

A Serious Game to Support the Drug Misuse Prevention for Teenagers Students

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Abstract— The lack of success of advertising campaigns on drug use is attributed to the use of inappropriate language at a young audience. It is believe that an approach based on digital games can achieve greater success because they offer the attractive environment. This article aims to demonstrate the use of a Digital Game developed for the prevention of drug use, with a language and approach for a younger people. The chosen methodology was qualitative descriptive through questionnaires administered to two groups in a school community totaling 69 subjects. The objective of the research was to ascertain how communication is the story and how the information on the preventive methods of drug use are effective for a particular young people. The method consists of making data collection by conducting a quantitative research through applied surveys inserted in the game context, without the user noticing that is reporting an analysis. Then a qualitative research by which aimed to answer the question on the validity of information and our attachment by young students. The results present a picture of effectiveness in the use of digital games approach to preventing drug use by young students. In general, these students have a hard time deciding on the possible ways that the game rules have. This suggests that a certain set of user group tends to use drugs are more likely than other groups. In addition, this information was very important to focus on prevention of drug use in school. It concludes by compiling the data that the communicability of the game reached greater success in fixing the concept of harm that drug use can cause, and through the game was possible to detect the meaning of illicit drugs in the middle-school context.

Keywords— *Game-Based Learning; Science-based drug Education; Drugs Misuse Prevention;*

I. INTRODUCTION

Health promotion is the science of helping people to discover their own health status, and then motivate them to improve their condition and support them in changing their lifestyle to better state of health [1]. In Addition, it is a process that delivers to the people the means to achieve control and improvement on their own life.

A public health problem is the abusive use of psychoactive substances [25] at all levels of society. Although there seems to be no clear linear process from soft to hard drugs, as first suggested by Cohen[18] and

Kandel[19], there does appear to be a likelihood of expanded drug use after the introduction of one or more drugs[20]. Such starting or intermediary drugs are known as gateway drugs [21, 22] and may be legal or illegal substances.

Gateway drugs often introduced among people in their youth, as in parties, festivals, ceremonies' and rituals. According to Grant and Dawson [23], experimental or occasional use of such drugs, as alcohol, does not generally cause any impairment, but may act as a risk factor for the development of abusive use.

In this way, it is fundamental role of health promotion to fight against abusive consumption of gateway drugs in its early stages in young population.

Students usually understand that drug abuse can have serious consequences for health. However, the way the subject is presented may not be satisfactory [3]. Examples of usual approaches are: public policy debates in classrooms [7], advertising campaigns [9], compulsory relocation [10] and by the use of force [8]. All these approaches have a common goal: instructing teenagers to reject drug use, and try to convince casual users to stop consumption completely.

The lack of success on a campaign can be attributed to the use of inappropriate language. Its efficiency depends on the combination of a balanced and comprehensive approach [24]. In the search of such features, the popularity of video games among young population led authors [4, 5, 6] to use them as drug prevention tools.

This work aims to assess the use of video games as suitable approach on drug abuse prevention. More precisely: (i) we developed and presented a serious game to 69 students to promote the damage of drug abuse; (ii) the game also submitted the player to moral decisions and stored their choices without their knowledge; (iii) we analyzed their in-game behaviors (choices) and after-match behaviors.

We concluded that videogames could be a powerful tool on drug abuse prevention as an instructional mechanism. In addition, the results indicate that a game can be used to identify risk behaviors that may indicate propensity to drug abuse.

The rest of this paper is organized as follows. Section II presents related works. Section III introduces the game

design. Section IV describes the empirical assessment. Section V concludes the paper.

II. BACKGROUND WORKS

When a digital game has a higher purpose than just entertain, showing a beneficial purpose to the human being, as education, we call this “Serious Game”. The serious games are examples of mediators capable of providing the player immersion, attention, working knowledge, setting goals, self-control, decision making, self-efficacy, internal motivation and feelings of competence and autonomy [9].

There has been an approach in the context of encouraging young people to recognize the negative characteristics of tobacco abuse [10]. Another paper presents a more collaborative and cooperative proposal, in which players are going through a detoxification process chemistry. The game's storyline intensifies the bonding between the players, friends or family, developing a positive opinion of themselves, making them appreciate and feel respected, increasing their self-esteem [11].

In [12, 13], the findings show the reactions of certain communities to check the behavior of the player exposed to drug misuse. There are other paper using virtual reality technology [14, 15] to different purposes, one to show the reactions of intoxicating elements in the brain during activities in daily life, and another showing the choice of teenagers to remain in a virtual environment in drug's expose.

Playing most of these games led to a broad spectrum of desirable outcomes from knowledge increases, to attitude changes, behavior changes, and other health-related changes [24].

Containing the motivating effect, digital games can be an alternative tool for prevention and education in the combat with drug misuse, and may cause the interest of many teenagers who need urgently to deal, with different activities, in a short time.

III. REINFORCED OR CHANGED BEHAVIOR BY GAMES

The possibilities of games for promoting health behavior changes, behavioral scientists need to collaborate with professionals who can write an engaging story and have knowledge and skills in game design, formative research, story boarding, producing, directing, music composition (for games with music scores), computer art, animation, and programming.

Games may use to promote behavior change for some time, however, others behavior-change programs must be used. In additional, in these Games, we introduced to young people a comprehensive model of learning for behavior change by a Social Cognitive Theory (SCT).

SCT addresses motivation and also practical behavioral capability (or knowledge), including skill development, self-control or volitional choice, self-direction of behavior, and impediments and facilitators of behavior change [27]

The SCT is elaboration likelihood model and includes the following steps: attention, retention, production, and motivation [26].

The SCT in games are research to derive their learning effects from at least three sources:

1) By creating immersion or transportation, a state in which the player becomes absorbed in the play without disbelief, while creating personally relevant experiences and deep affection for the characters;

2) By establishing flow, a state of high concentration in which the player experiences a balance between skills and challenge; and;

3) By meeting the individuals' needs for mastery, autonomy, connectedness, arousal, diversion, fantasy, or challenge [28].

In our research, we take careful to investigate an effective way to achieve the goals of fun-ness and seriousness.

IV. TRIAL DESIGN

The trial was designed to evaluate the use of the software in order to promote the prevention of drug use by adolescents in a school community. From the use of an observational trial model, by which is inserted into a controlled environment (digital game) situations and the player's behavior is analyzed during the play.

Through this observation, it was possible to collect data on how the technology used by a specific set of users. In this way, researchers can acquire a refined understanding of the technology, by witnessing any difficulties that the participants may present.

We start by selecting a group of teenagers in a high school with the permission of the parents so that they could participate in the research (Figure 1 illustrate all the trial process done).

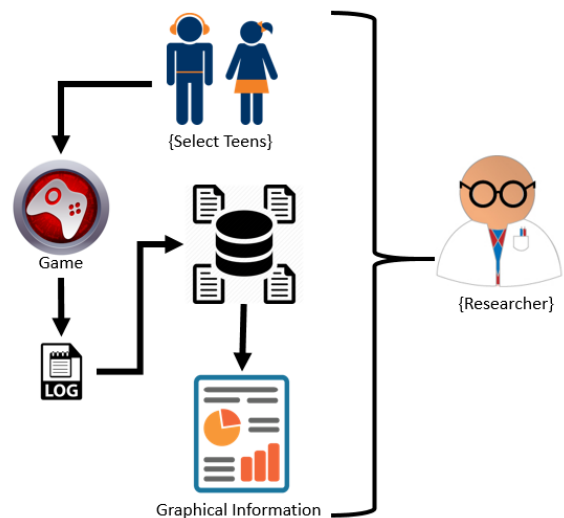


Figure 1 - Design Trial

After they sent to a classroom with computers available and previously installed our game. They was instruct only to start the game and the main features to be able to handle the game.

The researchers followed all activities, except for the use of the game, at which time the subjects were free to perform their choices.

The research object was a digital game that stores user's actions performed during the play, this is a data record for future analysis. The game records every action and choice of users and the duration of each phase. At later joins it in a database for analysis by researchers.

To retain a narrative flow and give playfulness we develop the game with six (6) phases, which link to each other, to rely on the player's choice makes during the game.

At Figure 2 illustrate four screenshot, most accessed in game. At Figure 2.(a) we see the phase selection to able to introduced the player in game. In (b), we see the first level play. In addition, in (c) we play with maze game. Moreover, the (d) shows a words instruction' to form the user about the problem.

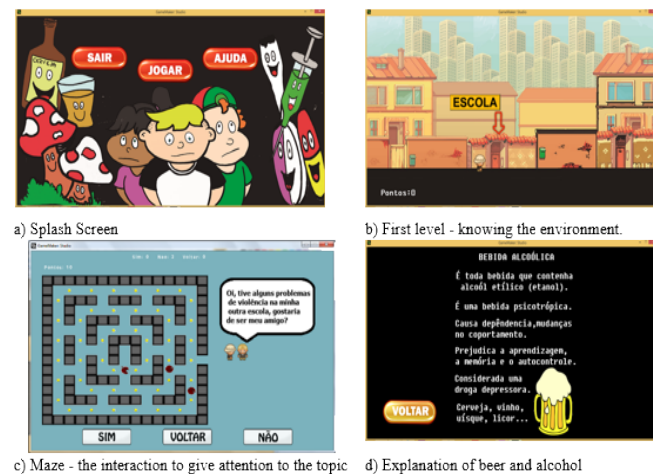


Figure 2 – Game's screens phase

Were give 20 minutes to go through all phases of the game. While the player progresses in the game, each stage completed he stumbles upon a condition of accepting or not some kind of conduct or numbing product. Moreover, even when the conduct chosen is bad, will depend on the whether of disapproval options was worse or not [16].

A. The research subjects

There were 69 subjects among these 32 are boys and 37 girls, average aged 13,7 years old. They were all from public school and remained at least one part-time without adult supervision.

They were at the same class but in different classroom. Not to shade results found in the literature about the profile of adolescents who use drugs, selected teenagers who have at least a parent figure in their home.

B. Procedures

In this study, we used the qualitative-descriptive method by a questionnaire to evaluate the use of our game as an educational resource. In this step, our purposes is isolate the variables "appropriate language" and "technological approach" with the goal of promote a breakthrough in digital games approaching. We mixed the genders in two-classroom without communication with each other.

V. RESULTS

The data are presented through the report shown in Figures 4. It has the player's characteristic information like gender and age, in order to carry out a comparison with the other players.

Report Game

Player: Noname Famele 1 Gender: Fem Age: 15

Personal	Done	AVG	Total
Number of Stages Visited	8		12
Time Effectives (min)	16:03	21:35	30
Bad Answer	7,00	7,45	12
Good Answer	5,00	5,75	12
Avg response time + (seg)	73,40	68,15	7,15%
Avg response time - (seg)	42,70	37,60	11,94%

Figure 4 – Game Report fist part.

The first information reports how many stages or phases the player passed and the total possible stages of his visit.

The data was grouped as to be able to do a comparison between the player and the Group analyzed.

It is shown on the effective time spent since the beginning of the game (we called Time Effectives) and in the second column, the average time spent by the other players and in the third column the maximum time of the game.

After is shown the amount of bad answers the player replied followed by the average of the other participants, and in the third column, the amount expected total responses. Similarly, good answers also shown.

At the end of this part of the report shows the average time of good and bad responses, also compared to the other players. In additional, the third column evidenced by the percentage of time for each answer.

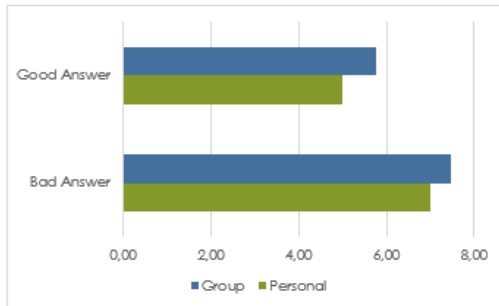
Figure 5 shows the volume of positive and negative responses by player and by group (Female and Male groups).

From the graphical illustration of the data on the responses of the player and the Group examined, we can perform some thoughts on the genre of the players and the average time of good and bad responses.

It is possible to perform a comparison by gender and identify green the average time of each reply, and in the volume of grey answers given during a match.

Report Game

Player: Noname Famele 1 Gender: Fem Age: 15



Response Time	Fem	Male	AVG
Avg response time + (seg)	71,40	64,90	68,15
Avg response time - (seg)	42,30	32,90	37,60

Visit Stages	Fem	Male	AVG
Bad Answer	5,65	9,25	7,45
Good Answer	7,30	4,20	5,75

Figure 5 – Game Report second part.

A. The findings

The match average time was 21' 35" (21 minutes and 34 seconds) that each player stay plugged in game.

After the match is over, many players encouraged other classmates to adopt good practices, exposing their choices. We considered this group influence behavior on the player.

However, the percentage of boys walking the phases with bad answer was 9.25 and of girls was 5.65 phases of the game. And for the good answer was 4.20 phases to the male and 7.30 to female. We considered this behavior was the world's discovery.

In contrast, the average time to first decision given by the girls (42,3 sec) was lower than that of boys (32,9 sec). These encouraging to say the group's behavior for the boys let themselves more involved than girls during the game.

Now, considering all the 69 subjects, regardless of genre, it is possible to identify the volume of negative responses are larger than the positive (7.45 stages average).

The association between games based on antisocial behaviors and player bad behavior has been studied over the

decades. There are experiments that found some statistical association with short-term player bad behaviors after a game play, but long-term results are inclusive. Mixed results found in literature and they could explained because some researches neglect to address the selection bias [31], as domestic violence and family antisocial behavior influence on the subjects.

Therefore, it is not possible to conclude that players who choose bad responses tend to consume some type of narcotic. However, if risk factors are present, as family history, we believe a game that registers the player behavior (as our prototype) can be used to help in the diagnosis of drug consumption tendencies.

We considered this phenomenon tend to occur when video game players become so immersed in their gaming that, when they stop playing, they sometimes transfer some of their virtual gaming experiences to the real world [26].

Also, consider that there may be people psychologically well resolved and others with more severe problems. Yet there are few studies that make this differentiation, so, we maintain the position of a group of subjects, some might make bad behavior, but there is no study showing that long-term bad behavior was influenced by the game or if it was a result of your emotional imbalance.

We have developed a game that encourages the perception behavior, but even encouraging cannot use the results found by the analysis of the report provided by the game as a condition to the use of drugs by the user [30].

We suggest that virtual behavior also may result when reinforced behavior exists [29]. We believe that it is possible to take advantage of the variety of strategies available in order to study the behavioral conditioning. However, we note that the technology can be crucial to encourage good behavior, by positive reinforcement, or punitive action.

VI. CONCLUSIONS

So as a prevention measure, the research reported in this paper showed that the use of digital games tend to be a powerful tool, due to its characteristics of learning and motivation. Outcome evidenced by the application of our research involved the development of a tool and its validation.

Note that the game this work tends to be love tool in the treatment of drug prevention, since due to the characteristics contained in that game mode, a wider range of options can be address. However, it is noteworthy that a game does not always provide the necessary output for a given situation, and the player required to follow predetermined rules, not realizing an option of your choice, disrupting their own expected results.

We relate in the game story a way to aggregate key behavior change procedures (that is, goal setting, problem solving, decision making, self-monitoring) by estimating that levels of immersion and fun stay close. However, we realize that game time and phases need to be revised so that the

motivation to play is not lost during the strategies of driving the game story.

As of the shown above, note the miscommunication that exists between preventive measures and adolescents in relation to drug use. It is know that usually at this stage, considered search and discovery occurs the first contact with some kind of illicit drug.

We was perceived this study is to take the school authorities find a way to promote health in the context of drug abuse, not only through repression, but through awareness with more targeted approaches to the target audience, as this suggested game.

Furthermore, a workforce dedicated to creating an open channel with teens can achieve greater successes for understanding reality both by students and by teachers may be see more efficiently.

We show that the socializing character of the school in which it is possible to make the contact of the young with different realities of his and, from there, to make them incorporate ideas, behaviors and attitudes in certain situations. Thus, the safety contained in games and the capability to handle the discoveries without suffering any damage and without the intention of creating an apology for consumption, have made our game a new combat drugs tool.

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