

Disclosing myths of Brazilian folklore through motivational games

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Abstract

Unmotivated students are a regular sight in schools. Although several factors that might account for this, a common one is the regular practice of schools to place a large focus on the use of expository classes in which students simply copy the contents shown by teachers. A method far too distant from the paradigm brought by the digital technologies and in which new learners, known as Digital Natives, are born in. Such technologies are highly familiar to these students' daily lives and when properly integrated to classrooms have a high potential to motivate them. Within this context, this paper presents the approach taken for the development of a Serious Games to teach students about the characters and creatures of Brazilian folklore (subject pointed to us by teachers of elementary grades as lacking didactical material), which incorporates to its development aspects of ACRS model of motivational design, in order to assure students' level of motivation, maintaining their interest and engagement to this activity.

Keywords: Brazilian folklore, Serious Games, Motivation.

Resumo

Alunos desmotivados é uma visão comum em escolas. Apesar de vários fatores poderem causar isto, um fator recorrente é a prática regular das escolas em por um grande foco no uso de aulas expositivas, em que os alunos apenas copiam o conteúdo mostrado pelos professores. Um método que se distancia muito do paradigma trazido pelas tecnologias digitais, no qual os novos estudantes, conhecidos como Nativos Digitais, nasceram. Tais tecnologias são altamente familiares no cotidiano desses alunos e quando adequadamente integradas à sala de aula têm o potencial de motivá-los. Dentro deste contexto, este trabalho apresenta a abordagem tomada para o desenvolvimento de um *Serious Game* para ensinar os alunos sobre personagens e criaturas do folclore brasileiro (tema apontado a nós por professores de séries fundamentais como carente de material didático) e que integra em seu desenvolvimento aspectos do modelo ARCS de design motivacional, como forma de assegurar o nível de motivação dos alunos, mantendo seu interesse e engajamento por esta atividade.

Palavras-chave: Folclore brasileiro, *Serious Games*, Motivação.

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1. Introduction

To find in classrooms students who seem to be unaware of the topics being discussed, or plainly, who appear to be unmotivated is far from an uncommon sight. However, this has come to be appointed as one of the biggest concerns currently being faced in classrooms.

Specifically, over the last decades different studies such as Boruchovitch et al. [2013], Bzuneck [2010], Steinmayr and Spinath [2009] and Schunk et al. [2008] have pointed to the huge influence that motivation, or its absence, has on students' learning process and performances.

The reasons for this shortage of motivation are very diverse, but most authors seem to agree that subjects that are too distant from the students' own reality and the gap between traditional teaching methods and the new needs that have risen among them are recurring topics that converge to the practice of schools of carrying lectures that emphasizes the exposition of subjects' contents by teachers and the copy of these contents by students [Bzuneck 2009; Carvalho et al. 2007].

Discussions about efficacy this model are not new and more recent contributions, such as the ones pointed in Hammes [2014], Kalsing [2014], Niskier [2014], LANDERS and Callan [2011], Huang, Huang and Tschopp [2010], Anderson [2009] and Van Eck [2006] add to its loss of space within schools and their effort to adapt to a society that is amidst a shift on its own paradigm, which was brought by as much as it has been caused by the technological boom and the rise of the Internet.

This new social paradigm, called Information Society (IS), is the one that students inhabit outside school. A world where the barriers of time and space are (in many circumstances) virtually inexistent due to the intense flow of information and that is heavily bounded to technology [Coutinho and Lisboa 2011; Pozo 2004; Hargreaves 2003; Castells 2003].

The students that dwell in this current paradigm of our society are the ones that Prensky [2001] calls Digital Natives, which are said to have been born shortly before or, as it is true for young students, right amidst this social paradigm and as such, as a group, tend to have an extreme high level of intimacy with Information and Communication Technologies, ICTs.

Among the ICT's Prensky [2001] arguments that the videogames are likely the most important technology being used by Digital Natives due to the immersion and interactivity that are common to the environments they promote.

Additionally, these environments have a natural potential to involve and instigate players, motivating them to move forward through the game space and

solve the problems they meet. All these characteristics are highly desirable in learners, as they promote the transference of knowledge, which, in videogames, occurs by the display of informations and situations and by the simulation of actions through the game mechanics [De Freitas and Liarokapis 2011; Anderson et al. 2009; Van Eck 2006].

Such context clearly indicates that videogames can be used to promote learning. Hence, what we propose in this study is to take advantage of the environments of videogames to teach students about the mythological characters of Brazilian Folklore. A subject that, according to teachers of the Colégio de Aplicação (CAp), a public school within the Federal University of Rio Grande do Sul (*Universidade Federal do Rio Grande do Sul – UFRGS*), not only lacks learning materials that motivate students to the subject, but, in general, lacks learning material of any kind.

Next this paper will briefly discuss in Section 2 will address different related work pertinent to this research, mainly, who are the Digital Natives, why use videogames to stimulate their learning and the role that motivation plays on learning; Section 3 will discuss the space of research, the theories and methods that will be applied in taking this research; Section 4 will present the characteristics of the game being developed in conjunction with CAp; and Section 5 will draw our final conclusion and expectations.

2. Related Work

This study aims to develop a Serious Game that can be used in classrooms to teach students about mythological characters of Brazilian folklore. An idea brought forth from the convergence of several concepts. The first being the current debate about the Digital Natives.

2.1 Digital Natives

Digital Native is a concept, and in some ways a status, that was coined by Prensky [2001] to emphasize the level of familiarity that people who have lived their entire lives among ICTs tend to present to digital technologies, in contrast to those who had to adapt to this social context later in life.

Computers, cellphones, videogames and, more recently, online selling websites, smartphones and a wide array of technological assets are, all of them, IS resources common to Digital Natives daily lives since their early years, which they used for entertainment as much as for information, communication, study and work.

In fact, Prensky [2010] states that by 2006, students that had just graduated had spent less than 5,000 hours of their lives reading in contrast to 100,000 hours playing videogames, other 100,000 using cellphones and more than 200,000 watching TV.

Hence, in contrast to their parents or teachers (Digital Immigrants), these individuals are people whose formation as a person was heavily influenced by ICTs, which sets a series of behavioral and thought differences between the two groups that are likely to

make Digital Natives less susceptible to the methods by which Digital Immigrants have learned, and largely, still apply when teaching them [Herold 2012; Prensky 2010].

Although various authors still debate about the legitimacy of this statements, such as Margaryan, Littlejohn and Vojt [2011], Bennett and Maton [2010] and Helsper and Eynon [2010] who point to a lack of empirical data to support these claims and argue that the period of birth alone is not enough to qualify these people as more attuned to the use of digital technologies, citing other factors such as exposure to these technologies, range of their use, experience, variety of ICTs they are familiar with and their confidence in their use.

Nevertheless, while Bennett and Maton [2010] remind us that such worries about the “novelty” of ICTs is a circumstance that has happen in the past within other contexts and technologies relevant to such periods, the empirical data collected by Margaryan, Littlejohn and Vojt [2011] and Helsper and Eynon [2010] indicate that, even though the younger learners that Prensky [2001] calls Digital Natives may not have an intrinsic deeper knowledge about the technologies that surround them, they do seem to be more prone to use it as a first method to access or check for facts and information, to apply it in broader contexts and to be familiar with a wider variety of ICTs. Characteristics can be compensated by older individuals through a more experienced use of these technologies or a deeper understanding of them.

To Herold [2012] and Prensky [2010] these older individuals, Digital Immigrants, are also ones to argue that learning is a process that in most instances should not be fun and that is strongly supported by lectures followed by the application of tests. A practice, in which, information is passed to motionless students who assimilate the contents presented by teachers.

A setting that is very different from the one filled with different incomes of information, the use of inductive reasoning and with the possibility to rapidly interact with showed instructions, in which young learners tend to perform better. A characteristic that is especially true for situations that provide often prizes or that immediately reward their actions [Prensky 2010; Van Eck 2006]. In fact, this setting is much closer to the environments regularly seen in videogames, which lead us to the second concept behind this study.

2.2 Videogames and learning

In short, videogames are electronic games that players visualize through some sort of screen (such as a television or a monitor) and with which they interact using some kind of controller.

The interesting in those media is that they allow for the construction of as many situations as one can imagine, which will take place in the virtual world that serves as their setting and, according to Van Eck [2006] possesses a high potential to engage individuals in the activities they present as well as to effectively

transmit contents to players, therefore, deserving a rightful spot within education.

In fact, games are already used for educational purposes. Such games are known as Serious Games and take advantage of the computational advances and of the intrinsically engaging environment of videogames to provide learners with educational content to transmit informations, to simulate situations or to train abilities [Crookall 2010; Anderson et al. 2009] in a highly immersive and interactive controlled environment that incorporates a wide range of audiovisual resources and stimulates knowledge absorption [De Freitas and Liarokapis 2011; Baddeley 2000; Paivio 1990].

This immersive environment is viewed by some authors as the biggest responsible for engage and motivate players. In that sense, immersion does not simply mean a high level of detailing of objects, but in fact, denotes the conjunction of the different areas that make a game, such as plot, interactivity, player's perception of being progressively moving forward and, at last, suitable representations of game objects [Csikszentmihalyi 1990; De Freitas and Oliver 2006].

In reality, what a Serious Game really does is to create a space for immersive tutoring that combines different digital learning materials and resources to an attractive user interface, which students progressively explore as they move forward inside the game. A progress that is guided by students' own interactions with the game plot and by the challenges they conquer [Landers and Callan 2011].

However, Serious Games are not a magic formula that assures learning. Each student has their own preferences, be it in respect to how they learn or to the games they choose to play. Moreover, if a game is incapable of affecting a student's motivation it will not have an effect on his or her learning [Hodgins 2005; Baron and Kenny 1986]. This leads to the third topic in this section.

2.3 Motivation and its impact on learning

When studying about human motivation it becomes apparent the extensive literature regarding the subject and, even more, the various different points of view through which researches have tried to understand and define motivation, what, in many circumstances, is done in respect to an specific topic of interest.

Despite a unique theory that integrates and defines all the different perspectives of this subject and the aspects by which it is approached being something inexistent, all point to the ideas of movement and action that push a person to act towards an objective, which will fulfill a need within this individual [Bzuneck 2009; Minicucci 1995].

This statement is true even to the more simplistic of situations, such as paying attention to something or "doing homework". The reason for this is that in all instances there is something else that is strengthened by the motivation, which is the person's desire to persist at the task that, in turn, energizes this person or activates in him or her a sense of purpose and direction

that enables this person to overcome the obstacles and failures that may block or change his or her course of action towards the desired objective [Stipek 1998; Pintrich and Schunk 1996; Ryan and Deci 2000].

Interestingly, this statement enhances the reasons for a lack of a unified motivational model, as each person has their own set of interests that, in most cases, do not intersect each other. In other words, people do not engage in the same activities for the same reasons [Fenouillet 2003; Bergamini 1990] and this is also true for students. Hence, students unwilling to invest in class activities, spending their minimal efforts to complete these tasks or even completely forsaking them are labeled, rightfully or not, as unmotivated and become a source of complain for teachers in various grade levels, who grow displeased in finding such students in their classrooms.

This setting has brought motivation to a major spot among educators, as students lacking motivation study very little, and thus, the school has the obligation to attempt to enhance and maintain their motivation as well as to locate motivational problems within individual students and help them to overcome these problems [Bzuneck 2009].

In this respect, the above author emphasizes that motivational studies involving the expectancy-value theory help to approach this matter by the students own sense of self-efficacy through a pair of simple enquires: "am I able to answer this question?" (expectancy); and "why should I answer this question?" (value). By helping students to answer these questions in response to the context of their classroom and to theirs own internal affective state, teachers can act as advisers that constantly help to maintain or amend students' motivation.

This task can be further improved by taking advantage of the positive motivations that each student brings with them to the classroom, stimulating their intrinsic and extrinsic motivations through their curiosity in exploring the new, which is especially strong in children [Ryan and Deci 2000; Stipek 1996; Spielberg and Starr 1994; Brophy 1983; 1987; Vidler 1977].

These two types of motivation relate to people response to their own internal needs (intrinsic motivation) or to some sort of exterior motivator that pushes them towards an objective that is not truly part of the activity they are engaged with but that depends on its conclusion (extrinsic motivation). These two concepts are presented in detail next.

INTRINSIC MOTIVATION

Whenever possible, intrinsic motivation is preferred over extrinsic motivation. This because, intrinsic motivated people look for novelty and for the opportunity to practice and master their skills on their own volition, with their only reward being the pleasure they take from this process [Guimarães 2009; White 1959].

When someone is intrinsically motivated with a task their engagement with this task is an end by itself,

with no need for other artifices to enhance their interest in it. However, despite a person predisposition to be intrinsically motivated by a task, not everybody has the same interest by the same activities and thus, each person will show a higher or lower degree of interest or satisfaction towards a same activity [Ryan and Deci 2000].

Even though each person has specific requirements that must be met in order to trigger this intrinsic motivation, the levels of satisfaction (known to have a high positive impact on learning) it grants to a person are higher than those of extrinsic motivation, as it stimulates individuals to engage in tasks that allow them to enhance their abilities, to focus their attention to the instructions being presented to them. In addition, it pushes them to look for new informations, to organize both new and old knowledge and to apply them to other contexts [Ryan and Deci 2000].

Unfortunately, schools still show some difficulty to provide students with intrinsically motivating environments, as Guimarães [2009] points through the research conducted by Larson et al. [1989] that collected data of preteen students from four different US schools using a survey to ask them about different situations they live in school.

Particularly, one question asking them about which situations in school caused them the most satisfaction was left in blank by most of the students. From the ones that answered it, most of the positive answers came from the older students. On the other hand, when the students were asked about the worst moments at school most of the answers concerned events that took place inside the classrooms.

Whether in k12 or in teenagers students, intrinsic motivation is not common within the schools as this is not the main guideline for this institutions, which focus the transference of information to students through disciplines and the evaluation of their performance in these disciplines through scores.

In this respects, schools place a bigger emphasis on extrinsic motivations, which are presented next.

EXTRINSIC MOTIVATION

Contrary to intrinsic motivation in which a person acts due to his or her own desire and pleasure to interact and fulfill a task, the extrinsic motivation relies on an external element, i.e., the person engages with a task due to its outcome or to a reward that depends of fulfilling this task [Ryan and Deci 2000].

This reward can in fact be anything as long as it is of real interest to the individual, such as material rewards, social rewards, some form of recognition for the knowledge and skills he or she exhibits, or even the avoidance of a punishment. In any circumstance, it is this reward that truly motivates the individual to engage and persist in the activity [Guimarães 2009].

The importance behind extrinsic motivation is that, even though intrinsic motivation is preferred it is not always possible. In most cases people do not engage in an activity due to their personal desires or interests. Therefore, they are not intrinsically motivated and the

use of sources of motivation that are external to the activity they are conducting may improve their participation on it [Ryan and Deci 2000].

In this respects there are as many authors who condemn the use of extrinsic motivators, such as Woolfolk [2000], Stipek [1993], Ryan et al. [1985] and Neri [1982], as those who support its use, pointing that a well-balanced use of extrinsic motivators might have very positive results in engaging people with activities, like Guimarães [2009], Lepper and Hodell [1989], Brophy [1983] and Bandura and Schunk [1981].

Moreover, some author argue that a dichotomy between intrinsic and extrinsic motivation such as, for example, to know if in the lack of a reward or of a punishment a student would still get involved with an activity is not enough to truly explain extrinsic motivation [Guimarães 2009]. That way extrinsic motivation becomes a continuum in which various conducts can be marked according to different degrees of engagement.

Within it there is the external regulation in which only the rewards or the avoidance of punishments associated to the task matter to the students (“can I have a problem if I do not do this task?”); the introjected regulation in which the first signs that the student is beginning to internalize the activity start to appear, yet, the reasons for his or her engagement are still apart from the task (“am I going to feel guilty if I do not do this task?”); the identified regulation in which a person sees his or her acts as personal, and engages in an activity for believing it is something important; lastly there is the integrated regulation in which extrinsic motivation is autonomous just like in intrinsic motivation, with external incentives acting as important informations (feedback) regarding the task and not as a reason for the task [Guimarães 2009; Lepper and Hodell 1989; Brophy 1983; Bandura and Schunk 1981].

In this respect Guimarães [2009] also points that, as long as the external motivators act as a source of information for the task there are no indicators that they can in any way impair intrinsic motivation.

Moreover, as extrinsic motivators can promptly be attached to class activities (such as compliments, rewards, or some sort of status among parents, educators or classmates) they become an import tool for teachers to assure or enhance the engagement of their students [Guimarães 2009; Amabile et al. 1994].

In any circumstance it is important to use such motivators with care in order to avoid that these stimuli become the true goal of students with a task and, at the same time, assuring their interest with it and enhancing their sense of self-efficacy and self-determination.

3. Space of research and methods

The research aims to develop and evaluate a game preliminarily entitled “Exploring the Brazilian Myths” that will teach players about mythological characters of Brazil’s national folklore and myths.

In this respect, what we mean by evaluation is to verify if a Serious Game can pose as an engaging

learning material for the teaching of Brazilian national folklore myths and legends, enhancing students' performance on these classes and motivating them to explore these themes.

The game itself will consist of a single player platform puzzle game with five levels. It will keep a leaderboard with the score of each student on a remote server, so students can compare their scores with the ones of their classmates, thus stimulating their interaction and competition.

When this idea was brought to the CAP of UFRGS we were met with great interest of its teachers, as we have found out that, there is in fact not just a lack of digital media regarding this topic, but, in fact, a lack of didactical material that focus the country's own national myths.

In addition, the teachers of CAP have also pointed out that, the development of a game exploring this subject would not only add for the teaching of Brazilian culture. It would also meet the interests of Digital Natives, who are immersed in the daily use of ICTs and to have quick access to both information and entertainment.

The study will be conducted using a case study and a control group with target audience ranging from 13 to 15 years old students. At the control group of study, CAP classes regarding Brazilian myths and folklore will proceed as usually taught by the institution, which consists of expositive classes and of group assignments and researches. The case study group will have the game integrated to its curriculum as part of the teaching-learning process of the subject, which, for both groups, takes place within the classes of Literature. Beta tests to collected empirical data to validate the approach discussed within this section are expected to start at the end of 2014.

3.1 Student's learning and performance

Currently, the actual stage of development of the game is the conception stage, in which the teachers of CAP are providing the development team with important information about the didactical content.

This closer contact brought to evidence some key aspects that the game must fulfill and aided in defining the game's visual interface, mechanics and plot elements, all of which are essential for the progress of the learning process.

These elements will be show on the next section. However, it seems proper to first explain how they work together to create a learning process. Let's take for example the game Limbo developed by Playdead, a platform puzzle game much like the one proposed in this paper.

The game essentially revolves around four mechanics: walk/run; jump; hang to/climb reachable platforms; move scenario's objects such as blocks, switches or similar objects.

As the player progresses each of these mechanics is presented to him or her in a way that it is necessary to use or practice this skill in order to move forward. By experimenting with these mechanics the player process

and internalize new informations that he can later apply to new conditions presented by the game after a period of reflection.

Therefore, by acting as a medium through the provided informations and both the player's previously and newly acquired knowledge a game can promote periods of reflection, which take place when the player evaluates both the current objectives that must be fulfilled and what the game has revealed to him or her up to that point, be it plot or mechanics.

From these reflections the player will create new hypothesis that will be refuted or validated as a solution for the problem at hand, through the actions he or she chooses to make. In the game we took as example such hypothesis could be use the jump and hang mechanics to try to reach a platform.

If such hypothesis turns false the player will have to go through a new period of reflection in order to solve the problem "reach platform", taking into account the game mechanics that he or she knows and the interactive game objects available in the environment, which could very well, lead him or her to a "move block and climb on top of it to reach platform" solution based on these said mechanics.

Such learning processes based on experimentation followed by reasoning are very close to Kolb's [1984] Experiential Learning Theory (ELT) which Crookall [2010] points as the potential best practice for players.

The ELT states that learning is a process where knowledge comes from the experiences lived by a person and by the way this person transforms this experience through informations and data that were either collected from the environment or triggered by his or her recollections.

Hence, the process can be divided in a pair of states, each consisting of two situations: the grasp of experience (concrete experience and abstract conceptualization); and the transformation of experience (active experimentation and reflective observation).

These states are experienced by people as the cycle seen in Figure 1 in a way that, when learning, at some point they will have passed by all of them.

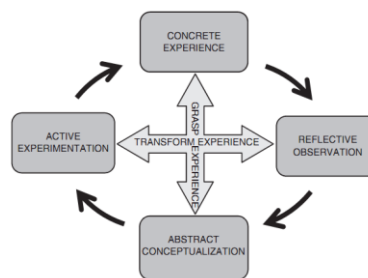


Figure 1: Cycle of ELT. Source: Kolb and Kolb [2009]

We find the ELT particularly interesting as it clearly depicts how learning happens in videogames. Moreover, they also make the act of make mistakes part of the player learning process at the same time that eliminate retaliations from peers as he or she tests, validates or refutes his or her hypothesis until be able to solve the problem presented by the game.

In that way, videogames provide players with an extremely interactive environment where it is safe to

make mistakes as they progress and learn. This is the type of learning environment that we will be creating with the help of the teachers of CAP in order to teach students about the characters of Brazilian national myths and folklore.

In this respect our ideas about measuring a student's performance on the game and on the classes of Literature (which covers the topics that will be dealt in the game) are distinct aspects. The student performance on the game reflects the score he or she makes playing the game, advancing through the plot and solving the puzzles that the game presents.

On the other hand, a student's performance on the classes although being influenced by his or her progress on the game will be evaluated by the teachers of CAP responsible by the classes of Literature. Who will use equivalent instruments on both the case control and the case study group, what will allow for the comparison of performance of both classes.

However, as the study assumes that triggering the student's motivation is essential in order for this learning to be substantial it is necessary to make clear how we intend to trigger and measure this motivation.

3.2 Student's motivation and performance

In order to create a Serious Game environment that truly triggers the motivation of the learner, capturing his or her attention and pushing this student to a commitment with the displayed activities, a game must fulfill some aspects in order to be, at the same time, didactical and ludic.

To this day, the works of Malone [1980] and Malone and Lepper [1987] are a valuable resource to this matter as it suggests a series of heuristics that act as guidelines to include intrinsic motivators in games with learning purposes, i.e. Serious Games, which are essentially added to the game during its design stage, which is precisely the current stage of development of "Exploring the Brazilian Myths". There are four aspects in these heuristics:

- The **challenge** that pushes the learner to act. It requires a proper balance between the game's subjects and activities and the student's knowledge and skills so as to not look too easy or unfair.
- The **fantasy**, which relays on imagination to create elements and scenarios not seen on daily life. It seeks to create an emotional appeal to students so to grasp their interest.
- The **curiosity** builds expectation on the student. Making him or her wonder about the game through sensorial aspects such as plot and visual elements, or through cognitive aspects such as solving puzzles.
- The **control** is related to the domain the player exerts on the environment through his or hers own actions, interacting with it and influencing changes on it, or, being obstructed by game mechanics, design or other characters or player's actions.

By adopting these motivational guidelines in conjunction with the ELT we intend to provide students with learning experiences that prime for the interaction

and experimentation and that incentive the student to promptly apply the gained knowledge.

However, despite providing a way to assure learning and to afford a ludic and didactic environment, neither the ELT nor the previous guidelines establish a proper way to measure this motivation.

This concern has led us to incorporate to our research Keller's [1983; 1987a; 1987b] ARCS model of motivational design, based on the concepts of Attention; Relevance; Confidence; and Satisfaction; and that offers a proper tool to measure motivation within the model, the IMMS (*Instructional Materials Motivational Survey*) [Keller 1993].

The IMMS is a questionnaire consisting of 36 items that may be valued from 01 to 09 on a Likert scale, with 01 being "absolutely false" and 09 "absolutely true". Each of these items is linked to one of the four components of the model: 12 for the attention; 09 for the relevance; 09 for the confidence; and 06 for the satisfaction. The version of the IMMS adapted for videogames that will be used in this research and its 36 items can be found in Huang et al. [2010].

In respect to the components of the model, the **attention** relates to the response of the students to the stimuli presented by the instructional material and the engagement it triggers on them. Besides the concept of fantasy found on Malone [1980] and Malone and Lepper [1987] the attention is closely related to the challenge guideline, through the concrete representation of didactical subject as game activities and the reflections and correlations they activate on students.

The **relevance** is linked to the aid the instructional material provide students in associating their current knowledge to the new informations supplied by the material. In this research this mainly concerns to the game plot and mechanics, which in turn are connected to the curiosity guideline. The challenge guideline also adds to the relevance, as the game activities also help students to internalize the subject.

The **confidence** regards to the importance to give students the opportunity to create good expectations about their performances, which is mainly attained by allowing for different solutions to come to a same result and by providing proper feedback to indicate the student's level of success.

Hence, in respect to Malone [1980] and Malone and Lepper [1987] the confidence seems well linked with the challenge, the curiosity and the control, as, at the same time that curiosity works over the learner expectations through what the game presents, the challenge will have an active role in what this learner believes that he or she can accomplish on this environment, while the control will define how much of his or hers hypothesis are, in fact, valid or even testable.

At last there is the **satisfaction**, which according to the ARCS model occurs close to the end of the learning experience, at the time when the learner must apply the newly gained knowledge. Interestingly, as we believe that a game as a whole is a process of experimentation (thus our choice of Kolb's [1984]

ELT) the satisfaction will progressively appear throughout the game, marked by the obstacles the player overcomes as he or she progresses through it.

Both the student's perception to be enjoying the learning experience as eventual rewards obtained during it that indicate his or her good performance are generators of satisfaction [Keller 1987a; 1987b]. In a game environment such rewards are mostly game points, performance feedback or collected items.

On the other hand, the enjoyment of the experience will be closely connected with the control guideline, as it regards the learner actions on the game space as a player and the validation of his or her hypothesis, which results in the player progress through the game. This is also supported by fantasy, which gives a context to such interactions.

The IMMS for the ARCS model has no intention to measure the learning or the performance of the students within a learning material, focusing only on obtaining metrics in respect to the students' motivation regarding the learning material. Hence, the need to establish the ways of measuring learners' progress within the subject of study, as detailed on the previous section.

Moreover, as the model was created with the actual aim to obtain metrics regarding students' motivation, its application includes a previous application of the questionnaire to identify the motivational levels before the use of the instruction material – to find out about learners' predisposition to the activity as well as to take preventive actions to increase or maintain motivational levels – in addition to the taking of subsequent measurements to verify the levels of motivation after these actions [Keller 1983; 1987b].

The application of this questionnaire is essential for the purposes of this research. However, due to its extensive number of questions and the fact that it is not in our interest to interfere to students' game-playing, as we understand that such an action would, by itself, have a negative impact on their motivation, we intend to apply the IMMS as part of the game progress (between its levels), in two different moments.

The first one would be after the student finishes the first level of the game, in a way that, after concluding this level the student would be able to advance to the next one only after answering the questionnaire, what would give as a perspective of the students' first impression of the game.

The last one would be after the students conclude the game, going through all its intended levels. To the player, the answering of the questionnaire at the end of the game is a condition to have his or her score sent to a leaderboard that will rank the score of each player among their classmates.

It is our belief that such a tactic would minimize the application of the questionnaire to players' gameplay, at the same time that would allow us to obtain and compare players' first impressions of the game to their view of it after a full exploration of its environment. Thus, indicating which motivational objectives were met and which must be reviewed.

With all that said, we will now present the characteristics of the game "Exploring the Brazilian Myths".

4. The game

As previously stated the game "Exploring the Brazilian Myths" will focus on Brazil's national folklore, regarding particularly its mythological characters. A subject that teachers of CAP have pointed to us as lacking didactical material and thus, are highly interested in taking an active participation in the development of the game plot and challenges, as they will correspond to this subject didactical content and exercises.

Particularly, the subject will be present to students through the game environment in a way that students learn through experimentation as they progress over the game plot, a perspective that is in accordance with Kolb's [1984] ELT.

The game will be a two dimensional (2D) single player platform puzzle game with 05 levels; each representing one of the five regions of Brazil and having as "level boss" a creature of Brazilian folklore that is related to that region.

Together, characteristics of the myth and of the region it resides within the game will set the tone of the scenario of each level. The student will then take control of an avatar to explore such levels and face the opponents and challenges brought by the game, while absorbing the context of the various folkloric elements and creatures that it presents to him or her.

Such characters and avatar will have an appearance inspired by Braid, a game developed by Number None, Inc. and that first debuted on the XBOX in 2008.

While this game also inspires the combat mechanics to "Exploring the Brazilian Myths", the intended puzzle mechanics are closer to the ones found in Limbo developed by Playdead which highly focus player's reasoning and creativity in using objects of the scenario to overcome imposed obstacles. These two games are respectively show on Figure 2 and Figure 3.



Figure 2: Platform challenge in Braid. Copyright: Number None, Inc. 2008



Figure 3: Puzzle in Limbo. Copyright: Playdead, 2010

The plot of the game will be the main device to present learners the didactical content as it will provide to players a contact with the stories and characteristics related to these myths. In addition to this, players will

also be able to collect notes at each level, which describe different aspects of each myth or country region. Once collected, this information will be accessible through a “character bios” screen.

In this respect, the game plot will revolve around the Cuca, a popular character of Brazilian folklore known as an evil witch who steals children, who is commonly shown as an anthropomorphic alligator.

The reason for her rebellion will be her huge distress due the fact that she and the other creatures have been forgot by Brazilians, who not only have stopped to believe in them but have also reduced their very existences to children’s tales. This will lead the Cuca, depicted on Figure 4, to take control, convince or coerce other myth creatures to do her deeds.



Figure 4: Cuca. Author: Marcos Jardim. Source: Internet

The player will be a child who intervened on a spell the Cuca was performing and thus gained physical abilities (higher endurance and physical feats) that allow him or her to face the game levels, exploring them from the south to the north of the country and thus, playing a reverse version of the national saying “from Oiapoque to Chui” considered two of the extreme points of the country, north and south respectively.

Each of these levels will be controlled by a specific mythical creature of Brazilian folklore and will integrate several geographical characteristics of the region it is set in.

In that sense, the south region level will depicted the Boitatá, Figure 5, a giant luminescent serpent that has devoured the eyes of several animals drowned on a flood and burns with the light of the sun they last saw.



Figure 5: Boitatá. Author: Unknown. Source: Internet

The southeast region level will have the Corpo-Seco (dry-body) as its boss, a kind of vampire creature refused by earth for the abuses done to his parents and imprisoned to the trunk of a tree, as seen in Figure 6. It kills the ones who come close to where it lives.



Figure 6: Corpo-Seco. Copyright: Mauricio Pereira. Source: Internet

The northeast region level will be the territory of the headless mule, Figure 7, the lover of a priest who was cursed to, once per week, turn into a creature resembling a mule without its head, with fire pouring out of its neck where its head should be. It runs through small villages and devours the ones it encounters.



Figure 7: The headless mule. Author: Roger Cruz. Source: Internet

The central-west region level will be the home of Curupira, Figure 8, a redhead dwarf that has its feet turned backwards so no one can follow his tracks. He protects the woods and punishes those who deforest it, making them get lost inside the woods, forgetting who they are or where they have come from.



Figure 8: Curupira. Author: Paulo Ítalo. Source: Internet

Finally, the north region level will be the setting for the Iara, Figure 9, an indigenous woman turned into a mermaid who lives in the Amazon River, attracting man with her singing and killing the ones who stare at her.



Figure 9 Iara is a dark haired/dark skinned mermaid. Copyright: Annestockes.com

Other than those, the Saci, shown on Figure 10, a one legged boy that travels on whirlwinds, will also have a prominent role on the game, acting as a supporting non-player character, NPC, that helps the player with tips, informations and transportation between levels.

In game feedback about the player’s performance throughout the levels will consist mainly of the game score, with encouragement phrases triggered at the conclusion of puzzles and other feats the player performs during the game. At the end of each level a

game board displaying the player's score, total of collectibles found and other similarly relevant data will also be shown.



Figure 10 Saci. Author: Unknown. Source: Internet

5. Conclusion

This paper presents the current stage of development of a Serious Game to teach students about Brazil's national folklore, focusing the mythological characters native to its culture. An idea brought forth in order to study how such media can impact student's motivation and performance in classrooms and, at the same time, supply didactical material to a national culture topic of study that lacks of it.

By adopting the concepts and methods described in this document we expect to enhance students' performance on classes regarding Brazilian folklore and their motivation to study this topic, which we aim to achieve by presenting this content to them through a videogame environment. Goals that we will evaluate or refute based, respectively, on the comparison of the performances of students from the case study and the control classes at the classes of Literature and on the results obtained by the IMMS questionnaire.

Additionally the research will be contributing to fulfill a gap of didactical material when studying Brazilian folklore, as pointed by the teachers of the CAP of UFRGS, as well as, in long term, make this material available as a means to contribute to the disclosure of national folklore inside and outside Brazil. All of which, are goals that we aim to achieve while conducting this research.

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