

Motivational Affordances to Gamification in Workplace: A Literature Review and Proposed Framework

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Article Info**Volume 82****Page Number: 8536 - 8559****Publication Issue:****January-February 2020****Abstract:**

In recent decades, the field of human computer interaction has become a popular trending topic in gamification studies. The latest trend in the application of gamification in the world of work, aims to improve the incorporation of game design elements into the workplace, to increase motivation. This study found that the elements used in gamification in the world of work are still very limited, and there are no suitable criteria for use in gamification based on game elements in the world of work by examining and evaluating workers as a team in a contextual context. game environment that replicates real aspects and work environment. This study will comprehensively review related to gamification by analyzing the models and concepts of gamification in empirical research. As well as reviewing previous research and showing the gaps that occur in the literature both theoretically and empirically. This review shows an understanding of the interactions between components in the application of elements present in gamification related to work. The findings in this study will be able to provide insight in the development of further studies to make uniform use of game design in increasing motivation

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I. Introduction

Gamification has become an interesting topic for discussion in recent years because it can increase engagement, and motivation of users that lead to better learning [1]. To build gameplay based on the definition of performance, as a rule experienced in a non-game context [2]. In principle, the mechanism gamification can provide economic benefits in sustainable use, which makes it possible to motivate users [3].

The latest trend in the application of gamification is at work or referred to as "gamification of work", aims to incorporate elements of game design into the workplace, to increase employee productivity and work motivation [4]. Now many businesses have turned to this field, both to involve and motivate employees in doing serious work and increase work productivity [5][4]. The statement is in line with the research of Cardador et al (2016), trying to make work more intrinsically motivating, by making the work process itself more useful [6], or factors that influence, for example age, sex, and interpersonal

factors (including: communication, collaboration, and competitiveness) in developing their intrinsic motivation [7]. Based on previous studies, several empirical studies have resulted in a very good perception in the application of gamification work in increasing employee motivation, this is in line with research [8][9][10][11].

In recent years, the use of non-game services with the application of mechanisms game has received great attention. In the empirical study described in popular discussion, there is a dearth of research that links gamification with user engagement. because the use of services that involve users will have a positive impact with increased activity, interaction and productivity of users [12]. Apart from a large number of popular topics, there is still a dearth of coherent understanding of the use of the gamification element by investigating what types of studies have been carried out, what methods are used, what results, and what conditions. Understand that gamification is effective or not applied in practitioners' problems. Several large companies have now provided services and investments related to gamification [13]. In this literature review, this will contribute to understanding the application of the gamification element by conducting several empirical research reviews on related topics, as well as describing some of the use of methods, types of research and the results of previous studies.

This study aims to overcome the gaps that occur conceptually and empirically, by reviewing and synthesizing literature on the concept of gamification and providing an empirical view of gamification in the workplace. The previous empirical study will be analyzed in detail to find out the domain where gamification has been carried out, with what will be done in a structured manner. Many studies have developed and used the model by looking at the concept of gamification uniformly. In fact, in practice, the

use of specific designs and environmental realization is very diverse. In this literature study, using 783 papers that have been categorized in 2013-2019 and as many as 43 selected papers will describe the domain in the field of gamification. This paper is used to find out the types, aspects, types and methods that are widely used or popular in gamification. The findings in this literature study, have found that the current application of gamification has been widely applied in the field of education [14][15][16]; and business/work organization [17][18][19]. So that the next step is needed as a decision in determining future research as the development of knowledge in gamification.

II. Related work and Background

Literature studies show the main results of this study, that the uncertainty of the results in the application of gamification, this is due in large part to produce a positive effect, but on the other hand the research shows negative results [13], positive effects produced on several users for a short time [20], and the use of gamification has a conceptual nature of obscurity [21]. The majority of papers reviewed do not address the theoretical foundations that guide this field, and there is still little discussion that addresses theoretical issues in the field [22]. And there is a gap between the use of theory and applied research in the field of gamification [22]. Theoretically this research field, still opens opportunities and still has limitations in developing theories both theoretically and practically in the field. So the need for development and application of theory in solving gamification problems.

Most of the reviews on empirical studies produce positive effects on motivation and behavior in the use of gamification [23][24][25]. The positive effects produced in the use of the gamification element are based on the anecdotal concept that application of the game is largely 'fun' and intrinsic motivation [26]. The main factor that

drives behavior change is individual motivation [27]. The use of gamification is able to positively influence human behavior in motivating work [28], increase employee engagement and motivation [29][5][25], encourage behavior that results in internal achievements or perceptions, such as enjoyment [30][31], and business improvement, perseverance and performance improvement [32]. Empirically several previous studies, most of which produced a positive effect on the use of the gamification element. Because, if applied correctly, gamification will produce motivation for its users.

While the lack of empirical research, states a broad belief in the benefits of gamification, by producing an assessment of the success of gamification is often vague and often pessimistic [33]. This is evidenced by the inconsistency about the impact of using elements on gamification such as: points, levels, badges, and leaderboards on user engagement [34], as well as can cause excessive competition, which can have an adverse effect on motivating [35]. According to Hanus and Fox (2015), the negative effects produced on the application of gamification on motivation, satisfaction, and performance [36]. And the use of the gamification element has no impact on motivation, activity, or performance [37]. The element of gamification has a negative effect on intrinsic motivation [38]. The low level of motivation of early users towards gamification [39]. Therefore, this study will propose several solutions to problems that are still relevant about how companies and organizations must apply gamification in order to have a positive effect that must be owned by employees.

But some problems in previous studies in the field of gamification, there are methodological defects by investigating the effects of using game elements together, and obscuring the extent to which each element uses its effects on the

motivation generated [40]. Highlights common methodological problems that do not have validated comparison or measurement groups [41]. There is still a lack of clarity in the proposed use of the gamification mechanism that can achieve motivational experience [13].

Some reviews of problems in research in the field of gamification, that previous studies have carried out the development and use of several elements in gamification as a uniform concept in increasing motivation [42][43]. Whereas in practice, the realization of the specific uses of the design and the realization of the application environment for gamification are very diverse [42]. It can be seen that, there are still many forms that can be taken in gamification by combining several elements of game design in various ways, but it is not appropriate to only study the motivational effects of gamification as a generic construction.

So that gamification is "the process of improving services with affordances for game experience in supporting the creation of overall user affordances motivation, both experience and behavioral outcomes" [44][12]. According to Karthic et al (2016), gamification is a paradigm that emerges in using game mechanisms and game thinking to change behavior [45]. The use of elements in gamification such as: challenges, levels, and rewards can offer effective ways to motivate users to act [45]. The use of game mechanics and design experience by involving and motivating people digitally in achieving goals. Game elements are needed to build a game. While game mechanics describe key elements in general in game use, such as points, badges, and leaderboards [33]. To use gamification, you don't have to make the game explicit, but just use some of the techniques and mechanisms behind the game.

The purpose of implementing games is to be motivated and able to provide fun and enjoyment, while the use of gamification has the main goal to change people's behavior in its use. The use of gamification is not about a way of turning routine activities into games, but only redesigning the work process by applying game mechanisms as a pleasant experience [46]. Whereas gamification design results in the experiences faced by users in achieving the goals expected to change people's behavior [33].

Gamification not only refers to its effectiveness, usefulness, and ability to change behavior, or to make the experience more pleasant and interesting or change behavior by exploiting "gameful" reinforcement. Gamification can also be presented in the form of a gamification system for game elements based on empirical results. Pushing on alternative games in reality, serious game, and how aspects of the game currently permeate interactive system design [47]. Gamification, in this case does not have to make a game, but only enough to apply some of the techniques, mechanics, and mechanisms behind this game [46]. The use of gamification in motivating users does not have to make or design games, but only use or apply some techniques, mechanics and mechanisms to gamification. Nevertheless, that gamification is a game that can be a promising tool to increase motivation at work. Then based on previous research studies. Stating the need to conduct an evaluation to prove, study and learn about the effects of applying the elements to gamification is really effective in increasing motivation. Some design elements in gamification are interrelated to user behavior.

III. The Review

In this study will conduct studies, and systematic mapping or often referred to as "systematic literature review" which aims to collect, clarify and analyze research related to a particular topic [48]. This literature review is to conduct a systematic literature review, so that this study can be categorized as a tertiary literature review [49].

This study has a systematic based on the guidelines proposed by Kitchenham (2007).

In this systematic literature review, we will propose 6 steps. In the first stage, make a literature review question to gather empirical evidence. The second stage, proposes the creation of a strategy for determining search strings and applying search strings to selected digital libraries to extract all relevant documents. The third stage, leads to determining the selection of research criteria to identify relevant studies that can really contribute to this study. In addition, relevant studies go through the quality assessment process by designing a number of quality checklists in conducting the assessment. The next stage will be data extraction and data synthesis. Data extraction stage, to design the form of data extraction and then improve it with data extraction. In the final stage. we will determine the appropriate methodology for synthesizing data retrieved based on data types.

As a result, this study will gather results from a series of selected studies on motivation-related gamification, published in the 2013-2019 period, using systematic mapping and review procedures. Review protocols are very important for SLRs. In Sections 3.1 below, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7 will present a complete review of the literature. While at the end of this session, will examine the challenges by conducting validity of the review protocol will be analyzed.

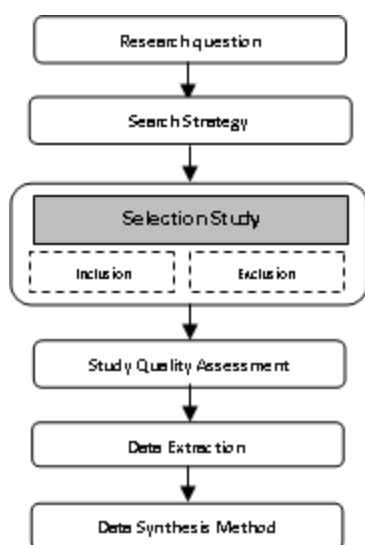


Figure 3. Steps for Literature Review

3.1. Research question

Literature review to summarize and clarify empirical evidence in the field of gamification. The discussion of this literature will raise some research questions. As well as a series of questions raised there will be discussions related to the type of study in this study with five components (PICOC), namely: Population, Intervention, Comparison, Outcome, Context [50].

1. Population (P): Employees and Users
2. Interventions (I): Method of analysis, context / domain, empirical type, results of influence.
3. Comparison (C): n/a
4. Outcome (O): Psychological and behavioral outcomes.
5. Context (C): Every possible study in the context of gamification.

Overall this literature review was carried out with empirical studies. Although not always stated explicitly, in this literature review, several research questions will be asked as follows:

Table 1. Research Questions (RQ)

ID	Research question	Motivation
RQ1	What types of motivational affordances are often used in the field of gamification?	To identify the types of motivational affordances that are often used
RQ2	What aspects are there in gamification?	To identify what aspects of outcomes are often used in the field of gamification
RQ3	In what context, gamification is often applied?	Identify in what domain or context is often applied to gamification
RQ4	What types of data types are often used in the gamification topic field?	Identify the types of data types that are often used in the field of gamification
RQ5	What types and methods of analysis are often used in the field of gamification?	Identify the types / types of analysis methods which are often used in the field of gamification

3.2. Search Strategy

Creation of a search strategy for determining search strings and applying search strings to selected digital libraries. This was done to extract all relevant documents, by developing search procedures, and identifying the main studies used in support of this research topic. The following is a list of digital databases sought: 1) IEEE eXplore; 2) ScienceDirect; 3) Springer; 4) EBSCO; 5) Emerlad; 6) Proquest; dan 7) Google Scholar.

To avoid researcher bias, this literature review uses several procedures in determining search strings [51][49], involve:

1. Identify key words in terms of population, results, and context.
2. Identification of the main relevant requirements.

3. Search all synonyms or spelling variations or main terms, if any..
4. Connect the main population requirements, interventions, outcomes and context using the Boolean "AND", to take notes that contain all the requirements.
5. Use the Boolean operator "OR" to join the same terms, to take notes that contain any requirements.

In steps one through five, it will return the following search string::

“(gamification OR gamify OR gameful OR game) AND (education OR learning OR training OR workplace) AND (motivation OR engagement OR enjoyment) AND (Since 2013)”

3.3. Selection Study

This stage will identify relevant studies in the field of gamification research, with reference to titles, abstracts, and keywords. in the initial stage of search, will be identified on each document that is a candidate, to determine whether the document that has been identified must be accepted or rejected. After that, the next step in the study selection process is to determine which databases provide results, and the search is focused on the database. A focused search was performed using the following criteria:

1. Complete peer-reviewed papers are published internationally. After narrowing the results to peer-reviewed studies, and further searches were refined through the results;
2. Includes empirical studies;
3. The research method is explained;
4. Study papers that can identify motivation clearly; and
5. The study is on element gamification rather than full games.

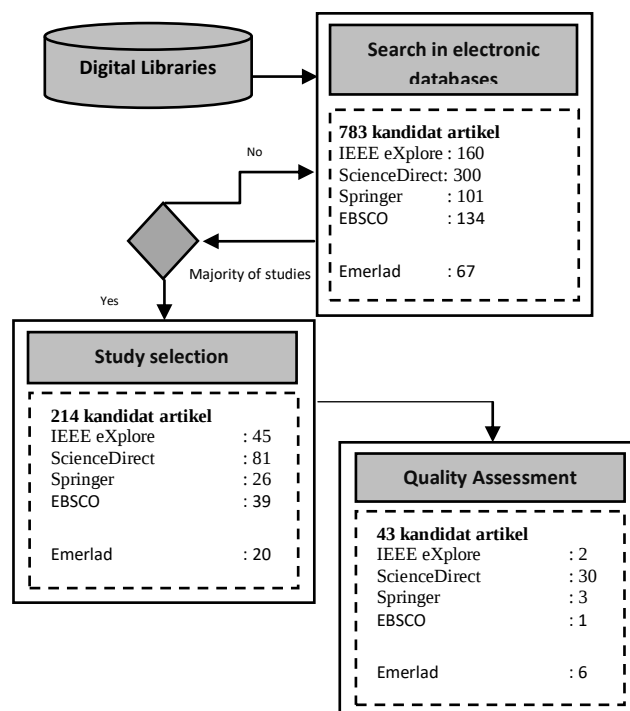


Figure 4. Selection Study Process

3.4. Study Quality Assessment

Assessment of research quality aims to improve research and the strength of the conclusions described. The collection of evidence from selected studies and data taken in this review are included as quantitative and qualitative data.

3.5. Data Extraction

At the data extraction stage, the study conducted was chosen in gathering data on related research in this review that could contribute. The use of gamification based on usability aspects that can be applied and in accordance with real aspects of the work environment in the context of team play. The proposed model must have the ability to explore evaluations on aspects of the environment, engagement and characteristics of employees. Gamification received attention, mainly because of its potential to motivate employees to work. Therefore, our aim is to evaluate the level of understanding of the factors and impacts that influence the motivation of gamification in the context of the world of work.

More specifically, the presentation of this information can be a facility in the process of identifying and analyzing empirical evidence that shows motivational effects in the use of elements on gamification. The impact of motivation is only as a psychological process that gives purpose and direction to behavior. In this case, not only individuals are motivated but in this case the team will be motivated to increase employee engagement in applying elements to gamification. A number of motivational steps have been applied in an effort to determine the effects of gamification. To provide support for decisions about how conclusive study results are reported, add categories such as: study samples, study duration, data collection methods, techniques and results

3.6. Data Synthesis Method

At this stage the data is extracted, synthesized and tabulated according to the research questions raised, by gathering evidence to answer it. In this study, the data used cover 2 types of data: quantitative and qualitative, and in this review study will describe and discuss several types of research questions, by approaching data synthesis to produce narrative synthesis. The application of this method, aims to improve the presentation of findings, with several visualization tools, such as: graphs and tables that serve to improve the presentation of data distribution.

IV Result And Discussion

This stage will present the results and discussion in a literature review. First, it will provide an overview of selection studies. The second part, will present the findings from the review of the report in accordance with the research questions raised. Third, the results of the implications for the research will be presented. while in the fourth part, will present limits on this literature review. And finally, provide conclusions, and future research.

4.1. Journal of Significant Publication on Gamification

In this literature review, there are 43 main studies used to study and review the field of gamification research in the world of work. Journal distribution starts from January 2013 to March 2019, this is done to show how trends and interests in the field of gamification research have changed over time. A brief review of the distribution of this study, from 2013-2019 which is relevant to this research study, is shown in Figure 5. Based on a literature review, the results show that research on gamification is still very relevant. Regarding the type of study chosen in this literature study, are experimental studies and survey studies, and no review studies are used in this section.

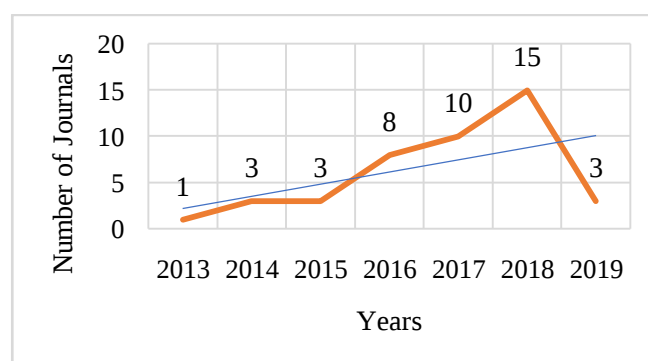


Figure 5. Distribution of Significant Journal Numbers

According to the main study chosen in the field of gamification topics the most important is the journal used is presented in Figure 6.

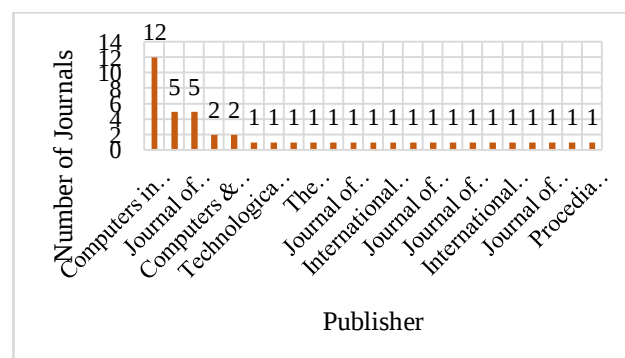


Figure 6. Journal Publication and Distribution of Selected Studies

In this study, the Scimago Journal Rank (SJR) and Q (Q1-Q4) scores from the gamification journal will be explained. Journal publications will be judged according to their SJR scores, presented in table 2.

Table 2. Scimago Journal Rank (SJR)

No	Journal name	SJR	Q-Category
1	Computers in Human Behavior	1.55	Q1 in Human Computer Interaction
2	International Journal of Information Management	1.37	Q1 in Library and information science
3	Journal of Business Research	1.26	Q1 in marketing
4	Telematics and Informatics	1.3	Q1 in Communication
5	Computers & Education	2.63	Q1 in Education
6	Kybernetes	0.29	Q2 in Social Science
7	Technological Forecasting & Social Change	1.38	Q1 in Business and international management
8	The International Journal of Information and Learning Technology	0.23	Q3 in Education
9	The International Journal of Management Education	0.6	Q2 in Education
10	User Model User-Adap Inter	1.17	Q1 in Human Computer Interaction
11	Journal of Educational Technology & Society	1.09	Q1 in Education
12	Journal of Knowledge Management	0.92	Q1 in management technology and innovation
13	International Conference on System Sciences	0.24	Scopus
14	International Journal of Educational Technology in Higher Education	0.39	Q2 in Education

No	Journal name	SJR	Q-Category
15	Journal of Environmental Management	1.16	Q1 in management, monitoring, policy and law
16	Journal of Consumer Marketing	0.66	Q1 in Business and international management
17	Journal of Interactive Marketing	3.4	Q1 in Business and international management
18	International Journal of Human Computer Studies	0.6	Q1 in Human Computer Interaction
19	International Conference on Computer Science & Education	0	Scopus
20	Multimed Tools Appl (2016)	0.24	Scopus
21	Journal of Service Management	1.49	Q1 in Strategy and management
22	Aslib Journal of Information Management	0.73	Q1 in Information system
23	Procedia Computer Science	0.26	Scopus

4.2. Motivational Affordances (RQ1)

According to Koivisto and Hamari (2019), stated as a whole, there were 47 different motivational affordances identified in the literature review study. And grouped by type, including: progression-oriented, social, immersion, real world-related and miscellaneous elements [24]. Meanwhile, according to Hamari and Sarsa (2014) collected and combined 10 different motivations in this study. The results show that uses such as: points, leaderboards, and badges are the most commonly used variants [13][52]; use of game design elements to motivate users [53]. Based on the literature review conducted there are 13 affordances, but motivational affordances that are often used are Badges (20), Point (16),

Leaderboards (13), and Reward (12), for more complete data presented in the table 3.

Table 3.Frequency of use of Motivational Affordances

Motivational Affordances	Frequency	%
Badges, Achievements, Medals, Trophies	20	23
Point, Score, XP	16	18
Leaderboards, Rangings	13	15
Reward	12	14
Levels	10	11
Challenges, Missions, Quests, Task	6	7
Skill, status bar, progress	3	4
Avatar, Character	2	2
Feedback	2	2
Timer	1	1
Social	1	1
Story/Theme	1	1
Clear goals	1	1

In the literature, it will be discussed, regarding the application or use of motivational affordances that experience general development in gamified. In a literature review of 43 studies, it shows that badges are the most widely used variant. And it can be concluded that Badges, Points, Leaderboards, and Rewards are dominating in the application of gamification. According to Deterding (2015), that the use of motivational affordances without considering the application of the context and the user, will only produce pointsification in the activities [54]. So the need

to make adjustments in the use of motivational affordances in gamification in the world of work/industry. Determination of the use of motivational affordances must be adjusted to the needs of the organization and users, in order to produce alignment with the organizational strategy.

A process of improving services with affordances for playing experience to support the creation of user value related to experiences such as the games they experience during service consumption [55]. By applying motivational affordances and maintaining them while varying the nature of the underlying service, it will provide insight into how context influences the results of gamification [13]. Some previous studies empirically have used elements in gamification by implementing affordances by maintaining user engagement. Specifically for the industry, the literature review has a very important role in determining appropriate motivational affordances and can help organizations operationally determine the types of techniques and mechanisms of play that are effective in ensuring successful gamification in the workplace.

4.3. Gamification aspects (RQ2)

In the study of this literature study, part of previous studies, many use statistical and experimental methods in conducting analysis of services and implementations conducted by previous research. The study of this literature, will investigate psychological and behavioral factors. The psychological factor focuses on aspects of motivation, attitude and enjoyment [13], Details will be presented in Table 4.

Table 4. Study of Psychological and Behavioral Aspects

Dependent Variable	Frequency	%
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Dependent Variable	Frequency	%
Psychological:		
1. Motivation	26	32
2. Attitude	7	9
3. Enjoyment	6	7
Behavior	43	52

The results of the analysis conducted in this literature study, show that psychological factors in empirical research on gamification largely focus on what is understood and needed as a system, whether it is fun, provides encouragement for users. Games that discuss a pleasant experience, while the application of gamification is proposed as a requirement created to produce pleasure for users.

Meanwhile, according to Koivisto and Hamari (2019), gamification in general is a method used for various activities or tasks in increasing motivation [24]. Where technology most directly influences learning through motivation [56]. Psychological factors focus on aspects of motivation, attitude, enjoyment [40]; and flow [57]. Other psychological outcomes considered include: work focus, learning, mindfulness or presence of mind, awareness, happiness, engagement, and interests [57][24]. While the impact of behavior in the organization, including: competence, compliance, job satisfaction, employee engagement, communication, health, safety, system performance or efficiency, and work transparency [57].

In the results of this literature review, it concludes that psychological results are often used in applying and evaluating gamification performance. Based on previous studies, in general the use of gamification to create pleasure

and pleasure for its users. So that the application of gamification is used to increase user motivation for a worker in his organization. Based on the results of this review so many previous empirical studies have tested motivation on gamification as an outcome from the psychological side. But in this presentation, behavioral results show results that have popularity and are often used as the application and use of gamification. In the world of work that is used to evaluate the performance and motivation of employees, most of them use elements of points, badges, and leaderboards. Because the application of gamification is also very dependent on motivational affordances.

4.4. Context or Domain (RQ3)

Context or domain in gamification is a core service or an activity carried out on gamified [13]. According to Hamari et al (2014), it shows that some previous studies produce positive effects in the use of elements in gamification. However, most research only explains and discusses the effects and benefits of applying gamification, but no one has been able to explain and describe which factors can predict why people use gamification services [13]. In this literature review, it uses 9 gamification contexts, which are presented in table 5.

Table 5. Use of Context or Domain in Gamification

Context/Domain	Frequency	%
Education/learning	10	23
Health/Exercise	5	12
Crowdsourcing	12	28
Social behavior/networking	2	5
Consumer behavior/marketing	6	14
Work/Organization	4	9

Context/Domain	Frequency	%
Software development/design	1	2
E-commerce/E-services	2	5
Business/management	1	2

Contextual factors greatly influence the results of the use of gamification, but usage in certain domains and tasks is also very necessary. So far, the use of elements in gamification lies in the domains of education, health and crowdsourcing, while in other domains only get limited attention [58][13].

Based on this research, crowdsourcing is a context that is often used in gamification. And is one of the main application areas in gamification, which generally aims to save costs or the possibility of innovating solutions that would be difficult to develop on their own [59]. Crowdsourcing enlist the help of people who are willing to take on assignments for free or to get help for a small fee. At present, the use of Crowdsourcing is growing, that is, organizations need more work activities such as playing games to provide other motives for work than just monetary compensation [60].

While the context of gamification in education / learning is the most common context for implementation. This study considers gamification results in the learning process to have a positive effect, for example, increasing motivation, enjoyment and engagement in learning tasks. [13]. Building the relationship that occurs between the nature of the game and the psychology of learning explicitly is very important to understand and how the game can influence the learning process [56]. In general, the only way a game can be designed to be applied in

various contexts and domains to learning. By providing or setting these targets broadly, in order to support and improve existing training or education programs [56]. While the application in the organizational context, both from management to forms of service and industrial processes, has become one of the domains that has not been much studied until now [57].

4.5. Gamification Data Type (RQ4)

In this section, we will report the results of data collection methods used in previous studies. There are several types of data used in empirical research in this literature review. The most widely used or popular data collection methods used are survey and questionnaire methods, both qualitative and quantitative. Whereas the second most common method is observation and interview. Based on the results of the literature review in this study presented in Table 6, there are only 5 types of data used in the literature of this study and the rest are other methods not mentioned in this literature review.

Table 6. The Data Type used is Gamification

Data Type	Frequency	%
Survey Data	31	72
Field notes, Experiential Data (Phenomenological Data)	1	2
Use data/Log data	2	5
Image/photos, Audio, Video, Records	4	9
Observation/Interview	5	12

Based on the results of the above table in this literature review, the most widely used is the type of data obtained by survey data (questionnaire), both the data analyzed qualitatively and quantitatively by 72%. Although there are various types of data collection methods and data types

that are often used in this analysis, the research approach is more likely to concentrate on the method or type of data. While the popular structure for data collection is through quantitative surveys that are numerical or with questionnaires.

4.6. Gamification Analysis Types and Methods (RQ5)

1. Types of Empirical Research

Based on a literature review, the research conducted is the empirical type of research most often using quantitative research methods. Qualitative research is a type of research that is not widely used. As for the mixed method is also widely used, research like this is to combine all forms of qualitative and quantitative approaches.

Table 7.Types of Empirical Research

Types of Empirical	Frequency	%
Quantitative :	34	67
1. Quantitative Inferential (29)		
2. Quantitative Descriptive (5)		
Qualitative	4	9
Mix method	5	12

In this literature review, the most popular type of empirical research is quantitative research. There are 2 studies with quantitative approaches in this analysis, namely: descriptive and inferential. Because the use of empirical quantitative research on gamification outlines can be easily concluded, several relationships between variables, and the results will be analyzed. Whereas qualitative research is very unpopular in the application of gamification, due to the many difficulties in describing the application of games in the world of work which for the most part carry out numerical assessments in their use. Whereas in studies that use mixed methods, it is a study that

combines qualitative and quantitative research approaches, ranks second which is often used in gamification.

According to Koivisto and Hamari (2019), Most of the empirical research on gamification carried out with quantitative approaches is descriptive, which means that data analysis is often reported in terms of percentages and ways taken from numerical data [61]. The use of quantitative research types in gamification is largely related to the field of science in HCI, which generally uses a quantitative approach, so that in this study found that quantitative methods are very popular and are often used in evaluating gamification.

2. Analysis Method

Based on a literature review, that the analysis method used in gamification there are 8 analysis methods. The results of this study, states that the quantitative modeling analysis method is the most widely used.

Table 8. Analysis Method

Analysis Method	Frequency	%
Quantitative Modelling	24	55
Quantitative Comparison	5	11
Quantitative Descriptive	4	9
Quantitative Association based	4	9
Quantitative Statitital	1	2
Qualitative	2	5
Explaratory qualitative	1	2
Experimental & Implementation	3	7

Quantitative modeling analysis methods, for testing data usually use T-tests, Mann-Whitney U-test, regression, Structural equation modeling, Wilcoxon rank-sum test, Welch's t-tests, and Wilcoxon signed rank test.

Whereas statistical quantitative (binomial tests, social network analysis, growth curve analysis, cluster analysis, logistic models, fuzzy AHP, granger causality test, hierarchical linear modelling, Z-test for proportions); quantitative comparisons (ANOVA/ANCOVA/MANOVA, kruskal-wallis); and quantitative association-based (correlations, Chi square, factor analysis, Crosstabs, spearman's rho) [24].

4 Proposed Framework

In the framework of the development of this research model, it will synthesize, abstract, and extrapolate from various theories and scientific thought that reflect the paradigm as well as guidance to solve research problems and formulate hypotheses that will be explained in this section. In this literature study, we will develop a theoretical model for investigating employee engagement that motivates intrinsically with the application of game dynamics by drawing a Self-Determination Theory (SDT) framework.

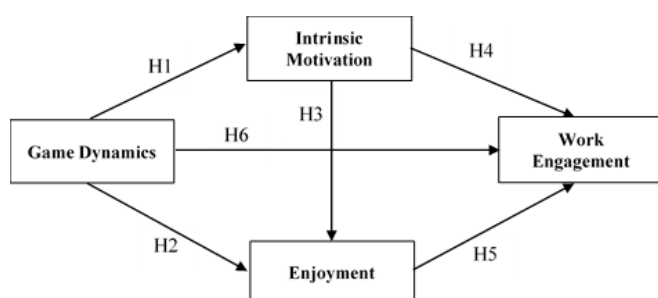


Figure 7. Proposed framework

V. Avenues for future research

At present, the topic of gamification research and motivational opportunities show that the service

context may be an important antecedent to involving gamification [13][62]. The gamification element is designed to use a cooperative objective structure that has been defined as the main antecedent [58]. The use of the gamification element also provides feedback that is considered an important antecedent for engagement [31][63]. One of the main antecedents for adopting a gamification system is user enjoyment [64]; engagement behavior to continue using the application [65]. In addition, many empirical studies have been reviewed, that the effect on the use of gamification lies in the quality of the user's nature [3][66], has a significant effect on behavior [67][68].

SDT is one of the main theories adopted in gamification research in determining user motivation [69][24][22][70]. In this context, can encourage the continuation of behavior directed at motivation. Has three conceptual main parts: 1) Application of motivation; 2) psychological results; and 3) behavioral results [13].

Gamification empirical research has experienced a very significant increase in publications from 2013 to 2019 and has the opportunity to be developed conceptually and methodologically. However, there is still a dearth in empirical studies that investigate the effects of the use of gamification elements, with respect to employee behavior in the workplace. This study identifies the main issues for the submission of model testing factors, presented below: The first issue, based on Suh et al (2017) research, states that by including the elements of gamification (reward, status, competition, and self experience) to promote engagement) deep by adding enjoyment to the use of existing information systems, but cannot guarantee that user engagement will continue [71]. Nuanced understanding is needed for the successful application of gamification [72]. Many studies have developed and used

models as diverse concepts, which can be applied in various contexts [25][43].

The second issue, research in this field is still very limited, most only look for effects on gamification services on performance, motivation, engagement and behavior [73]. There is a positive effect produced by the effect of gamification on engagement, motivation, and satisfaction [3][74]. Gamification is a very popular approach in terms of technological design, because it can make future gamification designs more effective by understanding the motivational paths of gamification design [75][76]. However, according to a survey conducted by Gartner (2012) states that practical failure has made the company lose confidence in gamification. Especially in the business domain, 80% of gamification applications are currently estimated to fail to meet their objectives due to poor design (Gartner, 2012). That a design inspired by games can provide experiences and behaviors that are more inclined to the game than others (Deterding et al., 2011).

But some problems in previous studies in the field of gamification, experience defects in methodological application that only produces the effect or effect of several elements of the game at once, by obscuring the extent to which each element uses its effect on motivation and performance produced [40]. Highlights common methodological problems that do not have validated comparison or measurement groups [41]. There is a lack of clarity about the understanding of the use of gamification mechanisms that achieve motivating experiences [13]. Nevertheless, that gamification is a game that can be a promising tool to increase motivation at work. Then based on previous research studies. Stating the need to conduct an evaluation to prove, study and learn about the effects of applying the elements to gamification is

really effective in increasing motivation. Some design elements in gamification are interrelated to user behavior.

VI. Limitations of This Review

Based on the results of the analysis it can be found that the use of gamification in the world of work or industry is a new field of science, because most of the gamification is widely applied in the world of education and training. So that the gap in this study, will link the work or industry literature with observations taken from actual gamification elements, about how the development of gamification by using elements in the game by linking motivation and work engagement. In addition, it is evident in the literature study object, that there is a gap in the theoretical and conceptual understanding of the phenomenon.

In this literature review study, it explicitly only studies and discusses the use of elements related to gamification as well as the motivation and engagement included. In the literature review review is only limited to conceptual and theoretical research reporting to investigate employee engagement that intrinsically motivates by implementing game dynamics by drawing a Self-Determination Theory (SDT) framework. SDT is a motivational theory that studies human tendencies involved in an activity when they are intrinsically motivated [70].

There is potential in this literature review, by looking at the phenomenon of the use of gamification with the application of game elements in increasing motivation and engagement in work. And there are many terms in the use of the word gamification but in this case the author makes a general use of the word gamification. In this case, the literature study also provides a close view of the use of gamification specifically in increasing motivation and engagement. The approach is good in spelling out

context / domain, data types, analysis tools and methods. And many studies in this literature study use quantitative methods. It is hoped that this study can provide insight for future research by looking at limitations in this literature review.

VII. Conclusion And Future Works

This literature review study presents studies related to gamification. The purpose of this literature study is to identify and analyze the application of the methods used in the literature review in research published between January 2013 and July 2019. The field of gamification is the use of game elements to increase the ability of experience motivation to influence outcomes on behavioral and psychological changes that are Furthermore. It can be concluded that some of the benefits of using game elements in increasing motivation and engagement. Although there is still an interesting phenomenon that the field of gamification still has uncertainty in the application of the contours of this field. As well as some previous studies, it is still limited in looking for the effect of gamification services on performance, motivation, engagement and behavior development. For future work, it is important to review the field of gamification by using diverse game elements by looking at aspects of influence on psychological and behavioral factors.

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APPENDIX A:

Authors	Empirical type	Analysis methods	Domain/ context	Data type	Crowdsourcing Type / affordances	Effects reported in quantitative studies	Psychological Outcome
[66]	Quantitative inferential	Quantitative modelling	crowdsourcing	Survey data	Levels, badges and leaderboards	All tests positive	Social influence, recognition, attituded
[78]	Quantitative inferential	Quantitative comparison	Education/ learning	Survey data	Badges dan rewards	All tests positive	Motivation
[79]	Quantitative inferential	Quantitative modelling	Health/ exercise	Survey data	Badges, levels dan point	All tests signifikan	Enjoyment
[80]	Quantitative inferential	Quantitative modelling	Education/ learning	Use data	challenge	All tests positive	Motivation dan attitudeds
[81]	Quantitative inferential	Quantitative modelling	Health/ exercise	Experintial data (phenomenon)	achievements	All tests positive	Attitudeds
[82]	Quantitative inferential	Quantitative modelling	Health/ exercise	Survey data	Points dan rewards	All tests positive	Motivation dan attitudeds
[83]	Quantitative Descriptive	Quantitative descriptive	Consumers behavior	Survey data (Questioner)	points, badges and leaderboards	All tests positive	Motivation
[11]	Qualitative	Implementation , experiment	Work	Survey data	Rewards	-	Motivation
[84]	Quantitative inferential	Quantitative association based	Consumer behavior	Survey data	Rewards	All tests positive	Enjoyment
[85]	Quantitative inferential	Quantitative association based	Consumer behavior	Survey data	Rewards	All tests positive	Enjoyment
[86]	Quantitative inferential	Quantitative modelling	crowdsourcing	Survey data	challenges	All tests positive	Motivation
[87]	Quantitative inferential	Quantitative modelling dan experiment	marketing	Survey data	challenges	All tests signifikan	Motivation
[88]	Mix	observation, semi-structured interviews, questionnaires dan statistical	Education/ learning	Observation, interview dan survey	Badges	-	-

Authors	Empirical type	Analysis methods	Domain/ context	Data type	Crowdsourcing Type / affordances	Effects reported in quantitative studies	Psychological Outcome
		quantitative					
[89]	Qualitative	Qualitative	crowdsourcing	Observation, dan interview	time, knowledge and skills	-	Motivation
[90]	Quantitative inferential	Quantitative modelling	Education/ learning	Survey data	badges, showing different levels of achievement, leaderboards, progress bars and meters, points and rewards	All test signifikan	Motivation
[91]	Qualitative	Implementation, experiment, Questionnaire	Work	Visual	points / score	-	-
[92]	Quantitative inferential	Implementation, experiment, Questionnaire, Quantitative modelling	Software development/ design	Survey data	points / score	All tests positive	Attitudeds
[93]	Quantitative inferential	Quantitative comparison	work	Survey data	points, levels dan leaderboards	All tests positive	Motivation
[94]	Quantitative inferential	Quantitative association based	crowdsourcing	Image/photos	Rewards	All tests positive	Motivation
[95]	mix	Quantitative dan Exploratory qualitative	crowdsourcing	Survey data	Rewards	All tests positive	Enjoyment dan Attitude
[93]	Quantitative Descriptive	Quantitative descriptive	crowdsourcing	Image	points, levels dan leaderboards	All tests positive	Motivation
[92]	Quantitative inferential	Quantitative modelling	Education/learning	Survey data	Levels	All tests positive	Attitude
[96]	Quantitative inferential	Quantitative modelling	Crowdsourcing (knowledge sharing)	Survey data	points, levels dan badges	All tests positive	Motivation
[55]	Qualitative	Qualitative	Health/ exercise	observations, dan interviews	challenge, entertainment, social dynamics, dan escapism	-	Motivation
[97]	Quantitative inferential	Quantitative modelling	Consumer behavior	Survey data	Reward, avatar, content dan competition	All tests positive	Motivation
[98]	Quantitative inferential	Quantitative association based	Education/learning	Survey data	Badges	All tests positive	Attitudeds
[99]	Quantitative inferential	Quantitative modelling	Social behavior/networking	Survey data	medals, levels dan leaderboards	All tests positive	Motivation
[100]	Quantitative inferential	Quantitative descriptive	Work	Use data/log data	Rewards	-	Motivation

Authors	Empirical type	Analysis methods	Domain/ context	Data type	Crowdsourcing Type / affordances	Effects reported in quantitative studies	Psychological Outcome
[101]	Quantitative descriptive	Quantitative modelling	crowdsourcing	Survey data	points, leaderboards,dan badges	All tests positive	Motivation
[102]	Quantitative descriptive	Quantitative modelling	crowdsourcing	Survey data	leader boards, achievements, levels, story, clear goals, feedback, rewards, progress dan challenge	All tests positive	Motivation
[8]	Quantitative inferential	Quantitative modelling	crowdsourcing	Survey data	point rewarding and feedback	All tests positive	Motivation
[103]	Quantitative inferential	Quantitative modelling	crowdsourcing	Survey dan observatio n data	points, badges, leaderboard	All tests significan	-
[104]	Quantitative inferential	Quantitative modelling	eCommerce	Survey data	points, badges dan leaderboards	Not significan	-
[105]	Mix	Qualitative (inductive dan deductive) dan qualitative modelling	Health/ exercise	Survey data	Challenge, feedback dan character	All tests positive	-
[106]	Mix	quasi- experimental research, qualitative dan quantitative comparison	Education/ learning	Survey data	leaderboard Table	All tests positive	Motivation
[107]	Quantitative inferential	Quantitative comparison dan post- experimental	crowdsourcing	Survey data	Badges dan point	-	Motivation
[108]	Mix	Quantitative, qualitative dan quasi- experimental design	Education	Survey data	Badges	-	Motivation
[109]	Quantitative descriptive	Quantitative modelling	Education/ learning	Survey data	Challenge	-	Enjoyment
[110]	Quantitative inferential	Quantitative comparison, experimental	Marketing/ customer behavior	Image	Reward	-	Enjoyment
[111]	Quantitative inferential	Quantitative modelling	Eservice	Survey data	Point dan badges	All test significan	-
[112]	Quantitative inferential	Quantitative modelling	Education/lear ning	Survey data	leaderboards/ rankings	All tests positive	Motivation

Authors	Empirical type	Analysis methods	Domain/ context	Data type	Crowdsourcing Type / affordances	Effects reported in quantitative studies	Psychological Outcome
[113]	Quantitative inferential	Quantitative modelling	Business/ management	Survey data	Points and levels	All tests positive	Motivation
[114]	Quantitative inferential	Quantitative modelling	Social behavior/ networking	Survey data	medals, levels dan leaderboards	All tests positive	Motivation