

Lost in Spain

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ABSTRACT

Education refers to the honing of skill, knowledge and motivation and is necessary for people in order to become fully literate, and create solid opportunities for a lifelong learning. However, there is some criticism in regards of how learning is performed today, mainly because it does not support or promote students motivation enough. The focus of this report is specifically on language learning and how motivation can be increased. A solution in the form of a virtual reality application is developed where the students gets to experience a gamified version of learning and practising a language. One the most prominent outcomes is the extended opportunity to rehearse, this by the student being given instant feedback on what he or she has to improve. Additionally, the application enables all students, independent of level of proficiency, to complete the game. Presented in the report is a proposal for a concept that supplies a starting point to enhance learning with motivation in mind.

1. KEYWORDS

Education, unmotivated student, student intrinsic motivation, motivation, language learning, virtual reality, gamification, full potential

2. INTRODUCTION

That school is of great importance regarding an individual's future is something that most people been told throughout their childhood as well as during the years behind the school bench. However, there are a number of studies criticizing teaching arguing that the ways of learning does not always meet the requirements that it should. Thus, disabling students to reach their full potential [10][12]. Gärdefors [12] highlights the fact that people are natural knowledge seeking creatures with a strong desire to learn, which the Swedish school system, as it is today, fails to support. Hence, the natural curiosity fostering a student's intrinsic motivation therefore becomes mitigated rather than enhanced. Consequences which could follow are passive and unruly behavior as well as decreased desire to learn [11].

According to Wahlgren [12] motivation is one of the most important building blocks when it comes to education, which

is mainly enhanced by two factor in particular; the feeling of confirmation and meaningfulness. The former implicates the importance of the individual being seen as she wants to be seen, whereas the latter refers to the human being's embedded way of thinking, i.e. in cause and effect. This entails that a student's motivation is enhanced when seeing a meaning in the different learning tasks performed. Nevertheless, it should also be highlighted that keeping up teachers incentive to teach is an important part of ensuring students motivation, and should not be neglected [11].

Furthermore, the difficulty of maintaining or promoting students' motivation is present in all school subjects, most of all in language education. The use of authentic material is considered to be one way to maintain, or increase, the their motivation to learn. Authentic material referring to material not created solely for educational purposes, as for example different types of magazines, newspapers, movies or simply googled pictures (e.g. locations, sites, people) of what's documented in the non-authentic texts. This is prone to connect learning to reality, providing the students a feeling of learning the "real " language [6]. Other incentives proven to enhance motivation is moving away from the theory-based learning and more towards practical exercises, i.e. actually practicing the spoken language. The reward that follows is overcoming the language barrier and thus fulfilling the need of [2] confirmation and meaningfulness [11].

2.1 Our focus

The purpose of the project is to enhance the motivation for learning a new language. As described, one of the problems is that the current system is more focused on theoretical learning while language by nature is best learned when combining theoretical learning with practical tasks. Additionally, students today often fail to see the meaning in the theoretical tasks they are given.

Moreover, one of the goals of the project is to develop a proof of concept prototype, showcasing the concept and its core functionality. The prototype offers the opportunity for students to immerse, with the help of an Oculus Rift, into a virtual environment built to project a spanish city with all its cultural essence. The core concept is a game letting the students practice their verbal ability and follow given instructions. In addition, this hopefully enhances the possibilities for teachers to build up the lost sense of purpose and contribute to the student's intrinsic motivation.

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3. BACKGROUND

While discussing the problem definition, motivation and the lack of it is the core problem area that this report tries to solve. Follow subsections tackles this area and a proposed solution to the problem area.

3.1 Motivation

The notion of motivation it typically divided into two major divisions; intrinsic and extrinsic [1]. Although looking at reality the two is not totally separate and independent of each other, but rather has an interrelationship [8]. The former mentioned refers to motivation that arises from within, encouraging behaviors of where there is some kind of self-reward. Examples are performing activities or tasks because of pure interest for a certain topic, curiosity or pride. Regarding extrinsic motivation, it has its base in motivation originating from the external environment leading to behaviors like pursuing a course aiming for good grades or a career [1]. Students with a more evolved intrinsic motivation doesn't need as much external influences as those with less inner motivation [8]. Both types of motivation are considered in the project concept, although the prototype first and foremost focus on enhancing the student's intrinsic motivation.

3.2 Gamification

Employing gamification in education is one suggested way to enhance students urge to learn, this by addressing their natural curiosity. As just described 'curiosity' and 'the sense of achievement' are factors which triggers a person's intrinsic motivation. Hence, a gamification that would provide the student an opportunity to compete against himself could enhance the motivation to play, resulting in an exponential learning curve[12][4]. In the case of this project, the intended game needs to be able to both immerse the students in order to motivate them to play through the game, while at the same time enable the students to learn and refine their knowledge about the language the game teaches.

Furthermore, with immersion being a vital part in making students motivated to play a game for learning, it is important to know what makes a game immersive. Realism is one of the aspects in a game that affects how immersive the game is. To achieve this it is important with realistic and high resolution textures, good lighting and convincing and high quality sound as well as naturally looking models and animations [5].

Using techniques such as virtual reality a game could achieve high immersion and maybe even true presence. Presence is a term used to describe the feeling of really being in a virtual environment which requires a game to deliver an experience that convinces the user that he or she really is part of the virtual world. Using virtual reality in combination with different techniques for tracking position and motion of the user's body would help to achieve this, although it does set some high demands on the technology such as, high resolution screens on a VR headset and precise tracking of the body [3].

4. METHODS & PROCESS

As described in 3.2 there is a potential with using gamification to motivate students. This potential was the base for the concept "Lost in Spain", but in order to develop the concept, several methods were used.

4.1 Divergence

To clearly pinpoint the reasons for poor motivation among students we decided to do a mind map exercise. While drawing up the mind map we concluded that possible reasons for bad motivation could be monotone exercises, theory based learning rather than practical, an unstimulating study environment, poor teaching or support or just poor self esteem among the students which made them feel uncomfortable speaking in front of others. All of these reasons could prevent a student from reaching their full potential, and are all problems considered during the span of the project.

In addition to the Mind-map, an altered problem tree analysis was applied to sort out different causes and effects to unmotivated students, the altered version used the group members as stakeholders instead of the intended diverse group of stakeholders when developing the diagram. As described in Luma field guide [7] a problem tree analysis is a method for understanding the sequences of related circumstances that is connected to a specific cause or effect. An effect that was seen in the problem tree diagram was that an unmotivated student might not reach their full potential. It also became apparent that a cause for unmotivated students was the monotone environment that being used for learning languages.

To clearly differentiate the stakeholders in the project and their needs in the context, a stakeholder mapping were performed. The method added depth to the different contextual roles in the concept the relevant stakeholders possess. For example, it became clear that enabling the teacher to have a hands on mentor role in the experience could be beneficial to the product. The teacher will in this case be able to interact with the application, actively giving tips and pointers to students, by presenting themselves temporarily as an avatar for the student. The parents on the other hand has a passive mentor role in the application leading the concept to have functionality of saving and sharing sessions, to evaluate a student and its performance and further enhance the student's experience.

In order to get a deeper understanding what to have in mind when it comes to learning languages, a mail contact was kept with both Kattegattgymnasiet and STS-språkresor. Through these interactions it became clear that the students often have different starting points (beginners or advanced skills). In addition it was mentioned that learning a new language is best done when interacting with others, where both body language and facial expressions are a big part. It also became clear that students need to get an understanding of what the language can be used for to motivate them further.

4.2 Ideation

During the ideation phase, a brainstorming session and a storyboard where performed to let the project members get a common ground on the different uses of the intended application and the state of the situation.

The brainstorming of choice was the 6-3-5 method [9]. The focus of the brainstorming session consisted of exploring and defining the different novel uses of the concept. To limit the problem area, the brainstorm focused on exploring scenarios, feedback and rewards in the context of the application. More specifically, it became clear that the concept itself synergizes with a learning environment on a few different levels, and clearly benefits from reflecting what a

student experiences in the virtual environment to the day to day school life of the student. The possibilities of different scenarios is limitless, and showcases that the scenario itself is not important, it's the believability of the scenario and the possibility to keep the concept interesting and engaging. Regarding feedback, the most prominent outcome was the importance of enabling all students, independent of level of proficiency, to complete the game. Afterwards each student would receive feedback on what they performed well, - and less well on, i.e. an opportunity to make improvements for next time. Additionally, rewards became a very beneficial resource when enforcing the gamification aspect of the application.

Two storyboards were created in order to visualize the concept for "Lost in Spain". The first storyboard showcased the unmotivated student and focused on the entire exam day. This storyboard let the group visualise the problem in several steps, get a deeper understanding for the user and get a shared understanding of what unmotivated students entails. The second storyboard was a temporal visualization for the game in form of a tree structure diagram, this structure described how the user would interact, i.e. the flow in the game. Additionally, to connect and ease the bridging between design and implementation, the temporal tree diagram was connected to a spatial map of the virtual environment. This diagram describes how the user would physically move in the virtual environment.

4.3 Convergence

We decided to create a hi-fi prototype to convey our concept and it's core features, both for evaluation purposes and proof of concept. At the end of the project the prototype was presented to be tried out by users at an exhibition at Visual Arena. Since this was the first time users outside of the project group got to try out the prototype some valuable feedback was gathered that could be used in future work.

5. RESULTS

The result consists of two different parts: first is the concept for the design and then the implemented prototype. The prototype is a sufficient representation of the concept's core features, but the concept in reality is by the project's limitations and goals a more complete product.

5.1 Concept

The final concept "Lost in Spain" consist of a Virtual Reality application where the user can be immersed with the help of an Oculus Rift into a Spanish city with all its cultural essence, e.g. body language, facial expression cultural references. In the concept the user is supposed to walk around freely in a big room with a virtual environment that matches the physical space, however, in the prototype the user was, due to time and space constraints, forced to use a controller in order to control their movement.

A spatial representation with the help of leap motion will enhance the feeling of actual being in Spain, thus enhancing the feeling of presence. In order to motivate students to learn a new language they need to get over the language barrier, practising speaking and interacting with others is one way to do that. In the context of the concept, the motivational aspect is enabled by a game like scenario where the user is given a task, which only can be solved by using their linguistic skills.

Lost in Spain dynamically enables students from different starting points in terms of skill to engage with the application, the student can then learn and grow in their own pace, not limited by a skill cap or a threshold. By being given the opportunity to interact in different ways, it also makes it possible to evaluate the students in a richer, closer to reality way than the tests and exams used today. Lost in Spain can measure which words the students are using, how correct they say a sentence and if they contextually can express themselves, ranging from a basic level to an expert level, which leads to a more nuanced grading system than true or false.

5.2 Prototype

In order to visualize the concept, a high fidelity prototype was made to share the experience that the concept is supposed to convey. The most important aspect of the prototype which most focus was put on was the presence that the user would feel when using it. In order to make the user feel more present in the virtual world an Oculus Rift was used to allow for a complete immersion. The Oculus was coupled with with a headset and a microphone that would allow for surround sound as well as controlled voice input.

Voice input was important for the experience as well, in order to deliver a natural and convincing experience when communicating with in game characters as well as to be able to practise the vocal part of language learning. In the prototype the voice input from the user is recorded by a local server that is constantly listening to the input and trying to match it with acceptable pre-defined phrases. If the input could be matched with a phrase it is sent to the game which checks if a there is a character in the player's vicinity and if that is the case the text is sent to a script that handles the actions of that character.

The final version of the prototype used the previous mentioned parts to create a gamified way to learn Spanish. It featured a functional voice input system where the user started playing in a small city in Spain. The users were assigned a quest where they were supposed to find their missing passport by using the voice input system to talk to the various characters in the game. Finally the user would utilize the information received in the game in order to find who took their passport. The accused character would then tell the user whether their assumption was correct or not.

6. DISCUSSION

In language classes today a lot of the learning phases that the students go through can feel monotone, especially in the beginning. The concept that we have suggested does not eliminate the need for regular classes, but it can be used to gamify the more repetitive steps a student has to go through to get all the hard phrases into their memory. Different students learning the same language can also have very different experiences depending on how skilled their teacher is [11]. Our concept takes a lot of the pressure from teaching the students from the teacher and instead depends on how well created the content of the application is, which is something that puts all students using the software on equal ground.

With the current technology our concept will unfortunately be costly if each student is to have their own Oculus, however, we believe that the motivation it can bring to the students it is well worth the costs. A school does not need to get one for each individual, but perhaps just a couple

of rigs so that students can take turns practicing their verbal skills and use the down time to practice reading and writing, something that our concept does not offer to help with. Another issue with our concept is the fact that it is ideally quite space consuming. Our idea is that the school could perhaps let the language students use the gymnasium in order to practice with full immersion and use a virtual representation of the physical space in the gym in order to create a mixed reality. Something that is important to note about the concept is that, as was mentioned before, it does not replace a language class all together, it is still important to learn the basics and then the student can use our concept to practice it until they feel they fully grasp how they should use certain phrases.

We feel that our concept can make a difference and motivate people to get better at languages, perhaps just to feel the satisfaction of beating harder levels in concept. The students gets to experience a gamified version of learning a language which might lead to them having more fun along the way. We would also suggest that the increased motivation may help a student to reach their full potential. For the teacher we feel that this is a great way that the students can practice with practical learning, while still allowing the teacher to supervise and gather information on the different students progress. The concept could also potentially be used when grading a student by creating a point system that measures how advanced the language is that the student is using.

7. CONCLUSION

During the course of the project very little time was available to evaluating the final concept. However, during the exhibition the prototype received plenty of feedback from different types of users. A language teacher commented “This would be useful as a self-evaluation tool during my course.”, another user involved in a company developing learning games said that “This would be something we’d be able to develop and sell.” and a third user said that “I wish i had this when i moved to Sweden and learned Swedish.”. Since the prototype was made for students that would like to improve their spanish many of the testers had trouble understanding the information that was passed through the game. Users that didn’t know spanish expressed that the experience was fun and some also said that they wished that their language lessons had been more like the presented prototype. When the prototype was presented to test subjects actually capable of speaking and understanding spanish they seemed to have an easier time understanding what to do in the game. Nevertheless, they still experienced that the current prototype was too hard and not as intuitive as it could be. The prototype shows a lot of potential for a future product, however, in its current state the content needs improvement.

8. FUTURE WORK

We feel that there still is a lot of work to be done before the concept feels more complete. We would have liked to have more time to evaluate the concept and get more feedback from actual students on how the learning experience differs from the one they normally receive. We would have looked at different possibilities of applying this input to a final concept. An important additional feature to the concept

that we did not have time to look into was a possible level editor. In order to minimize the costs of creating new content for schools we would have liked to create a level editor that is easy to use and possibly allow for the content to be produced by the community that uses the application. This could be a way for students to challenge each other with new levels, these levels could then be reviewed by teachers and then published so other schools could get access to them. Finally we would have liked to explore possible ways of integrating our concept with how schools work today and which way would be the best to go in order to let the schools access our concept as easily as possible.

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