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A Pedagogical Experiment Involving Game Design Students in Producing Non-Violence Serious Games

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Abstract: In this article, we describe a pedagogical experiment aimed at understanding the motivation drivers for the involvement of game design students in the development of serious game projects. This experiment was developed as a case study for the assessment of specific measures and hypotheses towards involving students in the design of a themed serious game (non-violence).

Keywords: Serious game, serious modding, video games, learning, non-violence

1. Introduction

In previous work [Damien & Alvarez, 2014], we tasked engineering students from different disciplines (software engineering, civil engineering, chemical engineering, civil aviation, meteorology) to design serious games prototypes. These projects often showcased strong student involvement and games productions beyond our expectations along with lively and well-informed debates around the proposed topics.

The learners participating to these projects enrolled voluntarily in a weeklong introduction course. Since the video game thematic was not focused on their core disciplines, the design of a serious game was regarded as a pleasant experience. However, would we still be able to observe similar levels of enthusiasm and involvement with game design students? The latter are accustomed to the management and production of video game projects and intend on pursuing careers in the entertainment industry. How involved would they be in the design and production of serious game projects? How would their involvement with game design and topic compare with that of engineering students?

Our experience of teaching serious games with dedicated game design masters programs MAJE (Cannes, France) or RUBIKA (Valenciennes, France)), have led us to believe that the design of serious games is less attractive to students than that of entertainment digital games. Students on such courses often regard serious games as a sub category of digital games and consider them inferior in terms of production budget, aesthetics and technically to game titles dedicated exclusively to the entertainment market. Traditionally, there are generally very few students aiming for a career in serious game (between 5 and 10% in the student population on these courses). In this context, given the evident lack of intrinsic motivation for serious game projects, what solutions could be developed in order to involve students with both the design and the topic of a serious game?

In this article, we first define the serious games, serious diverting and serious modding concepts and the notion of student involvement. We then describe a pedagogical experiment rooted on our previous work on involving learners in the design of serious games. Our aim is to hypothesize and intervene on factors that would facilitate the involvement of second year game design students at the RUBIKA digital game school with the production of a serious game. We will advance a number of hypotheses towards overcoming the negative perception of serious games by this particular student population and aim to identify the effect of specific

interventions, through a comparative study (i.e. observation, analysis) of student designs and attitudes traces (i.e. documentation, and questionnaire).

2. Introducing the main concepts associated with Serious Modding

The Serious Modding concept is core to this research and is best described through both serious games and the utilitarian functions of entertainment digital games.

2.1. Serious game

In previous work [Alvarez & Djaouti, 2012], based on approaches by Chen & Michael [Chen & Michael, 2005], Zyda [Zyda, 2005] and Sawyer [Sawyer & Smith, 2008], we defined serious game as: an artifact, digital or not, targeting non-entertainment markets (e.g. training, advertising, defense, health, humanitarian aid, cultural, governmental, etc...) and offering, simultaneously, a blend of game mechanics and utilitarian functions such as: message broadcasting, training and data gathering.

The notion of targeting non-entertainment markets is a defining aspect of the serious game concept, although, as Mauco [in Alvarez & Djaouti, 2012] points out, entertainment games also comprise utilitarian notions and functionalities.

2.2. Digital Games and Serious Diverting

Red Dead Redemption (Rockstar Games, 2010) was a critically acclaimed third person shooter game that, in addition to its entertainment appeal, also served to broadcast a message and denounced, in part, the difficulties for outlaws to re-integrate society in 19th century American Far West. Despite the presence of a strong and serious message, Red Dead Redemption could not be considered a serious game as it only targets the entertainment market. This example, as suggested by the ESARO [Filion, 2015] framework, demonstrates that an entertainment game can also integrate utilitarian functions and aspects. The ESAR© framework is a classification method which aims to classify and organize games and toys on the basis of the skills (i.e. psychomotor, language, communication, social...) that a player has to master in order to use them¹.

Therefore, a video game designed exclusively for the entertainment market, can also be used to target utilitarian goals. This form of catachresis, " A concept that refers to the gap between expected and real use of "artifacts" [Rabardel, 1995] commonly refers to, in the Serious Game domain, as "Serious Diverting" [Bouko & Alvarez, 2014]. The use of *Angry Birds* (Rovio, 2009) to teach physic sciences in US Schools is an example².

2.3. Modding and Serious Modding

"Serious Modding" is an approach close to both serious game and Serious diverting concepts [Bouko & Alvarez, 2014]. In videogame culture, modding refers to the editing of an existing game [Djaouti, 2011, p.50]. A mod is not a stand-alone game and needs an existing game, along with assets, engine and implemented mechanics for its development and deployment and mod designers are usually not connected to the authors of the original game. In many cases, game modding is often confined to the editing of games for entertainment purposes. This is, however, not always the case and mods are sometimes developed with the intention to modify an existing game towards a specific topic and the development of a serious game, hence the term "Serious Mod". Escape from Woomera (Kate Wild et al., 2003), for instance, is a Serious Mod based on Half-Life (Valve Software, 1998), which aimed at developing awareness about living

¹ http://www.restode.cfwb.be/pgres/copil/novobs/dossiers/dossier_jeu.pdf

² <http://fnoschese.wordpress.com/2011/06/16/angry-birds-in-the-physics-classroom/12>

conditions in an Australian refugee camp. Contrary to a Serious Diverting approach, Serious Modding is not based on a catachresis but on a modification of the game software itself. As we will see in a later section (section 3.4.), we decided to use Serious Modding as a medium for our study of the involvement of game design student in developing serious games.

2.4. Notion of involvement

Based on Paullay's work (1994), Ali Chughtai [Ali Chughtai, 2008] describes the notion of involvement (i.e. job involvement) as the degree to which a person is: 1) invested cognitively by her work, 2) engaged in her work and 3) concerned by her work. Chughtai's experiments have consolidated Brown and Leigh (1996) finding, in that: "People who are highly involved in their work tend to be more motivated and consequently are likely to put in more effort into their jobs and therefore should perform better than less involved individuals"

In this context and by taking into account Chughtai's findings, we hypothesize that game design student involvement in serious game development should be reflected and translated in their productivity and outputs. As such, student involvement in their project should be observable and evidenced in their documentation of their project and greater student involvement should, thus, be traceable.

3. Experimental Protocol

3.1. Context

In 2013 Q1, we conducted a pedagogical experiment in association with the Non-Violence 21 (NVXXI) association and RUBIKA Supinfogame game design school (Valenciennes, France). Our aim was to assess the level of motivation of a group of 20 students in game design school towards the design of a serious game.

Students at the RUBIKA game design school will be looking for jobs in the video game industry (e.g. game designer, project leader, level designer, game developer, 2D or 3D game artist) after graduation and are not necessarily interested by the serious games sector (see section 2). We focus our experiment on 2nd year game design students (5-year course) from the 2012/2013 cohort. This choice was based on the fact that the previous student cohort (2011/2012) had to manage exactly the same project. Thus, we will be able to compare the involvement between these two students' cohort (2011/2012 and 2012/2013).

3.2. The "non-violence" concept

Throughout this experiment, NVXXI aimed to promote and broadcast "non-violence" as a message through the video game medium. Muller [Muller 2014] defined "Non-violence" as: "The first step towards a non-violence culture is to dishonor and delegitimize the use of violence, to deconstruct the ideology of violence as a human right and the worship of the strongest. [...] The non-violence culture must aim to promote the core "values" for respect and human rights and integrate them institutionally in order to guarantee respect for all" [Muller, 2014]. Non-violence is fundamentally opposed to the use of violence as a mean to solve issues and resolve conflicts. It promotes the notion of looking for alternative solutions to problems through pacifist protestations, human shields, using diplomacy and pedagogy, sabotaging organizations that use violence, etc.

3.3. Projects objectives and constraints

#	Hypothesis	Description
1	Distributing the development period over several months rather than a short one to two weeks	Through the running of a number of serious game design courses, we noticed that several months rather than a short one to students seem to be more involved with a serious game project when it was concentrated and exclusively dedicated on a short period.
2	Little interest in serious games against other video game projects	Students who enroll on a video game course aim to work in the entertainment industry. In this context, we could hypothesize that students would show less interest in working on a serious game project.
3	The non-violence theme does not appeal to game design students	The 2011-2012 student's cohort might not have appreciated the proposed topic.
4	Lack of valorization associated to serious game	During their training, students have to manage multiple projects in parallel. In the case of the serious game project, we could hypothesize that students regard a serious game project as a low priority.

Table 1: Hypotheses as to why game design students might lack motivation when working on non-violence serious game projects

This project followed a previous collaboration between NVXXI and the RUBIKA Supinfo game design school in 2012. On completion of the first round of projects, NVXXI noted that the serious games designed by students were lacking and were generally not elaborated enough to provide a meaningful representation of the topic at hand. On this first attempt, students were given a total amount of 10 days to design non-violent serious games concepts. During these 10 days, students attended lectures on the representation of nonviolence and theoretical serious game design. Additionally, practical sessions were offered and students were allocated "free-time" toward the development, prototyping and testing of the games. It was thus, surprising, given the students' game design experience, to conclude that the games provided by game students on a 10 days exercise compared negatively against 5-days experiments with students from non-game design related courses [Djaouti & Alvarez, 2014]. One must then ask as to why games design students were not able to produce serious game designs as efficient and meaningful as students with presumably less understanding of game making and design. Indeed, unlike non-game students in the 5-days experiment, the students participating in the 10 days experiment received lectures on the management and delivery of games in a short production period. This could not be related to the software aspect as all these students were invited to use the same technologies to develop their games: Adobe Flash, Game Maker, RPG Maker... As mentioned previously through Chugthai's work (section 2.4.), expertise and knowledge in game making combine with negative attitudes towards the serious game domain might have led to a lack of motivation from the students.

In this context, we, thus, aim to identify the reasons that may have led game students to fail to be suitably motivated by this type of project. Following an interview process in which students were asked to describe their experience of the projects, we elaborated a list of potential hypothesis as to how to better motivate game design students towards serious games assignments (Table 1). While this table is non-exhaustive, it represents a first step through which we can start to investigate motivation factors that would benefit the involvement of game design students on serious game projects.

3.4. Investigation pathways

3.4.1. Serious Gaming pathway

In order to improve game design students involvement in serious games projects, we investigate a number of solutions to the different hypotheses listed in Table 1. We, however, have to ignore hypothesis #1 and course schedules do not allow for short periods to be exclusively dedicated to one project. It was, unfortunately, not possible for us to modify course and program schedule and accommodate the implementation of a solution to hypothesis #1. We can however explore hypotheses #2, #3 and #4. It is also interesting, at this stage, to note that for most students, the development of a serious game is regarded as stepping away from video game development. This could be interpreted as either carrying a task that is not as pleasurable as the development of video games or activities that would not necessarily contribute to their goals of finding employment in the game entertainment industry. In this context, one way to improve student involvement in a serious game project could be to associate the game development aspect of the project with AAA technologies and provide students with experiences and skills relevant to their overall goal. We thus decided to explore the Serious Modding approach and unlike creating a serious game from scratch, we asked students to modify an existing video game (see 2.3.). Several AAA titles offer a level design editor [Djaouti, 2011, p. 50-51] and allow for the development of custom levels. The proposed Serious Modding approach could allow us to investigate hypothesis #2 in Table 1.

3.4.2. Challenge pathway

Whilst our focus on serious modding and the modification of acclaimed AAA videogame titles could improve game design students' involvement in the development of serious game projects, the integration of the nonviolence theme could pose problem. Most AAA games would be based on violent gameplay and integrating the non-violence theme could be regarded as cognitive dissonance by students (Villeneuve et al. 2010). We thus decided to introduce the theme as a challenge to students and tasked them to combine a non-violence approach through the modification of a gameplay initially develop for violent setting.

3.4.3. Contest pathway

The hypothesis #4 in Table 1 is focused on ways to increase the value of a serious game development to the student. We proposed to students to submit their Serious Modding projects to a real-life contest and enter the international e-virtuoses awards in June 2013 in the Serious Gaming category. Serious Gaming encompasses notions of Serious Modding [Bouko & Alvarez, 2014] and is therefore compatible with the assessment given to students on the course. Students on the 2012/2013 cohort were invited to submit their game productions to the e-virtuose awards. We aimed, with this initiative, to significantly raise the involvement of RUBIKA Supinfgame students in the design and development of serious games.

3.4.4. Proposed interventions

Table 2 summarizes proposed solutions to Table 1 hypotheses.

#	Hypothesis	Proposed Solution
1	Distributing the development period over several months rather than a short one to two weeks	Not applicable: Concentrate the conceptualization and development period to one or two weeks
2	Little interest in serious games against other video game projects	Undertake a Serious Modding approach on AAA games
3	The non-violence theme does not appeal to game design students	Introduce a non-violence Serious Mod based on AAA violent games as a challenge to the students.
4	Lack of valorization associated to serious game	Associate Students Serious Game project to real-life Serious Gaming awards (e-virtuoses).

Table 2: Potential solutions towards a greater involvement of game design students with serious games projects

3.5. Planning

In order to carry out this pedagogical experimentation on the design of serious game and student involvement, we invited the 20 game design 2nd year students (2012/2013 cohort) to form 4 groups of 5 and produce 4 distinct games. Table 3 summarizes the planning of activities, deadlines and milestones.

Date	Tasks
Day 1	NVXXI and RUBIKA Supinfogame co-introduce the project, describe the concepts of non-violence and present relevant serious games to students.
Month 1	The students e-mail their first game concept to NVXXI
Month 3	Game concept presentation and approval by a NVXXI panel
Month 4	Final prototype and submission of proof of concept to e-virtuoses
Month 6	Presentation of the games to the e-virtuoses panel

Table 3: Main Schedule for NVXXI projects

3.6. Expectations

In order to assess the involvement of 2nd* year game design students (2012/2013 cohort) in the development of serious games (non-violence), we propose to observe changes brought by the implementation of solutions #2, #3 and #4 on the quality of the games developed by student compared to those produced by the 2011/2012 cohort. Based on Chughtai (Sec 11.4.), better student involvement of 2012/2013 students would be manifested an increase in quality (conceptualization, production) compared to the 2011/2012 cohort. Such production gains would bring essential information in better understanding the sources of motivation for game design students towards the development of serious games.

4. Results

4.1. Production Outputs

In April 2013, all students' projects reached a significantly more advanced development stage than the 2012/2013 cohort with developments at stages beyond conceptualization and prototyping (section 3.3.), three close to a final product:

* Turn-based strategy game « Sid Meier's Civilization V » (Firaxis Games, 2010):

The “Nonviolent Challenge” game is a Serious Mod which invites the player to incarnate Gandhi, the leader of the Indian empire. The player must face the conquering ambitions of Catherine of Russia, leader of an unparalleled military power by using diplomacy only.

* Real-time strategy game « Starcraft II » (Blizzard, 2010):

The « Starcraft II - Intervention » Serious Mod offers the player the possibility to control Marines troops, initially combat units, as blue helmet peacekeeping units. The player's units are deployed in between civil populations and oppressing troops and must maintain peace until a peace treaty is signed.

* Role-Playing game « The Elder Scrolls V: Skyrim » (Bethesda Game Studios, 2011):

In the « Voice of Peace » Serious Mod, the player inhabits a quiet and peaceful village located in between two rival clans. In order to protect the area, the player is tasked to prevent a war by stealing weapons from both clans while trying to convince soldiers to oppose the conflict.

Overall, these three projects serve to illustrate the better integration of the non-violence theme in serious games developments with the 2012/2013 cohort compared to its 2011/2012 counterpart, despite identical development and production schedules. This could be interpreted as a sign of better student involvement with the theme by 2012/2013 students and is in line with our expectations (section 3.6). In this context, we need to identify the principal factors that would explain the perceived better performance from the 2012/2013 cohort.

We propose to explore Table 2 and weight in the different factors and solutions that would allow better student involvement with the theme. Firstly, we should ignore the solution to the first hypothesis in Table 2 as we could not manipulate the time variable in a fixed educational program (section 3.3.). With regards to the other three hypotheses and solutions proposed in Table 2, could student performance be explained though: The fact that students developed their Serious Games from an AAA video game (solution #2)? Can performance gain be explained though the conceptualization of non-violence within a gameplay (solution #3)?

Or finally, did extrinsic motivation (i.e. contest) play a role in student performance (solution #4)? In order to answer these hypotheses and identify the principal factor in student involvement, we propose to investigate each with respect to data and traces collected from the students involved.

4.2. Investigating solutions 2 and 3

Firstly, we need to determine whether student involvement is primarily linked to the development of a Serious Mod (solution #2) or to the introduction of the non-violence theme through a video game as a challenging activity (solution #3)? Several sources and traces could be used in order to determine which factor was the most prominent:

- The different design documents submitted by students in the development of their serious game projects. These documents were submitted at the end of Month 1 (see project planning in Table 3).

- Students' answers to a NVXXI questionnaire carried out in Month 3.
- The analysis of Serious Mods and presentation material submitted in Month 6.
- 3 pages synthesis reports submitted by the different groups in Month 12, 6 months after the e-virtuoses contests and once students have graduated to year 3. These synthesis reports allow an insight in the initial intension behind the project, its production and development and conclusion.

4.2.1. Data collected from students on the non-violence theme

Knowledge linked to the non-violence theme; despite being interesting for a majority of students (14 out of 20) seems to have lost importance over time. Despite debates between students and NVXXI, the non-violence concept, from a gameplay perspective, could be summarized to a game conceptualization in which violence has to be prevented. For the majority of students, this approach seemed antagonistic with offerings from the game industry. Only 6 out of 20 students would envision integrating non-violence as mechanic in future game designs. Some students saw in the non-violence theme, a contradiction with the entertainment and nature of games. We can thus conclude, that the solution to hypothesis #3, which introduced the integration of nonviolence within a gameplay as a challenge was not particularly the source of involvement for the majority of game design students.

4.2.2. Data collected from students on the Serious Modding concept

In each period, the collected data show a strong interest in the video game conceptualization: technologies, game mechanics analysis for the games concerned, nature of player involvement and challenges, etc. Learning seems to be mainly focused on this aspect and is still part of reflections at Month 12, 6 months after the project has ended. This is not necessarily surprising given the profile of the students aiming to work in the games industry. We can thus conclude, that the solution to hypothesis #2, linked to Serious Modding on AAA videogame, was particularly a source of involvement for the majority of game design students.

4.3. Investigating solution #4

Solution #4 lies in associating student serious game development to a real-life serious game contest. For this contest, the independent e-virtuoses jury panel nominated 4 "serious gaming" projects. Amongst these, two were selected: "Non-violent Challenge" and "Voice of Peace" (section 4.1.). The nomination required the project group to defend their project to the e-virtuoses jury panel for 15 minutes in English in June 2013. The students nominated had a month notice to prepare and finalize their prototypes. The "Non-violent Challenge" Serious Mod was finalized ahead of the presentation and distributed online through Steam (Valve, 2003). In January 2014, 6 months after its release, the game had received 2186 unique visitors, had 192 players playing the game and listed as favorite to 5 of them. Whilst none of the projects won an award, the e-virtuoses platform allowed students to showcase their games and work to industry professionals. Other contest organizers such as Game For Change also shown interest in the games and the group behind "Non-violent Challenge" were invited to exhibit at the Games and Learning Alliance 2013 conference at Dassault system HQ in October 2013. A downside is that student groups not nominated to the e-virtuoses contests, decided to abandon the development of their projects, thus highlighting the fact that the extrinsic motivational factor of a contest is more important than the development of a Serious Mod based on an AAA game. Additionally, such motivation seemed more important to some students than the grading of their work as part of their curriculum. In fact, marks and grades were not available at the time of

nominations for the e-virtuoses contest and students could have completed their game developments in order to achieve the best grade possible.

4.4. Findings

From this analysis of Table 2, it seems that the main motivational factor for the 2012/2013 2nd Year Game Design cohort is the association with an external Serious Game contest (solution #4). The possibility to build on an AAA digital game for Serious Game adaptation (solution #2) came second whilst the challenge of introducing a non-violence theme in a violent gameplay (solution #3) did not seem to particularly motivate this group of students.

5. Conclusion

This article described a pedagogic experiment, which targeted digital game students in the design of non-violent serious games. We found that, in order to obtain student involvement comparable to our previous work with engineering students, we had to adapt our approach by targeting Serious Modding as a task and associate game development to a real-life serious game contest. These two elements were significant factors in gaining student involvements with the projects. In terms of findings, we found that 6 months after the end of this pedagogic experiment, students would more readily describe aspects related to the conception and development of Serious Mods than they were about the non-violence theme, a fact logical in view of the specialty and profile of the students concerned (i.e. game design) and their ambition in life (i.e. working in the games industry). We are however somewhat surprised that students did not seem to be particularly sensible to the challenge of introducing non-violence within gameplay and it would be interesting to find out as to why.

It might be possible that part of the answer might be related to the fact that non-violence might be too distant to common themes in games and students would question the entertainment values of such an approach (section 4.2.). It is also probable that other factors are at play and that for instance, in the student minds, the proposition of non-violent games could be antagonist to the belonging to certain gamer communities or be seen as a barrier to apply to specific game development studios. More research would be necessary in order to determine these factors and develop a better understanding of motivating factors for student involvement.

This in itself highlights limitations in our approach as these only point out towards student involvement factors without necessarily explaining their underlying motivations and factors. Additionally, the analysis conducted in this article is exclusively based on traces from 3 groups rather than an extensive study. In order to provide a more extensive study of student involvement factors, we would need to deploy a methodology through which individual involvement could be monitored in line with the method proposed by Lodahl et Kejner [Lodahl & Kejner, 1965] which involve the completion of semi-directed interviews. As such, in view of the data at our disposal, we cannot exclude effects linked to influencing and normalization from within group dynamics.

Through a qualitative approach targeting the individual learner, rather than the group, we should be able to obtain more accurate data and identify different perspectives as to student involvement factors. As per mention in section 3.3, this study is non-exhaustive and the hypotheses listed in Table 1 could and should be expanded in further studies. Finally, if the non-nomination to the e-virtuoses contest acted as a de-motivational factor to learners, we should, in future experiments, work at addressing this so this isn't the case anymore. Once our evaluation protocol suitably addresses such issues, we should aim to reproduce our approach to other game related schools and courses and assess as to whether these results are generic across the spectrum or not.

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