Report of a VR game dealing with the emotional stress caused by the outbreak of coronavirus

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ABSTRACT. *Due to the current epidemic situation, China has implemented measures such as banning recreational activities and reducing going out. This paper will take the impact of new technology on the current epidemic situation as the breakthrough point, and discuss how the application of VR technology affects the society shrouded by the epidemic.*

KEYWORDS: *VR game, emotional stress, coronavirus, epidemic situation*

1. Introduction

The outbreak of Covid-19 is still in a state of emergency. People infected with the virus develop symptoms of varying degrees, from fever or a mild cough to pneumonia or, more seriously, death. Covid-19 primarily transmits from person to person in close contact [5]. Currently, no miracle drugs or vaccines have made the global lockdown end at a far distant date, seriously affecting the regular operation of various global industries. Undoubtedly, many people around the world are suffering from severe emotional stress. Helpfully on cue, a synthetic APP+VR game alleviating the emotional stress seems necessary. Through appropriate strategies and tools, this report aims to identify the opportunity and develop a concept of the new service of synthetic APP+VR game for the target users of college students.

2. Target users

The very fact that close contact can be contagious has proved frightening. Besides, the global large-scale lockdown strategy to control the outbreak has severely restricted daily travel and made people anxious. Emotional stress refers to the psychological stress reaction or state formed by an individual under the influence of emotions such as anxiety or fear [4]. It is related to the unexpected environmental stimulus faced by the individual and the assessment of the individual's ability to

cope with it. People who are stressed by the outbreak are likely to become the potential users of the service. However, college students with high background knowledge and thought foresight could make the functions of the technology service play as much as possible. Therefore, college students are the target users of the service. Besides, they also need to deal with the emotional stress to attend an online course during the outbreak and resume class fast after the outbreak.
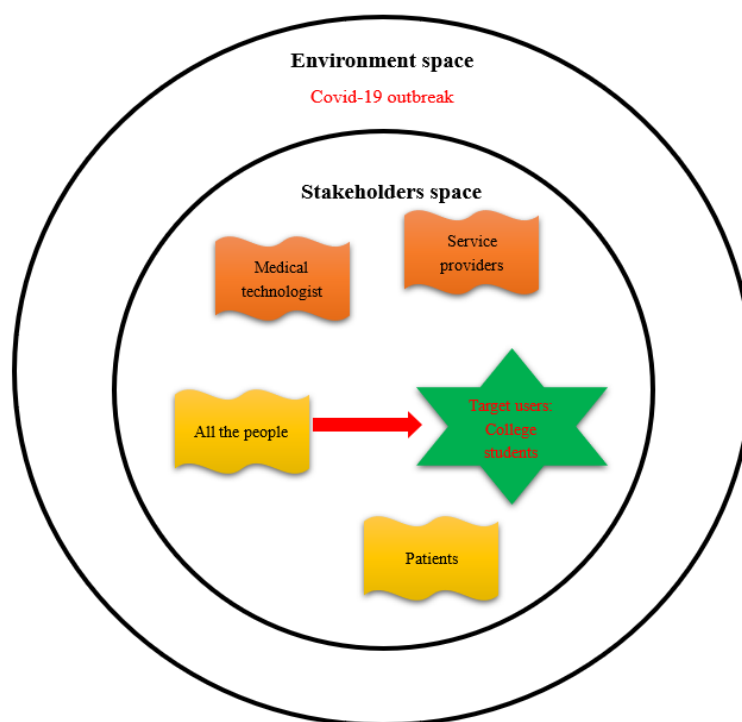

Figure. 1 Stakeholders Canvas for target users (Made by author).

The five telephone respondents were college students from the author's hometown, who have enjoyed enough access to information through smartphones. Base on the economic climate, technology progress, environmental change, social factors, political environment, and legislation [1], full access to dealing with daily routine within doors is a trend not only during the outbreak. After the outbreak of Covid-19, a series of services have emerged to provide the information of Covid-19, such as the daily online update of Covid-19, instant video broadcasting of the outbreak, APP safeguard manual against Covid-19, and others. Nevertheless, few providers have developed services or APPs to relieve emotional stress (See Appendix). Therefore, a service aiming to solve emotional stress seems a disruptive concept.

3. Empathizing

The identified appropriate keywords in the telephone interview were the global event of Covid-19, study, life, emotional stress, and plan, seen in Figure 2. Evidently, the lockdown caused by Covid-19 has profoundly affected the five respondents. Five corresponding Persona Canvas after the interview serve for the subsequent data analysis and theme synthesis, seen in Figure 2.
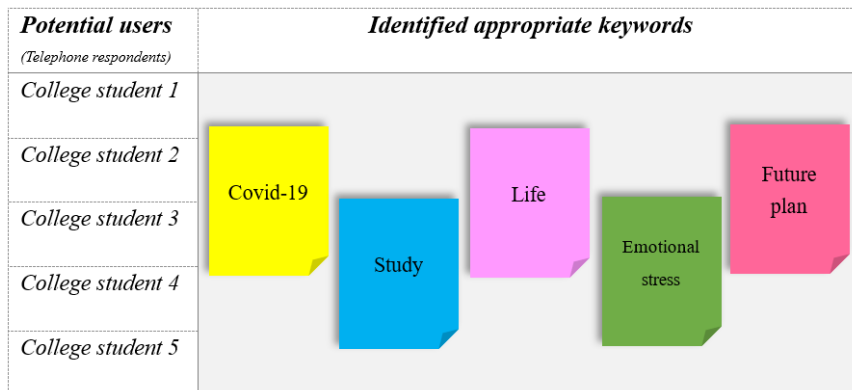
Potential users (Telephone respondents)	Identified appropriate keywords
College student 1	
College student 2	Covid-19 Life Future plan
College student 3	Study Emotional stress
College student 4	
College student 5	

Figure. 2 Identified appropriate keywords in the telephone interview (Compiled by author).

Respondent Name: Na Zhao	Interview date: 08 May 2020
Photo:	**Needs:** Convenient network, reliable knowledge of Covid-19
Age: 24 **Sex:** Female **Occupation:** Overseas student	**Interests:** Window-shopping, listening to music, beauty makeup
Activities during the lockdown: Taking online courses, reading, playing mobile games, chatting online	**Hates:** uncertainty, noisy environment
Attitudes towards the outbreak of Covid-19: Feeling frightened; Hoping the epidemic will end soon and classes will resume soon; Current access to reliable information on the outbreak is adequate; Willing to try a service dealing with emotional stress.	

Figure. 3 Persona Canvas (Compiled by author).

Personas canvas with faces and names can better enter the potential users' needs. Furthermore, Persona canvas can make the users' characteristics more concrete and vivid, which is conducive to returning the feature pattern and forming a common language based on the customer segment. The information collection mirrored in Persona Canvas found that the substantive needs of potential users defy the solutions, such as resuming classes, traveling outside, and others [7]. However, innovations can revolve around their daily lives altered, such as access to reliable information and protection manual through a synthetic service covering emotional stress tests, emotional stress relief, and other choices. Figure 3 presents the synthetic themes from dimensionalities of gains, pains, and potency.

This telephone interview can obtain reliable and practical information through in-depth conversation, but it is hard to avoid the limitation of a small sample [2]. Also, it is impossible to control the various influences of the subjective factors of the respondents, such as role characteristics, facial expressions and attitudes, communication methods, and others. However, the telephone interview exhibits access to information more in-depth, which is conducive to empathizing. Empathy is critical to innovative design. McDonagh and Thomas (2010) believed that empathy could strengthen a designer's understanding of potential users with backgrounds, education, and culture that are different from their own [3]. Insight into users' emotions, desires, and fears can provide critical clues and inspiration for innovative designs to create more balanced functional and hyper-functional products.

Persona canvas	Gains	Pains	Potencies
College students	Accurate and reliable information; Practical protection manual; Emotional stress test; Emotional stress relief... ...	Uncertainty; Panic; Anxious; Boring; Worrying... ...	With no need for traveling outside; Easy and fast operation; Authoritative and professional knowledge; Effective suggestion or solution to relieve emotional stress.

Figure. 4 Synthetic themes from dimensionalities of gain, pain, and potency (Compiled by author).

4. Defining the opportunity

The outbreak of covid-19 is having an impact around the world. The effect is not only extensive but also exclusive. For example, close contact is prohibited, and going out is limited. The shock to the system needs innovation in a new direction. Divergent thinking allows presenting the problems of potential users in the form of opportunities [6]. Based on divergent thinking, three questions beginning with "How might we" will address the Persona canvas themes synthesized from Persona Canvas, paving the way for innovative ideas. This section will provide direction for the next step of ideating.
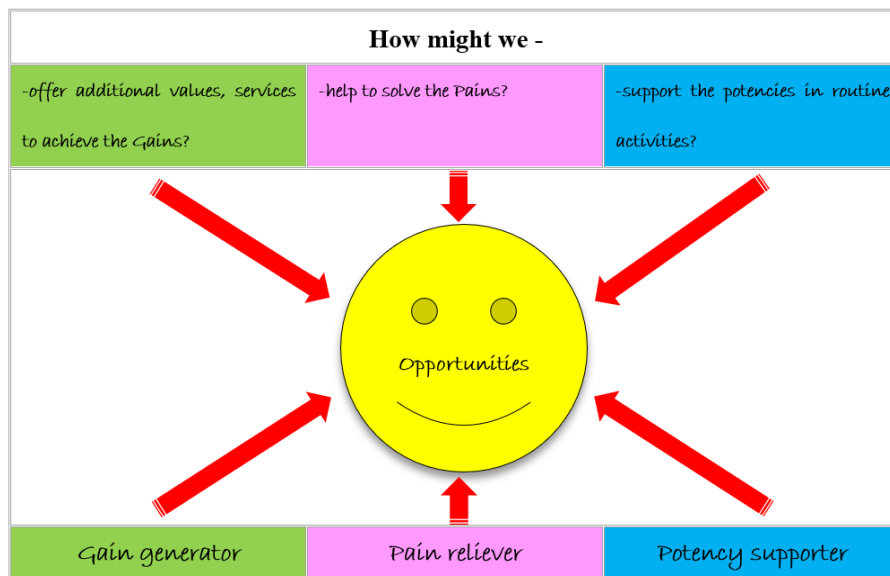
Figure. 5 Generating opportunities (Compiled by author).

Above analysis summarizes the problems of potential users or the opportunities generated from potential stakeholders fall in below:

1. Access to services at home;

2. Reliable information on Covid-19 and protection manual again Covid-19;

3. Authoritative emotional stress test;

4. Professional advice to relieve emotional stress;

5. Other adjunctive needs, like purchasing protective supplies, food deliveries, and other services.

It is worth mentioning that the above problems are based on the potential users' emotional pressure caused by the outbreak, along with its effects. Furthermore, these

problems are beyond the reach of solving the fundamental needs during the outbreak, such as consuming school, traveling outside, and others. Therefore, the summary of these problems or opportunities is limited to short-term behaviors during the outbreak.

5. Ideating

Generating ideas to solve the above problems needs related express tools, like brainstorm, visual connections, and scamper. Due to the lockdown and banning group gatherings, the following brainstorming ideas were generated from the author's classmates and friends. It is worth noting that if ideating is over based on the premise that travel is restricted during the epidemic, as well as the current mainstream technology and interdisciplinary restrictions, brainstorming will also be limited. Therefore, the classification of brainstorming mainly falls in the rough criteria of Excite me, Surprise me, amuse me, and satisfy me.
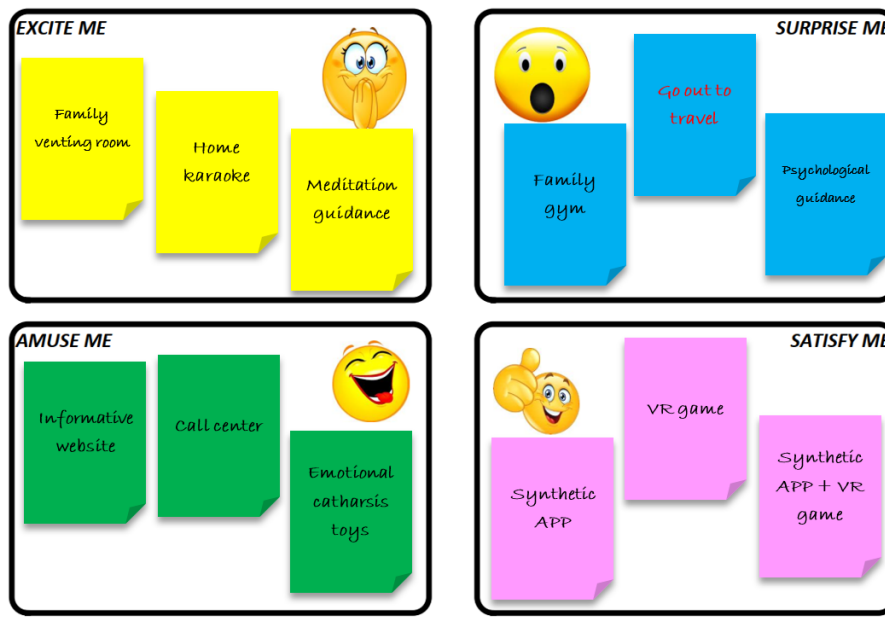

Figure. 6 Ideas from brainstorming (Compiled by author).

The idea of a Synthetic app + VR game seems very satisfying, thanks to developments in mobile technology and lockdown strategies during the outbreak. Given the lockdown during the outbreak, all ideas about outside travel were rejected. Because of the commercial and innovative requirements of the service, potential users' home DIY solutions to reduce the emotional stress, for example family venting room, home karaoke, family gym, and others, were also rejected.

Informative website or call center were not innovative enough. Therefore, the resultant idea of a synthetic APP +VR games turned out the best option in the brainstorm.

What is certain is that the implementation of this idea requires interdisciplinary collaboration, such as 5G, software development, IoT, psychology, VR technology and medicine, which will create limitations to the realization of the service concept.

6. The concept of the synthetic APP+VR game

Due to the outbreak and a series of effects brought by the outbreak, such as lockdown, lockout, and others, people have been suffering from enormous emotional pressure. Therefore, there is a great need for a service that covers outbreak information updates, protection manuals, and expert guidance, as well as conducts emotional stress tests and games to relieve pressure. A synthetic APP+VR game based on mobile technology and VR technology can be set as basic free services and premium services according to users' needs. The service concept falls in Figure 7.
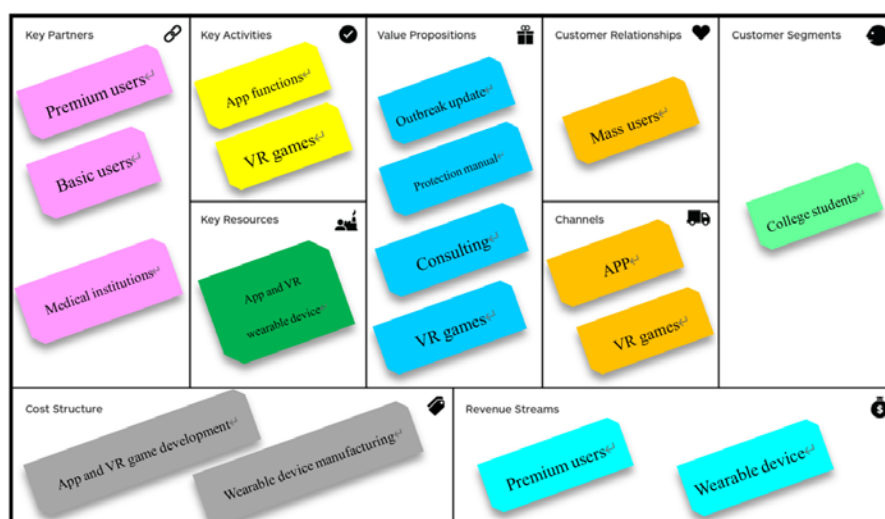

Figure. 7 The service concept (Compiled by author).

An APP that includes updates on the outbreak, protection manuals, emotional stress tests, and authoritative expert advice, allows targeting users to identify the source of emotional stress, as well as providing guidance accordingly. Able to operate on smartphones, this APP can achieve the requirements of convenience and staying indoors during the lockdown. The APP can also add interactive features, allowing users to chat with friends at any time and consult experts online. Besides, if

this APP connects with a corresponding VR game program for emotional relief, users can vent in the game.

Regarding the VR game program, when the user is in a quiet home environment, the VR wearable device automatically recognizes the user's emotional stress. Upon completion of the recognition, the VR game program will call up an intense stimulus scene, which can be set to Covid-19 related scenes according to the user's needs. Then, the VR game program will automatically switch to a peaceful and relaxing natural environment. By detecting physiological indicators of multiple parameters, the VR game program can produce users' psychological stress state with ratings. Finally, the users can select different stress-relief games set in VR games according to their psychological stress rating. The service framework is seen in the appendix.

7. Conclusion

In reality, there are still many limitations in this innovative design, as shown in Figure 8. Besides, whether the service concept can be put into the business model also needs to consider revenue streams, customer feedback (especially in the early phase), and other problems.

	Will it within budget?	Will it be finished in time?	Will it be operable?	Is it revolutionary
Synthetic APP + VR game	😐	😐	🙁	🙂
Descriptions	It is difficult to estimate the development budget of APP and VR game program; The design and manufacturing costs of VR wearables are challenging to estimate.	Lack of relevant professionals; The time of APP development and wearable device production is unknown.	Both of preceding limitations significantly reduce the feasibility of the service.	It is revolutionary to design a VR game based on the scientific stress test indicators and the universal emotional stress caused by the global event.

Figure. 8 Assessment of the innovation idea (Compiled by author).

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Appendix

The service framework

Other persona canvas

Respondent Name: Tian Zhang	Interview date: 16 May 2020
Photo:	Needs: Online course, reliable knowledge of Covid-19, correct protection manual
Age: 23 Sex: Female Occupation: College student	Interests: Watching TV, singing, reading
Activities during the lockdown: Taking online courses, reading, playing mobile games, chatting online	Hates: Uncertainty, assignment
Attitudes towards the outbreak of Covid-19: Feeling frightened; Hoping the outbreak will end soon; Current access to reliable information on the outbreak is adequate; Willing to try a service dealing with emotional stress.	

Respondent Name: Dong min Shi	Interview date: 07 May 2020
Photo:	Needs: Online course, reliable knowledge of Covid-19, protection manual
Age: 21 Sex: Male Occupation: College student	Interests: Travelling, reading, and sports
Activities during the lockdown: Taking online courses, reading, playing mobile games	Hates: Uncertainty, disease
Attitudes towards the outbreak of Covid-19: Feeling frightened; Hoping the outbreak will end soon; Current access to reliable information on the outbreak is adequate; Willing to try a service dealing with emotional stress.	

Respondent Name: Jun Liu	**Interview date:** 18 May 2020
Photo:	**Needs:** Online course, reliable knowledge of Covid-19
Age: 21 **Sex:** Male **Occupation:** College student	**Interests:** Reading
Activities during the lockdown: Taking online courses, cooking and sports at home	**Hates:** Uncertainty
Attitudes towards the outbreak of Covid-19: Feeling frightened; Hoping the outbreak will end soon; Current access to reliable information on the outbreak is adequate; Willing to try a service dealing with emotional stress.	

Respondent Name: Dan ting Wang	**Interview date:** 17 May 2020
Photo:	**Needs:** Daily Shopping, reliable knowledge of Covid-19, correct protection manual
Age: 19 **Sex:** Female **Occupation:** College student	**Interests:** Reading, listening to music, traveling
Activities during the lockdown: Taking online course, reading, accompanying family	**Hates:** Uncertainty
Attitudes towards the outbreak of Covid-19: Feeling frightened; Hoping the outbreak will end soon; Current access to reliable information on the outbreak is adequate; Willing to try a service dealing with emotional stress.	