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DIGITAL BADGE FROM THE PERSPECTIVE OF SELF-DETERMINATION THEORY

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Abstract

Digital badges, as an example of gamification of learning, have recently been used as credentials by educators and corporations to display and reward learners. The use of game design elements in non-game contexts receives only a limited amount of research. The main purpose of this study is to examine how three components of Self-Determination Theory (SDT) are related to value perception and intention to send an application to corporations adopting badges to mark achievements. In this context, data collected from 207 employees of various firms operating in different industries in Indonesia were tested and analyzed. We investigated which motivational elements of the theory influence the digital badge value perception and the intentions of the respondents.

INTRODUCTION

Background

The number of bachelor degree holders being unemployed increased from 5.34 to 6.22 per cent in 2015 (Ganesha, 2016). This number illustrates how competitive it is for millennials, i.e. individuals who were born after the mid 1980s (Samsudin and Hasan, 2017), to find and secure jobs once they graduate. Despite the competitiveness in the job market, today's graduates have their own preference in selecting jobs. This generation is also known to rarely stay at one job for a very long time. In the U.S., for instance, it is noted that there is 21% of millennials left their job in 2015 and this number is three times higher than non-millennials who also quit jobs. Besides, in selecting

the job opportunities, millennials select those that in line with their needs and goals in life (Rigoni and Adkins, 2016).

Recently, various organizations have implemented gamification design elements to drive performance outcomes, with varying degrees of success. Gamification illustrates the nature of humans who want to be recognized. According to Danna (2018), the employees of most companies (93%) reported that they are not just willing to carry out rewards and recognition to remain competitive, but are strong supporters of non-cash rewards and recognition as a competitive advantage for the organization.

One of the gamification design elements adopted in the workplace context is digital badge. According to Fry (2014), digital badges have the ability that standard resumes do not in representing talents' skills that include information about projects, videos, and actual work or experience. Therefore, today's young talents may find companies that implement digital badge in workplace as more attractive in a way to represent themselves better.

One of the online talent platforms and the digitization that employers can implement is digital recognition system for talents' skills and achievements. The idea of digital open badges was initiated by Mozilla Foundation in 2010 as an alternative for paper certificate (Loughlin et al., 2016). The digital badge includes issuer information, award description and other information that can be verified, embedded, and shared in various digital platforms, e.g. virtual learning and social media.

According to Ruhi (2015), the goal of gamification within a company is to generate desired results by engaging and motivating employees, e.g. improved productivity, organizational transformation and innovation. Recently, gamification has become an object of empirical research, and to date, only a few studies have investigated how these gamification elements affect an employee's motivation (Seaborn and Fels, 2015; Mekler, Bruhlmann, Tuch, and Opwis, 2015). To determine how to make them more verifiable as their paper counterparts is one of the challenges associated with digital badge (Glover & Latif, 2013). In this study, we explore the role of such micro-credential within the context of working environment through the value perception of digital badges and how it may influence the intention of talents to send their applications.

Research Problems

To date, only a few studies have investigated the effects of particular game elements on types of motivation, value perception, and behavioral intention. This research attempts to assess if extrinsic motivation, amotivation, and intrinsic motivation can be used to determine digital badge's value perception and its associated effect on intention to apply. The aim is to enhance the understanding of how gamification element can be used by organizations to drive employees' motivation and their value perception.

Research Questions

Based on the discussion above, the research questions addressed in this study are: (1) What is the effect of extrinsic motivation, amotivation, and intrinsic motivation towards perceived value and intention to apply?; (2) How far does extrinsic motivation affect perceived value and intention to apply?; (3) How far does amotivation affect perceived value and intention to apply?; (4) How far does intrinsic motivation affect perceived value and

intention to apply?; (5) How far does perceived value affect intention to apply?; (6) Which variable is the most affecting one towards both perceived value and intention to apply?

Research Objectives

This study aims to investigate a research gap in the academic literature on gamification related to digital badges is the main objective of this study. More specifically, we focus on the effect of three motivational drivers (extrinsic motivation, amotivation, and intrinsic motivation) on the perceived value of digital badge and behavioral intention to send an application to companies implementing a digital badge system. The specific objective of our research is to assess the effects of extrinsic motivation on perceived value and intention, the effects of amotivation on perceived value and intention, and the effects of intrinsic motivation on perceived value and intention.

LITERATURE REVIEW

Literature on digital badging and other micro-credentialing approaches is expanding, but much of it focuses on the potential to improve learning outcomes rather than workforce outcomes. In working environment, users usually look for gratification from achieving specific valued outcomes, e.g. recognition. To Maslow (1954), recognition represents a “character expression,” not a striving for external satisfiers. According to Herzberg’s (1966) motivation-hygiene theory, “recognition for achievement” is identified as one of the “growth or motivator factors that are intrinsic to the job.”

Self-Determination Theory

Ryan and Deci’s (2000) Self-Determination Theory (SDT) investigates people’s tendencies and needs underlying their self-motivation and personality integration. To facilitate growth and integration, as well as personal well-being and social development, the theory has identified three motivational needs – the needs for competence, relatedness, and autonomy (competence as the feeling of mastery, improvement and ability to perform well; autonomy as the feeling of choice and control over own actions and decisions; and relatedness being the feeling of closeness to others and belonging to a group or community). Because of the functional and experiential differences between self-motivation and external regulation, a major focus of SDT has been to supply a more differentiated approach to motivation, by asking what kind of motivation is being exhibited at any given time. By addressing the perceived forces that energize people’s behavior and move a person to act, SDT has identified three different types of motivation to put pressure on people for motivational and well-being outcomes. *Extrinsic motivation* refers to the performance of an activity in order to achieve some separable outcomes. Amotivation, resulting from not valuing an activity, is the state of lacking the intention to act (Ryan, 1995).

As evidence that digital badges could eventually have a value for employers and others outside of learning or training contexts, Grant (2014) offers examples of social media websites that have created ways for members to post evidence of their skills for potential employers to view: the coding website GitHub created an Open Source Report Card feature for its users, and online programmer forum Stack Overflow created a platform it calls

Careers 2.0. User profiles on these platforms are functionally similar to digital badge portfolios. They display evidence of users' hard skills in programming as well as users' habits and dispositions, captured through metrics on their forum contributions and their reputations in the online community.

Hypothesis Development

In an academic environment, a learner who has strong intrinsic motivation to earn digital badges would perceive them as performance-contingents that could yield higher academic performance (Reid, Paster, and Abramovich, 2015). When participants perceive the badge to be a reward for work accomplished, they perceive this as positive feedback, thus the motivation to continue using it (Cruz, Hanus, and Fox, 2015). In using digital badges, participants are motivated to achieve external incentives, e.g. points, levels, badges, to improve intrinsic motivation (Jovanovic and Matejevic, 2014). Badges are seen as a good ploy to encourage meaningless behavior (Cruz, Hanus, and Fox, 2015). In gaming environment, the badges were assessment signals indicating gaming competence while other participants that argued badges primarily demonstrated time spent, not the possession of skills (Cruz et al., 2015). Therefore, extrinsic motivation has a positive influence on value perception of digital badge (Hypothesis 1). Amotivation has a negative influence on value perception of digital badge (Hypothesis 2). Intrinsic motivation has a positive influence on value perception of digital badge (Hypothesis 3).

The practice of gamification has been used to support behavioral change, e.g. energy use reduction, improving attitudes and intentions towards exercise (Gustafsson, Katzeff & Bang, 2009; Hamari and Koivisto, 2013). However, in the state of amotivation, a person is lacking the intention to act (Ryan and Deci, 2000). This leads to the following: extrinsic motivation has a positive influence on an employee's intention to send an application to a company that implements digital badge (Hypothesis 4), amotivation has a negative influence on an employee's intention to send an application to a company that implements digital badge (Hypothesis 5), and intrinsic motivation has a positive influence on an employee's intention to send an application to a company that implements digital badge (Hypothesis 6).

In gamification approach, the perception on learning outcome will lead a positive behavioral intention in the form of learning achievement (Sánchez-Mena, Martí-Parreño, and Aldás-Manzano, 2017). Thus, it can be assumed that teachers' beliefs that gamification has a positive effect in attracting students' attention will affect teachers' intention to use gamification in their courses (Su and Cheng, 2015; Sanchez-Mena et al., 2017). Therefore, an employee's value perception of digital badge has a positive influence on his/her intention to send an application to a company that implements digital badge (Hypothesis 7).

MATERIALS AND METHODS

Research Approach

This quantitative research was conducted from March to April 2018. The primary research data were collected using an online survey involving 207 employees from various firms operating in different industries in capital city

of Jakarta and its surrounding areas. All of the participants were able to respond to the initial online survey provided to them through email and WhatsApp, requiring them to click on a URL link.

After being directed to the URL for the survey, the participants were directed to read the definition of digital badges. The objective of providing the digital badge definition was to ensure that the participants have a similar understanding of the term. This was followed by the actual survey questions. The first part of the survey questions collected information about their demographic characteristics: gender (male or female); age (18-24, 25-34, 35-44, 45-54, >54); education level (High School Graduate, Diploma, Bachelor Degree; Masters; and Doctorate); residentials (Jakarta and Banten, West Java, Central Java, East Java, other); employment industry (Advertising, Education, Banking and Finance, Oil and Gas, Insurance, Hospitality, Telco, Retail, other); social media (Facebook, Instagram, Twitter, LinkedIn, YouTube, Google+, other). The rest of the questions on the survey used a Likert scale of one to six, with one being “Strongly disagree” or “Very unlikely”, and six being “Strongly agree” or “Very likely.” GoogleDocs, Excel, and SPSS were used as data analysis tools.

This study used a framework to describe the relevant variables for study of a particular topic and proposed a collection of hypotheses. From the framework, this study suggested two models to test empirical results from the inputs in a independent variable to outputs in a dependent variable. The models or equations are Model 1 (from extrinsic motivation, amotivation, and intrinsic motivation to perceived value) and Model 2 (from perceived value to intention to send an application). The framework proposed by the researchers for this study is as follows:

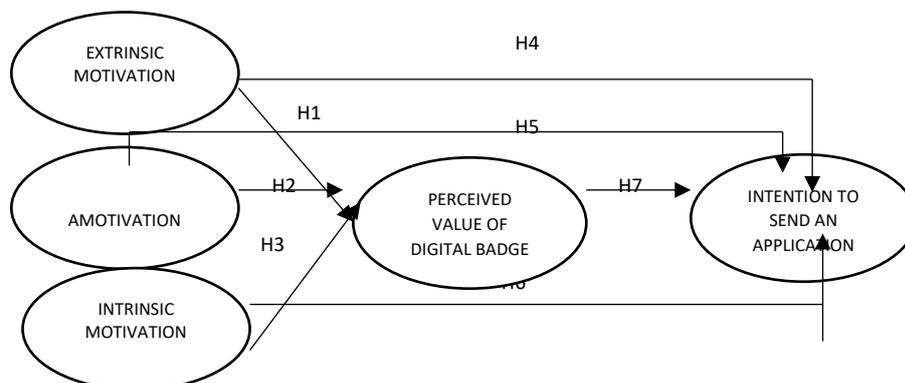


Figure 1. Research Framework of Study

Population and Sample

According to The Indonesian Central Bureau of Statistics (2017), the number of workforce in Indonesia was around 128,000,000. This study employed purposive sampling/judgment sampling and the minimum requirement of the samples was 100 based on the Taro Yamane formula.

RESULTS AND DISCUSSIONS

To check the validity and reliability of the survey items, the researchers conducted a pre-test to 33 respondents. All survey items are valid and reliable. Therefore, they are eligible to be used for further analysis.

According to the survey collected, most of the respondents were male (55%). In the age category, the majority of the respondents are from 25–34 years old (43%), followed by 35–44 (27%), 18–24 (18%), 45–54 (11%), and above 54 (1%). In terms of educational background, 113 are bachelor's degree holders (55%), followed by 71 master's (34%), 11 diploma's (5%), 9 high school graduates (4%), and 3 PhD's (1%). The majority of the respondents live in Jakarta and Banten (74%), followed by West Java (17%), Central Java (3%), East Java (2%), and other areas (4%).

Most of the respondents' businesses are in the sector of education (30%), followed by other sectors (17%), banking and finance (14%), fast moving consumer goods (10%), telecommunications (6%), health care (5%), information technology (5%), oil and gas (5%), service (4%), and advertising (3%). Most of the respondents' choice of social media is Instagram (52%), followed by Facebook (23%), YouTube (12%), LinkedIn (4%), and the rest at 2% each (Google+, Twitter, WhatsApp, and others).

Descriptive Analysis of the Variables

As presented in Table 1, on average, the respondents seemed to be in agreement per survey item with a mean INTENT (Intention) score of 3.92 (SD = 1.17), PERVAL (Perceived Value) of 3.97 (SD = 1.18), EXTMOT (Extrinsic Motivation) of 4.05 (SD = 1.13), AMOT (Amotivation) of 3.46 (SD = 0.98), and INTMOT (Intrinsic Motivation) of 3.85 (SD = 1.18). The table also shows that the highest tendency of the respondents in filling out the series of questions is the variable extrinsic motivation; the lowest is amotivation.

Table 1.
Descriptive Statistics

	Mean	Std. Deviation	N
INTENT	3.9179	1.17218	207
PERVAL	3.9603	1.17933	207
EXTMOT	4.0524	1.12855	207
AMOT	3.4615	0.98167	207
INTMOT	3.8521	1.18270	207

F-test of Model 1 (EXTMOT, AMOT, INTMOT towards PERVAL)

Table 2 shows the influence factor of the three independent variables (EXTMOT, AMOT, INTMOT) towards the dependent variable (PERVAL) approximately 84%. Table 3 shows that F-stat $372.207 > F$ -table 2.61 and the “Sig.” value is less than α ($0.000 < 0.05$). Hence, the model is fit and statistically significant.

Table 2.
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.920 ^a	0.846	0.844	0.46595

a. Predictors: (Constant), EXTMOT, AMOT, INTMOT

Table 3.
Multiple Linear Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	242.433	3	80.811	372.207	0.000 ^b
	Residual	44.074	203	0.217		
	Total	286.507	206			

a. Dependent Variable: PERVAL

b. Predictors: (Constant), EXTMOT, AMOT, INTMOT

t-test Result for Model 1 (EXTMOT, AMOT, INTMOT towards PERVAL)

Table 4.
ANOVA Regression of Model 1

Model		Unstandardized Coefficients		Standardize	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	0.268	0.237		1.132	0.259	-0.199	0.735
1	EXTMOT	0.509	0.063	0.487	8.090	0.000	0.385	0.633

AMOT	-	0.039	-0.023	-	0.477	-0.103	0.049
	0.02			0.713			
	7						
INTMOT	0.448	0.058	0.449	7.693	0.000	0.333	0.563

a. Dependent Variable: PERVAL

In Table 4, the ρ -value of EXTMOT $0.000 < \alpha (0.05)$ and the t-value $8.090 > t\text{-table } 1.962$, indicating that EXTMOT is significant and affects the perceived value factor significantly. For AMOT, the ρ -value $0.477 > \alpha (0.05)$ and the t-value $-0.713 < t\text{-table } 1.962$. It shows that AMOT is not significant and does not affect the perceived value factor significantly. For INTMOT, the ρ -value $0.000 < \alpha (0.05)$ and the t-value $7.693 > t\text{-table } 1.962$, indicating that INTMOT is significant and has an impact on the perceived value factor significantly.

Based on the coefficient of multiple linear regression table (Table X), the equation of the regression model for model 1 is **PERVAL = 0.268 + 0.509 EXTMOT + 0.448 INTMOT**. According to the equation, the constant value is 0.268 with 2 independent variables having positive signs and 1 negative. The test results indicate that extrinsic and intrinsic motivations have a significant positive relationship with perceived value (every time the independent variables are increasing, the increase will bring a positive effect to perceived value). Meanwhile, amotivation has a significant negative relationship, meaning that every time the independent variable is increasing, the increase will bring a negative effect to the perceived value factor.

This model explains 84.4% of the variance in value perception, and this is statistically significant at $\alpha=0.05$. Extrinsic motivation and intrinsic motivation are positively associated with perceived value such that, adjusting for the other variable(s) in the model, for each additional value of the extrinsic motivation and intrinsic motivation, the natural logarithm of value perception is predicted to increase by 0.509 and 0.448 units respectively. Amotivation is negatively associated with perceived value. For each additional value of amotivation, the natural log of perceived value is predicted to decrease by 0.027 units.

F-test Result for Model 2 (EXTMOT, AMOT, INTMOT, PERVAL towards INTENT)

Table 5 shows the influence factor of the four independent variables (EXTMOT, AMOT, INTMOT, PERVAL) towards the dependent variable (INTENT) approximately 77%. Table 6 shows that F-stat $173.888 > F\text{-table } 2.38$ and the "Sig." value is less than $\alpha (0.000 < 0.05)$. Thus, the model is fit and statistically significant.

Table 5.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.880 ^a	0.775	0.770	0.56156

a. Predictors: (Constant), EXTMOT, AMOT, INTMOT, PERVAL

Table 6.
Multiple Linear Regression

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	219.343	4	54.836	173.888	0.000 ^b
	Residual	63.701	202	0.315		
	Total	283.044	206			

a. Dependent Variable: INTENT

b. Predictors: (Constant), EXTMOT, AMOT, INTMOT, PERVAL

t-test Result for Model 2 (EXTMOT, AMOT, INTMOT, PERVAL towards INTENT)

Table 7.
ANOVA Regression of Model 2

Model		Unstandardized Coefficients		Standardize	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	d			Beta	Lower Bound
1	(Constant)	-0.266	0.286		-0.929	0.354	-0.830	0.299
	EXTMOT	0.279	0.087	0.268	3.196	0.002	0.107	0.450
	AMOT	0.110	0.047	0.092	2.371	0.019	0.019	0.202
	INTMOT	0.077	0.080	0.078	0.964	0.336	-0.080	0.234
	PERVAL	0.600	0.085	0.604	7.095	0.000	0.433	0.767

a. Dependent Variable: INTENT

As Table 7 indicates, the p -value of EXTMOT $0.002 < \alpha (0.05)$ and the t -value $3.196 > t$ -table 1.962 , indicating that EXTMOT is significant and affects the intention factor significantly. For AMOT, the p -value $0.019 < \alpha (0.05)$ and the t -value $2.371 > t$ -table 1.962 . It shows that AMOT is significant and influences the intention factor significantly. For INTMOT, the p -value $0.336 > \alpha (0.05)$ and the t -value $0.964 < t$ -table 1.962 , showing that the variable INTMOT is not significant and does not have an impact on the intention factor significantly. For PERVAL, the p -value $0.000 < \alpha (0.05)$ and the t -value $7.095 > t$ -table 1.962 , indicating that PERVAL is significant and is significantly associated with the intention factor.

Based on the equation of model 2 (**INTENT = - 0.266 + 0.279 EXTMOT + 0.110 AMOT + 0.600 PERVAL**), the constant value is - 0.266 with 3 independent variables having positive signs and 1 independent variable negative. The test results indicate that extrinsic motivation, amotivation, and perceived value have significant positive relationship with intention, meaning that every time the independent variables are increasing, it will bring a positive effect to the dependent variable. Meanwhile, intrinsic motivation has a significant negative relationship, meaning that every time

the independent variable is increasing, it will bring a negative effect to the intention factor.

This model explains 77.0% of the variance in intention, and this is statistically significant at $\alpha=0.05$. Extrinsic motivation, amotivation, and value perception are positively associated with intention such that, for each additional value, the natural logarithm of intention is predicted to increase by 0.279, 0.110, and 0.600 units, respectively. Intrinsic motivation is negatively associated with intention, for each additional value of intrinsic motivation, the natural log of intention is predicted to decrease by 0.077 units.

CONCLUSIONS

The results of this study demonstrate that both extrinsic and intrinsic motivations did affect perceived value of digital badge. Not just as simple motivators, the badges also enhance enjoyment while getting challenged with gamified products. This is consistent with our expectation that value perception of digital badge positively focuses on both extrinsic and intrinsic motivations (cf. Dyjur and Lindstrom, 2017; Reid, Paster, and Abramovich, 2015; Bittner, 2014).

Unsurprisingly, amotivation was not found to affect perceived value towards digital badge. This is consistent with what Barkoukis (2008) and Deci and Ryan (2002) mentioned, that a person is in a state of inability to perceive a relationship between their behavior and its subsequent outcome. According to Melenhorst, Rogers, and Bouwhuis (2006), older individuals may perceive the learning of new skills as a serious obstacle due to age-related changes and declines of sensory and cognitive abilities that influence the ability to learn technological equipments.

Extrinsic motivation also seemed to contribute to the increase in intention to send an application to the companies adopting game design elements. Specifically, digital badges proved to be more rewarding for millennials with high performance expectancy for individual subjective assessment. This finding is consistent with that of Liu et al. (2014) that performance expectancies are functional and task-oriented expectations about a technology that are associated with performance improvements.

However, this study found that amotivation did significantly influence behavioral intention. This finding was somewhat surprising, because previous studies showed that rewards are important in promoting knowledge in organizations. A possible explanation for this finding may be that these respondents may not value organizational rewards, because they are motivated by other objectives. In other words, the beliefs about the value and characteristics of learning tasks, and/or about one's ability to complete the task are low and negative, and they seem to be consistent with the conditions for amotivation.

Another surprising finding from this study is that the intention to apply was not affected by intrinsic motivation. This unexpected result might also be explained by the millennials (majority of the respondents) which seek interactive experience and are used to getting frequent information through digitally networked infrastructure. Hence, the experience of sending an official application by mail may not be expected from them.

Consistent with Wei, Chang, Lin & Liang (2016), value perception of digital badge predicted intentions. The image of a corporation implementing digital

badge may serve a key antecedent of the intention-to-apply organizational attractiveness perspective.

This study contributes to the extant literature exploring the outcomes of game element designs. For talent managers, this study suggests that gamification, in the form of a gamified app in particular, is a valid product offering to encourage behavior change and maintenance in the physical activity domain. One main limitation of this study is the purposive sample used. Although a sample of 207 employees is adequate for exploratory research, it does not allow for generalization of our findings. Future research should use a representative sample of certain age groups or industries in order to generalize the findings to the target population. Also, an investigation of other game design elements within the context of working environment would be logical for next research.

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