations where smart glasses would be used at home or in public, their entertainment value would be an antecedent for consumer's usage intention. L.-H. Wu et al. (2016) studied consumer's intention to use smartwatches and suggested that perceived enjoyment significantly affects attitude towards smartwatches especially among individuals between 35 and 54 years old. In another study, Gao et al. (2015) suggested that the users of fitness wearable devices pay attention to hedonic motivation when they decide whether or not to accept them. The importance of hedonic motivation was also confirmed by Gu et al. (2016) in the context of wearable commerce.

HoloLens offers several uses and applications that can appeal to a user's hedonic needs and motivations. HoloLens can turn monotonous tasks into a game for the users. For example, they can replace the physical world around them with an interactive and scrolling scenery as they jog on a treadmill. HoloLens also offers a selection of mixed reality games that make use of the user's physical environment and have spatial sounds to guide the user through the game. HoloLens provides users with the capability to combine gestures, voice, and the HoloLens gaze feature to create 3D objects. Users can also create short clips with special effects that can be viewed on HoloLens. Therefore, the following hypothesis is proposed:

H2: Hedonic motivation is positively related to consumer's intention to adopt ARSGs.

Image

One of the most important aspects of adopting new technologies is helping individuals improve their image, express themselves, and differentiate themselves from others (Buenaflor & Kim, 2013; M. Horton, Read, Fitton, Little, & Toth, 2012; Southgate, 2003). This is especially true when the new technology is rare in the mainstream culture (Sundar, Tamul, & Wu, 2014), or when the technology has fashion characteristics. This so far has been the case for most wearable technologies such as smartwatches, smart glasses, smart garments, etc. Technology acceptance models that were proposed after TAM such as TAM2, TAM3, the UTAUT model, and the IDT model have all incorporated “image” as an influential factor in individual’s adoption behavior. Image is defined as “the degree to which use of an innovation is perceived to enhance one’s image or status in one’s social system” [(Moore & Benbasat, 1991), p.195].

One factor that can affect customer’s perception of social image is their propensity towards adopting new technologies. Jeong, Kim, Park, and Choi (2017) found out that early adopters perceive wearable technologies to be more influential on their social image compared to other groups of consumers.

As ARSGs are not just used but also worn, the literature proposes that factors related to other people seem to matter (Rauschnabel, Hein, et al., 2016). In this study, it is proposed that the image of wearing ARSGs matters. Therefore, the following hypothesis is proposed:

H3: Image is positively related to consumer's intention to adopt ARSGs.

Risks of Using

One of the most important aspects of wearable technologies that immensely affects the customers' attitudes and can be a serious barrier for adoption is how these technologies are perceived in terms of the risks they impose on individuals. Blackwell, Engel, and Miniard (2001) define perceived risk as consumer's uncertainty about the potential positive and negative consequences of the purchase decision. These risks can have a higher adverse effect on adoption when the technology is new, and hence there is more uncertainty associated with it (E. Rogers, 1995). An extensive discussion of these perceived risks can be found in the literature of wearable technology adoption (Kalantari, 2017).

Technology acceptance scholars have identified various risks as relevant to people's adoption and use of technology. This research proposes that this is also true for ARSGs. In particular, two risk factors seem to play an important role: First, the general risk of using ARSGs from a technological perspective, as proposed by TAM

Scholars (King & He, 2006), and second, the risk of threatening a user's privacy (Rauschnabel & Ro, 2016).

The first risk that is incorporated in this analysis is the technology risk. According to Featherman and Pavlou (2003), perceived technology risk has various aspects: psychological risk, risks due to uncertainties in purchase decision, and physical risk.

Psychological risk addresses the potential anxiety or disappointment that can occur after the consumer purchases the technology.

Risks that are due to the uncertainties in purchase decision are financial risk, time loss risk and technology performance risk. R. L. Horton (1976) defines financial risk as the "net financial loss to the consumer including the possibility that the product may be repaired, replaced, or the purchase price refunded" [p.696]. Consumer's concern over the financial loss in buying wearable devices could negatively affect their purchase intention (Ko, Sung, & Yun, 2009; Yang et al., 2016). Time loss risk happens when consumers feel that they have invested their time in purchasing a technology that does not meet their needs. Performance risk refers to consumer's concerns about the failure of a technology to perform as expected and the loss that will be incurred to them due to this failure. Several researchers have identified performance risk to be a barrier in wearable technology adoption (Hwang et al., 2016; Ko et al., 2009; Nasir & Yurder, 2015). Yang et al.

(2016) suggested that perceived performance risk is an important factor for potential users of wearable devices.

Physical risk refers to consumers' beliefs about the negative consequences of using wearable technologies on their health and their threats to human life, such as radiation emitted from smart glasses (Buenaflor & Kim, 2013) or the possibility of personal injury and dangers to human body (Ko et al., 2009; Nasir & Yurder, 2015; Schaar & Ziefle, 2011). In particular, wearable technologies can affect a user's vision and mobility. ARSGs overlay information and holographic objects on a person's field of view which in turn leads to limiting the view to some extent and potentially causing distraction. ARSGs generally require that users shift their focus quickly from the real world in the distance to the overlaid information and objects. Some users may have difficulty adjusting focus. Users may also get distracted by the virtual objects and hence have longer reaction times than usual. An example of this hazard can be wearing ARSGs while driving which may lead to misjudging the speed of other cars and underestimating reaction times.

The risk of threatening users' privacy emphasizes the importance of safe and secure data handling and storage. Today's consumers are concerned about privacy breaches and the potential loss of control over their personal information. They need to make sure that their data is handled and stored in a safe and secure manner. According to A. J. Mills, Watson, Pitt, and Kietzmann (2016), when it comes to

wearable devices, security is even more important because these devices are very personal and intimate and fit wearer's anatomy. Moreover, since many of them are visible, the risks of theft is higher for these devices. In many cases such as medical wearable devices, hacking the data could also lead to the malfunction of the device and hence physical harm to the user. Consumer's perception of the privacy risk of the wearables can negatively affect their trust in these devices which could lead to decreased adoption intention (Gao et al., 2015; Gu et al., 2016; Kwee-Meier et al., 2016; Nasir & Yurder, 2015; Schaar & Ziefle, 2011; Spagnolli et al., 2014). In many cases, obtaining anonymous data from the consumers should also be consented (Kwee-Meier et al., 2016).

The privacy risk factor is particularly important for ARSGs as these devices are equipped with cameras, microphones and other sensors (Hein et al., 2017). This allows ARSGs to technically capture, process, and share the personal interactions of a user with third parties, such as hackers. Not surprisingly, media have also elaborated on this criticism, and scholars have discussed this issue conceptually. Recently, Rauschnabel, Hein, et al. (2016) analyzed the impact of these risk factors on users' adoption intention and did not find a significant effect to confirm this empirically; however, a replication using a different research design could help with generalizing or falsifying this finding.

Therefore, it is proposed that both risk factors – technology risk and privacy risk – are negatively related to HoloLens adoption:

H4: Perceived technology risk is negatively related to consumers' intention to adopt ARSGs.

H5: Perceived privacy risk is negatively related to consumers' intention to adopt ARSGs.

Technology Characteristics

This study also proposes that several characteristics of ARSGs determine the intended use. One of the main factors in the original TAM model that is known to influence adoption behavior is Perceived Ease of Use of the technology (PEOU). PEOU is defined as “the degree to which a person believes that using a particular system would be free of effort” [Davis, (1989), p.320]. The PEOU construct is introduced in the UTAUT model as “effort expectancy”. Davis (1989) suggested that when it comes to initiating the use of a new technology, PEOU would be the major technical factor that affects user’s attitude towards usage.

The Technology Acceptance Model also suggests that perceived usefulness increases as consumers perceive the technology as easy to use; therefore, perceived usefulness partially mediates the relationship between PEOU and behavioral intention to use a new technology.

The effect of PEOU on behavioral intention to use wearable technologies has been widely studied and confirmed in the literature in various contexts, such as: health and fitness technologies (Gao et al., 2015; Preusse, Mitzner, Fausset, & Rogers, 2017; L. Wu et al., 2011), smartwatches (Chuah et al., 2016; Kim & Shin, 2015; Krey et al., 2016), smart glasses (Hein & Rauschnabel, 2016; Rauschnabel et al., 2015; Rauschnabel, He, et al., 2016; Rauschnabel & Ro, 2016), smart clothing (Ko et al., 2009), and GPS-based AR applications (M. Leue & Jung, 2014).

Therefore, this study proposes that perceived ease of use is also positively related to adoption intention in the context of Augmented Reality Smart Glasses.

H6: Perceived ease of use is positively related to consumers' intention to adopt ARSGs.

Norms

It is a widely replicated finding that people's behavior is strongly influenced by other people. As discussed before, the adoption of wearable technologies is known to be highly influenced by users' social networks especially because these technologies are visible and have fashion characteristics.

Technology acceptance models that were proposed after TAM such as the UTAUT model and the IDT model have all incorporated "social influences" as an influential factor in individual's adoption behavior. In addition, the TRA framework includes subjective norms as a predictor for intention to use (Fishbein & Ajzen,

1975). Subjective norms address how individuals perceive the opinions of their social network about performing a particular behavior which further emphasizes the importance the social aspect of technology adoption.

Many of the researchers who have investigated consumers' adoption of wearable technologies have incorporated factors that address this social aspect of adopting new technologies and found significant effects for social influences (Buenaflor & Kim, 2013; Yang et al., 2016). Kim and Shin (2015) analyzed the main determinants of smartwatch adoption. They included subcultural appeal that was adapted from Sundar et al. (2014) in their model and hypothesized that smartwatches are viewed both as utilitarian products and fashion products that have aesthetic attributes that can help users express their characters and values. They found a significant effect for subcultural appeal on user's attitude and intention to use. The significant effect of social influences on behavioral intention to use smartwatches was later confirmed by L.-H. Wu et al. (2016). Kwee-Meier et al. (2016) investigated the acceptance of wearable locating systems by passengers. They discussed that the adoption of these systems could be prone to social influences because people tend to perceive that these devices enhance survival possibilities. Their analysis confirmed the effect of social influence (subjective norms and image) on the intention to use. The importance of social influences on the adoption of wearable devices has also been confirmed in other contexts, such as smart glasses (Rauschnabel et al., 2015), smart

clothing (Turhan, 2013), and health and fitness wearable devices (Canhoto & Arp, 2017; Gao et al., 2015; L. Wu et al., 2011). The construct of social influences reflects an injunctive normative belief. Injunctive normative beliefs describe the extent to which a person believes that other people expect a person to engage in particular behaviors (Cialdini, Reno, & Kallgren, 1990)– which in the context of this research means to adopt HoloLens (H7).

However, the literature on social norms also proposes a second type of norm: descriptive norms. With regards to ARSGs, descriptive norms describe the expected social conformity of using them. In other words, they indicate if a person believes that using ARSGs will be somehow common among his or her peers (H8).

With very few exceptions, most prior research on TAM and ARSGs have focused on injunctive norms; however, especially in the early stage of the product lifecycle, a comparison of the two types of norms provides an interesting contribution to the literature. Therefore, the following hypotheses are proposed:

H7: Injunctive norms are positively related to consumers' intention to adopt ARSGs.

H8: Descriptive norms are positively related to consumers' intention to adopt ARSGs.

Figure 29 provides an overview of the proposed model. Inspired by the extant technology acceptance literature (Davis, Bagozzi, & Warshaw, 1989; King & He,

2006; Venkatesh et al., 2012) and prior research on ARSGs (Ernst et al., 2016; Rauschnabel et al., 2015), the model proposes that consumer's intention to adopt ARSGs is driven by the benefits and risks of using them, other characteristics of the technology, and social norms.

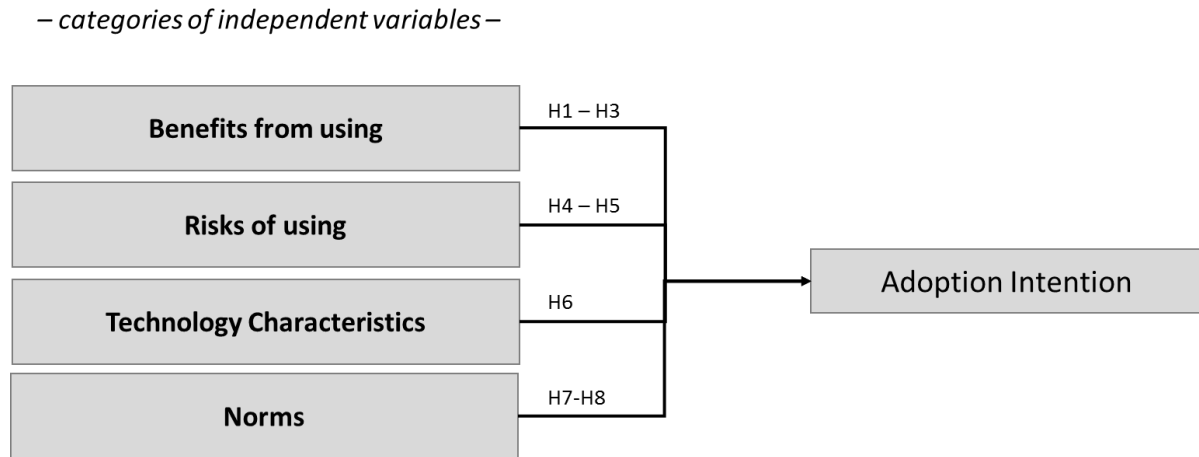


Figure 29: Model Overview

Methodology and Research Design

One hundred and sixteen students of a North American university took part in an online survey on ‘new media and technologies’ for extra credits in one of their courses. The sample consists of 43% females, and respondents’ average age was 23.2 (SD=5.1). The study started with a short, approximately 2-minute video by Microsoft that explains HoloLens followed by the constructs of interest and demographic variables.

Where possible, existing scales from the literature were used and adapted to the context of HoloLens. For measurement, 7-point Likert scales were used ranging

from 1 to 7 with 1 meaning totally disagree, 2 meaning disagree, 3 meaning somewhat disagree, 4 meaning neither agree nor disagree, 5 meaning somewhat agree, 6 meaning agree, and 7 meaning totally agree. All items and references are presented in Table 51.

Table 51: Measures for the HoloLens study

Construct	Items
Perceived usefulness (inspired by Rauschnabel et al. (2015) and Venkatesh et al. (2012))	HoloLens would make my life more efficient. HoloLens would help me accomplish my tasks better. HoloLens would help me accomplish my tasks faster.
Hedonic Motivation (inspired by Venkatesh et al. (2012))	Using HoloLens would be fun. Using HoloLens would be enjoyable. Using HoloLens would be very entertaining.
Ease of use (inspired by Davis (1989))	I would find it easy to use HoloLens. Learning to operate HoloLens would be easy for me. It would be easy for me to become skillful at using HoloLens. My interaction with HoloLens would be clear and understandable.
Injunctive norms (inspired by Venkatesh et al. (2012))	People who influence my behavior would think that I should use HoloLens. People who are important to me would think that I should use HoloLens. People who are in my social circle think that I should use HoloLens.
Descriptive norms (inspired by Rauschnabel et al. (2015))	Many of my friends are interested in buying HoloLens. Many of my colleagues are interested in buying HoloLens. My peers are interested in having HoloLens. It will be very common among my peers to own HoloLens.
Technology Risk (Inspired by Bannister and Connolly (2007))	Using HoloLens would be risky. Using HoloLens would entail uncertainty. Using HoloLens would entail vulnerability. I feel that it would be unsafe to use HoloLens.
Privacy Risk (Rauschnabel, Hein, et al., 2016)	Using HoloLens could threaten my privacy. Using HoloLens could lead to a loss of my personal information. Criminals (e.g. hackers) might access HoloLens and steal my personal information.
Image (Inspired by Venkatesh and Davis (2000))	People in social network who will use HoloLens would have more prestige than those who do not. People in my social network who will use HoloLens would have a high profile. Having HoloLens would be a status symbol in my social network.
Purchase Intention	I intend to own HoloLens once they are launched. I predict I would buy HoloLens in the near future. I would like to be one of the first people to own HoloLens. Assuming I have the financial resources, I am willing to buy HoloLens.

All coefficient alphas exceeded the recommended thresholds of 0.7, indicating sufficient reliability, as shown in Table 52 (diagonal). All the items were aggregated

composite mean scores. Table 52 also presents the mean values, standard deviations, and correlations between the constructs.

Table 52: Correlations and descriptive statistics

		M	SD	1	2	3	4	5	6	7	8	9
1	Perceived usefulness	5.34	1.26	.93								
2	Hedonic motivation	5.65	1.26	.44**	.89							
3	Image	5.76	1.72	.35**	.15	.91						
4	Technology risk	3.78	1.30	-.22*	-.04	-.16	.89					
5	Privacy risks	4.57	1.51	-.16	-.02	-.11	.60**	.93				
6	Ease of use	4.98	1.28	.36**	.25**	.07	-.12	-.17	.94			
7	Injunctive norms	3.63	1.46	.43**	.16	.25**	-.19*	-.19*	.48**	.93		
8	Descriptive norms	3.38	1.45	.30**	.15	.38**	-.13	-.13	.27**	.53**	.95	
9	Adoption intention	3.49	1.49	.48**	.17	.42**	-.31**	-.21*	.41**	.55**	.63**	.88

** p<.01; *p<.05 / diagonal: Cronbach's alpha

Results

Research question 1 focuses on how consumers evaluate HoloLens. Table 52 presents the descriptive statistics, particularly mean and standard deviations. Results show that the surveyed respondents tend to evaluate the benefits substantially higher (perceived usefulness: m=5.3; hedonic motivation: m=5.65; image: m=5.76) than the risks (technology: m=3.78; privacy: m=4.57). Respondents also expect that HoloLens is easy to use (m=4.98) and evaluate them low in terms of social norms (injunctive: m=3.63; descriptive: m=3.38). Interestingly, the standard deviation is

particularly high for image ($SD=1.72$), indicating that HoloLens is associated with a very positive image for some respondents and a very negative one for others.

With regards to research question, multiple regression analyses was applied. The results are outlined in Table 53 and visualized in Figure 30. An inspection of VIF factors did not indicate any concerns with multicollinearity (all $VIF < 3$), and the overall model fit F-test indicates an R squared statistically significantly above zero ($p < .001$).

Table 53: Regression analysis

	β	t	p.
Perceived Usefulness	0.20	2.49	0.01
Hedonic Motivations	-0.07	-0.98	0.33
Image	0.14	2.00	0.05
Technology Risk	-0.18	-2.21	0.03
Privacy Risk	0.05	0.65	0.52
Perceived Ease of Use	0.16	2.08	0.04
Injunctive Norms	0.13	1.59	0.12
Descriptive Norms	0.40	5.09	0.00
R Squared	.57 ($p < .001$)		
R Squared (adjusted)	.543		

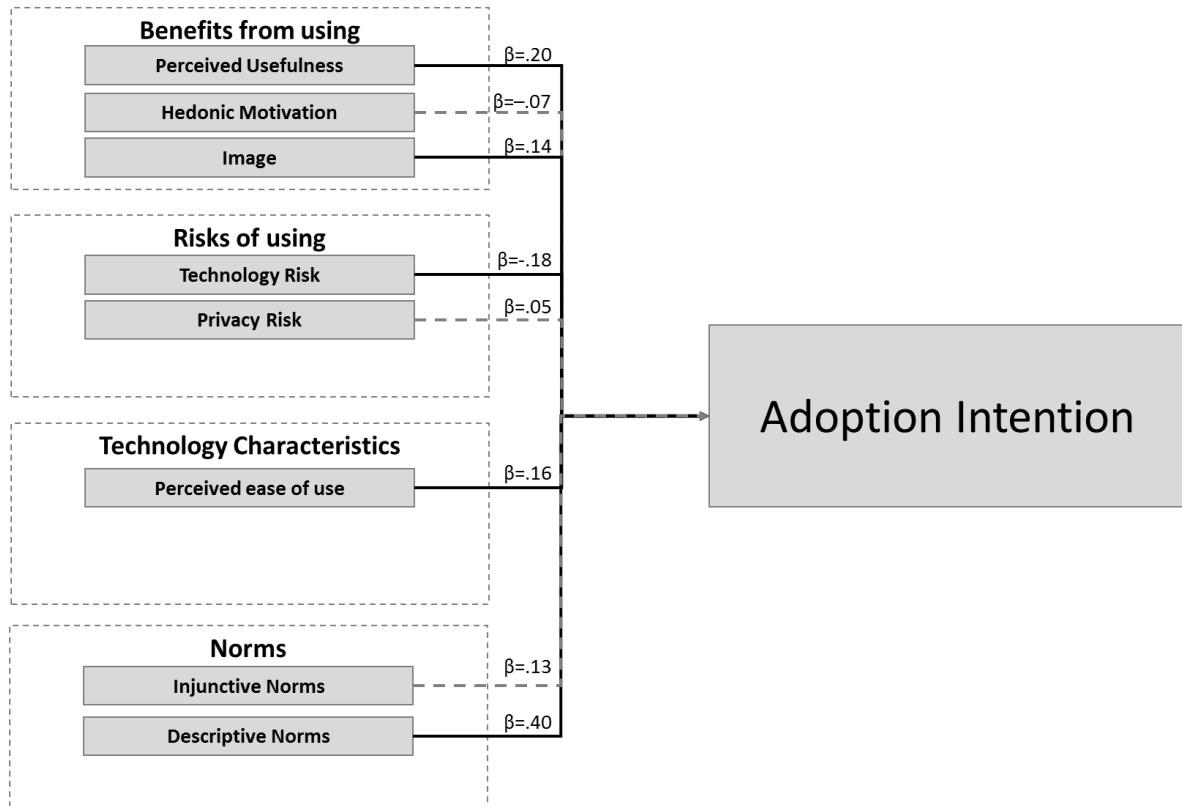


Figure 30: Visualization of the results

This is one of the few studies that investigates consumers' acceptance of a novel technology: Microsoft HoloLens, a recently launched ARSG device. Drawing up on established technology acceptance theories and taking into account the ARSG specific characteristics, this research proposes and empirically tests a model consisting of eight hypotheses to explain consumers' intended adoption of ARSGs. The results of this study show that perceived usefulness, image, ease of use, and descriptive norms are positively related to adoption intention whereas technology risks are negatively related to adoption intention. No significant effect was found for hedonic motivations, privacy risk, and injunctive norms. Descriptive analyses also

show that consumers tend to see more benefits than risks of ARSGs. Findings of this research have important implications for theory and practice as discussed below.

The first theoretical contribution of this study is a comprehensive framework of antecedents to ARSG adoption. While prior research has often focused on a small number of factors (Ernst et al., 2016; Rauschnabel et al., 2015; Weiz et al., 2016), the model in this study incorporates benefits, risks, technology factors, and norms. By doing so, this study provides a more comprehensive overview of factors relating to the adoption of ARSGs than proposed in the existing research. Counter-intuitively, the coefficient of hedonic motivation did not approach significance. This is surprising, as consumers generally value new technologies for being ‘fun’ to use (Venkatesh et al., 2012). A potential explanation is that hedonic motivations behave similarly to other antecedents in Rauschnabel and Ro (2016) by focusing on the evaluation of the device, rather than the behavioral intention.

The second contribution of this research is the focus on risks. Prior research on ARSGs has predominantly focused on benefits (Rauschnabel et al., 2015; M Claudia tom Dieck et al., 2016) or other established TAM factors (Rauschnabel & Ro, 2016). Results of this study confirm Rauschnabel, Hein, et al. (2016)’s that people’s perception of the privacy risks do not seem to matter in their intention to adopt. In addition, this study shows that general technology risks can affect the adoption intention. That is, while this research replicates the counter-intuitive finding that

privacy risks are less crucial, it also shows that general risk factors matter. More research is needed to better understand the nature and antecedents to these risk factors.

The third contribution is the distinction of the descriptive versus injunctive norms (Cialdini et al., 1990). Prior research, including numerous TAM studies in related disciplines have predominantly looked at injunctive norms (Venkatesh et al., 2012). In this study, the injunctive and descriptive norms were integrated. Results indicate that, at least in this study, descriptive norms seem to be more relevant in explaining the adoption intention. This is an important contribution for ARSG research, but also for the TAM domain as a whole. Findings suggest that scholars should consider descriptive norms in addition to injunctive norms.

Finally, most prior research has focused on Google Glass (Eisenmann et al., 2014; Rauschnabel et al., 2015; Rauschnabel & Ro, 2016) or ARSGs in general (Rauschnabel, Hein, et al., 2016). So far, not much research has studied ARSGs using the example of Microsoft HoloLens. Compared to HoloLens, Google Glass has a plain design, only one prism and is not able to realistically integrate 3D Holograms into a user's perception of the reality. HoloLens, however, offers these features, but in a much more 'bulky' device.

This study also provides a number of implications for ARSG manufacturers and app developers. In particular, in order to foster the adoption of ARSGs,

manufacturers should focus on utilitarian benefits, ease of use, and the reduction of technology risks. Utilitarian benefits can be promoted by showing how a user's life can be improved in terms of efficiency. Potential examples include opportunities for collaboration, organizer functions and so forth. In order to improve user-friendliness, app developers and manufacturers need to understand users' expectations of how to operate this novel form of media technology. So far, Microsoft HoloLens uses a variety of operation methods (voice commands, hand gestures, and mouse-like clicker devices) to provide users with options when it comes to working with HoloLens. More challenging might be the way to reduce the technology risk as a whole. Therefore, Manufacturers should understand the factors that determine this overall risk.

In addition to that, focusing on descriptive norms in communication could be a promising strategy. Manufacturers can provide information about how our lives could look like in the future or communicate summaries of the promising forecasts in their advertisements.

CHAPTER 6 “CONCLUSIONS AND FUTURE RESEARCH”

In this chapter, the conclusions of this dissertation will be summarized, and main contributions of the research studies as well as directions for future research will be discussed.

Conclusions

This dissertation involves different research experiments with regards to customer engagement in Online Brand Communities, designing more efficient Referral Reward Programs, and understanding early adopters of technological innovations such as Augmented Reality Smart Glasses. In this section, results and conclusions of each research study will be summarized:

Customer Engagement in Online Brand Communities

The incredible growth of social media platforms has led to dramatic changes in the way brands communicate with their customers. They started to realize that the traditional marketing communication models where brands would initiate and control the marketing efforts can no longer be applied in today's world. The social media platforms have created an ever-increasing interconnected world where customers are more empowered and engaged with brands.

Today's customers constantly interact with brands and other consumers through social media. The emergence of this new customer behavior has inspired brands to

use their social media platforms to engage their customers and spread awareness about their brand to their customer's networks (Moran, Muzellec, & Nolan, 2014).

Online Brand Communities (OBCs) are among the game-changing social media platforms. Whether initiated and moderated by the brands or the consumers, these communities have enabled marketers and consumers to establish and enhance consumer-brand relationships.

In an effort to disseminate innovative math educational materials designed by the AMP21 initiative, the first part of this dissertation focuses on building online communities in Facebook groups for this brand. Some of the challenges of creating a network for AMP21 are discussed in chapter 2, such as communicating the value proposition of AMP21, standing out among the competitors, and getting to a self-sustaining critical mass.

Having a successful and sustainable brand community depends on the engagement behavior of its members. Research shows that engagement in online communities leads to the sustainability of the communities, increased levels of customer loyalty and higher purchase intentions. Therefore, chapter 3 addresses the drivers of engagement in OBCs and proposes hypotheses for increasing engagement through reputation systems. Different reputation systems including centralized, distributed, and semi-distributed are discussed. A survey study on Amazon Mechanical Turk shows that semi-distributed reputation systems are generally more

effective in terms of increasing engagement behavior. Data also shows that centralized reputation systems work better in brand-created online communities whereas distributed reputation systems work better in consumer-created online communities. These results confirmed the proposed hypotheses; hence, the main engagement experiment was carried out in the AMP21 Facebook groups. Although the author made numerous efforts to create engaging content and use the reputation systems in these groups, the resulting engagement level was very low which made the analysis of the data quite difficult. Therefore, the results are discussed through descriptive statistics. The limited success of the engagement experiment could be attributed to the unsuitability of Facebook for promoting educational materials as well as the relatively small number of members in each Facebook group.

Referral Reward Programs

Chapter 4 aims to develop strategies for growing the AMP21 online communities. In this chapter, Referral Reward Programs (RRPs) are used as powerful tools for spreading the Word-of-Mouth among social networks of math teachers. RRP's have been used by marketers as powerful tools for diffusing a new product or service and expanding the customer base. In these programs, customers are offered different types of incentives as a motivation for recommending a product or a service to their family and friends. Although incentives have long been known for their positive effect on motivation and performance, there are studies both in

psychology and in referral programs that show that sometimes incentives have a “crowding-out” effect on motivation. In this research, the goal is to overcome the “crowding-out” effect by designing better incentives to encourage individuals to spread the Word-of-Mouth; therefore, a survey experiment is designed and implemented to analyze the effect of reward structure (choice vs. no choice) and reward type (cash vs. in-kind) on referral likelihood. It is also hypothesized that gender moderates the relationship between reward and referral likelihood. In order to test these hypotheses, a survey study is conducted and participants are recruited through Amazon Mechanical Turk. The results of the study show that gender moderates the relationship between rewards and referral likelihood. Provision of reward choice is more effective for men whereas, provision of in-kind rewards is more effective for women. The finding about reward choice is further confirmed in the referral program that was launched in the AMP21 Facebook groups. Furthermore, providing rewards proved to be more effective than no rewards in these programs. Since the number of participants in these referral programs was relatively small, another referral experiment was carried out through an online training for optimizing LinkedIn profiles. This experiment aimed to test the effectiveness of choice of rewards, in-kind rewards, and the combination of both. However, this referral program had very limited success in encouraging people who registered for the course to participate in the referral program.

Exploring the Early Adopters of Augmented Reality Smart Glasses

The research studies in previous chapters generated interest in understanding the drivers of consumers' decisions when it comes to adopting new innovations. Chapter 5 further explores this concept in the context of technological innovations. This chapter aims to understand the factors that affect consumer's intention to adopt Augmented Reality Smart Glasses, in particular, Microsoft HoloLens. Based on a review of the literature of technology acceptance, factors such as Perceived Usefulness, hedonic motivations, image, technology risk, privacy risk, Perceived Ease of Use, injunctive norms, and descriptive norms are hypothesized to impact adoption intention. A survey study is carried out by recruiting participants from a North American university. The results of the survey show a significant positive effect of Perceived Usefulness, image, Perceived Ease of Use, descriptive norms and a significant negative effect of technology risks on the adoption intention. However, the effects for hedonic motivation, privacy risk, and injunctive norms were not significant.

The next section discusses the main contributions of this dissertation.

Contributions

This dissertation makes several contributions to the areas of customer engagement, Word-of-Mouth marketing, and diffusion of innovations.

To the author's best knowledge, this is the first study to address the practice and issues of building Online Brand Communities for educational brands from scratch and discuss the challenges involved in the process. These established communities could be used for future research studies in the area of online communities.

A unique aspect of this dissertation is its longitudinal nature. Furthermore, whereas most studies in the literature have conducted engagement experiments solely through surveys, this thesis showcases a real-world experiment where different reputation systems are used to increase the engagement level of members in Facebook groups; therefore, this study reports the actual behavior of the participants instead of their self-reported data.

Furthermore, to the author's best knowledge, this is the first study in the form of a controlled experiment where there is a one-to-one relationship between the engagement data from the online communities and the download data from the website. This data structure makes it possible to find the relationship between engagement in online communities and website visits as well as downloads and purchases.

In terms of the referral experiment, this work makes several contributions to theory. This is the first study that systematically examines the role of gender on recommendation behavior in a Referral Reward Program. Furthermore, provision of reward choice has not been studied in the literature of Referral Reward Programs

before. This is also the first research to systematically examine gender differences in their reaction to different incentive types in an RRP context. One of the strong points of this research is once again validating the results of the survey experiment in a real-world setting by launching Referral Reward Programs in Facebook groups. The results of this research also sheds light on how incentives in RRP could be designed in order to better encourage customers to spread the word-of-mouth, especially when the targeted customers are mainly male or mainly female.

The hypotheses tested in these experiments (both in the engagement and referral experiments) are novel and grounded in well-known psychological theories such as self-determination theory, self-attribution theory, perception of organizational support theory, and social identity theory.

This research provides best practices and a discussion of challenges that could be beneficial for brands that have social media presence and are looking for ways to increase their customer base, engage their customers, and encourage new purchases. It also benefits managers of Online Brand Communities by suggesting strategies to better manage these communities.

Chapter 5 makes several contributions to the area of consumer adoption of wearable technologies. It is one of the few studies that explores adoption drivers in the context of Augmented Reality Smart Glasses. Compared to previous studies in the literature, this study provides a more comprehensive framework of adoption

antecedents which relatively increases the explanatory power of the proposed model. The other contributions of this research are considering technology and privacy risks as important factors as well as differentiating between injunctive norms and descriptive norms in the proposed model.

The next section discusses possible directions for future research.

Directions for Future Research

As social media will enable researchers to have access to consumer behavior data more conveniently, the field of social media marketing is one of the promising research fields for the future. With the availability of these big data sets, it will be interesting to analyze other driving forces of customer engagement and customer inclination to participate in the process of Word-of-Mouth dissemination.

It would also be beneficial to study the financial values of customer engagement behavior. This research direction will investigate the marginal profit generated through customer engagement in online brand communities. Financial outcomes of customer engagement could be attributed to higher loyalty, higher purchase intentions, customer acquisition, and value co-creation. Researchers could also investigate the effect of rewarding customers in online communities on their engagement behavior. These rewards could be special deals and coupons as well as rewards for customers with highest contributions.

According to Hodis, Sriramachandramurthy, and Sashittal (2015), Facebook users are different in terms of their characteristics and the ways they tend to use and get engaged in this social networking website; therefore, one idea for future research could be coming up with strategies for content creation that would best engage a wide network of heterogeneous users in OBCs.

In terms of the referral experiment, one possible direction for future research could be coming up with strategies to trigger customer's intrinsic motivation to make referrals instead of offering monetary rewards. Another interesting idea is investigating the relationship between customer demographics and behavior, their referral likelihood, and the success of their referral effort. Customer behavior refers to their purchase history as well as engagement in online communities.

With regards to chapter 5, there are different efforts that could improve the current research endeavors in the area of consumers' adoption of wearable devices. Examples include studying other influential factors that can impact consumer's decisions, replicating the existing findings in various contexts and different populations to increase generalizability, and delving deeper into some of the more arguable adoption antecedents such as privacy concerns. Although most of the studies in the literature have focused on determining the underlying factors that impact consumers' adoption of wearable devices, there is still need for extending these findings and improving the explanatory power of the acceptance models by

identifying additional antecedents of wearable adoption. Some constructs that can be further tested are result demonstrability (i.e. whether the outcome of using the device can be observed and communicated), mobility, and the experience of flow and immersion when using these devices. Moreover, since referrals and product recommendations are important predictors in the process of diffusion of innovations, another construct that could be interesting to investigate is the consumer's intention to recommend the wearable device to their social network.

As previously discussed, privacy issues and concerns can have negative effects on consumer's adoption intention. Therefore, further research should be carried out to understand how privacy concerns are mediated by social norms, and what kinds of new policies in terms of privacy protection should be developed to mitigate public privacy concerns about wearable devices.

A closer look at the literature of wearable technology adoption reveals the lack of qualitative research methodologies in this area. In order to identify the underlying attributes that drive consumers' adoption, it is critical that future studies employ qualitative research methodologies through conducting in-depth interviews before moving on to quantitative testing. Since experience with technology is a key parameter in consumers' adoption, it is essential that consumers can touch, feel, and actually wear the devices before they are interviewed about their attitude and tendency for adoption. Of course, it will be ideal if there could be a longitudinal

investigation to obtain more information about how consumers develop attitudes towards wearable technologies over time.

APPENDIX A

Survey Instruments for Chapter 3

In this section, the survey instruments used in study 1 in chapter 3 will be presented. This study aimed to explore the effect of different reputation systems on engagement behavior in Online Brand Communities. The beginning of the survey was similar across all treatment groups. The difference between treatment groups was in the description of the Facebook group and the introduction to the reputation systems and best contributors. The final section of the survey was also similar across all the groups.

Introduction to the Survey (Similar across All Treatment Groups)

In this survey, we will ask you about a Facebook group that is formed around sharing quick and healthy food recipes for busy people.

Therefore, in the following questions, we would like to know your general opinion about using Facebook and about keeping a healthy diet.

- 1) How much do you agree with the following statements about Facebook:

	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
In general, I have a strong interest in Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook is very important to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook matters a lot to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I get bored when other people talk to me about Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook is relevant to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider myself an active user of Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I log in to Facebook everyday.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I spend long periods of time on Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning to use Facebook is/ was easy for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy to get Facebook to do what I want it to do.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is clear and understandable how to use Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook is flexible to interact with.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It is easy to become skillful at using Facebook.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
In general, I find Facebook easy to use.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2) How much do you agree with the following statements about quick and healthy food recipes:

How much do you agree with the following statements about quick and healthy food recipes:

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
I attach great importance to keeping a healthy diet.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
One can say that talking and learning about quick and healthy food recipes interests me a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Healthy and quick food recipes is a topic which leaves me totally indifferent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learning quick and healthy food recipes is relevant to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Group Description for Engagement for the Control Group

Please read these instructions carefully before moving on to the survey:

In this survey, you will be introduced to a Facebook group called "Healthy Recipes for Busy People". In the following pages, we will share some screenshots from this group. It is very important that you carefully read through all the information that will be presented in these screenshots. We would like you to focus specifically on the **group description, posts** and **comments**.

You will then be directed to the survey questions.

The following screenshot shows the **group description**.

Busy People

Home

Healthy Recipes for Busy People

Secret Group

Joined Notifications

Discussion Members Events Photos Files

Search this group

Write Post Add Photo / Video Create Poll Add File

Write something...

PINNED POST

Welcome aboard to our community of healthy food lovers! You are embarking on a journey of all around well-being and healthy-eating. In this group, we will post healthy and nutritional meal recipes, backed by science, which you can use every day. We try to stick to quick and easy recipes, so there are no excuses for not starting a healthy diet!

Please feel free to share your own tips, recipes, and experiences with other members. You can also invite your friends to help them get healthier as well.

Like Comment

22 people like this.

ADD MEMBERS

+ Enter name or email address...

MEMBERS 107 Members

Invite by Email

DESCRIPTION Edit

Welcome aboard to our community of healthy food lovers! You are embarking on a journey of all around well-being and healthy-eating. In this group, we will post healthy and nutritional meal recipes, backed by science, which you can use every day. We try to stick to quick and easy recipes, so there are no excuses for starting a healthy diet!

Please feel free to share your own tips, recipes, and experiences with other members. You can also invite your friends to help them get healthier as well.

GROUP TYPE

Club

Group Description for Treatment Groups with a Brand-Created Community

Please read these instructions carefully before moving on to the survey:

In this survey, you will be introduced to a Facebook group called "Healthy Recipes for Busy People". In the following pages, we will share some screenshots from this group. It is very important that you carefully read through all the

information that will be presented in these screenshots. We would like you to focus specifically on the group description, posts and comments.

You will then be directed to the survey questions.

The following screenshot shows the group description.

The screenshot displays a Facebook group page for "Healthy Recipes for Busy People". The page header includes a search bar with "Busy People" entered, a "Home" button, and navigation icons. The main banner features a wooden surface with wooden spoons, a spiral notebook, and fresh vegetables like a red bell pepper and cauliflower. The group name "Healthy Recipes for Busy People" is prominently displayed, along with a "Secret Group" lock icon and buttons for "Joined", "Notifications", and a menu icon.

Below the banner, there are tabs for "Discussion", "Members", "Events", "Photos", and "Files". A search bar for the group is also present. The "Discussion" tab is active, showing a "Write Post" section with options to "Add Photo / Video", "Create Poll", and "Add File". The text "Write something..." is visible.

A "PINNED POST" is shown, featuring a small image of a dish and the following text:

Welcome aboard to our community of healthy food lovers! You are embarking on a journey of all around well-being and healthy-eating. This group is created by "Healthy Recipes for Busy People" to function as an online community in parallel to our website. In this group, we will post healthy and nutritional meal recipes which you can use everyday. We try to stick to easy and quick recipes, so there will not be any excuses for starting a healthy diet! Please feel free to share your own tips, recipes, and experiences with other members. You can also invite your friends to help them get healthier as well.

Below the text are "Like" and "Comment" buttons. At the bottom, it says "22 people like this."

On the right side of the page, there are sections for "ADD MEMBERS" with an input field, "MEMBERS" showing 107 members with profile pictures, and "RECENT GROUP PHOTOS" showing a grid of various food dishes.

Group Description for Treatment Groups with a Consumer-Created Community

Please read these instructions carefully before moving on to the survey:

In this survey, you will be introduced to a Facebook group called "Healthy Recipes for Busy People". In the following pages, we will share some screenshots from this group. It is very important that you carefully read through all the information that will be presented in these screenshots. We would like you to focus specifically on the **group description, posts and comments.**

You will then be directed to the survey questions.

The following screenshot shows the **group description.**

The screenshot shows a Facebook group page for "Healthy Recipes for Busy People". The page header includes the group name, a search bar, and navigation icons for Home, notifications, and settings. The main banner features a wooden surface with wooden spoons, a spiral notebook, and fresh vegetables like cauliflower, red bell peppers, and tomatoes. Below the banner, there are tabs for Discussion, Members, Events, Photos, and Files, along with a search bar for the group. A post creation bar offers options to Write Post, Add Photo / Video, Create Poll, and Add File. A pinned post by a user with a profile picture of a woman contains a welcome message and a recipe. The message reads: "Welcome aboard to our community of healthy food lovers! You are embarking on a journey of all around well-being and healthy-eating. This group is created by fans of the 'Healthy Recipes for Busy People' brand. We want to be in touch with other healthy food lovers and encourage each other to keep a healthy lifestyle. This group is for sharing recent recipes from 'Healthy Recipes for Busy People' as well as your own healthy recipes, modifications, tips, and experiences. You can also invite your friends to help them get healthier as well." Below the text are "Like" and "Comment" buttons, and a notification that "22 people like this." To the right of the post, there are sections for "ADD MEMBERS" with a search input, "MEMBERS" showing 107 members with profile pictures, and "RECENT GROUP PHOTOS" displaying a grid of food images.

Screenshots of Typical Group Posts (Similar across All Treatment Groups)

The following screenshot shows one of the **group posts** with a recipe.

RECENT ACTIVITY

 ▼

Recipe of the Day: Slow-Cooker Pork Taco;

Start the meat in a slow-cooker before you go out for the day and come home to tender, flavorful pork tacos. Or, if you don't want to wait, make this recipe in a Dutch oven in half the time.

Directions:
Put the ancho and pasilla chiles and the garlic in a bowl; add 2 to 3 tablespoons water. Microwave on high until soft and pliable, 2 to 3 minutes. Stem and seed the chiles; peel the garlic. Transfer the chiles and garlic to a blender... [See More](#)



 Like  Comment  Share

58 people like this.

20 shares

RECENT GROUP PHOTOS [See All](#)



The following screenshot shows another group post and its comments. This post follows the previous post.

Busy People   Home    


Hey guys, what did you think of the Slow-Cooker Pork Taco? Who made it? Did you make any modifications to our recipe? Share your experience and/or suggestions!

 Like  Comment

Reynaldo Fuentes and Abby Dane like this. ✓ Seen by 2

 **Abby Dane** I always wanted to try a Pork Taco, finally your recipe did it! I made it last night, it was really delicious. I don't have a slow-cooker at home, so I used the oven. I highly recommend this to everyone!
Unlike · Reply ·  3

 Happy to hear you liked it Abby 😊
Like · Reply ·  1

 Write a reply...  

 **Reynaldo Fuentes** Here's a picture of my pork taco. Use a little bit of cheddar cheese and sour cream; you won't regret it!



Unlike · Reply ·  3

 That looks really yummy Reynaldo!
Like · Reply ·  1

RECENT GROUP PHOTOS See All



Introducing Reputation System in Groups with Centralized Reputation System

The following screenshot shows one of the admin's posts that describes the **group's moderation strategy**.

We believe that having active members in the group is the key to advancing the community and helping each other out in the path to getting healthier.

That's why every month, the admin of the group will pick "THE GRAND CHEFS" who are members with the highest contributions.

You will get points for activities such as:

- Posting helpful tips and recipes,
- Participating in discussions,
- Downloading the group files,
- Sharing group posts to your timeline, and
- Inviting your friends to the group.

Every month, we will announce 2 "GRAND CHEFS" in our monthly series of "Badge of Honor".



Like Comment

Write a comment..

36

RECENT GROUP PHOTOS [See All](#)



The following post shows the **winners of GRAND CHEF in the month of April 2016** based on their contributions to the group. The winners have been picked by the **group administrator**.

Hey everybody, we've got good news!
 Here are the GRAND CHEF winners from April: Cliff Jackson with 233 points and Avery Herbert with 212 points.
 Congratulations guys! We all appreciate your contribution to our community of healthy food lovers.



WINNERS OF  APRIL 2016

Cliff Jackson
233 Points

Avery Herbert
212 Points

Like Comment

29

Maddie Morson Awesome! Congratulations guys 😊
 Unlike · Reply · 3

Tammi Daniell Congrats, I really liked your lentil soup recipe Cliff 😊
 Unlike · Reply · 2

Abby Dane well deserved! I learned a lot from Cliff and Avery. Way to go guys!
 Unlike · Reply · 1

Write a comment...

Introducing Reputation System in Groups with Distributed Reputation System

The following screenshot shows one of the admin's posts that describes the group's moderation strategy.

We believe that having active members in the group is the key to advancing the community and helping each other out in the path to getting healthier.

That's why every month, you can nominate and choose the members who you think had the best contributions to the group during the month. You can choose your favorite contributors based on activities such as:

- Posting helpful tips and recipes to the group, and
- Participating in discussions in a helpful and respectful manner

The two candidates with the highest number of votes will be "THE GRAND CHEFS" of the month and will be announced in our monthly series of "Badge of Honor".



Like Comment

Write a comment...

36

RECENT GROUP PHOTOS [See All](#)



The following screenshot shows the **poll for choosing the top 2 contributors** of April 2016.

It's time to vote for April's "GRAND CHEFS". Please nominate your favorite contributors here. You can vote for more than one candidate in the list. The 2 candidates with the highest votes will win this month's "GRAND CHEF".

Add an option...

Like Comment

Write a comment...

The following screenshot shows the **poll results for the top contributors of April 2016.**

It's time to vote for April's "GRAND CHEFS". Please nominate your favorite contributors here. You can vote for more than one candidate in the list. The 2 candidates with the highest votes will win this month's "GRAND CHEF".

<input checked="" type="checkbox"/>	Cliff Jackson	   +54
<input checked="" type="checkbox"/>	Avery Herbert	  +51
<input checked="" type="checkbox"/>	Abby Dane	 +24
<input checked="" type="checkbox"/>	Tammi Daniell	+19
<input checked="" type="checkbox"/>	Maddie Morson	+19

Like · Comment · Share

 Write a comment...  

The following post shows the **winners of GRAND CHEF in the month of April 2016.** The top contributors have been nominated and voted by the **group members.**

Here are the GRAND CHEF winners from April: Cliff Jackson with 57 votes and Avery Herbert with 53 votes. Congratulations guys! We all appreciate your contribution to our community of healthy food lovers.



Introducing Reputation System in Semi-Distributed Reputation System Groups

The following screenshot shows one of the admin's posts that describes the group's moderation strategy.

We believe that having active members in the group is the key to advancing the community and helping each other out in the path to getting healthier.

That's why every month, you can choose among the members with the best contributions to the group.

Basically, we will give points to each member for activities such as:

- Posting helpful tips and recipes,
- Participating in discussions,
- Downloading the group files,
- Sharing group posts to their timeline, and
- Inviting friends to the group.

At the end of each month, we will pick the top 5 contributors. We will then create a poll, and you can vote for your favorite contributors among these candidates.

The two candidates with the highest number of votes will be "THE GRAND CHEFS" of the month and will be announced in our monthly series of "Badge of Honor".

Like Comment

Write a comment...

36

RECENT GROUP PHOTOS See All

The following screenshot shows the poll for choosing the top 2 contributors of April 2016.

It's time to vote for your favorite contributors. Here are the 5 top contributors of April 2016. You can vote for more than one candidate in the list.

<input checked="" type="checkbox"/>	Cliff Jackson	+54
<input checked="" type="checkbox"/>	Avery Herbert	+51
<input checked="" type="checkbox"/>	Abby Dane	+24
<input checked="" type="checkbox"/>	Tammi Daniell	+19
<input checked="" type="checkbox"/>	Maddie Morson	+19

Like · Comment · Share

Write a comment...

The following post shows the **winners of GRAND CHEF** in the month of **April 2016** based on their contributions to the group. The **top 5 contributors** have

been picked by the **group administrator** and the **final 2 winners** have been chosen by the **group members**.

Hey everybody, we've got good news!
The poll results are in. Thanks for helping us choose the top contributors in our group.
Here are the GRAND CHEF winners from April: Cliff Jackson with 57 votes and Avery Herbert with 53 votes.
Congratulations guys! We all appreciate your contribution to our community of healthy food lovers.



Like Comment

Write a comment...

29

Maddie Morson Awesome! Congratulations guys 😊
Unlike · Reply · 3

Tammi Daniell Congrats, I really liked your lentil soup recipe Cliff 😊
Unlike · Reply · 2

Abby Dane well deserved! I learned a lot from Cliff and Avery. Way to go guys!
Unlike · Reply · 1

Engagement Intention Questions

Looking at this Facebook group, if you were a member of this group, how likely would you be to participate in the following activities?

	Neither Likely						
	Very Unlikely	Moderately Unlikely	Slightly Unlikely	nor Unlikely	Slightly Likely	Moderately Likely	Extremely Likely
1) Actively participate in any types of group activities (reading posts, posting recipes, leaving comments, liking or sharing the posts, inviting friends to the group)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2) Actively read the group's posts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3) Actively post recipes or other information about healthy diet to the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4) Actively participate in group discussions (commenting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5) Actively like or share posts in the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6) Invite other friends to the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7) Provide new information about the group and its posts to other people outside the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8) Support other members in the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9) Say positive things about the group to other people outside the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10) Recommend the group to anyone who sought their advice about healthy diet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11) Encourage other people outside the group to go on a healthy diet	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12) Not hesitate to refer other people to the group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

APPENDIX B

Survey Instruments for Chapter 4

In this section, the survey instruments used in studies 1, 2 and 3 in chapter 4 will be presented. These studies aimed to explore the effect of reward strategy and reward type on consumer's referral behavior.

Survey Instruments for Study 1

The beginning of the survey was similar across all treatment groups. This section was used to introduce the online shopping website. Participants later saw screenshots and were asked questions that were customized for their gender so that the gender effects would be emphasized.

Introduction to the Online Shopping Website

In the following paragraph, you will be introduced to an online shopping website called “Best Deals”. Please read carefully through the information below.

What is “Best Deals”?

“Best Deals” is a reputable online shopping website that works with the most popular retailers in North America. Customers will receive cash-back for purchases they make on Best Deals website.

Tell-a-Friend Program

Previous surveys showed that Best Deals has a great and loyal customer base who have shown interest in spreading the word about their website. Therefore, Best Deals is planning to promote their website by running a referral campaign called “Tell-a-Friend”. They allocated a page on their website to this program.

They would like to get some feedback on this referral program before it is actually launched. Going forward, you will see a screenshot of their proposed webpage. We do not want you to focus too much on the graphic design of the page, but rather we would like you to focus on the content of the webpage. Please read through the content carefully and then complete the survey.

Screenshots of the Tell-a-Friend Program for the Control Group

Screenshot for female participants:



Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?



SHARING IS REALLY EASY!



Step 1: Share your personal link with a friend

Here's your unique URL:

<...://tell.a.friend/rf.do?referrerid=n%2fk7kAax>

Copy Link



Step 2: Your friend can benefit from our unique online shopping services when they become a member of our website.

Screenshot for male participants:



The screenshot displays the 'Tell-a-Friend Program' interface. At the top left, there is an icon of a woman and a man. The title 'Tell-a-Friend Program' is centered at the top. Below the title, the text asks, 'Do you have a friend that would enjoy online shopping experience with us as much as you do?' and 'Why not tell them about us?'. To the right of this text is a photograph of two men in business attire looking at a laptop. Below the text, it says 'SHARING IS REALLY EASY!'. The main content area is divided into two green boxes. The top box, labeled 'Step 1', instructs the user to 'Share your personal link with a friend' and provides a unique URL: '...://tell.a.friend/rf.do?referrerid=n%2fk7kAax'. A 'Copy Link' button is next to the URL. A white arrow points down from this box to the bottom box, labeled 'Step 2', which states: 'Your friend can benefit from our unique online shopping services when they become a member of our website.'

Screenshots of the Tell-a-Friend Program with one cash reward (\$10 value)

Screenshot for female participants:




Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?



SHARING IS REALLY EASY!

 **Step 1:** Share your personal link with a friend

Here's your unique URL:

[...://tell.a.friend/af.do?referrerid=n%2fk7kAax](https://tell.a.friend/af.do?referrerid=n%2fk7kAax)

Copy Link

Step 2: As soon as your friend becomes a member of our website, you will receive a **\$10 Amazon Gift Card** through email as a token of our appreciation.



Screenshot for male participants:



Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?




SHARING IS REALLY EASY!

Step 1: Share your personal link with a friend

Here's your unique URL: [...://tell.a.friend/rf.do?referrerid=n%2fk7kAax](https://tell.a.friend/rf.do?referrerid=n%2fk7kAax)

Step 2: As soon as your friend becomes a member of our website, you will receive a **\$10 Amazon Gift Card** through email as a token of our appreciation.



Screenshots of the Tell-a-Friend Program with choice of cash rewards

Screenshot for female participants:



Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?



SHARING IS REALLY EASY!

Step 1: Choose your favorite gift card by clicking on one of the following options:

				
\$10 TARGET Gift Card	\$10 HOME DEPOT Gift Card	\$10 AMAZON Gift Card	\$10 BEST BUY Gift Card	\$10 MACY'S Gift Card

Step 2: Share your personal link with a friend

Here's your unique URL: <...://tell.a.friend/rf.do?referrerid=n%2fk7kAax>

Step 3: As soon as your friend becomes a member of our website, you will receive your favorite gift card through email.



Screenshot for male participants:

Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?

SHARING IS REALLY EASY!

Step 1: Choose your favorite gift card by clicking on one of the following options:

\$10 TARGET Gift Card	\$10 HOME DEPOT Gift Card	\$10 AMAZON Gift Card	\$10 BEST BUY Gift Card	\$10 MACY'S Gift Card

Step 2: Share your personal link with a friend

Here's your unique URL: <...://tell.a.friend/rf.do?referrerid=n%2fk7kAax>

Step 3: As soon as your friend becomes a member of our website, you will receive your favorite gift card through email.

Screenshots of the Tell-a-Friend Program with one cash reward (\$20 value)

Screenshot for female participants:



Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?



SHARING IS REALLY EASY!

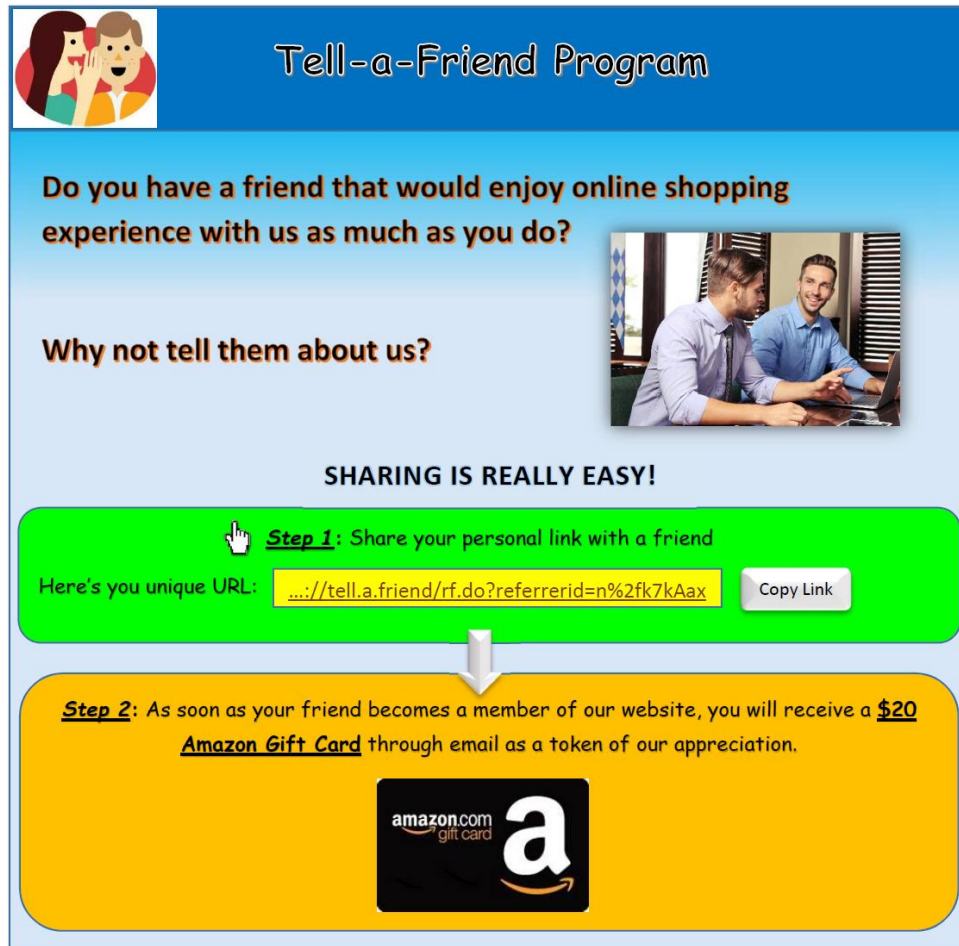
 **Step 1:** Share your personal link with a friend

Here's your unique URL:

Step 2: As soon as your friend becomes a member of our website, you will receive a **\$20 Amazon Gift Card** through email as a token of our appreciation.



Screenshot for male participants:



Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?

SHARING IS REALLY EASY!

Step 1: Share your personal link with a friend

Here's your unique URL: <...://tell.a.friend/rf.do?referrerid=n%2fk7kAax>

Step 2: As soon as your friend becomes a member of our website, you will receive a **\$20 Amazon Gift Card** through email as a token of our appreciation.



Screenshots of the Tell-a-Friend Program for the Group with In-Kind Reward

Screenshot for female participants:




Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?



SHARING IS REALLY EASY!

 **Step 1:** Share your personal link with a friend

Here's your unique URL:

<...://tell.a.friend/rf.do?referrerid=n%2fk7kAax>

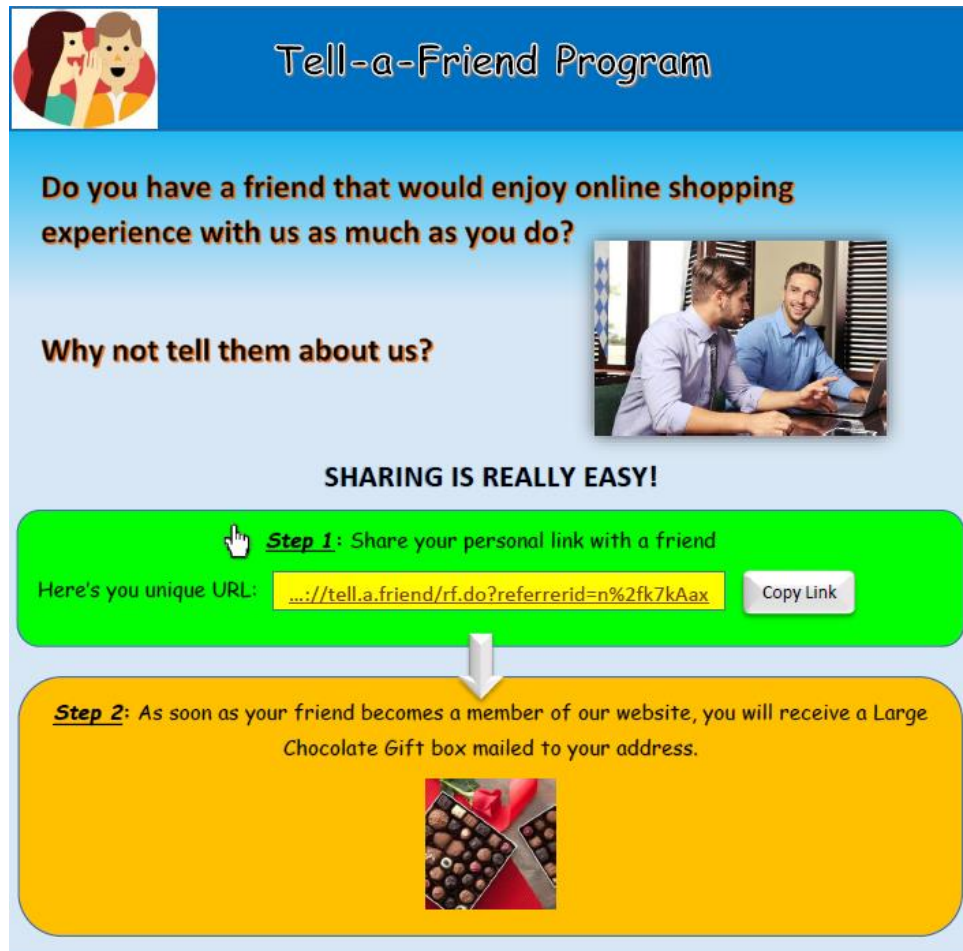
Copy Link



Step 2: As soon as your friend becomes a member of our website, you will receive a Large Chocolate Gift box mailed to your address.



Screenshot for male participants:



Tell-a-Friend Program

Do you have a friend that would enjoy online shopping experience with us as much as you do?

Why not tell them about us?

SHARING IS REALLY EASY!

Step 1: Share your personal link with a friend

Here's your unique URL: <...://tell.a.friend/af.do?referrerid=n%2fk7kAax>

Step 2: As soon as your friend becomes a member of our website, you will receive a Large Chocolate Gift box mailed to your address.

Referral Questions:

- 1) Looking at the "Tell-a-Friend" program, how likely would a man/woman like you be to participate in this referral program? Please enter a number between 0 and 100 in the box below with 0 meaning "Not at all Likely to Participate" and 100 meaning "Extremely Likely to Participate".
- 2) How much do you agree with this statement: "Looking at the referral program on the website, I believe a man/woman like me would refer a friend to Best Deals"

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 3) On a scale of 1 to 7 with "1" meaning "Not at all willing" and "7" meaning "Very willing", please indicate your willingness to participate in such a Referral Program.

1	2	3	4	5	6	7
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Perception of Choice Questions (for Groups with Rewards)

- 1) Looking at the reward that has been offered, how much do you agree with this statement: "I feel that Best Deals provided their customers with choices and options in terms of selecting their reward."

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

- 2) Looking at the reward that has been offered, how much choice do you think the customers have in selecting their reward for referring a friend?

Not at All			Moderate Amount			A Very Large Amount
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey Instruments for Study 2

The following introduction and questions were similar across all the treatment groups:

Applied Math Practices Referral Program

Thank you for helping us reach out to other math teachers and grow our community. Please fill out the information below. We will send an email to your friend/ colleague with an invitation to Applied Math Practices. We will use this information only to invite them to our Facebook group.

- 1) Your Name (as listed on Facebook)
- 2) Your Email Address
- 3) Please indicate your gender
- 4) Your Friend/Colleague's Name:
- 5) Your Friend/Colleague's Email Address:
- 6) Optional: You can write a personal message to your friend to introduce AMP21. We will forward them your message along with our invitation link.

Introducing the Referral Reward in the Group with One Cash Reward

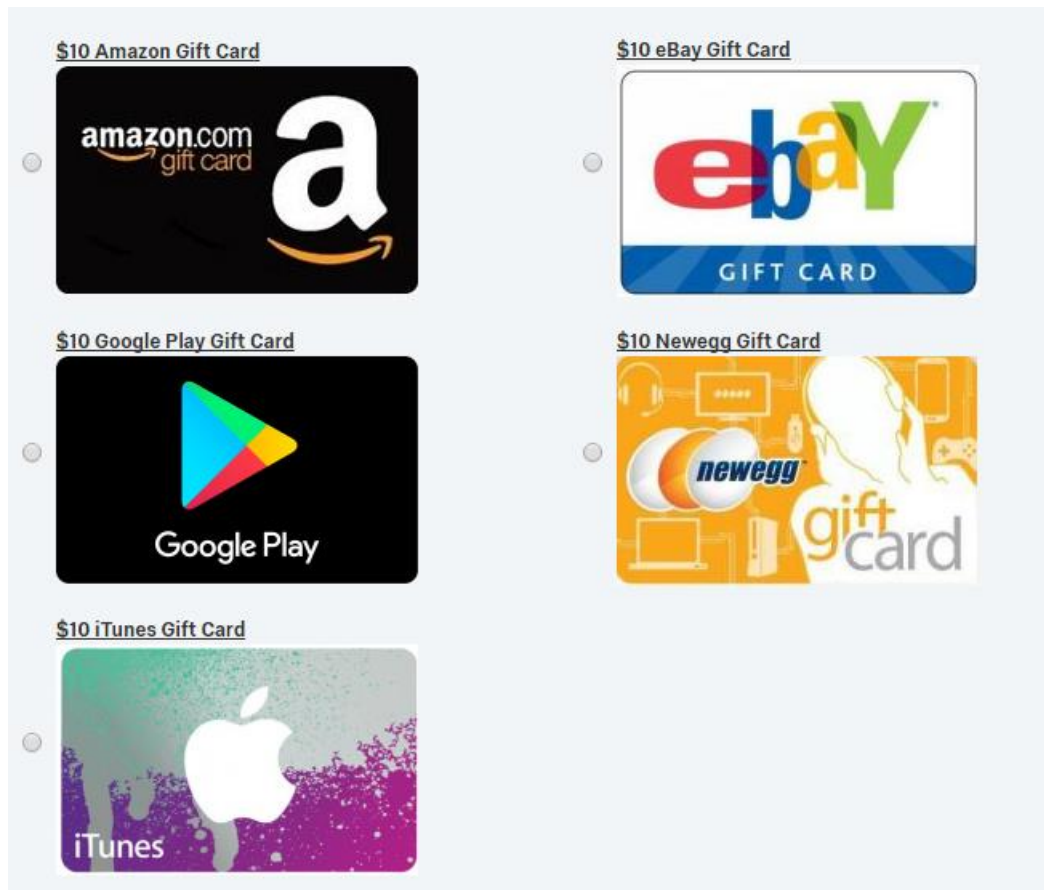
We would like to thank you for helping us reach out to other teachers and grow our community. As a token of our appreciation, we will email you a \$10 Amazon Gift Card in less than 2 business days.



Introducing the Referral Reward in the Group with the Choice of Cash Reward

We would like to thank you for helping us reach out to other teachers and grow our community. As a token of our appreciation, you can choose one of the 5 Gift Card options below. We will email your gift card to you in less than 2 business days.

Please choose one of the options below:



Survey Instruments for Study 3

Survey for the Group with One Cash Reward

Referral Program

Landing a Career with LinkedIn

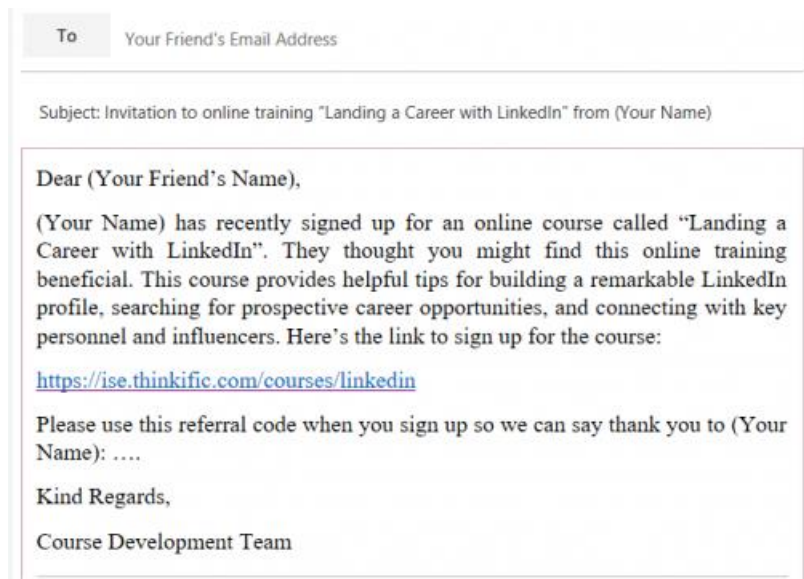
Thank you for enrolling in our online training. We hope you have enjoyed the course so far. Through this referral program, you can invite your friend(s) to sign up for this online training so they can also benefit from this opportunity to improve their LinkedIn presence. You can share this training with as many friends as you want. As a token of our gratitude, you will earn up to three \$10 Amazon Gift Cards once your friend(s) sign up for this training. Please go ahead and fill out the required information in order to participate in our referral program. This will only take 5 minutes. At the end of the survey, you will also receive a referral code that you can share with your network.

- 1) Your Name
- 2) Your Email Address
- 3) Gender
- 4) Age in Years (optional)

We would like to thank you for helping us reach out to other individuals who might be interested in this online training. As a token of our appreciation, you will earn up to three \$10 Amazon Gift Cards once your friend(s) sign up for the course. The gift card(s) will then be emailed to you within 5-7 business days.



The following is the message that will be sent to your friends on behalf of you.



In this referral program, you can earn up to three \$10 Amazon Gift Cards just by sharing this great course with your friends. You can invite your first 3 contacts below, but don't let this be the only place you refer! You can post your code on social media, send out emails, or any other way you think it will get noticed! Once you complete this survey, you will be given the unique code to share with your network. If someone registers for the course using your unique code, you will earn a \$10 Amazon Gift Card. If others register with your code, you can earn up to 2 additional gift cards.

Please fill in the following information:

Please fill in the following information:			
	Column Options ▾	Column Options ▾	Column Options ▾
	Click to write Column 1	Click to write Column 2	Relationship
	First and Last Name	Email Address	
1st Referral	<input type="text"/>	<input type="text"/>	<input type="text" value="▼"/>
2nd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text" value="▼"/>
3rd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text" value="▼"/>

Survey for the Group with Choice of Cash Rewards

Referral Program

Landing a Career with LinkedIn

Thank you for enrolling in our online training. We hope you have enjoyed the course so far. Through this referral program, you can invite your friend(s) to sign up for this online training so they can also benefit from this opportunity to improve their LinkedIn presence. You can share this training with as many friends as you want. As a token of our gratitude, you will earn up to three \$10 Gift Cards of your choice once your friend(s) sign up for this training. Please go ahead and fill out the required information in order to participate in our referral program. This will only take 5 minutes. At the end of the survey, you will also receive a referral code that you can share with your network.

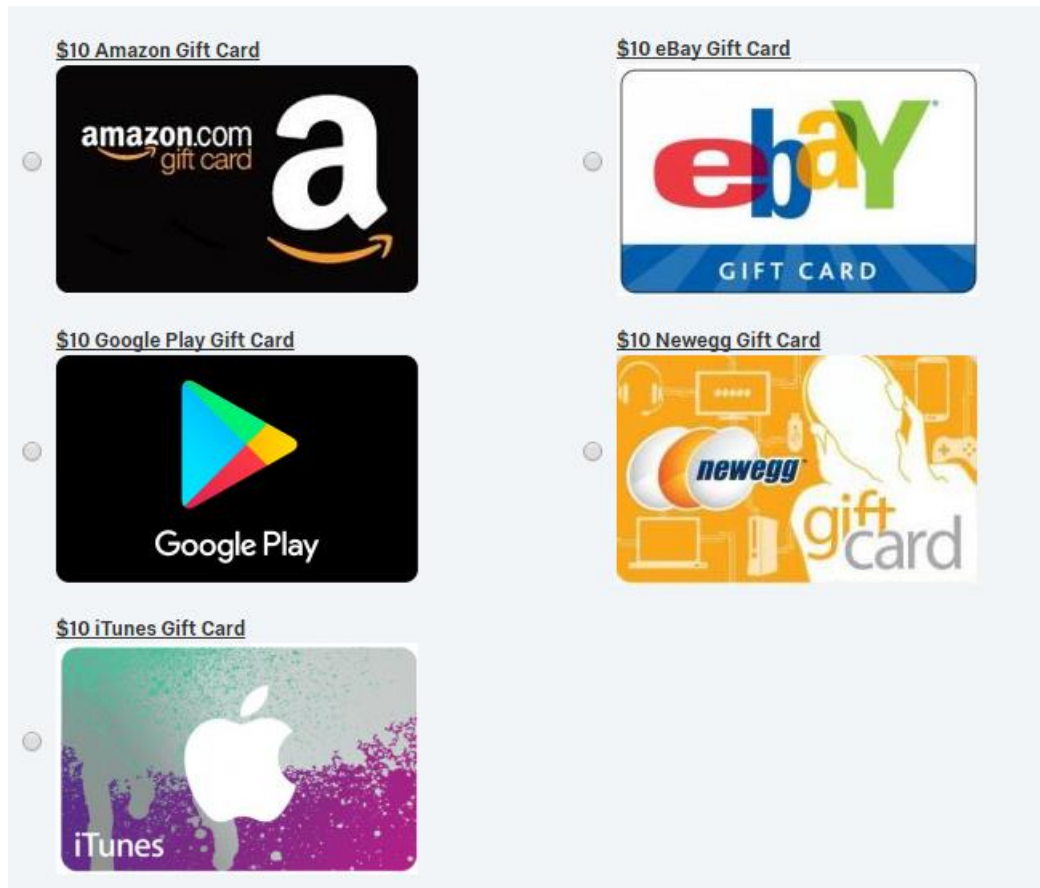
- 1) Your Name
- 2) Your Email Address

3) Gender

4) Age in Years (optional)

We would like to thank you for helping us reach out to other individuals who might be interested in this online training. As a token of our appreciation, you will earn your preferred \$10 Gift Card up to 3 times once your friend(s) sign up for the course. The gift card(s) will then be emailed to you within 5-7 business days.

Please choose one of the \$10 Gift Cards from the list:



The following is the message that will be sent to your friends on behalf of you.

To: Your Friend's Email Address

Subject: Invitation to online training "Landing a Career with LinkedIn" from (Your Name)

Dear (Your Friend's Name),

(Your Name) has recently signed up for an online course called "Landing a Career with LinkedIn". They thought you might find this online training beneficial. This course provides helpful tips for building a remarkable LinkedIn profile, searching for prospective career opportunities, and connecting with key personnel and influencers. Here's the link to sign up for the course:

<https://ise.thinkific.com/courses/linkedin>

Please use this referral code when you sign up so we can say thank you to (Your Name):

Kind Regards,
Course Development Team

In this referral program, you can earn up to three \$10 Gift Cards of your choice just by sharing this great course with your friends. You can invite your first 3 contacts below, but don't let this be the only place you refer! You can post your code on social media, send out emails, or any other way you think it will get noticed!

Once you complete this survey, you will be given the unique code to share with your network. If someone registers for the course using your unique code, you will earn the \$10 Gift Card of your choice. If others register with your code, you can earn up to 2 additional Gift Cards. Please fill in the following information:

Please fill in the following information:

	Column Options ▾	Column Options ▾	Column Options ▾
	Click to write Column 1	Click to write Column 2	Relationship
	First and Last Name	Email Address	
1st Referral	<input type="text"/>	<input type="text"/>	<input type="text"/>
2nd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text"/>
3rd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text"/>

Survey for the Group with an E-Book Reward

Referral Program

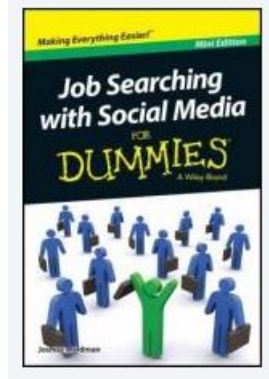
Landing a Career with LinkedIn

Thank you for enrolling in our online training. We hope that you have enjoyed the course so far. Through this referral program, you can invite your friend(s) to sign up for this online training so they can also benefit from this opportunity to improve their LinkedIn presence. You can share this training with as many friends as you want. As a token of our gratitude, you will receive up to 3 popular business e-books through email once your friend(s) sign up for this training. Please go ahead and fill out the required information in order to participate in our referral program. This will only take 5 minutes. At the end of the survey, you will also receive a referral code that you can share with your network.

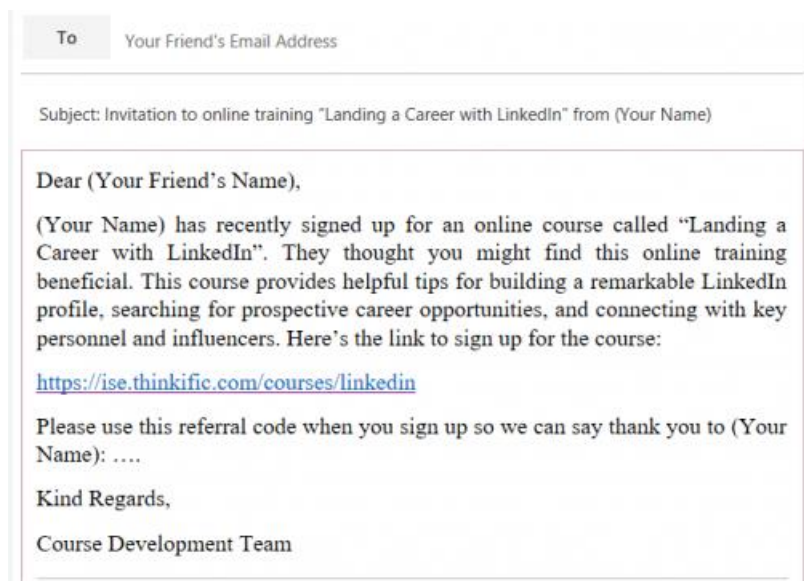
- 1) Your Name
- 2) Your Email Address
- 3) Gender
- 4) Age in Years (optional)

We would like to thank you for helping us reach out to other individuals who might be interested in this online training. As a token of our appreciation, you will receive up to 3 popular business e-books starting with "Job Searching with Social

Media for Dummies" once your friend(s) sign up for the course. The e-book(s) will then be emailed to you within 5-7 business days.



The following is the message that will be sent to your friends on behalf of you.



In this referral program, you can earn up to 3 amazing e-books just by sharing this great course with your friends. You can invite your first 3 contacts below, but don't let this be the only place you refer! You can post your code on social media, send out emails, or any other way you think it will get noticed! Once you complete this survey, you will be given the unique code to share with your network.

If someone registers for the course using your unique code, you will receive the "Job Searching with Social Media for Dummies" e-book. If others register with your code, you can earn up to 2 additional popular and highly-rated business e-books. Please fill in the following information:

Please fill in the following information:

	Column Options ▾	Column Options ▾	Column Options ▾
	Click to write Column 1	Click to write Column 2	Relationship
	First and Last Name	Email Address	
1st Referral	<input type="text"/>	<input type="text"/>	<input type="text" value=""/>
2nd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text" value=""/>
3rd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text" value=""/>

Survey for the Group with Choice of E-book Rewards

Referral Program

Landing a Career with LinkedIn

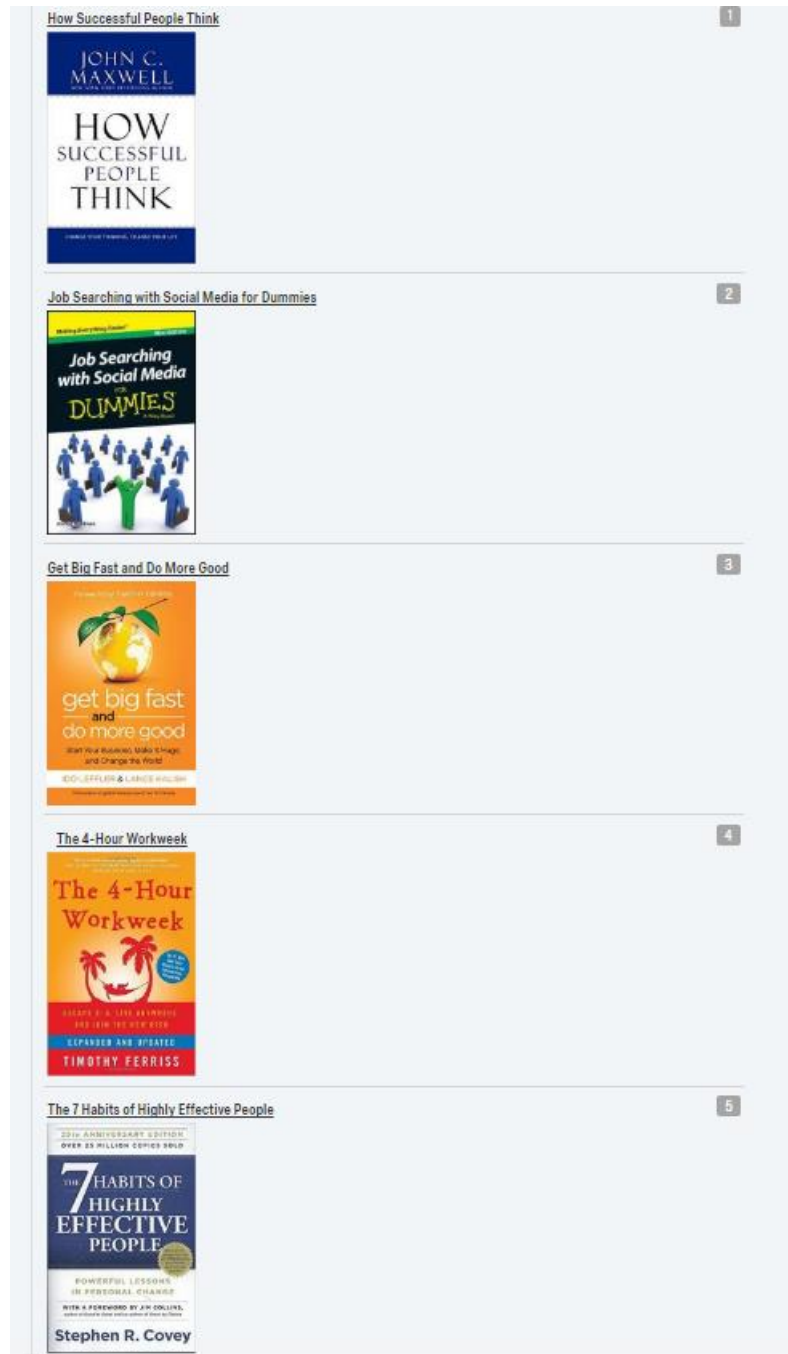
Thank you for enrolling in our online training. We hope you have enjoyed the course so far. Through this referral program, you can invite your friend(s) to sign up for this online training so they can also benefit from this opportunity to improve their LinkedIn presence. You can share this training with as many friends as you want. As a token of our gratitude, you will receive up to 3 popular business e-books of your choice through email once your friend(s) sign up for this training. Please go ahead and fill out the required information in order to participate in our referral

program. This will only take 5 minutes. At the end of the survey, you will also receive a referral code that you can share with your network.

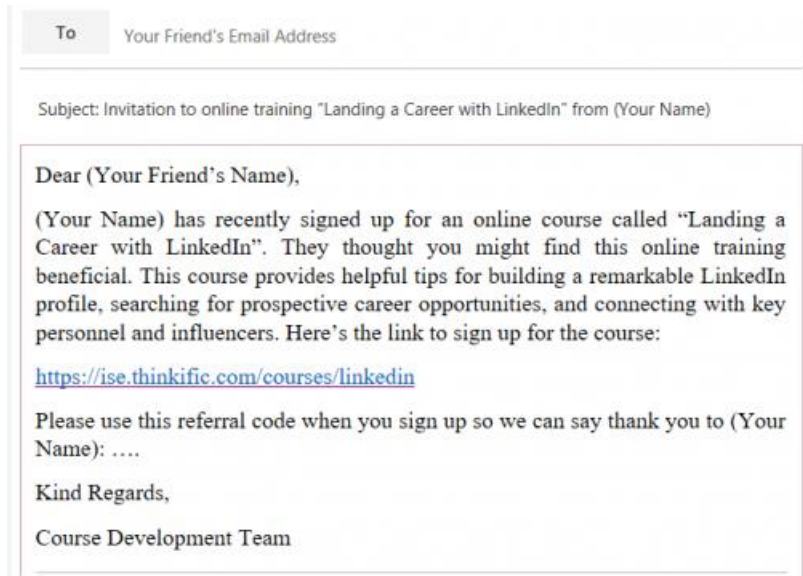
- 1) Your Name
- 2) Your Email Address
- 3) Gender
- 4) Age in Years (optional)

We would like to thank you for helping us reach out to other individuals who might be interested in this online training. As a token of our appreciation, you will receive up to 3 business e-books of your choice once your friend(s) sign up for the course. The e-book(s) will then be emailed to you within 5-7 business days.

You can rank the e-books below based on your preference. If someone registers for the course using your unique code, you will receive the e-book that you ranked first. If others register with your code, you can earn up to 2 additional books that you ranked 2nd and 3rd. Please rank the order of the following e-books by dragging and dropping them below:



The following is the message that will be sent to your friends on behalf of you.



In this referral program, you can earn up to 3 amazing e-books of your choice just by sharing this great course with your friends. You can invite your first 3 contacts below, but don't let this be the only place you refer! You can post your code on social media, send out emails, or any other way you think it will get noticed! Once you complete this survey, you will be given the unique code to share with your network. If someone registers for the course using your unique code, you will receive your preferred book. If others register with your code, you can earn up to 2 additional books of your choice. Please fill in the following information:

Please fill in the following information:

	Column Options ▾	Column Options ▾	Column Options ▾
	Click to write Column 1	Click to write Column 2	Relationship
	First and Last Name	Email Address	
1st Referral	<input type="text"/>	<input type="text"/>	<input type="text" value="▼"/>
2nd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text" value="▼"/>
3rd Referral (optional)	<input type="text"/>	<input type="text"/>	<input type="text" value="▼"/>

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ABSTRACT**INFLUENTIAL FACTORS IN CONSUMER'S ADOPTION OF
INNOVATIVE PRODUCTS**

by

MAHDOKHT KALANTARI**May 2018****Advisor:** Dr. Kenneth Chelst**Major:** Industrial and Systems Engineering**Degree:** Doctor of Philosophy

This dissertation addresses the challenges involved with the process of diffusion of innovations in the contexts of innovative educational materials and technological innovations.

Chapters 2 and 3 discuss building and using Online Brand Communities (OBCs) to disseminate innovative math educational materials. OBCs are known to be important platforms where consumers can communicate with the brand as well as other consumers. Through the effective use of these platforms, brands could accelerate the process of diffusion of their innovations. However, OBCs will not survive if consumers do not get engaged and participate in these communities. The purpose of this section of the dissertation is to investigate how customer engagement can be increased in social media based Online Brand Communities (OBCs) so that

these communities could be effectively used as platforms for disseminating innovations. Different hypotheses are suggested based on the consumer engagement literature and well-known organizational and psychological theories. These hypotheses are then tested in different studies in order to better understand the drivers of customer engagement behavior.

Since one of the important factors that can impact the success of OBCs is the size of the communities, chapter 3 discusses Referral Reward Programs (RRPs) as a means for growing the OBC size. In this chapter, different hypotheses are proposed based on well-known psychological theories. These hypotheses are then tested in 3 different research studies to understand the impact of different rewards on customers' likelihood to participate in the referral programs.

The next section of this dissertation which is presented in chapter 5 uses the context of technological innovations, particularly Augmented Reality Smart Glasses (ARSGs). The purpose of this chapter is to understand the factors that would impact consumer's decision to adopt a particular type of ARSGs: Microsoft HoloLens.

The results of the studies in this dissertation have important theoretical and managerial implications in the areas of customer engagement in OBCs, Word-of-Mouth marketing, and consumer's adoption of innovations.

AUTOBIOGRAPHICAL STATEMENT

As a graduate student, I was always fascinated by the tools and methodologies that industrial engineers learn in order to tackle real-world problems. My previous research was focused on Operations Research and its applications in designing Decision Support Systems for production firms.

When I started my PhD program, I was still working on Operations Research based problems. Meanwhile, I started working with Professor Kenneth Chelst as a teaching assistant. During this time, I got the chance to learn more about the amazing initiative he was leading with regards to math education in high schools and middle schools. This initiative was called “Applied Math Practices for the 21st Century” or AMP21.

One of the main challenges at AMP21 was to disseminate this new curriculum and get more high school and middle school math teachers on board to teach it in their classrooms. This got me interested in thinking more about the dynamics of diffusion of innovations among professional networks.

Although going down this research path was challenging, I learned a lot about social media marketing and psychology of consumer behavior. I’m really grateful for all the experiences and lessons that I gained along this path.