



Original Article

Primary Students' School Anxiety: An Initiative Study on Virtual Reality Therapy

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Abstract: School anxiety is an aspect of anxiety that can cause serious consequences on student's academic results. Anxiety is usually caused by excessive stress about school related experiences. Consequently, over thinking and extreme worrying can lead to skipping classes, or even dropping out of school. Despite the emergence of school anxiety in recent years among junior students, little research on specific situations causing anxiety at school has been carried out. More importantly, very few attempts using virtual reality have been made to prepare students for a new school environment and help students with school anxiety. This study discovered 12 school experiences with high anxiety levels through questionnaires given to 229 fifth year students aged 10-11 and developed several situations into a virtual environment that can be used as a treatment program for students. 20 students with very high anxiety were chosen to experience the virtual reality (VR) treatment program. The findings show that student's anxiety levels for the situations they have experienced in the treatment program have decreased dramatically. Students become more proactive when they handle the challenges in the program and they can even propose solutions for their problems.

Keywords: School anxiety, virtual reality, school experiences, treatment program.

1. Introduction

There have been many studies raising alarms about students' anxiety. A survey study in Germany with 1035 students aged 12-17, showed that 18.6% of students had anxiety disorders [1]. According to studies in the field

of School Psychology in the US, anxiety and depression disorders depend on different levels of education.

While feeling of anxiety or fear is somewhat necessary to boost the performance of a task or make the individual more focused, anxiety that frightens you will be detrimental. Along with the development of society, the expectations of families on their children are increasing, as well as the criteria for assessing

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students becoming more rigorous, leading to a situation where students face with heavier pressures. These pressures gradually turn into the fear of going to school.

Many studies have shown that anxiety manifestations inversely relate to stress coping and self-esteem. Anxiety not only affects learning results, but also affects essential social skills such as the ability to communicate or deal with fearful situations.

The establishment and development of learning advisory systems has initially received attention and investment from organizations and schools. According to the report of the Committee for Population, Family and Children in 2006 only 50/800 primary, junior high and high schools in In Ho Chi Minh City and 4/223 secondary schools in Hanoi have counseling room for students. However, by 2017, the Ministry of Education and Training issued Circular No. 31/2017/TT-BGDĐT requesting the establishment of mentoring groups, the Hanoi Department of Education and Training has also requested that 100% of school consultation rooms in primary, junior high and high schools in the area have to be set up.

Virtual reality is a technology that allows people to experience computer generated environments while in a controlled setting. A research conducted by Rizzo and his colleagues stated that VR offers the potential to develop human testing and training environments that allow for the precise control of complex stimulus presentations in which human cognitive and functional performance can be accurately accessed and rehabilitated [2].

This study is conducted with the goal of building virtual reality situations to help elementary students handle and minimize school anxiety through exposure to situations in a simulated environment, thereby support students to be more open and confident when coping with similar situations in reality. The research questions of the study are:

- i) What are situations that cause school anxiety for primary students?
- ii) To what extent does virtual reality support school anxiety reduction?

2. Literature Review

2.1. Anxiety

Spielberger has defined anxiety as “a state or feeling of discomfort, nervousness, apprehension and anxiety due to the effects or stimulation of the nervous system” [3]. According to the American Psychological Association, anxiety is the state of emotion that is portrayed by stress, worried thoughts and physical changes [4].

There are many objective causes of anxiety such as genes, brain structure, gender, social factors or external influences. Genetically, if a family has a person who tends to worry or have anxiety disorders, then the risk of having anxiety is higher for the family members. In terms of brain structure, basic emotional responses, though controlled by thought, can still be affected by other stimulus. In terms of gender, statistics from the American Association for Anxiety and Depression (ADAA) show that women are twice as likely to be affected by anxiety disorders as men [5].

Subjective causes of anxiety include personal experiences, personality, or lifestyle. In terms of personal experience, research has shown that individuals with childhood trauma are at a higher risk than normal people [6]. In addition, traumatic experiences such as violence, alienation, abandonment also have a strong impact on the risk of having anxiety.

2.2. School Anxiety

School anxiety is an aspect of anxiety that can have serious consequences on students' learning process and results. Anxiety can lead to avoidance and fear when having to go to school. In other words, school anxiety is a fear of school-related experiences and factors such as tests, public speaking, or new environment, people, forms of learning and habits. Numerous studies have documented the negative effects of school anxiety on the learning processes and outcomes. Individuals with anxiety often have hard time concentrating in class which is due to the fact that they pay too much attention to their

worries. If this condition continues without a suitable intervention, students may be unable to keep up with the class and eventually receive bad results or even drop out of school. From a clinical perspective, special behavioral techniques involving exposure and experience have been widely used to treat school rejection and produce positive results [7].

2.3. Virtual Reality

Virtual reality (VR) is a technology that simulates an environment in a real way thanks to the 3-D viewing glasses - virtual reality headset. This three-dimensional environment is created and controlled by a highly configurable computer system. Individual after wearing virtual reality headset will immerse himself/herself into a new world that can be an environment based on reality or can simulate an environment in imagination. In addition to being able to see the virtual reality around him/her, the experiencer can hear, walk and do some specific actions. Because of these advantages, VR is used in many fields such as entertainment, healthcare, or in the military. Virtual reality therapy (VRT) - a new paradigm that has the ability to expose clients to fear-provoking stimuli similar to their real world experiences delivers an innovative modality of therapy. This modern method of therapy has been increasingly used by many psychologists and scientists for cognitive therapies and structural desensitization of patients suffering from a variety of psychological disorders [8]. VR rehabilitation has been successful in various areas of application. A lot of the application has been designed for anxiety treatment. VRT has been successfully used for acrophobia, flying phobia and driving phobia. VRT has proven itself to be at least as effective as in vivo exposure [9]. More specifically, VR is also used to treat psychological conditions such as post-traumatic stress disorder (PTSD) or used in the recovery process of diseases such as Parkinson disease [10].

2.4. Previous Studies

Nguyen Thi Tram Anh when studying school psychology support program, presented a number of support program contents including: i) providing information about psychological characteristics of each student; ii) assessment and screening of students to facilitate the implementation of educational programs, diagnosis and intervention with therapeutic counseling techniques for students; iii) advice for schools and parents on school-related mental health issues; and iv) positive attitudes to life, values of life, life skills, adaptations, forming personality traits positive, etc [11]. However, this study only uses the traditional method of being a counselor/verbal psychologist for parents and students directly or indirectly. One of the limitations of face-to-face counseling is that many students and parents are hesitant, cannot arrange a suitable time to attend psychotherapy sessions, or find it difficult to share their thoughts and feelings.

Regarding mental health issues, a number of studies have been conducted in Vietnam. In a survey on the mental health of students in Hanoi city with the "Strengths and Difficulties Questionnaire" conducted by Mai Huong Day time Institute of Mental Health showed that on a sample of 1,202 primary and secondary students, the percentage of students with general mental health problems was 19.46%.

Thanks to VR's ability to generate a controlled environment, its appearance in psychiatric treatment, especially anxiety treatment has increased during recent years. Regarding research on the usage of VR technology in psychiatric treatment, the results suggest this method of treatment though more expensive and timely to prepare, it has a much more satisfaction rate [12]. A research conducted by Rus-Calafell and his colleagues on patients with schizophrenia has further confirmed the effectiveness of treatment using VR. The study confirmed that negative symptoms, psychopathology, social anxiety, and discomfort, avoidance and social functioning has improved significantly after the

usage of a virtual reality-integrated program for improving social skills [13]. Also, researchers have developed a Virtual Reality - Enhanced Cognitive Behavioral therapy researchers to help children who have “school phobia”. This therapy has been used as a tool by medical centers to help children [14].

The first study to use technology in school anxiety interventions was a study conducted in Spain in 2009. The team conducted a preliminary survey of 36 students and selected 18 students to participate and experience the program. Results showed that anxiety levels were reduced for the experimental group [15]. However, one of the limitations of this study is that the number of students surveyed is small with the age difference, consequently, the level of awareness and anxiety is also different, evaluation criteria are general and do not focus on specific situations.

3. Methodology

3.1. Research Subjects

The project was conducted in 02 primary schools (8 classes) in Hanoi, the subjects were 229 primary school pupils in grade 5, all of them were aged 10-11. The survey was developed to learn about school situations that cause anxiety for students, anxiety manifestations, and ways to handle student anxiety. Twenty students with very high anxiety (choosing “very anxious”) indicators were invited to participate in virtual reality therapy, students’ identities were encrypted during the analysis.

3.2. Research Procedure

The project used a combination of surveys and interviews. The survey included 19 situations, students were asked to fill in the survey. The level of anxiety (not anxious, not very anxious, anxious, very anxious) in the survey was consulted from the State-Trait Anxiety Inventory (STAI) [16]. Semi-structure

interview was carried out to seek for more information after the VR therapy intervention.

3.2.1. Data Collection

The total number of fifth graders at the two primary schools is 250, after being informed of the study’s purpose by the teachers, students can choose whether to participate in the survey. Twenty students chose not to participate in the survey, so the number of participants was 230, the number of valid answers was 229, accounting for 99%.

After analyzing the collected data, 2 situations were created for the treatment. 20 students with highest anxiety rates (with “Very anxious” option) were selected and invited to experience virtual reality situations, and they were asked to fill out a post-experience survey and interviewed individually.

Before inviting students to experience the virtual reality program, the researcher had applied for school permission and was allowed to conduct the project in a classroom. The researcher explained clearly to students the purpose of the study, how to use the VR headset, the controller as well as the virtual environment they will experience. Students took turns to experience the program. The research group would only interfere when students asked for help. After experiencing the program, students were asked to fill in the same questionnaire as they did before experiencing VR. In addition to questionnaire, students were also interviewed by the research group to further understand the program effect on student’s school related anxiety.

3.2.2. VR Intervention

Situations that caused anxiety were selected from the results of the survey combined with theories of factors causing anxiety to create virtual reality scenes and situations. The project built the virtual reality program with one level of experience.

Environment 1: The School

Scene 1: Outside the school yard

The player appears in front of the school gate and gets a good look at the school’s facilities and design. There is a sign on the school gate that says “Virtual Reality

Secondary School". The school's buildings are in U-shape. There are three 4-story cream colored buildings, each floor has 3 classrooms. There is a stage in front of the middle building. From the school entrance there is a map of the school and classes on the right.

Scenario 1: Find the class

If player finds the map and reads it, s/he earn points. There is a message displayed to the player when entering the school "Welcome to the virtual reality experience. In this experience, you will have to go through a number of situations and complete the missions. In this situation, you will have to find your class 6A before the bell rings. Good luck!". Player has 2 minutes before school starts. Player can move freely around the campus of the school to find their class. Class 6A is on the 2nd floor, Building C, room C201. When the player stands in front of the classroom, a message will appear "Congratulations on finding your class before the bell! Great job!"

Scenario 2: Cannot find the class

If the player cannot find a class within the time limit, a message will appear "Sadly, you did not find the class before school starts. Try to seek help from a teacher, a friend or a school staff to ask where your class is". After the player reads the message, a teacher will walk past the player, and there is a chat icon on the character. The player clicks on the icon and the

conversation starts (the conversation is displayed via bubble text).

Player: Excuse me.

The teacher, head tilted slightly to one side, holding a book in one hand: Hello there, is there anything I can do for you?

Player: May I ask where the class 6A is?

The teacher points to building C: Class 6A is in room C201, building C, 2nd floor.

Player: Thank you!

The teacher smiles: It's okay, hurry up and get to your class, school has already started.

When the player finds the class, a message will appear "Unfortunately, you did not find the class in time. Next time, remember to find the school map to determine where your class is and quickly find the class!"

3.2.3. Data Analysis

SPSS 20 was used to analyze data collected through descriptive statistics (frequency, mean, percentage) to find anxiety-causing situations to build the situations in virtual reality.

4. Results and Discussion

4.1. Situations Causing School Anxiety

Upon being asked about their feelings when thinking about experiencing situations in a new environment, 229 students responded with the following results:

Table 1. Situations causing school anxiety

| Situations | N | Min | Max | Mean | Std. Deviation |
|--|-----|-----|-----|------|----------------|
| You are about to study at a new school | 229 | 1 | 4 | 2.07 | 0.827 |
| You have to find a classroom | 229 | 1 | 4 | 2.38 | 0.991 |
| You have to get along with new friends | 227 | 1 | 4 | 1.57 | 0.835 |
| You have to get acquainted with teachers at a new school | 227 | 1 | 4 | 1.80 | 0.909 |
| You have to introduce yourself in front of the class | 229 | 1 | 4 | 2.39 | 1.065 |
| You have to do a presentation in front of your new class | 224 | 1 | 4 | 2.59 | 1.088 |

| | | | | | |
|---|-----|---|---|------|-------|
| You have to do exams at your new class | 229 | 1 | 4 | 2.32 | 1.116 |
| The teacher calls you up to the board | 229 | 1 | 4 | 1.78 | 0.893 |
| The teacher calls you up to solve an exercise | 227 | 1 | 4 | 1.88 | 0.936 |
| You can't solve the exercises at class | 228 | 1 | 4 | 2.85 | 0.931 |
| You don't know the school rules | 228 | 1 | 4 | 2.00 | 0.922 |
| You're not familiar with the new school | 228 | 1 | 4 | 2.07 | 1.026 |
| You can't get along with the classmates | 227 | 1 | 4 | 2.11 | 1.100 |
| You have to sit at a position you don't like | 227 | 1 | 4 | 1.64 | 0.946 |
| You have to go to school with people you don't know | 229 | 1 | 4 | 1.85 | 0.982 |
| You have to study more subjects at the new school | 226 | 1 | 4 | 1.89 | 1.050 |
| You have to take a nap at an unfamiliar place | 228 | 1 | 4 | 2.48 | 1.170 |
| You have to eat food you're not used to | 228 | 1 | 4 | 2.16 | 1.050 |
| You are bullied at the new school | 229 | 1 | 4 | 2.61 | 1.288 |
| Valid N (listwise) | 213 | | | | |

With 19 surveyed situations, 12 situations causing anxiety with a mean from 2.0 include: studying at the new school; finding new classes; introducing yourself; presenting in front of the class; taking a test; failing to do exercises; not knowing the school rules; not familiar with the

new environment; not getting along well with friends; napping in a strange place; eating strange foods; and being bullied. Situations causing high anxiety rates are presented in the table below (Figure 1).

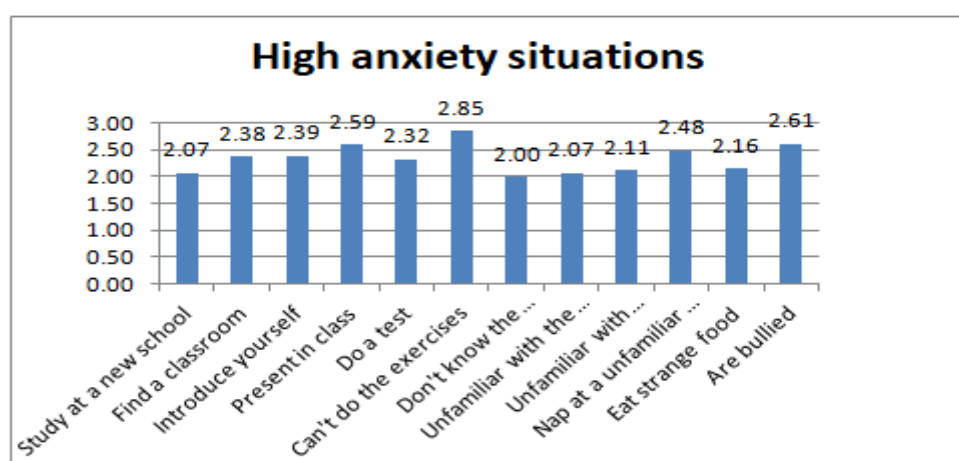


Figure 1. High anxiety situations.

It is noticeable that the situations that cause anxiety for students are tied to the context of a new environment when they have to make new friends, get used to new classes, new teachers, new rules, eat and sleep semi-boarding at a new place, and some special situations such as being bullied, failing to do homework. Although their anxiety of these situations may reduce over time, they can cause fears, obsessions and even psychological crisis for students if not treated well in advance.

The study chose two situations: going to a new school (mean 2.07) and finding a classroom (mean 2.38) to build on virtual reality because students will have to experience these two situations when they first enter a new school environment.

4.2. Supportive Impact of Virtual Reality on School Anxiety

20 students with the highest anxiety index (who chose “Very anxious” option) were selected to experience virtual reality. The researcher explained the purpose of the project clearly and instructed participants how to use VR before the experiment.

For the “Going to a new school” situation, 65% of experimented students chose “Not anxious” after experiencing the virtual school, 15% felt “not very anxious” and 20% were still anxious when thinking of going to a new school (Figure 2). Compared to 100% of “very anxious” before the experiment, this is a positive result especially when students could only use VR in a short time.

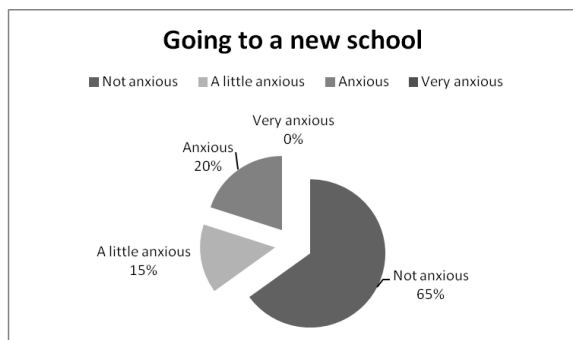


Figure 2. After experiencing the situation “Going to a new school”.

When interviewed, some students answered that they would explore the new real school as they did in the virtual school. Many students were excited, for example, A3 student said, “I think I will invite my new friends to walk around the school, by doing so I can make friends and know more places to play”. In contrast, the students who chose “worrying” gave the reason “I’m still afraid of going to new environments” (A15), or “I feel nervous not knowing what to do at a new school” (A19) when explaining their choices. It can be seen that the psychological preparation and related activities recommended for students before starting at a new learning environment is very important so that they can actively plan for themselves to integrate into a new environment.

In the case of finding a new class, the results of the post-experience survey showed that the levels of anxiety had decreased significantly, none of the students felt very anxious and up to 75% were no longer anxious after experiencing the situation in virtual reality (Figure 3).

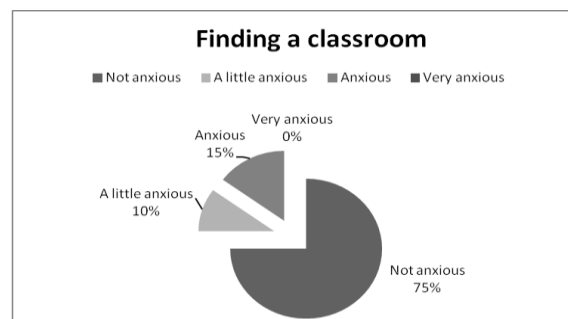


Figure 3. Results after experiencing the “Finding a classroom” situation.

When interviewed, many students felt more relaxed and less anxious, one student informed, “I will ask the teachers or friends nearby, after I do, I will not be afraid anymore” (A16). However, 15% still feel anxious and 10% feel not very anxious. It can be assumed that if students can practice more, their anxiety will be significantly reduced.

Survey results and post-experience interviews show positive results of virtual

reality applications in reducing school anxiety. The majority of students experiencing situations in virtual reality feel more confident and initiative in situations that have caused anxiety for them before.

5. Conclusion

The survey results show 12 situations that cause anxiety for elementary students related to experiences they are not familiar within a new environment such as finding class, being acquainted with teachers and new friends. Apart from being anxious from doing new activities, matters related to school violence, inability to get along well with classmates or inability to do homework in class are also issues that cause high anxiety among students.

Interview results show that students are very interested in virtual reality, the experience with virtual reality has helped students more confident and proactive in approaching and handling real-life situations. After experiencing virtual situations, the anxiety level decreased significantly, students can also proposed solutions for themselves such as actively exploring the environment, seeking support from teachers or friends. 100% of students, after the virtual reality experiment, expect to experience other settings to help them understand and handle obstacles appropriately.

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