Re-inventing Public Services Using Gamification Approaches

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ABSTRACT

Gamification is still an emerging field in social sciences with a growing interest in its application in public services. Yet, most of the published literature on gamification focus on the utilisation of electronic games and serious games as a methodology for the development of public services; rather than seeing how to apply gamification approaches in developing these services. Thus the rationale for this paper is to develop the capacity of the public sector to re-invent itself through the utilisation of gamification. This qualitative research aims to provide a theoretical framework for gamification approaches in the different sectors of the public services through enhancing the engagement of the stakeholders of these services. The findings show the opportunities for the government transformation that could come from gamifying essential sectors like education, water utility services, labour management, women affairs, traffic management, sewage and sanitary service, social insurance, police services and justice and legal affairs. The study concludes with recommendations for further empirical studies that would enhance the integration of gamification approaches in re-inventing the public services.

Keywords: Gamification, Social Change, Continual Improvement, Inspiration Labs, Re-inventing Public Services, Socio-economic Transformation
JEL Classifications: O35

1. INTRODUCTION

Gamification is radical change approach which focuses on raising the capacity of the organisation and enhance its strength as conceptual models through fostering its intrinsic motivation in non-game contexts. Deci and Ryan (1985). This paper investigates how gamification can help in creating change and re-inventing the public services in any country, taking the context of the Kingdom of Bahrain (Buheji, 2019; Buheji, 2018; Deterding et al., 2011b).

The approaches of the gamification in this paper focus on developing government services delivery through depending on observations of available services and seeing how to create processes that would induce the involvement and engagement of the people (Velten, 2017; Chin, 2016).

A review of the different game designs indicators is done after reviewing the concept of gamification and its critical success factors. After that, different motivational perspectives are analysed. Then psychology of gamification design is discussed (Sailer et al., 2013; Heckhausen and Heckhausen, 2008; Deci and Ryan, 1985).

The theoretical review results are compared to the effectiveness of the re-invented public services design (Werbach and Hunter, 2012). Gamification in changing public services is to use its motivational power and environment influencing behaviour to foster better learning and awareness. This influence psychological perspective (Buheji (2019a), Deci and Ryan (1985)).

2. LITERATURE REVIEW

2.1 Defining Gamification and What Differentiates it?

Gamification is about the application of any or all the elements of game playing or design (e.g., point scoring, competition with others, rules of play) to other areas of activity.

Gamification has evolved from the integration of the technological game designs and the social sciences. This integration has taken many phases of transformation until gamification became part of the socio-economic transformations thinking. Today gamification has become a proactive approach of how social involvement systems can be constructed Madrid and Hunter (2012).

Gamification helps to turn a routine into something exciting through developing better interaction. By turning events into games, we can change many regular tasks into something exciting, and make it easier to learn or sustain a behaviour too. This can be very beneficial for social change (Landers et al. (2015), Deterding et al. (2011a), Deterding et al. (2011b)).

Gamification is a method that applies the principles of games, and games design approaches into real-life activities, Kapp (2012). The concept uses the fun and addictive part of games to increase the engagement and motivation of people to achieve specific tasks through optimising status and achievements (Robinson and Bellotti, 2013; Heckhausen and Heckhausen, 2008).

In this paper, we focus on gamification that uses the elements taken from video games in the design of non-gaming platforms, in order to increase public services outcome and their stakeholders' engagement.

Gamification has also been conceptualised as a process of enhancing users' value creation through the employment of affordances for a gameful experience (Deterding et al., 2011b). The definition of gamification proposed by Deterding et al. (2011b) emphasises the core role of game elements as the design–base of gamification, however; there is no agreement in the literature on a defined set of game elements to be used in gamification. Deterding et al. (2011b) themselves raised the same concern when defining gamification, suggesting limiting gamification to the use of "characteristic game elements."

2.2. Gamification in Public Sector

Chin (2016) mentioned how the Taiwanese government improved the commitment of the citizens towards taxation through setting invoice numbers that motivate the consumers to demand official receipts. In the Singaporean Changi airport, the virtual reality is used to train the emergency officers on the different designed rescue scenarios (Velten, 2017; Deci and Ryan, 1985).

The work of Chin about how gamification is used in Salem town in Massachusetts to gather feedback about the low-income Latino neighbourhoods, shows the critical role that gamification could play in create socio-economic stability and improve public sector delivery. This gamification helped the Salem town mayor to overcome the language barrier while gathering the data from the Latino residents. Another application for overcoming languages barrier was used in Indonesia in Jakarta where the games used to communicate with the locals in their dialects to get them acquainted with the digital services.

Velten (2017) believes that the effective utilisation of gamification can create agile and efficient public sector. As per Chin (2016),

there are four ways that gamification could be utilised with to improve service delivery, and better stakeholders' behaviours.

Most repeated gamification approaches focus on points, or badges or sense of winning which users earn a sense of achievement based on actions they perform, or achievements received after accomplishing an objective. The other gamification approaches also use the technique of leader-boards, which focus on the ranking of the stakeholders based on their achievements.

The characteristics of the game elements targets to create a lasting effect on the stakeholders' behaviour, motivation and make them appreciate the value creation. This lead to a focus on identifying the purpose of behavioural change. Heckhausen and Heckhausen (2008), Deci and Ryan (1985).

Gamification has great approaches that can become an innovative part of our outreach tool kit for a social or behavioural change. Using games and gamification techniques can offer non-profits and public agencies a unique and engaging way to interact with their community to promote change that benefits the individual and society Rughiniş (2013).

Gamification is becoming more of a scientific approach to social development and change, while it started to influence many decision-makers and have its practical use in socio-economic issues. Gamification is about applying game-based thinking to organisation business, processes or new concepts or brands, Madrid and Hunter (2012). Through gamification, we create a new experience about the inherent powers within, including the level of focus, observation and persistence. Deci and Ryan (2000).

One of the early implementations of gamification is setting different regulations for parking in the cities, which helped to regulate traffic. For example, since the early 1980s, a study in Washington DC found that the availability of free parking is associated with a 97% chance that people would drive to work alone. Gamification helped to set scoring points for the parking and create a type of competition between them. Free parking is scored as everybody takes their car; pay-for-parking is score as people start shifting to public transport depending on price. Even competition for parking spaces plays a big role in whether you take your car into the city or use public transportation.

Another gamification in gamifying the public sector was transportation analogy. This project was applied first in Copenhagen by providing incentives by raising the availability of bike lanes and high price for parking. The rewards of biking – even in bad weather – were so superior to the high prices for parking. School grades have been a form of gamification in education which followed point scoring, competition with others and rules of play. Gamification makes the public sector more fun and impactful through engaging and involving citizens Deterding et al. (2011a).

2.3. Using Gamification as a Continual Improvement

Since the application of gamification is comprehensive, this paper focuses on the non-digital realisations in public services, focusing on typical indicators and constructs used in gamification. For

example, the constructs create codification, i.e., like colour coding that points to the accumulated activities within the gamification environment. The codification is similar to badges in games which are visual representations of achievements, which can be collected within the gamification environment Deterding et al. (2011b).

Visual management is used to resemble the leaderboards in games where the players are listed and usually are ranked by their success. Codification of status of achievement also represents the progress bars are used to provide information about the current status of a player towards a goal. The "hit rate" is used to resemble performance graphs and to provide information about a players' performance, compared to past performance Deterding et al. (2011b).

Gamification as per Buheji and Ahmed (2017) is very attractive to human mindset, since it is based on incremental, achievable yet challenging goals, that are tracked by points and personal progress analysis. The gamification also uses "quests of little tasks" where the stakeholders or the players need to fulfil to sustain a specific task, Lander et al. (2015). The gamification design needs to reflect meaningful stories. Robinson and Bellotti (2013), Deterding et al. (2011a).

The idea of gamification helps to build self-determination, which creates psychological needs for competence, autonomy, and social relatedness, Sailer et al. (2013). The fulfilment of these needs fosters intrinsic inspiration, which helps people to execute challenging yet exciting service development nature. This helps to effectively and interactively to execute the task that integrates with the targeted needs. Gamification helps to define a way of penalising those who choose to do something poorly. Buheji and Ahmed (2018), Buheji and Ahmed (2017), Deci and Rya (2000).

The mechanisms of motivations make the stakeholders more engaged with continual improvement activities until the goals are achieved. The stakeholders keep engaged and motivated to discover through experiential learning, Hense and Mandl (2012). This learning creates emotions that interact with the cognitive and motivational processes and can be influenced by instructional strategies. The stakeholders are likely to be motivated if gamification decreases negative feelings like fear, envy, and anger. Heckhausen and Heckhausen (2008), Deci and Ryan (1985).

Gamification approaches assume that people would resist extreme changes, thus they need gradual changes through approaches that make them feel rewarded or have their behaviours smoothly calibrated. Therefore, combining gamification with the process of change in the different service sectors helps to develop key performance indicators (KPIs), which in turn help us to monitor the small steps of change without resistance.

The KPIs in the gamification approaches design represent the milestones of change targeted or the values to be achieved. The approaches of gamification help to instruct the stakeholders on how to progress and achieve their goals with few resources. The game mechanisms used in the approaches also help to define the points, the level of progression and the challenges.

The other benefit of the KPIs is that they provide immediate feedback about the extent of improvement achievement. The game mechanics such as leader-boards, progress bars, public celebrations and feels of rewards or trophies; gives a visualisation of the greatness of the achievement targeted.

2.4. Engagement of Stakeholders in Public Services

Creating an environment of engagement for stakeholders with gamification approaches provide a platform for interaction and collaboration amongst themselves, through which they can positively impact their community, Adler and Goggin (2005). The stakeholders might be the process owners of the sector targeted, or the mediators, or the beneficiaries'.

The engagement used in the gamification approaches lead to knowledge development, opinion expression, common problem solving, and influence governmental decision-making. Hasan (2016) even suggested a framework for gamification of civic engagement platforms.

When the stakeholders get engaged, the proper allocation of public resources could be directed to the well-being of the community. This creates active participation of the stakeholders and makes them eager to manage a change that shapes the lives of their communities (Adler and Goggin, 2005; Deterding et. al, 2011a). With active stakeholders' engagement, public services authorities can improve their planning, reduce costs, and increase the trust in them. Hence, reliable, competitive governments tend to foster such public involvement by innovative approaches as gamification. Chin (2016), Coronado and Vasquez (2014).

Gamification is one of the most essential tools today in changing the mindset of the stakeholders and setting effective strategies for social transformation. Through gamification, we can recognise the level of learning and achievement in the public sector, with relatively informal and immediate feedback in relevance to day-to-day practice. Besides, for the specific public sector, the gamification approaches are found to be particularly more useful to attract non-formal change. Hense and Mandl (2012).

In a nutshell, the literature still has a gap on how gamification can influence the public services through enhancing the stakeholders' engagement, Coronado and Vasquez (2014). Moreover, there is a lack of theoretical or practical frameworks as guidelines for engagement through gamification platforms Alder and Goggin (2005).

2.5. Gamification Approaches and Process Motivation

Since gamification helps to maintain communities that are willing to actively engage the public participation, it creates a directional expression of motivation. The use of motivational approaches in gamification design focus on creating attention that raises both the intrinsic and extrinsic motivation of the service providers and the beneficiaries. Deterding (2011a).

Gamifying a process raises the intrinsic motivation and trigger the behaviour of the internal reward system in the brain, Deci and Ryan (1985). Through gamification approaches, we can create a type

of stimulation which require only limited mental efforts. Reward-based gamification is effective for quick, short-termed behavioural change that lasts for as long as the rewards are available.

Once gamification design is employed, intrinsic psychological rewards would trigger behavioural outcomes, Sailer et al. (2013). Researchers now confirm that gamification gives a feeling of process autonomy; and feeling of a community of common purpose and relatedness which enhance the stakeholders sustained engagement, Deterding (2011a), Zhang (2008).

Even sees that the influence of gamification in continuous improvement can be seen clearly in the changes of the individual perceptions and personalities. With gamification, we can attract all the type of specialities and personalities of stakeholders since everyone wants to be part of the achievers. Therefore, continual improvement can be achieved through bring people together and make them value accomplishments, and the common purpose. This creates a value autonomy and eases the interactions that are required for overcoming any barriers.

2.6. Gamification and Inspiration Labs
Gamification is based on iteration and emotion. Before we gamify any business, we need first to understand it, observe the opportunities built in it, reflect our point of view, ideate about, prototype about and do playtesting. This precisely what "inspiration labs" do for re-inventing any business model. Inspiration labs which is one the techniques of the International Inspiration Economy Project (IIEP) helps to analyse the requirements of change, do research analysis, then establish a type of gamification frameworks, establish interdisciplinary teams, build rapid prototyping and experience playtesting. Buheji (2018), Buheji and Ahmed (2017), Robinson and Bellotti (2013), Werbach and Hunter (2012).

Buheji (2018) showed how inspiration labs techniques could solve any complex socio-economic community problems or challenges in the public sector through the method of observation. Observation target to either find opportunities inside the problem or simplify the transformation by raising the capacity to realise the change in the specific community targeted. Inspiration labs use similar elements of gamification approaches as goals, rules conflict, competition, cooperation, time, reward structures, feedback, levels, storytelling and motivation of interests. Buheji and Ahmed (2017), Kapp (2012), Deterding et al. (2011b).

Three indicators bring together gamification and inspirational labs designs together. These key factors are mainly working to ensure the following leading indicators achieved: Mechanical indicators, reward indicators, behaviour indicators and measurement indicators. Sailer et al. (2013), Deci and Ryan (1985). These indicators of gamification are influenced by behavioural game mechanics called in paper "gamification approaches." The gamification Approaches are solely focused on human behaviour and can be in the form: Feedback loops, progression, engagement loops, engagement and re-engagement optimisation, Alder and Goggin (2005). Thus these gamification approaches can be like: Achievements badges, levels, leaderboards, progress bars, activity feeds, avatars (i.e.,ideas for example), real-time feedback,

challenges and quests, trophy case and mini-games within other activities. The gamification approaches help to build the gamification construct indicators, be it: Mechanical-, rewards-, measurement- and behaviour-based. Hense and Mandl (2012).

The mechanical indicator in the inspiration lab and gamification focus on using storytelling, speed of responses, reward schedules, disincentives, access and social feedback. While the rewards indicator focuses on approaches as recognition, status, accessibility, the third indicator is the rewards indicator which uses approaches as the reputation, the performance, the quality, the completion, the quantity and time. The last indicator used is the behavioural indicator, which focuses on the loyalty, mastery, quality and engagement. Coronado and Vasquez (2014).

3. METHODOLOGY

The central goal of gamification is to capture the attention of the stakeholders and get them engaged in improving the targeted services or products. In order to support the public services, sustainable improvement, gamification approaches were proposed to influence change on a specific issue of ten selected public sectors. A table would seek to combine elements of gamification that are used in each sector management of change into then see the repeated trend that helps to build the framework.

Based on the synthesis of the literature reviewed, also the specific constructs of gamification approaches suitable for the public services are extracted. These approaches were extracted as part of problem solution opportunities that were used in the inspiration labs, as published by the author, Buheji (2019a) and Buheji (2018). A review of the type of gamification approaches that helped to re-invent the public services activities are presented and discussed. The findings focus on the suitability of gamifying such services on the continual improvement efforts. Then, a discussion and conclusion are drawn based on the finding. Madrid and Hunter (2012), Werbach and Hunter (2012).

4. CASE STUDY

4.1. Background about the Situation of the Public Sectors Selected in this Case Study
During 8/2008 till the end of 2018, there were more than 60 projects that started in the public services in the Kingdom of Bahrain through what is called "Inspiration Labs." These labs targeted to re-invent the way public services are delivered through the engagement of the stakeholders and with minimal resources, Buheji (2018).

For this paper, we select the influence of the gamification approaches used in the "inspiration labs" on the following ten sectors: Education, water utility services, labour fund, woman affairs, traffic management, sewage sanitary services sector, police services sector and justice with legal affairs.

4.2. Type of Gamification Approaches
Table 1 links all the different public services sectors to the gamification approaches and stakeholders engaged.

Table 1: Illustrates the gamification approaches used in the different public services activities

Sequence of gamification activities used in the inspiration labs projects as per the sector situation	Gamification approaches	Stakeholders engaged
One-Education sector Situation: The university does not have hands-on projects and contracts that help students to practice lifelong learning skills and be more ready for the labour market. The students' get delayed in graduation in time and create more cost on the government with no effective academic advisory services due to many reasons, but the most critical is the none availability of suitable sessions to register.		
Steps of gamification: 1-Students were codified and classified based on fitness for graduation on time and with sufficient practical experience from University projects which address the reality of the labour market.	Codification, performance hit-rate, speed of response, accessibility, quality of engagement	Students/Professors/Colleges Deans Offices
2-Create competition between Colleges for attracting and then opening hands-on-projects and contracts that help students to practice lifelong-learning skills and be more ready for the labour market.	Reward scheduling Quantity and time	Professors/Colleges Deans Offices/Potential Projects Partners
3- The academic advisory services are evaluated based on their capacity of graduating students' on time (within 4 years), and measure of the turnover of the government-subsidised chair.	Speed Batches Calibration Codification Alertness Error-proofing	Academic Advisory Services/Colleges/Student
4-Colleges are evaluated through a program using "smart registration" that enhances the students' choices and eliminate waste in opening extra sessions.	Leader-boards Levels Interactions Response Alertness Interactions Activity feeds	Registration Office/Colleges/Students
Two-Healthcare sector Situation: Bahrain and other GCC Arab Countries are considered one of the highest countries that have risks of epidemic Non-Communicable Diseases (NCD's), i.e., Diabetes, Blood Pressure, Cholesterol and Obesity. i.e., More than 80% of the population are on the WHO risk matrix scale for getting NCD during their life. On average more than 35 patients die annually in the health-centres due to NCDs complications while waiting to enter to physicians in health-centres. The other major issue in Bahrain is the delay of admission in the major general hospital in a country where emergency cases have to wait up to 72 h before being admitted. The third main issue is the spread of poisonous disease from fast food during summer. The last but not least problem in Bahrain was the increase to suicidal rate compared to previous years. Steps of gamification: a) Gamification to deal with the high NCDs		
a-1 Family Physicians, Health-centres, School Health Department were all trained and prepared for the competition of catchment of Non-Communicable Diseases (NCD's) Patients or those prone to get NCDs in their life. The challenge was to identify those on WHO NCD risk matrix regardless of their age. Healthcare staff were measured for their ability to meet 80% "Hit-Rate" or more.	Challenges and quests, access and social feedback, Mastery	Family Physicians/Health-Centres Staff/School Health Staff/Patients/Patients Families
a-2 Families physicians are measured on their performance of counselling risk-prone families.	Quantity and time	Family Physicians/Health-Centres Staff//Ncds Patients Families
a-3 Patients arriving health-centres do self-triage and codify themselves according to their level of emergency.	Mini-games	Walk-in Patients to Healthcentre

Table 1: (Continued)

Sequence of gamification activities used in the inspiration labs projects as per the sector situation	Gamification approaches	Stakeholders engaged
a-4 Physicians codify psycho-sematic patients. a-5 Increase the readiness of the health centres for emergency cases.	Real-time feedback Levels Progress bars	a-4 and a5 Family Physicians/Patients/Health-Centres Staff
a-6 Competition for optimising the role of social workers, health educational specialist and health visitors in family screening.	Trophy case, challenges and quests, real-time feedback	Social Workers, Health Educational Specialist and Health Visitors Healthcentre Nurses Educational Institutions
a-7 Classifying the type of patients' time spent with physicians as per NCDs risk matrix.	a-7 and a-8	Family Physicians/Health-Centres Staff
a-8 Stream-mapping healthy practices in Educational Institutions towards "NCD free Generations."	Activity feeds, real-time feedback, challenges and quests	Accident and Emergency Staff/Wards Nurses/Medical Consultants
a-9 Gauging the development of the capacity to analyse the family profile competition between health centres.	Achievements badges, levels, leaderboards, progress bars, activity feeds, time feedback, challenges	Wards Nurses/Medical Consultants
b) Gamification to deal with low availability of emergency beds b-1 Stratifying the total throughput in accident and emergency and speed of admissions through focusing on bed turnover ratio in most congested hospital wards (as medical wards) and setting discharge and priority or beds based on urgency of the cases.	b-1 and b-2 Achievements badges, levels, leaderboards, progress bars, activity feeds, avatars (i.e., ideas for example), real-time feedback, challenges and quests.	Wards Nurses/Medical Consultants
b-2 Codifying the capacity of managing the availability of the capacity of beds utilisation by inspiring towards higher discharges on time and based on defined protocols and follow-up services.		Accident and Emergency Staff/Wards Nurses/Medical Consultants
b-3 Gauge the "peers review practice" between medical consultants for complex cases utilising bed for longer than 5 days.	b-3 and b-4 Achievements badges, levels, leaderboards, progress bars, activity feeds, avatars (i.e.,ideas for example), real-time feedback, challenges and quests.	Porters/Pharmacy/Wards Nurses
b-4 Gauging the capacity of delivering patients home or delivering his discharge drugs on time, year-round.		Food Inspectors/Fast-food Restaurants/Consumers
c) Gamification to deal with fast-food poisonous diseases during summer c-1 Codifying the "Intelligent Inspection" that minimise the rate of poisonous calls, or low hygiene fines by 90% with less manpower and more trust worthiness enhancement.	c-1, c-2 and c-3 Achievements badges, levels, leaderboards, progress bars, activity feeds, avatars, real-time feedback, challenges and quests, trophy case and mini-games	Food Inspectors/Fast-food Restaurants/Consumers
c-2 Codify the reputation of fast food services that supports local tourism. c-3 Codify level of intelligence of the inspection based on the outcome of hospitality services and with minimal resources.		Food Inspectors/Fast-food Restaurants/Consumers
d) Gamification to deal with the high suicide d-1 Gauge the capacity to manage the anxiety to avoid reaching the level of chronic anxiety. d-2 Gauge suicide ratio due to early treatment of main causalities among youth, including focusing on patients' with high sick leave, and those with psycho-sematic symptoms. Three-Water utility services sector Situation: Huge Sweat Water loss to hidden leakages that are discovered late.	d-1 and d-2 Achievements badges, levels, leaderboards, progress bars, activity feeds, avatars, real-time feedback, challenges and quests, trophy case and mini-games	d-1 and d-2 Psychiatric Clinic Staff/Family Physicians/Quality of Life Departments/Public Patients/Educational Institutions

(Contd...)

Table 1: (Continued)

Sequence of gamification activities used in the inspiration labs projects as per the sector situation	Gamification approaches	Stakeholders engaged
Steps of gamification:		
1-Rewarding inspectors and water authority call centers on their ability to intelligently forecast and detect water loss through early observation of the leakages.	Challenges and quests Mastery (4)	Water Utility Inspectors/Water Engineers/Household Consumers
2-Score the level of re-engineering in the water network system' intensive maintenance programs and level of water-pipes innovation and development.	Mini-games within other activities (i.e., within the different departments) Access and social feedback	Water Utility Inspectors/Water Network Engineers/Water Pipes Companies/Household Consumers
3-Reward consumers in their collaboration to detect "water loss" on time or even before time.	Real-time feedback Levels Progress bars Trophy case Challenges and quests Real-time feedback	Water Utility Inspectors/Water Authority Consumers Department/Companies/Household Consumers
Four-Labor fund sector		
Situation: Labor fund (LF) disburse millions of dollars per years as the national fund for thousands of entrepreneurial projects and startups. However, LF in many countries and not only in Bahrain have a significant waste, and their hit-rate is below 30% of return on capital employed if we see its realised benefit in the quality of life of the middle class or the GDP. The capacity for a start-up survival is on average <4.5 years, despite the variety of programs pumped by the LF initiative.		
Steps of gamification:		
1-Codifying and rewarding the funded projects had made a success story and build an early intervention system for the defaulters.	Avatars (the idea of pre-funding pensioners instead of just paying salary later)	LF Consultants/LF Beneficiaries/
2-Develop the capacity of start-ups since the bitching time with the development of safe exits methodology, especially for youth projects.	Trophy case (Best start-up)	LF Consultants/LF Beneficiaries/
3-Minimise enterprises' dependency on government purchasing.	Achievements/badges for the level of Independence	LF Consultants/LF Beneficiaries/ Ministry of Labour/Educational Institutes
4-Divert more mentorship on "necessity and neighborhoods entrepreneurship" to minimise low-profit margins and help for the survival of low-income families community.	Reputation and Performance Levels of Progress bars	LF Consultants/LF Beneficiaries/Ministry of Labour/ Educational Institutes
Five-Woman affairs sector		
Situation: Women empowerment programs are spreading all over the world. The support of public authorities for empowering women is very clear in Bahrain as well as developing countries. However, empowerment programs do not necessarily lead to women development, which leads to country development through eco-economy and family stability.		
Steps of gamification:		
1-Setup a comprehensive outcome and legacy driven national plan that changes the way woman are empowered in Bahrain by giving her more accountability to create social cohesion, stability and national competitiveness.	Achievements badges/storytelling/ Performance	Women Council/Government/Departments of Social Develop./Women leaders
2-Closing the gap and accelerating the transformation towards "women development" instead of "women empowerment" after 5 years from the National plan kick-off.	Quantity and time/Reward scheduling	Women Empowerment NGOs and Cells
3-Ensure knowledge sharing between Business Women, Women Entrepreneurs and Women of Productive Families Programs and especially those of the same or relevant business and link it to gamification rating. (i.e., Rating of entrepreneurs who contribute and share knowledge)	Achievements badges, leaderboards, activity feeds, avatars, real-time feedback, challenges and quests and mini-games	Women Entrepreneurs and Women of Productive Families

(Contd...)

Table 1: (*Continued*)

Sequence of gamification activities used in the inspiration labs projects as per the sector situation	Gamification approaches	Stakeholders engaged
Six-Traffic management sector Situation: Despite the fact that the quality of roads designs in Bahrain and Arab GCC countries are considered to be one of the best in the world, these countries have a rising fetal accident per population. The number of black spots is increasing despite the many regulations and radar speed cameras, as the black spots areas means the areas with repeated fetal accidents.		
1-Enhancing the design of the road to count for worst cases risks of accidents, due to driver, road or vehicle.	Real-time feedback	Works Dept. Road Engineers/Traffic Police/Municipalities
2-Scoring the speed of repair and active learning on the "black spots" areas.	Challenges and quests	Works Dept. Road Engineers/Traffic Police
3-Scoring municipalities care for designing better smooth entries for junctions roads from highways.	Activity feeds	Works Dept. Road Engineers/Traffic Police/Municipalities
Seven-Sewage sanitary services sector Situation: Sewage network is one of the most expensive public services, despite not been appreciated by consumers. Annually many areas in developing countries as Bahrain suffer from sewage system blockage due to bad management by consumers. Steps of gamification:		
1-Defining areas where sewage - drainage system designs need to be developed due to repeated blockages in the sanitary system.	1, 2 and 3 Hit-rate, achievements badges, progress bars, activity feeds	Sewage System Inspectors and Engineers/Call Centres Team
2-Score the station pumps designs that need to be aligned from the time the excavation work with water and electricity authorities.		Sewage System Inspectors and Engineers/Contractors
3-Evaluating and grading the sewage contractors based on results of their performance, i.e.,building and maintain pumps without blockages.		Sewage System Inspectors and Engineers/Call Centres Team/Consumers
4-Scoring consumers' habits and practices in dealing with sewage system and what goes into the drainage system vs. what goes on waste separators.	4 and 5 Hit-rate, achievements badges, levels, leaderboards, progress bars, activity feeds, real-time feedback	4 and 5 Sewage System Inspectors and Engineers/Call Centres Team/Resturant Owners/Hair Saloons
5-Preventing solid waste or debris from going into the sewage system through a transparent program than enhances the awareness about sewage water system utilization.		
Eight-Social insurance Situation: Despite the National Social Insurance (NSI) program in Bahrain is considered to be one of the best systems, many pensioners end-up with low quality of life and limitation of resources. Steps of gamification:		
1-Creating a selective thinking in the way of investment of pension fund that would enhance the productivity of the national economy.	1, 2 and 3 Achievements badges, levels, leaderboards, progress bars, activity feeds, Trophy cases	NSI and Pension Fund Consultants
2-Scoring the reliability of the social responsibility plans towards low-income pensioner jobs are more prepared for entrepreneurship after retirement.		NSI and Pension Fund Consultants/Low income pensioners
3-Evaluating amount of projects taken towards pensioners' "quality of life."		NSI and Pension Fund Consultants/Low-income pensioner
Nine-Police services sector Situation: Police services don't count for security, but the safety and the harmony of the public. In Arab countries and Bahrain is no exception; there is no appreciation for prevention policing services. Steps of gamification: 1-Codification and classification of the black spots in the country in relevance to: a. Drugs trafficking information b. Risk of fire or gas leakage c. Jewellery theft	1, 2, 3, 4 and 5 Storytelling, visual cues, Response objects, reward schedules,	Drug Assessment Specialist/Police Drug and Narcotics Unit/Community Policing/Civil Defense/Citizens

(*Contd...*)

Table 1: (*Continued*)

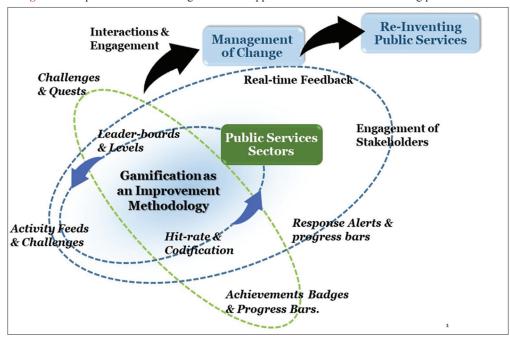| Sequence of gamification activities used in the inspiration labs projects as per the sector situation	Gamification approaches	Stakeholders engaged
2-Measure the prevention policing role in "social harmony" between neighbourhood.	disincentives	Community Policing/Social Development Dept./NGOs
3-Redction of transfer of cases to legal courts due to prevention policing role in creating resolutions or mediations between the families and the disputing parties in the police station.	access and social feedback recognition	Community Policing/Social Development Dept./NGOs/Citizens
4-Enhancing community-based prevention policing through improved screening and security assessment (in police stations).	status access and stuff reputation	
5-Strengthening the social role of the police (the relationship between police stations and community centres).	performance	Community Policing/Social Development Dept./NGOs/Citizens
6-Raising learning and knowledge management in (Economic crimes).	6, 7, 8, 9, 10, 11 and 12 Hit-Rate, Achievements badges, levels, leaderboards, progress bars, activity feeds, avatars, real-time feedback, challenges and quests, trophy case and mini-games	Community Policing/NGOs Police Stations/Citizens
7- Increase the efficiency of patrols (Abandoned houses)		6, 7, 8 and 9
8- Raising efficiency and readiness (Cadres guard)		Community Policing/Economic Crime Unit/Social Development Dept./NGOs/Citizens/Police Patrols/ Guarding Police
9-Enhancing community prevention through improved screening and security assessment (Theft of gold shops).		Community Policing/Ministry of Labor/Shops Owners
10-Reducing the criminal risk resulting from unregularly employed expats.		Community Policing
11-Improve the follow-up service of the communication with the stakeholder in police stations.		Civil Defense/Building Owners
12-Rasing safety readiness and evacuation of residential and commercial buildings (Civil Defense).		Police Centre Officers/Citizens
13-Rasing efficiency in gathering inferences in the Police centres in order to reduce court rejection or persecutor is returning the cases due insufficient evidence.		
Ten-justice and legal affairs sector Situation: Similar to many countries, people in Bahrain are losing confidence in the legal and justice system. Steps of gamification:		
1-Reduce the timings of the Legal Courts per case and avoid unjustifiable delays	1, 2, and 3 Hit-rate, achievements badges, progress bars, activity feeds, real-time feedback	1 and 2
2-Enhance the rights of the family in speeding up the courts' delays.		Legal Courts Management Team/Judges/Lawyers
3-Establish "resilience courts practices" in Universities where lawyers from different religious and loyalty background defend for the same case. (Legal Clinic in Law Schools)		University/Legal Courts Management/College of Law

Figure 1: Propose a framework of gamification approaches that lead to re-inventing public services

5. FINDINGS

The majority of the steps of the gamification approaches were designed based on the situation of the observed and then specified public sector challenges. In general, all the gamification approaches needed some motivational engagement using rewards and behavioural constructs more than measurement and mechanical constructs. These rewards were linked to the speed of the service and using a simulation of achievement using score and batches. The challenges helped to develop the quests for the gamification approaches that lead to improvement.

Real-time feedback and levels for overcoming the challenges were identified through the codification and the classification which helped to develop the alertness and error-proofing. This also helped to develop a simulation like leader-boards that reflect levels of engagement, interactions and response to the stakeholders' issues.

The measurement constructs used in the inspiration labs that led to re-inventing the public services, came as a result of the following gamification approaches in relevance to the different activities developed: Leader-boards, levels, interactions, establishing avatars, activity feeds, challenges and quests, achievements badges and progress bars.

The mechanical construct is the collective effort of the gamification approaches that are repeatedly were used in the different public services sectors. i.e., in order to achieve the desired goals that lead to re-inventing the way the public services are delivered, approaches as: Hit-rate, codification, response alertness, progress bars, challenges and quests, were applied. Also, real-time feedback, avatars (i.e., as the idea of training instead of inspecting), trophy case (i.e., competition for best training), achievements badges and real-time feedback, i.e., through self-assessment anxiety forms; were used as part of the mechanical constructs gamification approaches.

Table 1 shows the sequence of gamification activities like a sequenced story that can be easily understood as a means for management of change towards the targeted improvement. This shows the importance of gamification as a technique for continual improvement, even in complicated sectors like public services.

6. DISCUSSION AND CONCLUSION

Describing a public service challenge ease its gamification that leads to developing its level of engagement with the stakeholders'. However, in for this engagement would lead to continual improvement of sectors as the public service, one need to be selective in the gamification approaches chosen.

This paper fills a gap for the body of knowledge as it addresses the role of gamification approaches as a continuous improvement methodology. Applying gamification in special business processes, as in public sectors, helps to soften and enhance management of change. With gamification, we can engage the stakeholders in the modification of their business processes using gaming dynamics and mechanisms; without making them fear failure.

The experience of the inspiration labs run by this longitudinal project for 4 years could be generalised only if a theoretical framework is proposed. Therefore, using the literature review and cases in Table 1 the following framework is proposed to show how gamification could differentiate and re-invent the public services efficacy. The framework shown in Figure 1 focus on how public services could involve the stakeholders and the beneficiaries in the developing and continually improving the services, until they are re-invented or re-engineered. This can be achieved through gamification approaches that lead to improvement, based on real-time feedback.

The gamification used in inspiration labs during the 4 years' projects in the Kingdom of Bahrain shows that there could be

many innovative possibilities for public services improvement. The gamification used in this work is highly essential for re-evaluating the government services and the different possibilities for its improvement.

The indirect rewards built as part of the labs and projects approaches helped to engage the stakeholders of the different service. This could help to overcome the challenges of change that ways services are delivered. The different gamification approaches helped avoid the mixed signals about the focus of change and improved the possibility of finding opportunities inside each of the problems in the inspiration labs.

The gamification constructs help to make almost all the interventions psychologically acceptable. The mechanical and measurement constructs gamified 76% of the services. Rewards construct constitute 10% of the gamified public services while the behavioural construct constituted 14% of the total inspiration labs carried in the different public sectors.

In the context of this paper, we excluded gamification based on games and based on serious games. The paper is highly suitable for think-tanks leaders, policymakers and academics. The paper shows that gamification has its influence on many sectors, despite being focused on the public sector.

Gamification seems to ignite the capacity of different sectors, specifically the public sector to remodel itself and to offer more adaptability and flexibility for engaging the stakeholders of the service. The simulation of gamification based projects in this paper shows that involving the concerned stakeholder would bring-in appropriate dynamic partnerships between the public sector and other potential beneficiaries, thus would shift the public service policymakers from a scarcity to an abundance mindset that see the opportunities in the different exploited resources. The critical performance outcome here would is that more gamification in the plenty of public services sectors would make governmental organisation and public services providers more flexible and adaptable to future foresighted requirements.

Use of gamification would help towards the gradual convergence of realistic, sustainable public services that enhance the overall services performance in a short time. This paper calls for more research in relevance to non-electronic gamification approaches in public sector and other socio-economic services areas which would foster economies that have an innovative and entrepreneurial spirit and that meet the demands for dynamic and diverse opportunities. The drive to establishing gamification could also create more employment opportunities that are attractive to youth in the public sector, specifically.

Gamification helps us to determine the adaptive ability of the public policy and where to invest more in relevance to the business environment, the skills profile, the institutional arrangements and type of infrastructure. Thus, gamification exploits where re-engineering or restructuring are needed most in the public sector.

The main contribution of this work is that it targets to inspire the reader to take the "gamification of the processes" more seriously and set it as part of the sectors development or change demands. The paper confirms that there are "no one size fits all" when applying gamification to different sectors as each has their special measurement or be approached based the conditions of the targeted beneficiary, or on the context which they are applied in. The paper emphasizes that the search for suitable gamification approaches could be only be achieved through experimentation.

The limitations of this paper are that it is being carried in one country and as part of government inspiration labs. However, the paper does not undermine recommending future studies that would explore further the influence of each gamification construct or indicators on the public services or similar other critical public services as education, municipality services, transportation, electricity and water supply and even security services. Development of interaction between all the stakeholders of these public services through the gamification approaches could help to further re-invent all these quality of life-related services to the benefit of citizens and the country in general.

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