Research Article
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Improving children's mental and physical health through holistic lifestyle changes during lockdown

Abstract

Coronavirus disease (COVID-19) pandemic and the lockdown has brought about a sense of fear and anxiety around the globe. The anxiety and fear extends to much more than being infected by the virus. Children between the ages of 8 - 12, being very young, may find it difficult to comprehend the sudden change in their life. From having online classes, to being isolated and away from friends and classmates, it has changed the dynamics of their lifestyle completely. In the literature review and primary research conducted on the user groups, the paper discusses the various impacts and negative lifestyle changes faced by children due to the lockdown and how this has led to increased screen time, strained mental and physical health and a disruption in the children's overall lifestyle. Probable solutions to overcome the adversities faced by children are discussed in this paper whilst taking into account the data analysed from the surveys and interviews. To do so, some of the key tools that have been used are mind mapping - to understand the topic, empathy mapping and saturated walls to synthesise the analysed data and prototyping to build the solution. After this, a long term solution was designed through the making of UNLOCK - an active interaction board game that encourages children to incorporate good lifestyle habits and set balanced routine tasks that include mental and physical stimulation and exercise.

Keywords: Children, Lifestyle Changes, Wellbeing, Board Game Design

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Introduction

Coronavirus disease (COVID-19) is a communicable disease caused by the SARS-CoV-2 virus. The primary noted infections from SARS-CoV-2 were discovered in Wuhan, China. From China, it soon spread to the rest of the world.[1] The first case of COVID-19 infection in India was reported in Kerala on January 27, 2020 and from there it rapidly spread to the whole of India.[2] Lockdowns were imposed in India limiting the movement of the entire 1.38 billion (138 crores) population as a preventive and cautionary measure against the pandemic in India.[3] The lockdown meant the inevitable shutting down of all industries, offices, factories, schools, etc. India declared a countrywide lockdown of schools on 16 March, 2020.[4] The pandemic had an unprecedented and unpredictable impact on the world. Covid distancing guidelines were imposed. This was a sudden change. It set off a state of panic among everyone. Children are sensitive and tend to absorb worries and anxiety from their parents and other adults around them. In their case, there were negative impacts, especially due to social isolation.[5]

Since then, Schools all over the world have taken to online learning platforms. Extensive screen time viewing can cause eye strain and visual impairments.[6] Students with high screen exposure have shown behavioural problems, skipped their daily routines, become careless, stubborn, and reported a reduced attention span.[7] Increased screen time adversely affects mental abilities, including cognition and higher functions, in children.[8] HMS researchers have also shown that using blue light-emitting screen devices like smartphones before bedtime can disrupt sleep patterns by suppressing secretion of the hormone melatonin.[8] Children and teenagers who stay up late using devices are not only getting less shut-eye, they're also lacking the deep REM sleep essential for processing and storing information from that day into memory.[8] In the general population, it was found that school children experienced an increase in body weight (MD 2.67 kg) and BMI (MD 0.77 kg/m^2) while in lockdown.[9] Children are eating more snacks during the lockdown, have less physical activity, and longer screen time. These have led to changes disrupted sleep patterns and difficulties in falling asleep. Physical activities decreased and recreation screen time rose.[10]

In this research paper, the aim was to study the effects of Lockdown on children (age: 8-12) and understand how lockdown has affected children mentally as well as physically while also looking into the lifestyle changes and responsibilities of the parents and teachers of these students and devising a probable solution that takes into account the restrictions and realities that children face while being amidst a global pandemic and works through them.

Methodology

The methodologies followed for this research paper show the synthesis of the conducted study which includes the detailed primary research, user studies and several other research tools and strategies used for the study, followed by their evaluation and analyses which will be useful in finding probable solutions to be looked keeping the aim and objective of this research in mind. The paper navigates through several ideations, conceptual and iterative stages and concludes by attempting to improve the mental and physical health of children by taking a holistic approach towards memory stimulating play with motor skills and other physically engaging activities.

Participants & location

Considering the aim of this research paper, 3 user groups were decided upon. They were:

i. Children between the ages of 8 - 12

ii. Parents of these children

iii. Teachers who teach 8 - 12 year olds

Hence a total of 38 people were interviewed for this study considering random convenient sampling as the method of sampling. All the subjects were chosen from Mumbai, from good socio - economic backgrounds and higher middle class families, with easy access to technology and online education and learning. The main

focus here was children aged 8 - 12 but in order to understand the children's problems, lifestyle and health issues better, their parents and teachers were also interviewed to understand things from their perspectives. Young children are also often influenced by their elders and teachers and they pick up so many things from them. Hence they were vital user groups too. The time of study was during the Covid 19 pandemic time year 2021. Before beginning a research project involving human subjects, the college acquired ethical permission. Each participant's personal agreement was also secured.

The methodology is divided into three phases based on the stages of data collection.

I) Phase I - *Data collected*

The first phase of the methodology was to do a thorough and in depth research on The physical and mental health issues faced by children in lockdown due to the global pandemic. This was done through primary and secondary (desk) research. Doing so, helped in understanding the problem from an unbiased and universal approach, comprehending the solutions being implemented currently, as well as the limitations which hinder the implementation of these solutions.

a) Secondary research

The effect of The Pandemic is a wide subject which had to be narrowed down to the key problem areas of the major lifestyle changes in children, their parents and the change in student's means of consuming and learning education through online platforms. On finding out how the pandemic had adversely affected the lifestyle and physical and mental health of children, parents and teachers separately, an extensive research was done on how this adversity affected not just themselves but also the other two user groups. This helped in attaining a key finding which was that children especially get hugely impacted by the behaviour and problems faced by their parents and teachers. An extensive research was done by studying a total of 20 articles, research papers and other scholarly sources relating to the topic and problem at hand. This helped synthesise and understand the key findings of the research, gaps in the literature review and note down important points to take forward.

b) Mind maps

Individual and Group Mind-maps were created, followed by consolidated user group mind maps.

c) Online surveys

Considering the pandemic situation, online survey tools were used. Questions were formulated and sent via google forms to the three user groups.

d) User - environmental and task profile and personas

User and environmental profiles and personas were made based on certain specific characters, variables and design implications which were followed by a task flow. This procedure was respectively followed for all three user groups.

e) User interviews

Through user interviews, better knowledge of the user's pain points, motivations and goals was attained. User Interviews helped in getting a deeper and wider understanding of the users post the online survey stage.

II) Phase II - *data analysed*

This phase was to examine and analyse the gathered data from Phase I. The user's inputs, pain points, motivations, goals, etc. were taken into consideration and the insights obtained from these were incremental in building and moving onto the next phase.

a) Empathy mapping

The data from the surveys and interviews was synthesised and analysed to attain themes and relevant findings for each user group. Empathy Mapping helped in getting a deep rooted understanding of the users in what they had communicated, not just explicitly but also implicitly through body language, voice tonality, modulation, inflections, etc. The mapping is done by categorising what the user has communicated in six ways:

Says

Thinks

Feels

Does

Pain

Gain

b) Saturated walls

The data found from the six categories of the Empathy Maps was analysed and grouped into further detail.

c) Problem statement

A Problem statement that describes the urgent user needs was formulated. Framing this helped in beginning Phase III.

d) How might we statements

Four how might we statements were devised to tackle the problem statement.

III) Phase III - *Prototyping*

The final phase was Prototyping. This involved conceptualising, brainstorming and ideating concepts which eventually led to the formulation and working prototype of the final concept by which this research paper is concluded.

a) Brainstorming

Brainstorming on how to implement the four how might we statements was done in the brainstorming phase. The various user problems, needs and goals helped were considered while brainstorming. These were then narrowed down to the 10 best ideas for each statement.

b) Ideation concepts and sketching

Mind Maps were made to help in thinking and ideating different concepts after which three final concepts were taken ahead for which product sketches were made.

c) Product vision

Considering the aim of the product and what problems it would aim at solving, a product vision statement was articulated.

d) Minimum viable product

The best product concept out of the three was finalised and taken forward. A final and specific product vision for the same was also formulated. This was prototyped as a minimum viable product which is the most elementary and essential form of the product.

e) Final prototyping and iterations

A process of iterations was followed for the prototyping stage which consisted of evaluating the design challenges, making the low, mid and high fidelity prototypes and deciding the best suited materials for the final high fidelity prototype. The board game was designed using Adobe Illustrator. With each stage of the low, mid and high fidelity, more and more details were added to the board game. The low fidelity prototype was made using paper and crayons for the pawns, the mid fidelity was made using thick paper and plastic pawns and for the final high fidelity, cardboard was used for the packaging, die - cut cardboard for the board, ivory sheets for the cards, glossy paper for the guidelines sheet and the pawns were made out of wood. Since this is an initial stage of the making of the product, further developmental evaluations would be required before the final release of the product.

Results and discussion

This section focuses on determining the factors responsible for the declining mental and physical health of children ages 8 - 12 due to lockdown to come up with probable long term solutions at improving their mental and physical health and bringing about good, holistic lifestyle changes. The key findings and the statistical analyses conducted in the study are presented below.

Phase 1: ***Research and data collection***

a) Survey forms

Three separate survey forms were curated and sent to children aged 8 - 12, their parents and teachers to get an in-depth understanding of the lifestyle changes faced by children, how well have they accepted the changes and how this has affected their interactions with people, their daily routines and mental and physical health. The survey is considered to have content validity in the opinion of experts (such as health professionals), it contains questions that address every facet of the construct being measured.

Survey results:

i) Children

Participants: 34

91.2% of children said that their schedule and lifestyle has changed after lockdown (Figure 1). A variety of different answers were received when asked what have children been doing during lockdown but 41% students said they have been spending most of their time either gaming, watching YouTube or being on some kind of device or the other.[11] It was found that 38.2% students do not approach their teachers at all while 50% will do so only if there is a discussion or a direct interaction initiated by the teacher (Figure 2). 44.1% of students stated that they do not like attending online classes at all (Figure 3). Most of these were students who said that they do not approach teachers in online classrooms. Feeling anxious and difficult to approach teachers and socially interacting with classmates through online means could be a major reason why some students do not like online classes.

ii) Parents

Participants: 16

On asking parents what is their children's daily average screen, 26.7% of parents said it was 6 hours while 33.3% believed it to be more than 8 hours (Figure 4 a). 68.8% of parents said their child spends most of their day using gadgets (Figure 4 b).

68.8% of parents believe that online learning is not as educational as in - person classes while 6.3% believe they are but their child is unable to pay attention and learn (Figure 5).

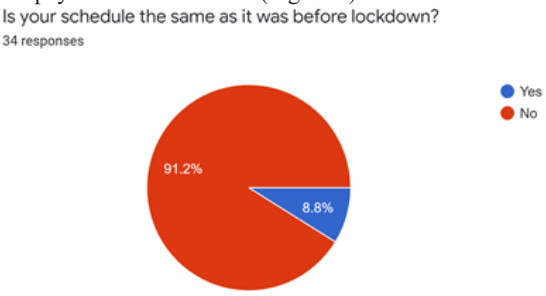

Figure 1 Google Survey Results (Is your schedule the same as it was before lockdown?).

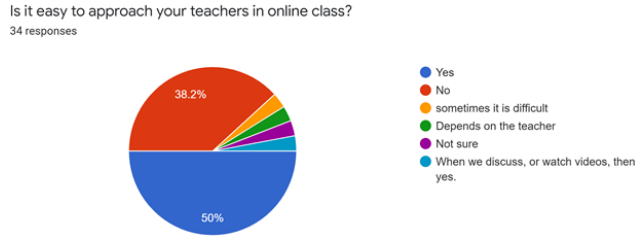

Figure 2 Google Survey Results (Is it easy to approach your teachers in online class?).

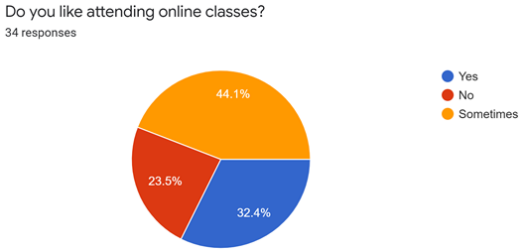

Figure 3 Google Survey Results (Do you like attending online classes?).

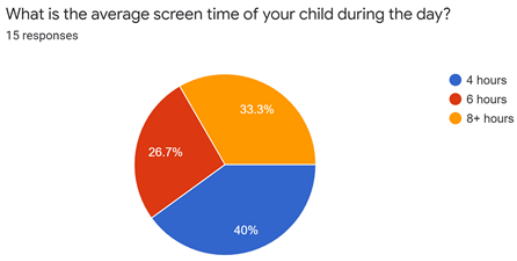

Figure 4a Google Survey Results (What is the average screen time of your child during the day?).

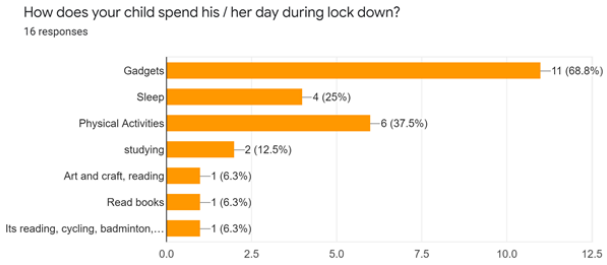

Figure 4b Google Survey Results (How does your child spend their day in lockdown?).

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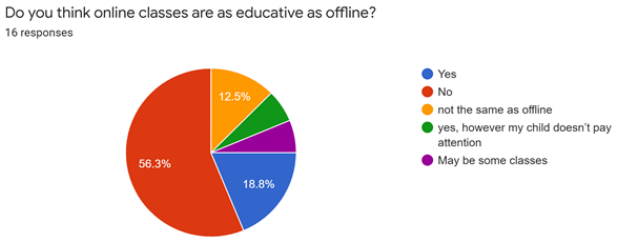

Figure 5 Google Survey Results (Do you think online classes are as educational as offline classes?).

iii) Teachers

Participants: 19

41.2% of teachers said that the interaction is not as much as it would have been in actual classrooms while 53% said there is no interaction at all (Figure 6 a). 52.2% Teachers mentioned that children tend to easily lose attention in online classes and are unable to pay attention (Figure 6 b). Teachers said that they are trying to make online learning more interactive and engaging by interaction, communication and teaching children through games and group activities.

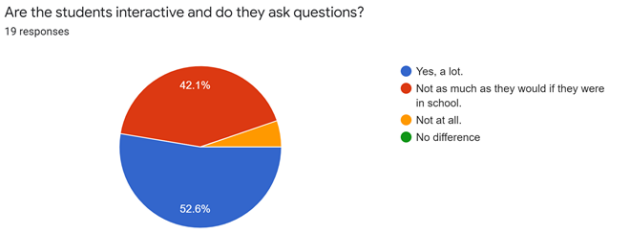

Figure 6a Google Survey Results a. (Are the students interactive and do they ask questions?).

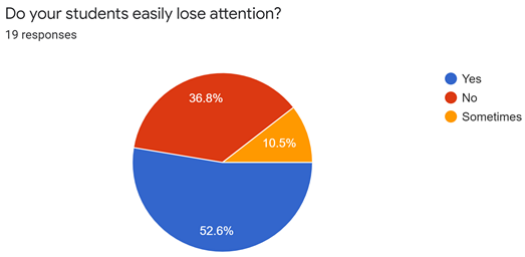

Figure 6b Google Survey Results (Do your students easily lose attention?).

b) Interviews

Interviews were conducted through video conferencing, via zoom. This helped in gaining further information and deeper insights. The three user groups were interviewed and their body language and responses were observed and analysed for the study.

i) Children

Participants: 14

Key areas	Results
Lifestyle changes	- Difficulty in adjusting to lockdown and social isolation - Increased gadget usage - Always fatigued and tired - Lack of a routine - Mood swings - Almost no physical and mental activity
Online learning	- Most students do not know what is being taught - Lack of interest - Lowered attention span - Students prefer not to interact

ii) Parents

Participants: 14

Areas covered	Results
Impact of Lifestyle changes on parents	- Difficulty in adjusting to lockdown and social isolation - Decline in their own mental health - Increase in consuming content on OTT platforms - Spending more time with children
Impact of Lifestyle changes on their children	- Declining mental and physical health - Mood swings - Increased device usage and screen time - Pursuing some hobbies - Spending more time with family
Online learning	- Most parents believe online learning is not as effective as offline learning - Mostly the child is not seen paying attention in online school - Unable to keep up with what is taught

iii) Teachers

Participants: 10

Areas Covered	Results
Online learning	- Most teachers do not like teaching online - Frustrating to teach an unresponsive class - It is difficult to learn and teach online - Seeing that children lack motivation to study - Teachers are using interactive tools to making online learning fun - Playing the role of guardians and friends by checking up on their student's mental and physical health

Phase 1 helped in identifying the main problems faced by children during lockdown from the root level and from the perspectives of all three user groups and gained insights into how each of the user groups are living with the problem and finding solutions to coexist with them.

Phase II: ***Analysis and examination of findings***

This section aimed at analysing the data received from the surveys and interviews, examining and narrowing it down to 4 key problem themes using tools like empathy mapping, saturated walls and user stories.

a. Dealing with negative emotions

With the lockdown came social distancing and isolation. This sudden change has left children feeling anxious and low. Social interactions have also become online and physical activities have almost become zero for most children. Children are also unable to focus in online classes and thus are unable to cope up with studies and assignment submissions. All these reasons have resulted in negatively impacting the children's mental health and are the cause for the constant feeling of negative emotions.

b. Encouraging healthy habits and maintain a disciplined schedule

Before the lockdown, when children used to attend in person classes, most of their schedule and routine revolved around getting ready for school, going for tuitions after school, studying and going out to play. Because of the lockdown and everything being online there is an increase in screen time and an absence of structure and discipline which has led to an unhealthy lifestyle.

c. Making online learning fun and interesting

Online classes are a real struggle for most children. Sitting in front of a screen for hours not only causes eye strain but also reduces attention span and concentration. In most cases there is little to no interaction in online classrooms. To make online learning more fun and interesting, active communication and interaction between the students and teachers should take place.

d. Limiting the usage of gadgets

With nothing to do and to make up for the lack of physical activity and social interaction, children take to using gadgets all day long. Whether it is under the pretext of studies and submissions or taking a break. And once the child starts using the device or multiple devices at the same time, there is no end. They may go on using them for hours on end. This is the major cause for most of the problems being faced by children. This impacts the child's physical and mental health and causes a disruption in maintaining a disciplined and balanced schedule with physical and mental activities. Most children tend to use gadgets because they find that they have nothing to do and being in isolation, no one to play with.

This phase helped in formulating the key problem themes which further helped in formulating the final problem statement which was that, "Children in lockdown need to do physical and mental activities because they drain themselves by spending time, being unproductive by using gadgets and lazing around, which causes mood swings and declined mental and physical health."

Phase III: Prototyping

Based on the insights gathered and narrowed down to the final four problem themes to be solved, it was realised that a long term solution that aids in making good lifestyle changes needs to be implemented. Several concepts were ideated, sketched and proposed.

Iteration sketches and low fidelity of the three concepts were made after which a final concept was chosen to take ahead based on the analysis of product viability and considering the one which would best solve the problem statement defined. The vision was to devise a solution which improves the routine and lifestyle of children in lockdown by helping them understand the importance of having a disciplined schedule while encouraging them to exercise both their mind and their body.

A fun family board game with fun routine activities that encourage mobility, physical fitness as well as mental stimulation was the way to go. The vision for the same was a fun, family board game that teaches children about setting a routine for their overall physical and mental development.

The process began by ideating what elements and content the board game would have and a basic look of the game was designed. Once this was done, a low fidelity model was designed (Figure 7) so as to understand how well the game works by playing it out and understanding any faults or limitations that can be improvised in the game to further improve it in the mid fidelity while also incorporating a basic design theme with an incorporated colour scheme (Figure 8). Once the board game was fully designed and its graphic elements were finalised, the high fidelity prototype of the packaging was made (Figure 9) along with the final Board Game model (Figure 10). It is called "UNLOCK" - Unlock fun this lockdown!

Unlock revolves around doing fun activities that are both physically and mentally challenging and stimulating. Some activities are done individually while others are competitive to spice things up! Children can play this game with family, friends and teachers. In the book written by Reid & Schaefer[12] has explained that play is not just a pleasant, naturally occurring human behaviour but also a key behavioural game changer. The board game can be played by 2-4 players. The board has 3 sections. Each player is given a pawn which is used to navigate through the paths of the game. The order of play is from youngest to oldest. Hence, the youngest player starts the game. The game starts with activities and tasks suited for the daytime, proceeding to the ones children do in the afternoon and finally activities to do at night. The board game promotes mental stimulation by riddles, decision making tasks and problems while also encouraging mobility and physical activity through stretching, jumping, running and yoga asana.

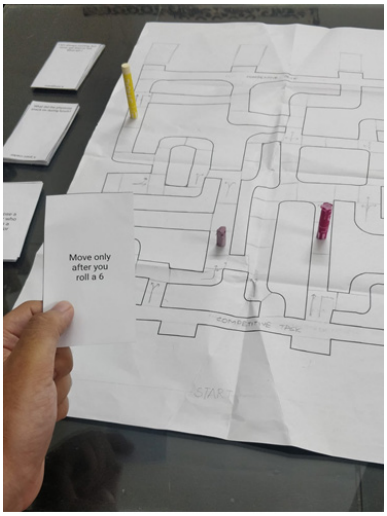

Figure 7 Low Fidelity Model.

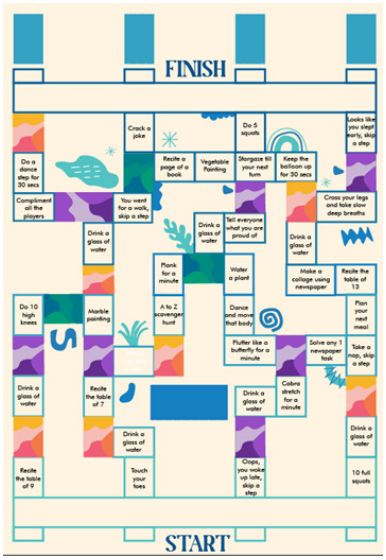

Figure 8 Mid Fidelity Model.

Figure 9 High Fidelity Packaging.

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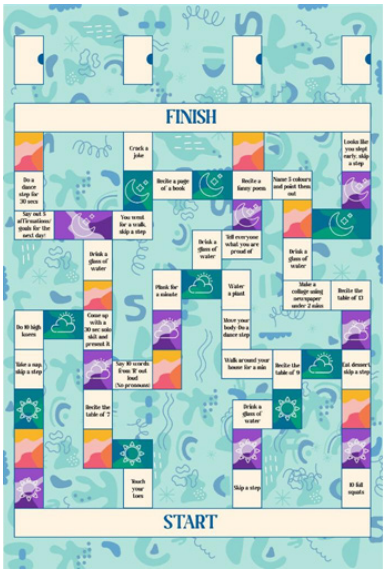

Figure 10 High Fidelity Board Game Model.

These are 3 different sets of decks with 20 cards each which are colour coded (Figure 11). They are -

- Fun Games (Competitive games)
- Riddle-O (Riddles)
- Twisters (Special cards/power ups/downs)

Figure 11 3 Decks of cards (Twisters, Fun Games and Riddle - Os).

Fun Games and Riddle-os are divided into 3 time zones decks of Morning, Afternoon and Night whereas Twisters are common for all time zones. The finish has 4 doors with flaps in which there'll be cards inside each. On shuffling and placing them inside each flap. One secret door will have a key inside it (Figure 10). A quick and easy questionnaire was given to participants to gauge their satisfaction with the games they had just finished. If necessary, the researcher verbally posed the questions. In the first section of this question, participants were asked to rank the games' difficulty on a scale of 1 to 5. The rest of the sections were kept open ended to gain user insights.

According to statistics, the "actual" population of users may, with a 95 percent confidence interval, rate the entire experience between 1.8 and 4.0 out of 5, with an average of 3.9. The mean values for each question were determined through analysis of the quantitative information from the participant surveys. Key themes were identified using thematic analysis to code the participant replies to the open-ended questions, the observations, and the expert reviews considering the game elements. *Because of their small sample sizes, statistical methods based on large sample approximation are not appropriate for* design and analysis So we focused on the conceptualization stage and initial user feedback to finalize the concept. Usability testing with larger sample size is the future scope for this study.

This study focuses on utilising board games to facilitate group collaboration with kids and family members. To engage and inspire kids and teenagers to discuss and work through their problems, combine the concepts of group play with board games. 'Unlock' games are a board games created for group work with kids and teenagers who experience isolation as a result of uncontrollable circumstances. The games make it easier for children to comprehend and express the complicated emotions they go through when faced with terrible life situations. The participants are encouraged and helped by the games to modify their behaviour and keep it changed. Similar finding was observed in the study made by Streng, in 2008.[13]

Conclusion

With COVID-19 came lockdown and its various social distancing guidelines and isolation. As seen in the secondary research, this has caused fear, worry and stress in everyone, especially children. These are real threats faced in times of uncertainty. This paper studied children between the ages of 8 - 12 and showed how lockdown has resulted in a major reduction in physical and mental activities and increased device usage due to boredom. This has had negative impacts on the children's lifestyle and routine and these problems could pose serious long term physical and psychological impacts. Through the study, it has been found that a long - term solution is needed to solve the problem at hand. Sit-down, thinking games are fun for children and adults alike and certain games also aim at enhancing memory formation, and instigating complex thought processes. Physical play helps to practise important cognitive skills, like higher-level strategic thinking, decision making, and problem-solving.[14] Using Active interaction and communication via the means of UNLOCK - a game that encourages both mental and physical activities, to set routines and achieve a disciplined schedule, we can solve the problem. This board game has been designed to lock away boredom and laziness and unlock fun. It is a game which would teach children about living a healthy, positive and disciplined lifestyle. This is also compelling evidence in the field of wellbeing specially when in the isolated state of life like any pandemic era gamification or a board-game could be used in engaging and educating a target audience on behavioural change. Much of the interests in wellbeing up-liftmen games have been concentrated on interactive board games. But the results of this study attest to the fact that board-games could effectively be used as a behavioural change tool. Board-games can effectively be used to engage and educate its audience.

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Conflicts of Interest

No conflict of interest.

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