- "What?": This dimension points out the behaviors that the target audience should have while using the gamified system. It guides the creation of stimuli to help the realization of this behaviors and tasks;
- "Why?": This dimension is related to the stimuli that will be generated in the users by the interaction with the gamified system. It approaches motivation intrinsically and extrinsically and what is the duration of the stimuli that will generate motivation in users;
- "When?": It identifies what are the appropriate situations in which users will need to be stimulated to the desired behaviors. This dimension presents the players' journey and the stimuli frequency and strength (such as points);
- "How?": This dimension is responsible for helping to choose game elements that will be implemented in the gamified system;
- "Where?": This dimension is where prototypes and the implementation will be made using Human Computer Interaction (HCI) and software engineering to achieve this goal;
- "How Much?": This last dimension is responsible for measuring how much the gamification was able to stimulate the desired behaviors in the target audience.

5W2H was selected as a starting point because it is one of the most complete framework regarding the gamification design, but it lacks details on building a motivational environment.

6. Framework 5W2H+M

To deepen the motivational aspects of the 5W2H framework towards a more motivational outcome four of the original dimensions of the framework were modified: "Who?", "Why?", "How?" and "How Much?" [Conejo 2018]. Each one of these four dimensions was altered without changing the end goal and use of the framework.

6.1. "Who?"

The dimension "Who?" identifies the target audience's characteristics. Initially, there were no motivational characteristics addressed by this dimension. Purpose, Amotivation and Motivation factors were included to help identify possible motivational characteristics in the target audience. Purpose addresses what will be the significance of the gamification in users' routine; amotivation factors identifies possible situations in which the gamification may have a negative impact in users and; motivation factors identifies situations in which the gamification may have a possible impact in users routine.

To help identify these characteristics the use of HCI design techniques such as interviews, questionnaires, focal groups and user observation is advised.

6.2. "Why?"

The dimension "Why?" identifies the stimuli that will be generated in the users in order to perform the desired tasks and have the desired behaviors inside the gamified system. This dimension presents three core stimuli that are: engagement, fun and motivation.

The motivation stimulus is presented by its duration (short and long term) and origin (intrinsic or extrinsic). As the SDT suggests, to achieve intrinsic and extrinsic motivations it is necessary to satisfy some basic psychological needs. The satisfaction of the

needs of autonomy, competence and relatedness were implemented into this dimension to further help the gamification process in the generation of the desired motivation stimulus, be it intrinsic, extrinsic or both. Each psychological need can be satisfied with some game element and the implementation of these needs will help better choose each game element. This dimension is responsible for the UX in the system, that is why it is necessary to use game design and interaction design so that the gamified system may achieve and generate the desired stimuli.

6.3. "How?"

This dimension aims to design the gamification so that the stimuli are generated, and the user has the desired behavior inside the gamified system. The dimension is responsible for helping choosing game elements that will be implemented in the system. These game elements are based in the MDC model.

Each basic psychological need can be satisfied by one or more game element. The extension made in this dimension categorizes game elements by each psychological need. This helps selecting right game elements to generate the desired motivation stimuli.

To achieve what the "How?" dimension proposes the participation of specialists such as game designers, software engineers, HCI specialists and systems analysts is necessary so that the project may be viable for implementation.

6.4. "How Much?"

The last dimension that was extended was the "How Much?" dimension. This dimension aims to evaluate the gamification. It evaluates how much the gamification was able to stimulate the desired behaviors in given situations presented in the system.

This dimension did not present any metrics to evaluate motivation so, the Intrinsic Motivation Inventory (IMI) is suggested [Ryan et al. 1983]. IMI is composed by several subscales that measure aspects such as perceived choice, perceived competence, relatedness, enjoyment and others. These metrics are used to evaluate how much an individual is intrinsically motivated to do the task and is a well-known tool to evaluate motivation.

Besides the IMI it is possible to use other metrics the designer sees fit such as interviews, other scales, questionnaires, field studies and others. After the evaluation is complete, another iteration of the framework may be applied if the desired results were not achieved to further polish the gamification implemented.

7. 5W2H+M Applied on the ConneCT System

In order to use the extended framework 5W2H+M in a real situation, the ConneCT accompaniment system was chosen. ConneCT is a gamified system that aims to assist monitoring of drug addicts with questions about the state of their life to know the risk of relapse. Healthcare agents receive daily updates about the addicts that they follow.

ConneCT was gamified by the first version of 5W2H to achieve three desired behaviors: high frequency of answers; longevity of use and; high amount of questions answered daily. The gamification consisted of missions, an individual ranking system, points and little feedback. All dimensions of the 5W2H+M framework were applied to redesign and implement ConneCT new version.

Dimension “Who?” addressed the target audiences’ characteristics through an interview with specialists on drug addiction that are healthcare agents was conducted so that information could be gathered. Information about gender, age, purchasing capability, schooling, motivation and amotivation factors were gathered and are as follows: Gender: Most of the of the addicts are male; Age: Between 15 and 50 years old; Purchasing Capability: The majority could afford a smartphone; Schooling: The majority could write and read; Motivation Factor: Be able to report their situation in a less embarrassing way; Amotivation Factor: Threatened anonymity and boredom; Purpose: Use the system as means of opening up about their situation and to keep a diary.

The anonymity is a crucial part of the system because of the context that it was applied and should be respected not only because of being an amotivation factor but because of legal reasons too.

Dimension “What?” is responsible for identifying the desired behaviors that the addicts should have while using the system. The frequency and amount of answers as well as the longevity of the use of the system were already objectives with actions identified, so, the feeling of belonging and the feeling of being accompanied by the healthcare agents were added as objectives. Expected actions to achieve all goals are:

- Frequency: The person must answer the questions every day;
- Amount: Answer all the questions presented in a given day;
- Longevity: Use the system for as long as possible;
- Accompaniment: Note the feedback messages presented while using the system;
- Belonging: Gain points to climb in the team scoreboard.

Dimension “Why?” is responsible for the influence of the gamification on the user. The main stimuli desired is motivation so that users may use the system for a long period of time returning everyday to answer questions.

As SDT states, intrinsic motivation tends to have better results in a long period of time. Knowing that, it was chosen to stimulate all three basic psychological needs of autonomy, competence and relatedness. The first version of ConneCT only had extrinsic stimuli having a great emphasis on game elements that satisfied competence only.

It is expected that with elements that satisfy autonomy and make the user know he/she is not alone using the system, all three basic psychological needs are satisfied and intrinsic motivation would be more likely achieved.

The ”When?” dimension identifies the moments in which the desired behavior will be emphasized. As the desired behavior is not complex, requiring only answering questions, the emphasis were designed to achieve important behaviors:

- Answer one question: This behavior will transmit valuable information to the healthcare agent;
- Answer various questions in a given day: This behavior will give extra valuable information to the healthcare agent;
- Answer everyday: To know precisely how is the state of the addict it is necessary a constant flow of information.

To achieve these, answering in consecutive days; answering at least one question a day and; answering all questions for consecutive days will be encouraged by the system.

The incentives are continuous and fixed, that is, the same type of incentive will be applied continuously in each situation.

On the dimension "How?" all game elements were chosen based on the desired stimuli and emphasis that will be applied. First, the dynamics were chosen based on the desired stimuli, after that the mechanics and finally the components. Table 1 presents each stimuli with its dynamic, mechanic and component chosen.

Table 1. Game Elements implemented On The System, blue components were added to the system, red components already existed but were modified, green components were already in the system and suffered little to none alteration.

Stimuli	Dynamics	Mechanics	Components
Autonomy	Emotion	Customization	Avatar, Nickname
Competence	Progression	Rewards	Emblems, Points
		Challenges	Missions, Levels, Points, Emblems
	Rules	Feedback	Points, Messages
Relatedness	Relationships	Competition	Points, Classification Tables
		Cooperation	Teams, Classification Tables

Besides the chosen game elements, a leveling system was designed to make easier for the user to see his/her progress: each question answered will yield a sum of points.

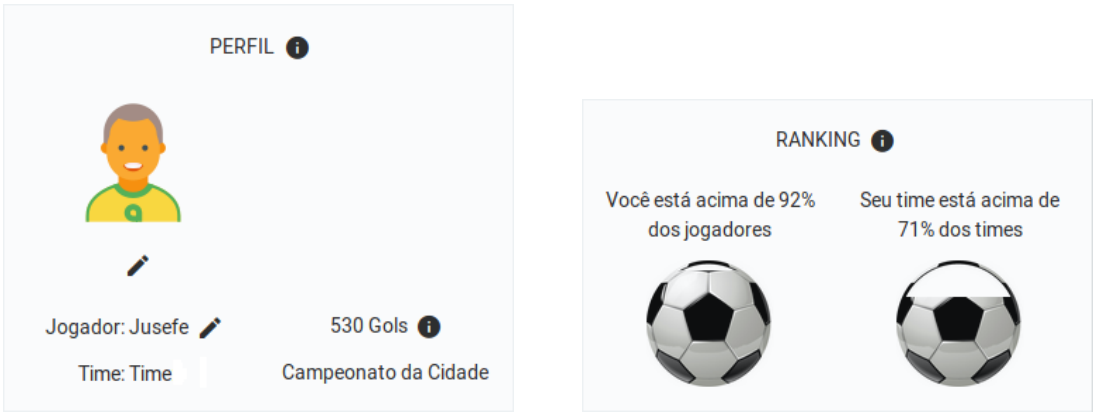
On the dimension "Where?", ConneCT was implemented with a soccer fantasy theme because most users are men and as it is used in Brazil, soccer fans. Each game element was implemented with the fantasy in mind. As an example the points are called goals and each level is a new tournament that the player will participate.

Each day the person will have to answer several questions, in the first version of the system it was not possible to choose more questions to answer so, to further increase autonomy the user now can respond more questions besides the required questions of that day, and they can also answer the same questions again.

A profile tab, as seen in Figure 1, was added that allows users to choose an avatar, nickname, team, points and level, and; a ranking of the team, was added instead of only the individual's one. Feedback messages were also implemented to give more information and foster more answers and, messages that pop up when the user does not answer in a given day. All messages use a language that alludes to the fantasy chosen to further immerse the user in the gamification aspect of the fantasy.

On the dimension "How Much?", an evaluation was conducted with a psychologist that is a healthcare agent responsible to accompany drug addicts in their rehabilitation. The specialist had already used the first gamified version of the system with a group of addicts. The evaluation protocol was composed by three use cases: first the specialist used the system freely; then the specialist used the system with a fake user account that supposedly used the system for almost a year; the final use case was with a fake user account that was using the system for the first time. This enabled the specialist to experience all feedback messages and features of the system.

After the test protocol an interview was conducted with questions based on the IMI



(a) User profile with an avatar, nickname, team name, points and level. **(b) Individual ranking and team ranking.**

Figure 1. Two additions made in the ConneCT System.

scale [Ryan et al. 1983]. There were questions about the enjoyment, autonomy, competence, relatedness and tension to evaluate the experience the specialist had with the system and if the system had the desired effects regarding motivation for longevity, frequency and number of answers, feeling of belonging and accompaniment.

The test protocol and the interview with the psychologist revealed that the changes made to the system were noticed and the answers related to autonomy showed that new features such as the possibility to answer the questions again could satisfy autonomy. Regarding competence, the leveling system and feedback were the elements that the specialist though had the most impact an could satisfy this psychological need. And, regarding relatedness, the specialist pointed out that the team ranking and being part of a team were the most important elements added to the system because the feeling of belonging is a crucial part in rehabilitation.

Regarding the objectives of the system, the specialist pointed out that the frequency and amount of questions would be achieved by the possibility to choose to answer again and by feedback messages encouragement; the longevity was unclear and need to be tested in a long period and; the feeling of belonging could be achieved by the team ranking. The specialist did not see the accompaniment sensation being satisfied, possibly because he did not pay attention to the feedback messages (closing them before reading).

8. Conclusion

This paper presented an extension of the 5W2H framework called 5W2H+M. The extended framework helped to choose game elements to implement on the ConneCT system to stimulate the basic psychological needs of autonomy, competence and relatedness and facilitated the gamification project to be implemented when focused on users' motivation. The resulting system was tested with a specialist in psychology that works with addicts' accompaniment. An interview was conducted with the specialist with questions based on the IMI scale and by his answers it is possible to say that the ConneCT system has a good chance to achieve some of its goals. We concluded that the 5W2H+M framework was an effective tool to design the gamification of a system with emphasis on motivational aspects. Future work would be to test the gamified system with other psychologists as

well as evaluating it from the users point of view.

As shown in the related works, research that extended a gamification framework was not found, only one work presented a framework with its application and only a few works revolved around the application of existing frameworks was found. This work not only extended an already existing framework but applied it in a system.

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