A Gamification approach to promote positive behaviours in Urban Logistics
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Extended abstract

Objectives and motivation
In this work the authors proposes the use of a gamification approach in order to promote positive behaviours in the actors of Urban Logistics. The term ‘Gamification’ was firstly used in 2008 in a blog post by Brett Terill. The first documented use dates back to 2008 (Paharia) but the term did not see widespread adoption before the second half of 2010. Current uses of the term fluctuate between two related concepts. The first is the increasing relevance and presence of videogames in the everyday life. The second more specific is related to the concepts that game elements should be able to make other, non-game products and services more enjoyable and engaging as well. The Gamification consists in “the use of game design elements in nongame contexts”. Brett Terill described the term as “taking game mechanics and applying them to other web properties to increase engagement”. The use of the game-mechanics in a nongame context is encouraged by the studies concerning the players’ psychological stimulus and also by the studies concerning the player learning curves. The Gamification can be applied to different environment such as: Recruitment, Customer Engagement, Problem Solving, and Employee Engagement. The Gamified learning curve it’s different from a “normal” learning not from a skill point but from a time-to-learn point of view: the Gamified approach it’s faster than the normal one. Considering the question ‘Why do games have such a radically different learning curve than advanced applications, the answer is that Gamified approach turns out that games are carefully tuned machines that hack into human being’s most fundamental learning processes. Games are exercises in applied psychology at a level far more nuanced than your typical application. In order to fulfill this goal there is a simple technique called “exploratory learning”. It’s authors’ belief that in order to improve the quality of life in cities it’s important to solve congestion, pollution, and other similar problems caused by traffic and Urban Logistics. Recently studies has shown that E-Commerce caused the increasing of traffic problems, because products bought on internet have to be delivered to the customers’ home by a lot of carriers and trucks moving in the hearth of the cities. One other problem is that public transportation is not enough efficient for all the citizen’s needs. Restrictions, prohibitions, and other forms of negative input to the citizens often not achieve the expected goal. Proposed solution ignore the complex social or personal motivations that people have when considering different behaviours, for example shopping on the commute to work, dropping of passengers on the school run or the weekend excursion; some of which are possible as a ride share. Furthermore, public organizations’ employees are more involved in bureaucratic stuffs than contributing to the improvement of the quality of citizens’ life. All those actors, such as 3PLs, citizens, and public administrations’ employees, have to be engaged and have to collaborate in order to change their behaviours, encouraging the positive ones while discouraging the negative ones. This is the reason why the gamification approach it’s particularly fitting with the problems listed above. We have to identify the way to motivate the people for moving in group, using the bike or walking in the city, involving and engaging them, instead of prohibiting and imposing.

General description
The idea that authors intended to promote it’s using the gamification in Urban Logistics for solving difficult/complex logistics problems using the “secret ingredient” of gamification, which is “fun”. Using players’ solutions as starting points for new business solutions, leveraging collaborative approach.

There is several works which consider a Gamification application to real world problems. We briefly summarize, here, the main related concepts. Gamification is obtaining a lot of interest both in industry and also in academia during the past years. An increasing number of games are offered as services to consumers. It has been also considered from the perspective of service marketing as ‘a process of enhancing a service with affordances for gameful experiences in order to support user’s overall value creation. The current understanding of gamification has been primarily based on the act of adding systemic game elements into existing environments. Another viable approach proposes to leverage the experiential nature of games and gamification, instead of the systemic understanding. Researchers are proposing not to stop people from driving or commuting in their cars, but rather to encourage people to occasionally change their behaviour in such a way that would lower or minimize traffic congestion for themselves and others. For example, by taking a different route, leaving home a little later or earlier, or perhaps a few times per week changing their mode of transport from car to bus or bicycle. The idea is to encourage modest changes in mobility patterns and to do this within a multi-player game-like environment. This approach is in contrast to current methods that often penalise drivers.

In this view, the core idea of our proposal, is to widen the initiative in order to include more actors, with different roles, leveraging on the synergy between them, their actions and their responsibility. Our proposal, in fact, aim at a more wider gamification approach, able to engage all the relevant actors, in a global initiative while, at same time, considering the specific character of each category. We describe the our proposal, describing how it is organized.

In order to gamify the Urban Logistic environment, the first step is the identification of the main “players” (actors) in the target environment and also the players’ interests. As said before the main actors to be considered are: the citizens, the urban police, the 3PLs, shop owners, public transportation, public administration, and their employees. All this actors are relevant because they are all involved in the movements of the vehicles in the urban texture. Their goals are different. For example private citizens move into the cities for...
going at work, shopping, etc. 3PLs move into the cities for delivering goods. Urban policemen have role of punishing laws violations and monitoring the correct flow of traffic. Shop owners are interested in having no traffic congestions in their location in order to have more customers. Public transportation employees are naturally involved because their efficiency is needed to lower traffic congestion. Public administration employees are interested in achieving the better results from their proposed traffic plans.

Once identified the goals and interests of all the environment actors, there's the definition of the “dynamics” of the gamification in the Urban Logistics. The “dynamics” of a Gamified process consists in the definition of the rules of the “Urban Logistic Game” that govern the environment. The rules are focused on promoting the positive behaviours giving to actors incremental goals as a reward of respecting the rules. On the other hand if an actor doesn’t respect the defined rules there’s the possibility of having a penalty. For example, a rule may be “using the public transport instead of using the private car for going to shopping”. Other examples may be “sharing the car with colleagues for going to work”, “picking up children from the school using one car”, “taking a street instead of another one during a particular period of the year”, “walking or biking instead of using car”, and so on. However, dynamics are not able to achieve the intended goal by themselves. They need to be supported by the use of the Gamification Mechanics, that are the general elements of the gamification approach. In particular the commonly identified Mechanics are levels, points, awards, ranking. The levelling system allows the progression of an actor in the game environment. A level is the status of the actor in the game; it states the possible actions that a player can perform. The more the level is high the more the player has privileges. The points are the fuel of the Gamified process. They allow levelling up the actors’ level. There are some different forms of points, such as experience point, karma point, gold, and so on. The awarding system is the key of the engagement. The rules are mostly followed by the achievement of an award, which consists in a part of the actors’ desired goal. The ranking system it’s a fundamental mechanic because it allow the comparison between the different actors.

The idea for enabling the involvement of the actors in the Urban Logistic Gamification consists in developing a Web Application, accessible from mobile devices, which implements the described dynamics and mechanics. The application, managed by the city municipality, should engage all the actors in different sub-games that represent the different actor’s domains. A single “big” rank for all the actors, even if necessary, is not sufficient for efficiently engaging enough number of actors in order to achieve a critical mass able to positively change the behaviours. So the application has to be organized in a way that make different gamification environment for the different actor types involved. In other words there is a rank for the citizens, another for the 3PLs and so on. Furthermore there are also periodical “missions”, “contexts”, or “challenges”, smaller in size and with a limited duration, aimed at involving small numbers of actors, in direct competition between them, divided for actor’s type in order to better engage the actors. The application it’s also integrated with the Social Network environment, in order to extend the application potentiality in terms of possible dynamics for the gamification processes and improves the application visibility. The application should be managed by the city municipality because the awards obtained by the correct fulfilment of the gamification dynamics should be “concrete” rewards and not only virtual ones, and the introduction of temporary objectives should be managed according to general plans for urban mobility, traffic and public transportation.

Results and conclusions
In this work the authors presented a viable approach for engaging the Urban Logistics actors in a way that is more efficient than the usual and institutionalized one. The use of game dynamics and mechanics allow a better and deeper understanding of the Urban Logistic problems. The actors are involved in a competition that maximise their goals but, at the same time, helps to reduce Urban Logistic negative attitudes and problems thought the continuous competition between the different actors.

Summarizing, the proposed Gamification approach, could be able to achieve concrete results leveraging the direct engagement of the more relevant actors, in a global application, which gives the right consideration to different point of view, trying to integrate them in a overall effort aimed at improving the quality of life in the city, while having fun in doing that.

References
- http://www.bretterrill.com/

Keywords: gamification; urban logistics; urban actors engagement; promoting positive behaviours;