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SOCIAL MOTIVATIONS TO USE GAMIFICATION: AN EMPIRICAL STUDY OF GAMIFYING EXERCISE

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Abstract

This paper investigates how social factors predict attitude towards gamification and intention to continue using gamified services, as well as intention to recommend gamified services to others. The paper employs structural equation modelling for analyses of data (n=107) gathered through a survey that was conducted among users of one of the world's largest gamification applications for physical exercise called Fitocracy. The results indicate that social factors are strong predictors for attitudes and use intentions towards gamified services.

Keywords: Gamification, Persuasive Technology, Social Networking Service, Facebook, Social Influence, Fitocracy, Recognition, Word-of-Mouth, Network Exposure, Reciprocity, Exergames.

1 Introduction

In the last couple of years, *gamification* (Hamari and Lehdonvirta, 2010; Deterding et al. 2011; Huotari and Hamari, 2012) and persuasive technologies (Fogg, 2003; Oinas-Kukkonen and Harjumaa, 2009) have been strongly harnessed for purposes of marketing, attitude change, and motivational pull. Gartner (2011) predicts that by 2015 a full 50% of organisations will have gamified their processes. Especially, *social networking services* (SNSs) and (social) games have been two parallel precursors to gamification. Social networking services such as *Facebook*, *Google+*, *Twitter*, and *MySpace* provide motivational affordances addressing needs for social interaction (Boyd and Ellison, 2007; Ellison et al., 2007). Concurrently, games such as *Angry Birds* and *World of Warcraft* have shown how games are powerful providers of persuasive service design (Hamari and Järvinen, 2011) which invoke cognitive intrinsic motivations, such as feelings of mastery.

There are several examples where these developments come together in form of services that are specifically focused on gamifying specific activities, such as listening to music (*Last.fm* - a gamified music tracking service), watching TV (*GetGlue* - a gamified television watching service) or exercising (*Fitocracy* - a gamified exercise tracking service). In essence, these gamification services provide game-like features that enable, for example, goal-setting by providing objectives, rewards, tracking, and monitoring the given activities (Hamari, 2013). Furthermore, essential to typical gamification services are the social aspects: people collect badges, rise in high-score lists and collect points for social reasons, such as receiving recognition.

In this paper, we investigate how these social factors related to *network effects*, *social influence*, *recognition*, and *reciprocal benefits* can predict attitude toward gamification, intentions to continue using it, and intentions to recommend it to others. The data was gathered via an online survey in one of the world's largest exercise-related gamification services called *Fitocracy*, which features gamified elements such as points, levels, and achievements (see Hamari and Eranti, 2011 on achievements) combined with a community of users who can 'like' and comment the exercise reports and other activities. The aim of the service is to encourage and persuade (Fogg, 2003) toward healthy exercise habits.

2 Gamification, persuasion, and related concepts

Gamification refers to service design aimed at providing game-like experiences to users, commonly with the end-goal of affecting user behaviour (Huotari and Hamari, 2012). Gamification differs from other, parallel developments in a few key ways: 1) Gamification commonly attempts to afford experiences reminiscent of games (e.g. flow, mastery and autonomy), rather than offering direct hedonic experiences by means of e.g. audiovisual content or economic incentives as seen in loyalty marketing (Huotari and Hamari, 2011; Huotari and Hamari, 2012). 2) Gamification attempts to affect motivations rather than attitude and/or behaviour directly, as is the case in persuasive technologies (Fogg, 2003; Oinas-Kukkonen and Harjumaa, 2009; Hamari 2013). 3) Gamification refers to adding 'gamefulness' to existing systems rather than building an entirely new game as is done with 'serious games' (Deterding, 2011; Huotari and Hamari, 2012).

Persuasive technologies, on the other hand, refer to interactive computer systems designed to change the attitude and/or behaviour of the user (Fogg, 2003; Oinas-Kukkonen and Harjumaa, 2009). Clearly there is some overlap between gamification and persuasive technology. For instance, some *persuasion* mechanisms can be regarded as similar to those applied in gamification, such as feedback and rewards (see e.g. Oinas-Kukkonen and Harjumaa, 2008).

Overall, most gamification services, games, social networking services and persuasive systems include affordances for both social as well as gameful interaction. Social and game dimensions could be

considered complementary in persuasive design. Therefore, it is essential to also study the social factors in gamification along with goals and rewards (Hamari, 2013).

Depending on how we conceptualise different approaches in persuasive design, gamification could be seen as an overarching concept in the sense that it can be utilised in several domains or as a particular kind of persuasive design within other approaches (see Table 1, below).

Concept	Definition	Goal
Gamification	‘A process of enhancing a service with (motivational) affordances for gameful experiences in order to support the user’s overall value creation’ — Huotari and Hamari (2012).	to support the user’s overall value creation by providing gameful experiences (see goal of games)
Games ¹	Free, no material interest, voluntary, uncertain, governed by rules, interesting choices, mastery, flow — Huizinga (1955), Caillois (1958), Avedon and Sutton-Smith (1971)	to create experiences such as flow, intrinsic motivation, achievement and mastery
Loyalty programme	‘Marketing efforts which reward, and therefore, encourage loyal customer behaviour in order to increase the profitability of stable customer relationships’ — Sharp and Sharp (1997)	to increase customer loyalty
Persuasive technology	Interactive information technology designed for changing users’ attitudes or behaviour — Fogg (2003), Oinas-Kukkonen and Harjumaa (2009)	to change attitudes and behaviours
Choice architecture	‘To nudge people towards the right choices [to make their lives better]’ — Sunstein and Thaler (2008)	to help people make better decisions
Decision support systems	‘A computer based system to aid decision-making [for running organisations more efficiently]’ — Sol et al. (1987)	to make decision-making activity more effective

Table 1. Comparison between parallel concepts related to changing attitude and behaviour.

3 Theoretical background

The core of the research model draws from the theory of planned behaviour (TPB) (Ajzen, 1991) and extends the TPB with factors related to network effects (Lin and Bhattacharjee, 2008), recognition (Hernandez et al., 2011; Hsu and Lin, 2008; Lin and Bhattacharjee, 2010; Lin, 2008), and perceived reciprocal benefits (Hsu and Lin, 2008; Lin, 2008), which we hypothesise to be relevant social factors predicting attitudes and use behaviour in a gamification service (Figure 1). The TPB is a model widely applied to explain behavioural intentions by measuring the attitude toward the behaviour and social influence (Ajzen, 1991); therefore, it is highly applicable for measuring attitudes in a persuasive environment, as the goals of persuasion and gamification are in the end related to attitude and behaviour change.

3.1 Social influence

Social influence refers to an individual’s perception of how important others regard the target behaviour and whether they expect one to perform that behaviour (Ajzen, 1991; Fishbein and Ajzen, 1975). In the context of this study, the target behaviour is the use of gamification to motivate oneself (to exercise). Social influence is then likely to reflect the user’s perceptions of how other users

¹ Games are included in order to show the relationship between games and gamification.

perceive the use of the service. By receiving recognition in the forms of 'likes' and comments, a user receives feedback on how well he or she has conformed to those perceived expectations of other users.

In line with Bock et al. (2005), Lewis et al. (2003), and Venkatesh and Davis (2000), we propose that the social influence, through the identification and internalisation processes relevant for group-formation (Kelman, 1958), affects attitude to using the service. Therefore, we hypothesise that social influence positively affects perceptions of recognition: the more strongly a person believes that others expect and support certain behaviour, the better it feels to conform to those expectations. Furthermore, when the relevant behaviour is supported and socially accepted, such social influence has a positive effect on the attitude toward the service.

H1a: Social influence positively influences the perceived amount of recognition received.

H1b: Social influence positively influences the attitude toward the use of gamification.

3.2 Recognition

Recognition fundamentally describes the social feedback users receive on their behaviours: users interacting with other users (Cheung et al., 2011; Lin, 2008). We propose that receiving recognition creates willingness to recognise others reciprocally within a service, which further promotes social interaction. In this manner, receiving recognition creates reciprocal behaviour (Cialdini et al., 1992; Cialdini and Goldstein, 2004) and increases the perceived benefits received from the use of the service. Furthermore, we hypothesise that the service is conceived more positively (Preece, 2001) when it produces a sense of recognition from others, thus positively affecting the user's attitude to using the service.

H2a: Recognition positively influences perceived reciprocal benefit.

H2b: Recognition positively influences attitude toward the use of gamification.

3.3 Reciprocal benefit

Perceived reciprocal benefit can be viewed as a form of social usefulness of the service – i.e., contributing and, in turn, receiving benefit from the social community (Preece, 2001; Lin, 2008). The *reciprocity*, receiving and contributing in a manner considered beneficial by the community, is likely to be of fundamental importance in encouraging users to carry out activities encouraged by the gamification system. Therefore, we hypothesise that reciprocal benefit positively influences the attitude toward the system's use:

H3: Perceived reciprocal benefit positively influences the attitude toward the use of gamification.

3.4 Network exposure

According to the theory of network externalities, the network effects (i.e., the value from the network) arise when the benefits from using the service depend on the number of other users (Katz and Shapiro, 1985; Lin and Bhattacharjee, 2008). The number of peers has been viewed as essential for SNSs, since they become more attractive to users as the quantity of peers or friends in the system increases (Baker and White, 2010; Sledgianowski and Kulviwat, 2009; Lin and Lu, 2011). Lin and Lu (2011) found the number of peers to be the second most influential factor in continuing use of an SNS.

However, instead of the network exposure affecting attitude directly, we hypothesise that the effect of *network exposure* is mediated by the other social factors. We propose that social influence, recognition, and reciprocal benefit mediate the effects of network exposure on the attitude toward use of the system, as attitude is likely to be dependent on the social input and the activity taking place in the network. Therefore, we hypothesise the following:

H4a: Network exposure positively influences perceived social influence.

H4b: Network exposure positively influences perceived recognition.

H4c: Network exposure positively influences perceived reciprocal benefit.

3.5 Attitude and intentions

In this study, attitude toward system use refers to the overall evaluation of the system’s usage, be it favourable or unfavourable (Fishbein and Ajzen, 1975; Ajzen, 1991). A strong relationship between attitude and use intentions has been shown in several studies (see, for example, Lin and Bhattacharjee, 2010; Bock et al., 2005; and Baker and White, 2010).

Word-of-mouth (WOM) refers to a person’s willingness to recommend a service to others. In the context of continued use intention (Bhattacharjee, 2001), it reflects the user’s satisfaction with the service in question and his or her trust that the service will continue fulfilling his or her expectations (Kim and Son, 2009; Srinivasan et al., 2002). Therefore, we hypothesise the following:

H5: Attitude positively influences continued use intention.

H6: Attitude positively influences intentions to recommend the service (i.e., WOM).

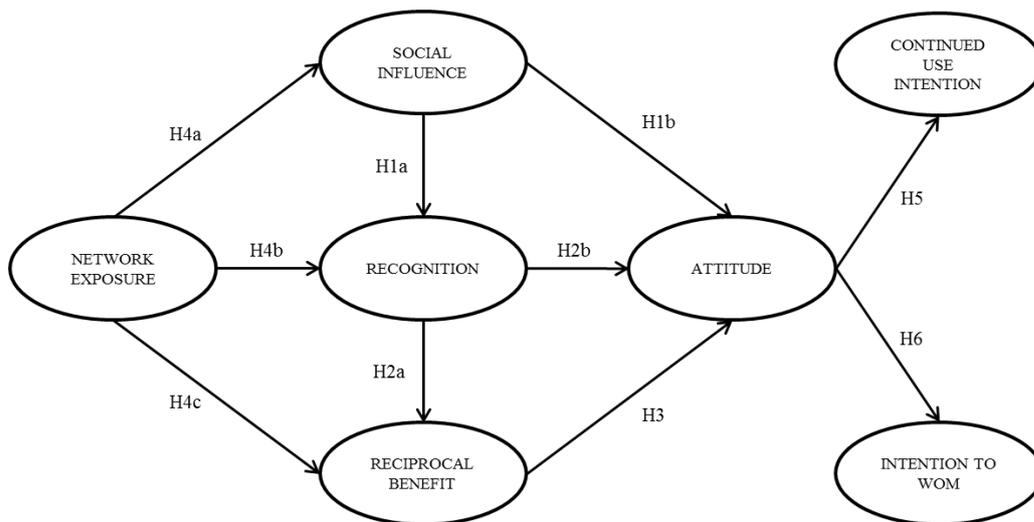


Figure 1. The research model.

4 The empirical study

4.1 Data

The data was gathered via an online questionnaire from the users of a service called Fitocracy that gamifies exercise:

“[Exercise] activities earn you points. Points lead to level ups. Earn badges for significant achievements. The community will reward your hard work with props.” – Fitocracy (2013).

Fitocracy’s persuasive design can be seen to consist mainly of motivational affordances corresponding to achievement and competence as well as social influence and relatedness (see Zhang, 2008 on motivational affordances). The service incorporates gamification in the form of offering an

opportunity to track one’s exercise and, on the basis of a point value allocated to a given exercise, enables gaining points, level-ups, and achievements for one’s actions. Users can also complete quests by performing and tracking an exercise corresponding to a given set of conditions or challenge other users into duels. Furthermore, other users can give feedback on achievements, level-ups and statuses by ‘liking’ or commenting the updates. The service holds similarities with SNSs in that it creates a venue for social activity such as group-forming and communication, incorporates profile-building and the possibility of sharing content (Lin and Lu, 2011; Baker and White, 2010; Boyd and Ellison, 2007; Ellison et al., 2007; Pfeil et al., 2009).

The survey was conducted by posting a description of the study and the survey link to the discussion forum and groups within the service. The survey was accessible only for users of the service. The questionnaire was launched on 17 October, and all 107 responses were gathered within the next three weeks. All respondents were entered in a prize draw for one \$50 Amazon gift certificate.

Time using the service	N	%	Age	N	%	Gender	N	%
Less than 1 month	12	11,2	20 or less	6	5,6	Female	54	50,5
1 - 3 months	20	18,7	21-25	37	34,6	Male	53	49,5
3 - 6 months	18	16,8	26-30	31	29,0			
6 - 9 months	16	15,0	31-35	15	14,0			
9 - 12 months	16	15,0	36-40	14	13,1			
12 - 15 months	23	21,5	41 or more	4	3,7			
More than 15 months	2	1,8						
Total	107	100		107	100		107	100

Table 2. Time using the service, age and gender information of the respondent data.

4.2 Validity and reliability

All of the model-testing was conducted via component-based PLS-SEM in SmartPLS 2.0 M3 (Ringle et al., 2005). The key advantage of the component-based PLS (PLS-SEM) estimation, when compared to co-variance-based structural equation methods (CB-SEM), is that it is non-parametric and therefore makes no restrictive assumptions about the distributions of the data. Secondly, PLS-SEM is considered to be a more suitable method for prediction-oriented studies, while co-variance-based SEM is better suited to testing which models best fit the data (Anderson and Gerbing, 1988; Chin et al., 2003).

Convergent validity (see Table 3) was assessed with three metrics: average variance extracted (AVE), composite reliability (CR), and Cronbach’s alpha (Alpha). All of the convergent validity metrics were clearly greater than the threshold cited in relevant literature (AVE should be greater than 0.5, CR greater than 0.7 (Fornell and Larcker, 1981), and Cronbach’s alpha above 0.8 (Nunnally, 1978)). Only well-established measurement items were used (see Appendix), all with a loading over 0.7. No indicators were omitted. Furthermore, there were no missing data; therefore, no imputation methods were used. We can conclude that the convergent validity and reliability requirements are met.

Discriminant validity was assessed first through comparison of the square root of the AVE of each construct to all of the correlation between it and other constructs (see Fornell and Larcker, 1981), where all of the square root of the AVEs should be greater than any of the correlations between the corresponding construct and another construct (Jöreskog and Sörbom, 1996; Chin, 1998). Secondly, in accordance with the work of Pavlou et al. (2007), we determined that no inter-correlation between constructs was higher than 0.9. Thirdly, we assessed discriminant validity by confirming that all items had the highest loading with its corresponding construct. All three tests indicate that the discriminant validity and reliability are acceptable.

	AVE	CR	Alpha	ATT	CUI	NE	RECIP	RECOG	SOCINF	WOM
ATT	0.773	0.932	0.902	0.879						
CUI	0.738	0.919	0.883	0.671	0.859					
NE	0.867	0.963	0.949	0.394	0.328	0.931				
RECIP	0.710	0.907	0.864	0.645	0.505	0.442	0.843			
RECOG	0.810	0.945	0.922	0.561	0.401	0.517	0.657	0.900		
SOCINF	0.696	0.901	0.854	0.638	0.448	0.367	0.503	0.423	0.834	
WOM	0.721	0.912	0.871	0.773	0.613	0.468	0.660	0.728	0.641	0.849

ATT = attitude, CUI = continued use intentions, NE = network exposure, RECIP = reciprocal benefits, RECOG = recognition, SOCINF = social influence, WOM = word-of-mouth intention. The figures on the diagonal correspond to square roots of the average variance extracted for the corresponding construct.

Table 3. Convergent and discriminant validity.

4.3 Results

The research model (Figure 2) could account for 59.8% of the continued use intention for the gamification service as well as 45.1% of intention to recommend the service to other people. Furthermore, the social factors accounted for 56.5% of the variance of attitudes toward the use of a gamified service. In addition, the model also accounted for 13.4% of the variance in social influence, 33% of recognition, and finally 44.6% of the variance of perceived reciprocal benefit.

Overall, the results (Figure 2) support all of the hypotheses except for hypothesis 2b. Network exposure positively influences all three social persuasion-related constructs (H4a–c). In the previous section of the paper we also hypothesised that network exposure would not have a direct effect on attitude but instead it would be mediated by other social factors. Indeed the coefficient between network exposure and attitude was only 0.017 ($p > 0.1$), whereas the total effect via other social factors was 0.394 ($p < 0.01$). Social influence positively influences attitude directly (H1b) and also the perceived degree of recognition users receive (H1a). Our results indicate that recognition does not have a significant direct effect on attitude (H2b); however, it has a positive influence on the perceived reciprocal benefits gained from the use of the service (H2a). Perceived reciprocal benefits were found to be a strong predictor for attitude toward the service (H3). Attitude was found to be a strong predictor of both intentions measured: intent to continue using the service (H5) and intentions to recommend the service to other people (H6).

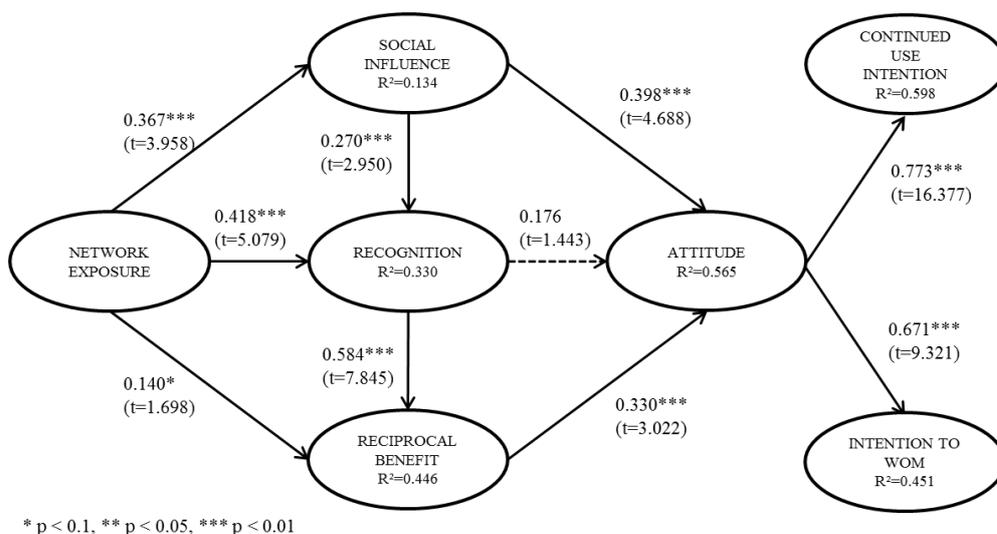


Figure 2. Path model results.

5 Discussion

In this paper, we investigated how social motivations predict attitude towards the use of gamification, and intentions to continue using a gamified service. The results indicate that social factors are strong predictors for how gamification is perceived and whether the user intends to continue using the service and/or recommending it to others. Additionally, these relationships were further positively influenced by the degree to which users are exposed to other users in the service.

The results also indicate that the amount of recognition users receive might not directly affect their attitudes toward gamification to a significant degree. However, recognition did have an indirect effect on attitude, through the concomitant increase in perceived reciprocal benefits. This could be due to that simply receiving recognition – e.g., in the form of ‘likes’ – might not improve how the service is perceived unless, at the same time, the user feels that receiving and giving recognition increased the benefits from using the service. This would further explain the indirect effect on attitude from the perceived reciprocity through beneficial experience created by the service.

Understandably, the larger the network, the more it is possible to receive recognition, get exposed to more social influence, and receive more reciprocal benefits from its use. However, the results show a relatively weak direct relationship between network exposure and reciprocal benefits. This could imply that the size of the network might not have so much intrinsic value with regard to reciprocal benefits directly. Instead, one could posit that the influence stems from the quality of the connection with other people and/or the frequency and nature of the interaction. Further inferences about this relationship, however, are beyond the scope of this study and remain possible avenues for future enquiry.

The results indicate that attitude toward a gamification service is a strong determinant of one’s intentions to continue using the service as well as of intentions to recommend the service to others. Thus the study further confirms the role of attitudes in explaining behavioural intentions (Ajzen, 1991).

5.1 Implications for the design of gamification and persuasive systems

From a design perspective, the findings have several implications. In the context of gamification and persuasive design, it is essential to take into account also the importance of having a community of people who are committed to the same goals. The importance of the network is apparent in creating a service with active and participating usage culture: the social norms and attitudes spread and are supported through the network. The network of other users and followers creates chances for meaningful interaction and further allows reciprocal activity and increases perceived benefits from the service. The findings show that enabling users to get exposed to attitudes of others and also to receive feedback directly from other users can positively influence the attitude towards using a gamification service. Further, social interaction via sharing and being exposed to activities of other users is likely to promote goal commitment towards challenges in the service (Locke and Latham, 1990). Commitment towards goals is likely to be an important antecedent for successful gamification and persuasive design. The social activity of sharing and getting recognized from completing challenges will, firstly, diffuse the norms towards challenges in the community and secondly strengthen commitment towards them. In practice, the findings indicate that gamification should be imbued with mechanisms that afford social interaction in order to enhance social influence and the perception of reciprocal benefits. Thus we propose that similarly to many contemporary games, social elements are essential for creating engaging gamification services.

5.2 Further research directions

The study points to several potential avenues for further research. Firstly, further studies could analyse the moderating effects of demographic variables on the effectiveness of social factors in motivating the use of such services. Secondly, in addition to comparing demographic variables, future work could consider differences related to, for example, how people perceive gamification, by measuring whether different gaming motivations differ with regards to adopting gamified services (Yee, 2007; Tuunanen and Hamari, 2012). Thirdly, this paper has explored only social motivations for using gamification (in the context of exercise); further studies could investigate hedonistic (Hirschman and Holbrook, 1982; van der Heijden, 2004; Webster and Martocchio, 1992) and utilitarian motivations (e.g., Davis, 1989) for gamifying activities. Fourthly, further studies could also measure the attitudes toward the gamified activities as well as intentions to partake in those activities.

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Appendix

Indicator	Survey item	Loading	Construct source
ATT1	All things considered, I find using Fitocracy to be a wise thing to do.	0.816	Ajzen (1991)
ATT2	All things considered, I find using Fitocracy to be a good idea.	0.925	
ATT3	All things considered, I find using Fitocracy to be a positive thing.	0.888	
ATT4	All things considered, I find using Fitocracy to be favorable.	0.884	
CUI1	I predict that I will keep using Fitocracy in the future at least as much as I have used it lately.	0.869	Venkatesh and Davis (2000)
CUI2	I intend to use Fitocracy at least as often within the next three months as I have previously used.	0.877	
CUI3	I predict that I will use Fitocracy more frequently rather than less frequently	0.843	
CUI4	It is likely that I will use Fitocracy more often rather than less often during the next couple months.	0.848	
NE1	I have a lot of friends on Fitocracy who follow my activities.	0.915	Lin and Bhattacharjee (2008)
NE2	Many people follow my activities on Fitocracy.	0.956	
NE3	I follow many people on Fitocracy.	0.919	
NE4	I have many friends in Fitocracy.	0.935	
RECIP1	I find that participating in the Fitocracy community can be mutually helpful.	0.849	Hsu and Lin (2008), Lin (2008)
RECIP2	I find my participation in the Fitocracy community can be advantageous to me and other people.	0.882	
RECIP3	I think that participating in the Fitocracy community improves my motivation to exercise.	0.773	
RECIP4	The Fitocracy community encourages me to exercise.	0.864	
RECOG1	I feel good when my achievements in Fitocracy are noticed.	0.890	Hernandez et al. (2011), Hsu and Lin (2008), Lin and Bhattacharjee (2010), Lin (2008)
RECOG2	I like it when other Fitocracy users comment and like my exercise.	0.894	
RECOG3	I like it when my Fitocracy peers notice my exercise reports.	0.940	
RECOG4	It feels good to notice that other user has browsed my Fitocracy feed.	0.875	
SOCINF1	People who influence my attitudes would recommend Fitocracy.	0.773	Ajzen (1991)
SOCINF2	People who are important to me would think positively of me using Fitocracy.	0.877	
SOCINF3	People who I appreciate would encourage me to use Fitocracy.	0.874	
SOCINF4	My friends would think using Fitocracy is a good idea.	0.808	
WOM1	I would recommend Fitocracy to my friends.	0.773	Kim and Son (2009)
WOM2	I will recommend Fitocracy to anyone who seeks my advice.	0.908	
WOM3	I will refer my acquaintances to Fitocracy.	0.780	
WOM4	I will say positive things about Fitocracy to other people.	0.877	

Appendix A. Survey items.