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MOTIVATIONAL DRIVERS BEHIND GAMIFICATION: THE ROLE OF UTILITARIAN, HEDONIC AND SOCIAL ASPECTS

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Abstract

The purpose of this paper is to investigate the motivational drivers behind gamification, adding new findings to the limited understanding of this phenomenon related to the use of game design elements in non game context, with the scope of affecting the user's behaviour. Several elements related to possible motivational drivers have been identified (characteristic of utilitarian, hedonic and social aspects) and analysed aiming to assess their impact over the intention to use and recommend a gamified service. The study presents multiple regression analysis conducted on data collected through an online survey (n = 208) related to the gamification e-learning experience of Duolingo. The results indicate that utilitarian, hedonic and social aspects present a statistically significant impact on the intention to use and to recommend the service. However, the various elements analysed assume different roles as predictors, implying specific approaches depending on the objective pursued.

Keywords: Gamification, Consumer Behaviour, Game elements, Motivations

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1. Introduction

A new phenomenon emerging from the many technology-based solutions that aim to effect consumer behaviour is the adoption of game-design elements in non game contexts, the so called "*gamification*" (Conejo, 2014). Raising increasing attention from companies and researchers (Hamari et al., 2014), gamification aims to attract and engage the consumers or employees by creating a higher perceived value of the products or activities of a company (Bunchball, 2010; Hamari et al., 2014; Morschheuser et al., 2016). In order to do so, elements, such as points, levels, leaderboards and badges, are adopted in situations other than those for which they were originally created, games. Furthermore, gamification, incorporating fun and progression elements (Sridharan et al., 2012), permits to find new and creative paths regarding the creation and implementation of solutions, going beyond the traditional processes (Palmer & Hugo, 2013).

In the recent past, companies have used this technique in many different contexts such as user engagement, organisational productivity, learning, physical exercise and recruitment. Among the many examples of successful gamification implementation we can find some of the main brands worldwide: Nike thanks to its social running app, Nike+, that enables to track and share training achievements with other users, gaining points and possible rewards, the Brand has been able to attract a user base of 28 million people since its launch (Mittal, 2015); Samsung has decided to implement game mechanisms in its online community, Samsung Nation, with important results such as an increase of 500% of product reviews and 66% more visitors on the website (Swallow, 2012; Liyakasa, 2013); other companies such as Microsoft, IBM and Oracle have decided to gamify their internal application (Badgeville, 2012), in order to face the problem of increasing engagement with employees and to improve efficiency (Burke, 2012).

However, even if this new phenomenon appears very promising (Bunchball 2010; Gartner, 2011), gamification should not be implemented without careful planning, and previous

analysis predict that almost 80% of gamified applications will fail to achieve their scope in the near future (Burke, 2012), this, mainly due to poor design and understanding of motivational aspects. A deep comprehension of the elements and mechanism related to gamification is considered necessary in order to create profitable gamification solutions, and for this reason, a higher expertise about the topic is required (Brigham, 2015).

This research, moving from previous studies regarding motivations and benefits behind gamification (e.g. Bittner & Schipper, 2014; Hamari & Koivisto, 2015), aims to further analyse the topic, combining and implementing the earlier findings with different variables. The first part of this paper aims to assess the state of the art regarding the topic, highlighting the different aspects that define gamification. In the second part, the data collected through an online survey for this scope related to one of the most successful gamification example, the e-learning experience of Duolingo, are used for multiple regression analysis. The findings of this research intend to contribute to a better understanding of the phenomenon.

2. Gamification

2.1 Definition of gamification

Even if the word "*gamification*" was firstly used at the beginning of the new millennium (Pelling, 2011), this term started to assume the current meaning only at the end of the past decade, when Bret Terrill and James Currier used it on their blogs, referring to it as: *"taking game mechanics and applying them to other web properties to increase engagement."* (Terrill, 2008). It is only in the second half of the past decade that the term saw widespread adoption obtaining both industrial and academic attention.

The most used and cited definition of "*gamification*" is: *"the use of game design elements in non-game contexts"* (Deterding et al., 2011; p. 9). As further described by the authors, this definition tries to clarify the peculiarities that characterise the phenomena and that

enable us to distinguish it from precursors and parallels such as "*serious games*", games designed for serious purposes that go beyond mere entertainment, and "*pervasive games*", new game genres that go beyond the traditional boundaries of games, adapting games into new contexts, situations and spaces (e.g. location-based games, augmented reality games).

Huotari and Hamari proposed an alternative definition of gamification, that is defined as: "*A process of enhancing a service with affordances for gameful experiences in order to support user's overall value creation"* (Huotari & Hamari, 2012; p. 19). The authors are more focused on the goal of the gamified experience than on the elements that distinguish it. With this in mind, gamification can be considered positively implemented only in the case that supports the core-service, making it gameful in a way that does not distract the user from the main purpose.

The common idea, that is highlighted throughout the literature review over the topic, is the willingness to create a valuable experience that is able, through game elements, to engage the customers and affect positively their behaviour (Hamari, 2013).

2.2 Gamification elements

Having provided the main definitions of gamification, the analysis will now focus on the elements that characterize a gamified experience: the gamification mechanics, dynamics and emotions (Robson et al., 2015). Those elements were developed in the literature review adapting the MDA framework (Hunicke, LeBlanc, & Zubek, 2004) to the new phenomena.

Common examples of gamification mechanics include levels, badges, points systems or rankings. Overall, three main kinds of mechanics can be identified and they characterize respectively setup, rules and progression in the experience. Through those mechanics, the designers, i.e. "*those who try to gamify a non game context*" (Robson et al., 2015), are able to determine the rules, the context, the different interactions and the goals of the gamified

experience. However, those elements alone, even if fundamental for the experience, are not able to guarantee the success of a gamification process.

The gamification dynamics are related to the impact that the above-mentioned mechanics produce on each user and their approach and response to them (Huotari & Hamari, 2012). Since those dynamics can not be previously set, it is very important to focus on which kind of behaviours each mechanism can generate, and try to predict the results in order to develop the gamified experience in the most appropriate way. Taking into consideration the different goals, the designers can aim, for example, for a more cooperative or more competitive dynamics, trying to avoid inappropriate and negative actions from the users, like trying to break the rules (Elverdam & Aarseth, 2007; McCarthy et al., 2014).

The gamification emotions are the affective psychological states that are generated by the way the user feels while following the mechanics and then generating the dynamics (Robson et al., 2015). The emotions can be both positive or negative, so it is important to create a gamification process that results in a fun and enjoyable experience for the user (Sweetser & Wyeth, 2005).

3. Theoretical background

A literature review was conducted aiming to assess the state of the art regarding the topic, and to identify the models and variables developed related to it.

In order to identify the different kinds of motivation that can have an impact on the users of a gamified experience, the research was structured combining the technology acceptance model (TAM) (Davis, 1989) and relative implementation from other authors (Van der Heijden, 2004; Venkatesh & Davis, 2000), an implemented model from Hamari and Koivisto (2013) that developed the theory of planned behaviour (TPB) (Ajzen, 1991) adding social factors, and other research applying the human motivation theories to online consumer behaviour and technology

acceptance (Webster & Martocchio, 1992; Deci & Ryan, 2000; Kim & Son, 2009; Hernandez et al, 2011).

Three are the types of benefits identified as possible predictors of the behaviours related to gamification: utility, hedonism, and social benefit. In this research, using survey collected data, their impact was analysed on the intention to use and recommend a gamified experience (WOM).

As described by the self-determination theory (Deci & Ryan, 1985), the motivations that can affect human behaviour, can have two different types of sources: the extrinsic motivations are invoked when the goal and conditions are related to external sources, such as an economic benefit for completing a task; on the other hand, intrinsic motivations are the one that brings a person to engage in a behaviour being driven by an internal reward, and can be related to factors such as interest, enjoyment or control (Deci & Ryan, 2000).

This theory is useful in order to evaluate the differences between gamification and loyalty programs, even if the usage of point-based systems and rewards can be similar, and both are customer oriented. Offering economic benefits and being focused on behavioural rewards, loyalty programs likely elicit extrinsic motivations (Deci, Koestner, & Ryan, 1999). The gamification process, instead, is able to increase the perceived value of the service, by affecting the users' intrinsic motivations by the implementation of game mechanics and therefore creating a gameful experience (Huotari & Hamari, 2012; Hamari et al, 2014). Moreover, gamification adds a competition's element that is not present in the others' engagement strategy, and the specific challenge impacts the behavioural and emotional responses (Harwood & Garry, 2015).

Another possible distinction that characterizes the technology adoption literature is related to the difference between utilitarian and hedonic systems: while the first system is related to the fulfilment of goals different from the service use itself, aiming to make those

goals more easily or effectively reachable, the second, related to intrinsic motivations, has the purpose of making the experience itself more entertaining and enjoyable (Davis, 1989; Van der Heijden 2004). Gamification is considered capable of providing both benefits since it attempts to motivate the user in obtaining utilitarian outcomes while invoking hedonic aspects, intrinsically motivated (Hamari & Koivisto, 2015).

Lastly, it is necessary to consider the impact of social features in the systems. Taking into consideration the social nature of human beings, when social aspects are integrated into utilitarian or hedonic systems, motivations can be generated from aspects such as recognition and mutual benefits, generating social interaction, and then supporting and adding value to the core service (Hamari & Koivisto, 2013).

3.1 Utilitarian Aspects

Analysing the utilitarian benefits that have an impact on a particular technology or system, the perceived usefulness is considered as a predictor of intention to use (Davis, 1989; Venkatesh, 2000). Defined as the range of the belief that a particular system improves the performance of a task (Davis, 1989), this factor is considered to be more effective in case of utilitarian purposes, than in the presence of hedonic objectives (Van der Heijden, 2004); still, considering, as previously mentioned, the dual nature of gamification that is characterized by both dimension, it is possible to assume that usefulness is fundamental for the user experience.

The willingness to use a system can be positively influenced by the perception that the gamified experience is easy to use. Regarding technology acceptance research, previous studies (Davis, 1989; Venkatesh, 2000) have demonstrated that the easiness of use can be considered a predictor of more efficiency in case of utilitarian systems, improving the interaction between the user and the system. Moreover, considering that gamification, as previously explained, also presents elements of hedonistic experiences, ease-of-use was shown to be positively related

also to the use intentions in the case of hedonistic experiences, with the consequent benefit of being more enjoyable (Van der Heijden, 2004).

3.2 Hedonic Aspects

As previously analysed (Hamari & Koivisto, 2015), the perceived enjoyment has a positive influence on the intention to use a gamified experience. This aspect, the fact that the system is perceived as enjoyable on its own (Davis, 1989), is characteristic of hedonic experiences and is a common element that influence games, game-like systems and other entertainment systems (Venkatesh, 1999; Van der Heijden, 2004). Another aspect to take into consideration is the playfulness of the gamified system. Defined as "*the tendency to interact spontaneously, inventively and imaginatively*" with a system (Webster & Martocchio, 1992), playfulness can be an important element for gamification, since this process enables to implement an original and creative way to approach the task.

3.3 Social Aspects

Considering the theory of planned behaviour (Ajzen, 1991), social influence is defined as the individual's perception of how other users judge a specific behaviour as relevant, and if they expect him to accomplish it. In the case of gamification, this element can be important to predict the use intention. Considering the human desire for relatedness and acceptance (Deci & Ryan, 2000), the sense of recognition, related to the feedbacks that users obtain from others for their behaviour (Hernandez et al., 2011), can positively affect the use of a service, promoting social interaction and increasing the perceived benefits related to the use.

4. Method

4.1 Research Questions and Conceptual Models

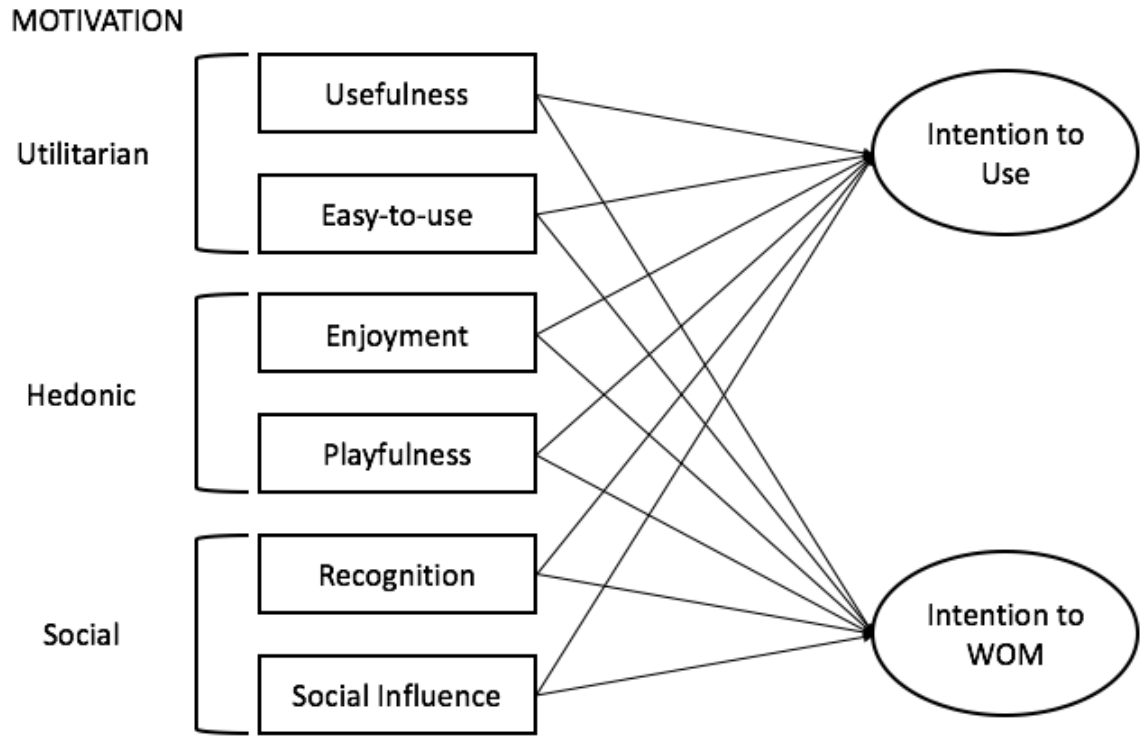
This study aims to investigate the relations between utilitarian, hedonic and social motivations and the intention to use or to recommend (World-of-mouth) toward gamification.

The decision to investigate the intention to WOM is related to the importance that this aspect can assume as an influencer in human behaviour (Day, 1971; Sundaram et al., 1998). In this research, world-of-mouth was defined as the intention to recommend a particular product or service, and previous studies have shown that it can be assumed as an indicator of user's satisfaction and willingness to use (Bhattacherjee, 2001; Kim & Son, 2009).

Combining the theoretical background, six different independent variables were identified as predictors, two for each kind of motivation: Usefulness, Easy-to-use, Enjoyment, Playfulness, Recognition and Social Influence.

The research questions of this study are related to the different possible interactions between each exogenous variable and the endogenous variables. For this purpose, the data collected through an online survey had been used to analyse if a positive association between the items can be statistically supported and, hence, stated.

Figure 1: Conceptual Model for Intention to Use and to WOM



Source: Own development based on Conceptual Background structure

4.2 Procedure

In order to gather the data necessary to test the research hypothesis, an online structured questionnaire was developed and sent via Facebook chat or email during the months of October and November 2016.

Different authors (e.g. Bittner & Schipper, 2014; Hamari & Koivisto, 2015) have investigated the topic, highlighting the necessity for further analysis using different context of gamification. Considering the previous research and basing the structure and development of the survey on the literature review, it was necessary to identify a context of gamification not previously analysed.

The e-learning experience offered from the free language-learning platform of Duolingo appeared as the most appropriate tool for doing it, hence it was used as an example of

gamification in the survey conducted. Duolingo includes a language-learning website and app, offering free of charge language courses over 23 different languages, reaching a worldwide base of more than 150 million users from its launch five years ago (Guliani, 2016; Hern, 2016). The learning service presents many elements peculiar to gamification: badges, points, levels, leaderboard, flow and the possibility to have social interactions through the chat and comment option.

The questionnaire encompassed 39 questions, it was organised in three parts and started with 3 simple multiple choice questions: the first regarding the knowledge of gamification, and the subsequent related to Duolingo and the use of the service.

The questionnaire was pre-tested with the contribution of 25 people, with distinct levels of education, age and gender. The pre-test was conducted in order to validate people's aptitude to comprehend and recognise each question and its general relevance to the study. This phase helped to reform the questions (that are adapted from previous researches, Appendix 1) and make them more appropriate for the research purpose.

4.3 Sample

Considering the necessity to interpret the data collected using methodology characteristic of Principal Component Analysis, the sample size had to fulfil the specific minimum requirement, characteristic also of factor analysis, of size given by the ratio 5:1 of respondents to items (Gorusch, 1983; Hatcher, 1994). One of the most well-know criteria for quantitative research is the number of 100 subjects as minimum size (MacCallum et al., 1999). The survey was sent to more than 400 people, reaching a total number of respondents of 223. Since some of the answers can not be considered complete, the number of valid responses is 208. Those features allow to satisfy the requirement of sample size peculiar to the conditions

of representativeness (Yamane, 1967; Singh & Masuku, 2014), resulting in a sample that contains an appropriate collection of data to conduct a study.

Among the respondents, 103 are men (45,5%) and 108 women (55,5%), so the two genders are almost equally represented. The most represented age group is between 18 and 24 years, counting for 38% of the total, the second is the one of 24-29 years old (26,9%), while only 8 individuals under the age of 18 answered the questionnaire. 148 are the respondents that hold a university degree (Bachelor and Masters are respectively 31,3% and 39,9% of the total).

4.4 Measures

The questionnaire was developed combining past studies, using scales that were previously validated by other researchers (Appendix 1). All the variables present four items that are measured with a seven-point Likert Scale (Likert, 1932). The decision to use a seven-point scale is supported by prior research that suggests an increase in reliability and validity (compared to the more popular five-point scale), without affecting the factor analysis, important aspect since a Principal Component Analysis (PCA), was necessary during the research (Churchill & Peter, 1984; Barnes et al., 1994; Colman et al., 1997; Harzing et al., 2009). In order to increase the accuracy of the answers (Malhotra & Birks, 2007), all Likert-scale scores had been categorised from 1 to 7 (1=Strongly Disagree, 4=Neither Agree or Disagree, 7=Strongly Agree). The question order was randomised, aiming to limitate the possibility for the respondents to identify patterns between the items and prevent common method bias (Cook et al., 1979).

In addition, a Cronbach Alpha test was run with the scope to assess the internal consistency reliability of the questionnaire (Cronbach, 1951). The results of the analysis fulfil the requirement for acceptance of .70 (Nunnally, 1978), and indicate an excellent level (> .90) of internal consistency for the constructed test (George & Mallery, 2003).

Since every variable contained 4 items, a Principal Component Analysis, that identify a linear combination of optimally weighted observed variables, using an orthogonal rotation technique, was run. This statistical procedure is considered appropriate as data reduction technique for predictive models and both the 5:1 ratio previously mentioned (Gorsuch, 1983; Hatcher, 1994) and the sample size bigger than 100 allows its application (Mundfrom et al., 2005). Considering the Eigenvalue and Scree Plot results it was possible to extract one component for each variable that reflects the different items (Bobko & Schemmer, 1984; Stevens, 1986). The requirement of >.60 for Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is satisfied from all the Principal Components Analysis (Cerny & Kaiser, 1977)., with values very close to > .80, considered good or excellent (Hutcheson & Sofroniu, 1999). Those component were, hence, used in the multiple regression analysis.

5. Results

In order to assess the effects of the independent variables over respectively Intention to use and to WOM, two distinct multiple regression analysis were conducted (Appendix 2 and 3).

The first construct could account for 79,6% of the variance of the intention to use. Both the utilitarian motivations present a positive relationship with the intention ($\beta = .326$, $p < .01$ for Usefulness, $\beta = .177$, $p < .01$ for Easy of use). With regard to the hedonic benefits, enjoyment is positively associated with the endogenous variable ($\beta = .194$, $p < 0.05$), while playfulness did not significantly predict the variable ($p > .05$). Social influence is a significant predictor for the dependent variable ($\beta = .258$, $p < .01$). Recognition too can not be considered as statistically significant for the analysis ($p > .05$).

Regarding the intention to recommend the service, the construct is able to predict 84.3% of the variance. Differently from the previous analysis, the usefulness does not present a direct relationship with the dependant variable ($p > .05$). Easy-of-use still has a positive relationship with the Intention to WOM ($\beta = .246$, $p < .01$). Passing now to the hedonic aspects, enjoyment is a significant predictor for intention to WOM ($\beta = .193$, $p < .05$), while Playfulness can not be considered so ($p > .05$). Lastly, social influence presents the highest significant associations with the endogenous variable ($\beta = .402$, $p < .01$). Recognition, once more, is not statistically significant for the construct ($p > .05$).

Table 1: Research hypothesis

H#	Description	Supported
H1.1	Usefulness is positively associated with intention to use.	Yes
H1.2	Usefulness is positively associated with intention to WOM.	No
H2.1	Easy-of-use is positively associated with intention to use.	Yes
H2.2	Easy-of-use is positively associated with intention to WOM.	Yes
H3.1	Enjoyment is positively associated with intention to use.	Yes
H3.2	Enjoyment is positively associated with intention to WOM.	Yes
H4.1	Playfulness is positively associated with intention to use.	No
H4.2	Playfulness is positively associated with intention to WOM.	No
H5.1	Recognition is positively associated with intention to use.	No
H5.2	Recognition is positively associated with intention to WOM.	No
H6.1	Social Influence is positively associated with intention to use.	Yes
H6.2	Social Influence is positively associated with intention to WOM.	Yes

6. Discussion and Conclusion

In this paper, I investigated how different kinds of motivations (utilitarian, hedonic and social) are associated with the intention to use and to recommend gamification. The findings that emerge from this research present similarities but also some interesting differences in the roles that the predictors assume over the dependent variables, and these results imply particular approaches in the implementation of gamification depending on the companies' specific goals.

With regard to the intention to use, gamification provides benefits characteristic of utilitarian systems, confirming the assumptions relative to the technology acceptance theories (Davis, 1989; Venkatesh, 2000). This conclusion is an important aspect that companies that are willing to increase their user base and retention rate have to consider: they should focus on creating a gamification experience that satisfies the aspects related to usefulness and easiness to use, developing a new solution that is efficient and that meets a precise objective. The hedonic aspect of enjoyment has to be considered as a crucial factor when designing a gamified product. The research finding is supported by other studies which suggest that the attractiveness of gamification is surely related to the people's positive response in terms of engagement and participation when facing sources of entertainment (Meloni & Gruener, 2012). This aspect, that is a direct consequence of the use of game design elements, also enables to differentiate this new phenomenon from other persuasive solutions, hence, the creation of an enjoyable experience has to be taken carefully into consideration (Sweetser & Wyeth 2005; Hamari & Koivisto 2015). Finally, the results related to the social aspects indicate on one hand, that recognition is not a significant predictor for the intention to use the gamified service, on the other hand, the social influence present a positive relation with the endogenous variable. The rejection of the hypothesis regarding recognition can be explained by the fact that this aspect is not able to increase how the service value is perceived, while the result related to social influence confirm what has previously found (Hamari & Koivisto, 2013).

Regarding the intention to recommend the service, an interesting finding, that appears from the analysis of the collected data, is that no direct relationship between the variable and the utilitarian aspect of usefulness can be detected as statistically significant. This result can be interesting for companies that want to increase the brand awareness, through a gamification, since it suggests that it would be necessary to focus more on other aspects rather than the usefulness of the experience. While the hedonic element of enjoyment has a similar role as predictor than in the case previously analysed related to the intention to use the service, an unexpected result regards the social element of recognition. The fact that this element does not present a statistically significant relation with the endogenous variable is a result that differs with other research finding (Hamari & Koivisto, 2013). A possible reason for this result is related to the different context used for collecting data (in this case Duolingo) and for this reason future studies should analyse the relation between the two variables, using different contexts of gamification. The results related to social influence indicate that this aspect assumes a pre-eminent role as predictor of intention to WOM. This finding can be explained by the fact that a person would prefer to recommend a particular service, as Duolingo, only in the case that the attitudes of another person about the service are positive and he or she thus assumes to meet their expectations. The fact that the social aspect assumes such a weight over the intention to WOM is a crucial aspect to consider in order to maximise the effort of increasing the awareness and, consequently, enhance the existing user base. In fact, in order to increase the potential sharing rate of a gamification experience through suggestion, the companies should implement all those elements that facilitate social interaction, giving the possibility to the user to share their results and receive feedbacks (Hamari & Koivisto, 2013).

From the analysis emerges, as first result, that while the hedonic benefits have similar relations with the Intention to use and to WOM, the utilitarian aspects are better predictors of

the first intention, while the social motivations present a stronger positive relation with the willingness to recommend gamification.

The intention to also investigate the element of world-of-mouth in this research is related to the fact that in the literature review is not possible to find a study related to the different types of benefit that affect this particular behaviour toward gamification. WOM can assume a relevant role as an influencer of behaviour, being considered often more effective than other marketer-controlled sources (Buttle, 1998), such as print sources (Herr et al., 1991). Moreover, it is considered effective to raise awareness about an innovation and to secure the decision to try it (Sheth, 1971). This can be a particularly relevant aspect for a procedure such as gamification, which is still establishing itself as a new method for marketing and customer engagement (Hamari et al., 2014).

The success of gamification could be affected by a low level of comprehension of how to implement the correct aspects (Gartner, 2012). Previous studies highlight that a possible reason for this difficulty to implement opportunely game elements is related to the fact that, since gamification involves motivation systems, aiming to affect behaviours (Hamari & Koivisto, 2015), a better understanding of those aspects has to be reached (Morschheuser et al., 2016). Considering the relative novelty of the topic and the knowledge level achieved, this research aims to bring further insights that can improve the comprehension regarding the topic, using primary data collected from one of the most successful examples of utilisation of gamification. A better understanding of a motivational tool such as gamification can help for a more appropriate development of such tools, resulting in a possible reduction in the high failure rate estimated (Burke, 2012).

7. Limitations and future research

Some limitations have influenced the present study, such as bias in the form of social desirability bias, which may have risen during the study, caused by the use of self-reported measures and the subjectivity of the answer given; another possible limitation is given by the sample used, that even if it satisfies the requirements of representativeness previously mentioned, could be expanded while focusing more on population segments such as people under 18 one that was not enough represented from the sample of this research and that will assume, in the near future, a focal role being constituted by digital native individuals that are going to occupy a critical role as future consumers.

Considering the present analysis, further research could focus on a deeper analysis of the roles of usefulness and recognition as predictors of intention to recommend a gamified service, more in specific to test if the fact that those elements are not considered a significant predictor is related to the specific context of this study. Furthermore, future works should investigate if the intentions described, indicator of willingness to perform a particular behaviour, will result in a concrete execution of the same. Another aspect that would be an interesting field of study is the different effect that the new platform and technologies such as augmented reality can have over the successful implementation of gamification.

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Appendix

	Item	Adapted from
Usefulness	Using Duolingo makes/would make it easier for me to start exercising. Using Duolingo enables/would enable me to accomplish more with regards to exercise. Using Duolingo is/would be useful for the purposes of the exercise. I find Duolingo useful.	**Davis (1989)**
Ease of use	I believe that using Duolingo interfaces does not require a lot of mental effort. The interaction with Duolingo is/seems clear and understandable. I find/would find Duolingo easy to use. I find/would find it easy to get the interface of Duolingo to do what I want to do.	**Davis (1989)**
Enjoyment	I find/would find the experience of the exercise and the related Duolingo use interesting. I find/would find the experience of the exercise and the related Duolingo use exciting. I find/would find the experience of the exercise and the related Duolingo use enjoyable. I find/would find the experience of the exercise and the related Duolingo use pleasant.	**Van der Heijden (2004)**
Playfulness	I find Duolingo original. I find Duolingo playful. I find Duolingo flexible. I find Duolingo creative.	**Webster and Martocchio (1992)**
Recognition	I feel/would feel good when my achievements in Duolingo are/would be noticed. I like/would like that other Duolingo users comment or like my exercise. I like/would like that my Duolingo peers notice my exercise results It feel/would feel good to notice that other user has/would browsed my Duolingo results.	**Hernandez et al (2011)**
Social Influence	People who influence my attitudes would recommend Duolingo. People who I appreciate would encourage me to use Duolingo. My friends would think using Duolingo is a good idea. People who are important to me would think positively of me using Duolingo.	**Ajzen (1991)**
Intention to WOM	I would recommend Duolingo to my friends. I would say positive things about Duolingo to other people. I would refer my acquaintances to Duolingo. I would recommend Duolingo to anyone who seeks my advice.	**Kim and Son (2009)**
Intention to Use	I intend to use Duolingo in the future. It is likely that I will use Duolingo in the next months. I predict I will start to use/keep using Duolingo in the future. I find using Duolingo to be a a wise thing to do in the future.	**Venkatesh and Davis (2000)**

Appendix 1: Survey questions

Predictors	β	SD	*t*	*p*
Usefulness	.326	.077	4.218	.000*
Easy-of-Use	.177	.065	2.732	.007*
Enjoyment	.194	.089	2.175	.031*
Playfulness	-.009	.073	-.118	.906
Social Influence	.258	.069	3.751	.000*
Recognition	.024	.055	.428	.699

Note: *Significant effect with $p < .05$

Appendix 2. Multiple Regression Analysis, source: IBM SPSS Statistic

Predictors	β	SD	*t*	*p*
Usefulness	.052	.068	.761	.448
Easy-of-Use	.249	.057	4.365	.000*
Enjoyment	.193	.078	2.467	.014*
Playfulness	.032	.064	.504	.615
Social Influence	.402	.060	6.661	.000*
Recognition	.069	.049	1.417	.158

Note: *Significant effect with $p < .05$

Appendix 3. Multiple Regression Analysis, source: IBM SPSS Statistic