

Virtual Reality as a Solution for Workplace Stress

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ABSTRACT

With continuous investments being made in the domain of simulation and allied technologies, the interest in virtual reality is on the rise. Cogent evidence is available pertaining to the implications of virtual reality in the clinical and organizational fields. VR is emerging as a successful intervention for dealing with a range of psychological problems, including but not limited to, stress, anxiety, depression, phobias, nociceptive disorders, etc. In the organizational context, the feasibility of VR for training and appraisals is well-known. Taking reference from the available literature, however, makes it apparent that there is dearth of research concerning the application of VR in the workplace for stress management, especially so when Asian settings are taken into consideration. Thus, this study aims to explore employees' perceptions about the suitability for VR to deal with stress at the workplace and to determine if it could be used as a relaxation tool for the employees. Due to the lack of availability of a standardized scale to determine the effectiveness of VR as a solution for workplace stress, the study takes a qualitative approach. The sample size consists of 17 individuals with age ranging from 25 to 50, employed in the organizational sector, at the middle to top level management. A 3D video incorporating biophilic elements was shown to the participants, after which they were interviewed to gauge their perceptions about the immersive experience. Further, thematic analysis is employed to derive inferences from the data. From the data, a number of themes emerged. Overall, it was found that the subjects had a positive immersive experience, experienced relaxation, and were in favor of implementing the VR technology at their workplace. It was found that aquatic elements were favored by the majority. The participants also expressed the need for VR to be custom-based.

Keywords: *Virtual Reality, Workplace Stress, Biophilia, Immersion, HMD, Relaxation, Burnout, Turn-over, Simulation*

Any technology or model which imitates reality results in simulation. For a long time in history, simulation has contributed majorly to aeronautics, training of armed forces, designing of aircraft and motorized machinery, and preoperative planning.

Virtual reality is principally a visual-experience based technology and is usually used in association with suitable audio. The whole environment is built using computer screens and applications. Virtual reality is boundless, and any sort of environment can be formed and

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displayed. It is gaining recognition in such areas as broadcast media, social platforms, and major conferences all around the globe. A major proportion of startups are incorporating virtual reality into their business plan.

According to Cruz-Neira (1993), “Virtual reality refers to immersive, interactive, multi-sensory, viewer-centered, 3D computer generated environments and the combination of technologies required building environments”.

Applications of Virtual Reality can be visualized on a scale ranging from a completely physical world to an entirely virtual world with a range of mixed realities inclusive of augmented reality and augmented virtuality (Milgram and Kishino, 1994).

From a clinical point of view, even a simple head mounted display has emerged as a viable option resulting in medical improvements similar in significance to that of more extravagant technologies. In fact, HMDs have evolved to dominate the simulation market with researchers and scientists constantly working to make this technology even more sophisticated.

Workplace stress in an ever-growing issue with increasing focus on areas like life satisfaction, work-life balance, etc., being constantly under scrutiny. Annually, companies invest huge amounts of money on dealing with these issues and still, the majority of the treatments available have negative side effects.

Virtual reality is gaining popularity as a solution for dealing with workplace anxiety and stress. Although there isn't much research focusing on the use of VR in dealing with anxiety and stress at the workplace, this subfield has gained momentum in the last few years, and it is to be a major focus of study in the coming years with the maturation of the field of VR.

Research sources have highlighted the applicability of VR for workplace stress with the participants experiencing at least some level of ease (Naylor, Ridout & Campbell, 2020; Pretsch, 2020; Soni & Shete, 2020; Ahmaniemi et al., 2017; Tichon & Mavin, 2016; Hesse et al., 2016;). Participants' relaxation also depends upon the extent to which the interventions are adaptable to the user needs and experience (Naylor, Ridout & Campbell, 2020; Anderson et al., 2017;).

Burnout is a major concern of organizational behavior and is linked to other areas of concern including voluntary turnover, counterproductive work behavior, absenteeism, etc. Current level of research also indicates that VR is a successful measure of reducing burnout and anxiety (Wiederhold et al., 2016;). Studies have also suggested that meditation and mindfulness classes can be used as an application installed in a VR headset to combat anxiety and stress in patients (Cikajlo et al., 2017; Crescentini et al., 2016;).

In the majority of the studies, natural scenes, and urban green spaces, i.e., biophilic elements have been related to relatively high degree of relaxation and well-being (Naylor, Ridout & Campbell, 2020; Yin et al., 2020; Biber, 2020; Thoondy & Oikonomou, 2017; Anderson et al., 2017;), increasing employee performance and enhancing creativity (Yin et al., 2020;); improving mental health and increasing life satisfaction (Roche, Liu & Siegel, 2019;).

Providing bio-feedback to the participants is considered highly relevant to the level of relaxation experienced by the employees (Naylor, Ridout & Campbell, 2020;). Availability

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of discrete spaces for employees in their break rooms with VR headsets has shown a clear-cut positive effect on the relaxation level of the employee (Kim, 2020).

Virtual reality would be taking the field of Human Resource Development by a storm with major job opportunities like Immersive Virtual Reality Counselor, completely changing the current scenario and significantly contributing to the clinical consequences of the workplace.

METHODOLOGY

Aim

To investigate the perceived effectiveness of virtual reality as a solution for workplace stress.

Objectives

- To examine the perceived impact of virtual reality application on workplace stress.
- To measure if virtual reality is successful in inducing a relaxation effect on the participant.
- To investigate the participants' opinion about the implementation of virtual reality in their workplace.

Sample

Snowball sampling method was used to recruit the participants from the target population with the researcher contacting the participants, giving a brief description about the purpose of the study, and inviting them to participate. From the pool of the initial sample, a consent form was presented to those who agreed. Thereupon, the data was collected at the participants' convenience. The sample of this study constituted of 17 participants (15 males and 2 females) among the age range of 25–50. Participants were well-educated, highly qualified individuals employed at the middle to top management level in the manufacturing sector, residing in a posh residential apartment colony of Haridwar. To ensure anonymity of the participants, they have been assigned numbers from 1 to 17 and would be referred to by their assigned number hereinafter.

Design

The study followed a qualitative research design with an exploratory approach to inquiry. Semi-structured interviews were used as the data-collection method, with thematic analysis forming the basis of the data-analytic strategy.

Procedure

Semi-structured interviews were conducted at the participant's home as per their convenience and recorded using a smartphone. All of the interviews were carried out within a week, with the data collection and analysis process occurring simultaneously to provide direction for upcoming interviews. The participants were asked to sign a consent form before the commencement of formal data-collection procedure. The consent form covered such topics as researcher information, purpose of study, ethical considerations, etc. The session was initiated by the researcher by giving a brief overview of the procedure, a few tips about the appropriate usage and adjustment were given to the participant, and then the participant were fitted with the head-mounted display. A short-length three-dimensional video of about 10 minutes was shown to the participant. After the end of the video, an interview was conducted and then, the participant was debriefed. The participants were

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given the opportunity to ask questions and give comments before the termination of the interview session.

Initial data were translated using forward and backward translation by the natively-skilled researcher to ensure integrity of data. The recordings were transcribed, and thematic analysis was conducted on the dataset to identify the emergent themes.

RESULTS

After conducting thematic analysis on the dataset, a number of significant themes emerged which have enhanced our understanding on the application of virtual reality in the workplace. The analysis took place at two levels — semantic, where there has been an effort to highlight surface level or explicit themes, and then to identify the underlying notions, views, and assumptions of the partakers, latent analysis was conducted. The major themes identified are coded as “Effective Workplace Stress Solution” which also represents the central theme of the study, “Hindrances to Relaxation”, “Preference for Biophilic Elements”, and “Preference-based Environment”. In association to these, a category labeled as “Unique Responses Worthy of Consideration” is also included to cover such distinguished yet subtle themes which resonated with the academic position of the study, and might even have a great impact on future research. There are certain themes which have varying degrees of correspondence, but this should be considered as an advantage as it provides a rich context for the interpretation of results.

Table No. 1 Themes and sub-themes along with participant frequency

| Major Themes | Sub-themes | Participants | |
|-------------------------------------|------------------------------|--------------|------------|
| | | Frequency | Percentage |
| Effective workplace stress solution | Desire to Explore | 15 | 88.24 |
| | Implement | 14 | 82.35 |
| | Useful for Relaxation | 11 | 64.71 |
| | Immersion | 11 | 64.71 |
| | Workplace Stress | 9 | 52.94 |
| | Focus Better | 8 | 47.06 |
| | Time for self | 4 | 23.53 |
| | Change Mood | 2 | 11.76 |
| | Rare Elements | 2 | 11.76 |
| | Passionate | 2 | 11.76 |
| Hindrances to relaxation | Dislike for Artificial Sound | 5 | 29.41 |
| | Loud | 4 | 23.53 |
| | Adjustment Issues | 3 | 17.65 |
| | Scenes Changed Frequently | 3 | 17.65 |
| | Excessive Noise | 3 | 17.65 |
| | Weak Eyesight | 2 | 11.76 |
| | Heavy | 2 | 11.76 |
| Preference for Biophilic Elements | Natural Environment | 13 | 76.47 |
| | Preference for Natural Sound | 5 | 29.41 |
| | Beaches | 5 | 29.41 |
| | Natural Elements | 3 | 17.65 |
| | Water Scenes | 2 | 11.76 |
| Unique responses | | 11 | 64.71 |
| Preference Based | | 6 | 35.29 |

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Effective Workplace Stress Solution

This category represents the central theme of the research, that is, the applicability of virtual reality as an effective solution for workplace stress and its effectiveness in inducing a relaxation effect on the participants. A number of sub-themes under this parent theme have contributed to its development. Excerpts from the transcript would be used to provide evidence of the effect of virtual environment on workplace stress.

Eleven out of the seventeen participants claimed that the virtual environment can be used to induce a relaxation effect and that they had felt relaxed while immersed.

R: Did the VR application help you relax?

P: Yes, it did, and it would be even more beneficial if it becomes lighter. We believe in our eyes the most, I think. We only have two such senses — auditory and visual, so audiovisual makes our brain believe that this is reality. So, our perception is redesigned and reconstructed. It also releases chemicals, so as scenes were appearing it released relaxing chemicals like serotonin, so I felt relaxed.

(Participant 14, Pos. 19-20)

Here, in this excerpt, the participant has mentioned how it would have been better if the device being lighter. This segment is also considered in the “Hindrances to Relaxation” category.

Another key factor which directly impacted the level of perceived relaxation of the participants was the socio-physical environment that they live in. In the excerpt highlighted below, the participant specifically mentions the excessive noise present in the environment in which they dwell and how it had enhanced the relaxation level, so it can be interpreted that the day-to-day experiences of the participants impacted how relaxed they felt during the session.

R: Did you enjoy the experience?

P: I felt relaxed as I felt very close to the natural environment, so I felt very peaceful and quiet. Like in today’s world there is so much noise and, you are unable to get this kind of relaxation. So, I felt quite relaxed.

(Participant 15, Pos. 5-6)

Another factor which seems to influence the impact of VR on participant’s relaxation is the rarity of elements which they discovered while immersed in the application. When participants encountered such elements which aren’t readily available in their physical environment, the engagement and relaxation levels increased. In the previous excerpt, the participant states about his inability to attain the peace and quiet in his physical environment, which he was able to attain in the virtual environment, and this directly impacted his relaxation levels. One more excerpt which highlights this viewpoint is mentioned below.

P: I felt that such things as sunset, sunrise, they are very helpful in relaxing as we don’t usually see such picturizations.

(Participant 7, Pos. 6)

It has been discovered that when people discover elements in the virtual environment which they are passionate about, it increases their level of relaxation. Here, in the excerpt mentioned below, the participant states that due to her passion for colorful and artistic elements, she was able to feel very relaxed.

R: How was your overall experience?

P: All the scene were very nice, very colorful, and I felt very relaxed after watching it as I am passionate about art and colorful things, so I really like different color

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combinations and different kinds of colorful things. And, from that point of view, the places that I saw were very inspiring and inspired by colors. It was inspiring from an artist's perspective.

(Participant 7, Pos. 5-6)

The participants were asked if they wanted to explore the virtual environment to determine if the virtual environment could generate sufficient engagement and attraction to produce a relaxation effect. Out of seventeen, fifteen participants claimed that they had wanted to explore.

R: Were you tempted to explore the virtual environment?

P: Yes, I didn't like that I wasn't able to explore and that I should be exploring.

(Participant 12, Pos. 18-19)

Participants have talked about the criticality of having time by themselves with not many people around as an important contributing factor to deal with stress and induce relaxation. Below are some excerpts to demonstrate this point.

R: If you wanted to relax, what kind of environment would you prefer?

P: I like home environment and also peaceful places and open places with not many people around.

(Participant 10, Pos. 3-4)

R: If you wanted to relax, what kind of environment would you prefer?

P: Somewhere far away, that is not easily accessible.

(Participant 12, Pos. 4-5)

P: I felt that I was present there and, it felt very relaxing, and I felt like I was sitting there, and I was all by myself, having some me time.

(Participant 7, Pos. 8)

P: I found that I could have some time for myself and watch the snow, as it never snows here, so I could experience that.

(Participant 9, Pos. 19)

The ability of VR to change the mood of the participants has emerged as a salient feature which enhances relaxation and helps in stress-relief while helping the participant to focus on their work.

R: Do you think it would help you focus on your work better?

P: Yes, it is helpful in stress-relief, sure, but it also gives a person a fresh mood.

(Participant 8, Pos. 29-30)

P: I like natural things because they are very calm and silent so only at places like these, we can change our mood.

(Participant 7, Pos. 4)

Immersion is sometimes, though not always, considered to be an important factor to help divert the mind of the user. It is characterized by feeling as if the virtual environment is real and the feeling of being present in the virtual world. Out of seventeen, eleven participants have mentioned about the feeling of being immersed in the application.

R: Did you feel like you were in the place that you were seeing?

P: Absolutely, I felt that I am in that place as I was so involved

(Participant 7, Pos. 7-8)

R: How much did the visual aspects appeal to you?

P: The visual aspects were good. The 3D effects were good. It seemed real, that we are in a real place.

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(Participant 2, Pos. 9-10)

R: How completely were your senses engaged? How much did you feel that you were in the place that you saw?

P: Yes, definitely, I felt like I was there and that it is front of me, I could feel it. People were coming and going and at the last scene, there was some desert and sand hills where people were taking pictures and I liked that.

(Participant 16, Pos. 9-10)

Out of the seventeen participants, fourteen directly asserted that the VR application should be implemented at the workplace.

R: What would you tell your company if they ask for your opinion about the implementation of VR at your workplace?

P: It should be implemented, and it could be used once a week for relaxation and as a stress buster. It can be used in offices.

(Participant 9, Pos. 24-25)

R: What would you tell your company if they asked for your opinion about the implementation of VR?

P: Yes, it could be implemented and tested as you see, I felt that I could forget about my stress for some time so other people, too, could try and see if it works for them in a similar manner, so its application at the workplace can be tested

(Participant 7, Pos. 15-16)

In the above-mentioned excerpt, the participant has also highlighted the subjectivity in the effectiveness of VR to deal with stress.

R: What would you tell your company if they ask for your opinion about its implementation in the workplace?

P: Definitely, they should implement it because you know if something new is popping up as it would be nice to try something which is newly emerging and is for the greater good, so yeah.

(Participant 10, Pos. 25-26)

In the above-mentioned excerpt, the participants' underlying attitudes towards acceptance of new technology and focusing on the greater good of the whole society has emerged after conducting latent analysis.

Nine out of seventeen participants have made direct claims about the effectiveness of VR for workplace stress.

R: Do you think it can be effective in helping you relax if you are under stress at work?

P: Yes, I feel it would be very helpful in stress relief.

R: Would you want to use it if you were under stress at work?

P: Yes.

(Participant 8, Pos. 25-28)

R: Do you think it will help you deal with stress at work?

P: Yes, definitely, and other than that it will also help the person train themselves in how if he gets a break for 5 minutes, he can recharge himself for next 4 hours

(Participant 14, Pos. 21-22)

Eight out of seventeen participants have talked about the ability of VR to improve focus on work. One excerpt is mentioned below to demonstrate this point.

R: Do you think it will help you deal with stress at work?

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P: Yes, definitely, and other than that it will also help the person train themselves in how if he gets a break for 5 minutes, he can recharge himself for next 4 hours
(Participant 14, Pos. 21-22)

It is evident from this segment of the analysis that there are a number of contributing factors which impact the perceived relaxation levels of the participant and their opinions about the ability of virtual reality to effectively counter the ever-growing stress at the workplace. We were also able to highlight some of the important latent elements existing in the dataset and identify the meaning that people assign to their daily experiences and how that meaning impacts their view of every other thing that they experience.

Hindrances to Relaxation

This is the second major theme identified in the dataset. It directly corresponds with the previous major theme highlighted, in that, there we considered if VR could actually help employees deal with the stress that they face at their respective workplaces, here we would be focusing on the factors which have obstructed the induced relaxation effect on the participant, and have hampered the ability of the VR technology to deal with stress.

Some of the factors that have emerged as hindrances are directly associated with the discomfort associated with the device used for immersion. There have been instances where participants have reported the device to be excessively heavy and its tendency to put pressure on the nose as causes for their discomfort.

R: How comfortable were you while being immersed in the VR application?

P: The device felt quite heavy and there was pressure on my nose so, if it could be lighter the experience would improve. Right now, its physical properties were hindering the experience and were a reminder that this experience is actually virtual and not real. The instrument should either be lighter, or its grip should be evolved.

(Participant 14, Pos. 13-14)

Another feature of the application which dampened the relaxation effect was the audio being overly loud, with four out of seventeen participants claiming this to be true. However, this appears to be a contradictory finding, as three out of seventeen participants mentioned the audio having a calming effect.

R: What would you say about the audio?

P: The music was very low and non-intruding, and I think that is why it was so impressive. If it had been louder, maybe it wouldn't have had such an effect.

(Participant 7, Pos. 11-12)

Here, an interpretation can be made that the preference of auditory and visual aspects of the application is highly subjective, another major theme which would be discussed in a later section.

A few of the participants have mentioned about the need to evolve the grip of the device due to it having adjustment issues as it grabbed their attention and inhibited the relaxation.

R: How comfortable were you while watching the video?

P: It was sufficiently comfortable. It would have been better if there was better way to fix it to the head. I was feeling scared that it would fall, so that was distracting me a little. It was good and comfortable when I held it in place with my hands.

(Participant 9, Pos. 14-15)

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Another factor which hindered relaxation is specific to people with weak eyesight. Such people have mentioned about the video being blurry and requirement of an application with a higher resolution.

R: What would you say about the visual aspects of the video?

P: Visuals, umm, maybe because my eyesight is a little weak so maybe because of that, it seemed a little blurry to me. It would have been better if I could have seen it through my glasses.

(Participant 9, Pos. 10-11)

Some of the participants also complained about the scenes changing frequently and asserted that it should have been stable or should have changed gradually. However, only three people had made such complaints, and this again can be interpreted as to be based on the subjective preference of the participant.

R: How was your overall experience?

P: It was nice, but it changed frequently. As soon as you started to relax, it would change to a different environment. If it had changed gradually, it would have been better.

(Participant 6, Pos. 5-6)

Lastly, excessive noise, that is, noise from more than one source seemed to cause the participant discomfort.

P: The application should have less noise. The view was fine, everything else was fine, but the noise was excessive and thus, I was not able to feel relaxed.

(Participant 1, Pos. 1)

Also, there seems to be a special dislike for the artificial sound added in the application.

R: How was your overall experience?

P: Overall experience is good, but the video's natural sound (music) was overpowered by the artificial sound (music) inserted in the video. The natural sounds like that of waterfalls, ocean waves, flowing water, birdsong, etc., without the artificial sound would have been better.

(Participant 2, Pos. 5-7)

R: Did you like the auditory aspects? Did that engage you?

P: The add-on music was overpowering the sounds of waves or the rain. The artificial music should not have been there as there are now dimensions for music like eight dimensions which we call delta, and we have spatial audio, so this was a bit overpowering the natural sounds. I would want to have only the rain drop falling or the natural sounds if I wanted to relax or beat the stress.

(Participant 11, Pos. 11-12)

It is apparent here that there are a number of factors which can dampen the relaxation effect of the virtual environment. Many of these can be easily adjusted to minimize their effect. Then again, we have also discovered that some of these are based on the individual preference of the participant.

Preference for Biophilic Elements

This is the third major theme of the research analysis, and it directly corresponds to one of the research objectives emphasized previously. In the last few decades, the concept of biophilia has emerged as a major contributor to the design sector, in an effort to bring man closer to nature which is proven to enhance the psycho-social state of a person. Such designs are being

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applied in the virtual environments to create the same effects, and previous research has identified such an attempt to be successful in inducing a relaxation effect on the user.

One of the sub-elements of this theme is identified as preference of natural environment for relaxation in comparison to urban or home environments. Out of seventeen participants, thirteen preferred natural environment.

R: What kind of environment do you prefer if you want to relax?

P: The natural scenes were being shown and nature is definitely better like water flowing as compared to if you look at metropolitan cities, there are huge buildings and everything, but nature is more soothing and peaceful.

(Participant 9, Pos. 4-5)

R: If you wanted to relax, what kind of environment would you prefer?

P: I like natural scenes like the ones which were shown, they gave a cool feeling and I felt stress-free. It was very good.

(Participant 13, Pos. 3-4)

As mentioned in the previous theme, participants displayed a special dislike for the artificial sound inserted in the video. At the same time, they showed a preference for the natural sound applied to the video.

R: What would you say about the visual aspects of the video?

P: The visuals were quite nice, just one feedback that for background music, I would prefer the natural sounds instead of the add-on sounds or the music because the add-on music was a bit loud for me. I would have enjoyed the natural sound much more.

(Participant 10, Pos. 9-10)

There have been mentions of preference for specific elements related to nature by certain participants. Here too, the factor of individual preferences can be highlighted.

R: How was your overall experience?

P: It is a stress-buster to some extent, it takes you closer to nature. There are many different scenes, sometimes snow, sometimes sea, so it was good, this video was good, the water flowing. There are different moods of life or phases, sometimes it was night, morning, it was good.

(Participant 9, Pos. 6-7)

There have been a number of instances where the participants have mentioned about the aquatic elements to be especially helpful in creating relaxation. A lot many participants have stated their preference for rain, rivers, flowing water, etc.

R: How much did the visual aspects of the place involve you?

P: I liked the visuals; you know, the rivers.

(Participant 12, Pos. 10-11)

P: The scenes were very beautiful like the seashores and the rivers. Like in Rishikesh, the water flowing was soothing.

(Participant 9, Pos. 19)

Also, there has been a special emphasis on seashores and beaches as a majorly preferred factor.

R: Did you want to explore the virtual environment?

P: I felt like exploring when a scene of the seashore came. I wanted to explore the beaches.

(Participant 6, Pos. 17-19)

R: What would you say about the visual aspects of the video?

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P: The visuals were all very nice, and as I said, I tried to compare the places that I saw with the places that I have been to. I really liked the seashores, and I felt that they were very relaxing.

(Participant 7, Pos. 9-11)

Another finding worth mentioning is preference of mountainous environments. Some participants have also mentioned preferring hill stations, liking such elements when they appeared in the virtual environment.

R: If you wanted to relax, what kind of environment would you prefer?

P: I prefer seaside environment, mountain environment. Either blue or green, these two colors are very relaxing.

(Participant 14, Pos. 3-4)

From these findings we have consolidated the viewpoint of biophilia being an important contributing factor in the enhancement of the health of people and in this case as an element of the virtual environment successful in inducing a relaxation effect. The newly discovered feature pertaining to the aquatic aspects of biophilia should be implemented more in future applications designed for this purpose.

Preference-based

From almost all the major findings discovered in this research study, one aspect emerges as a common factor influencing participants' opinion about VR and it being possibly used as a solution to deal with workplace stress. This aspect will be covered under this theme and refers to the subjectivity of preference of VR as an effective tool to counter stress, and the type of environment and specific features associated with that environment. To make this point a bit clearer, it can be summarized that the opinion of participants about VR and its abilities varies according to their own experiences and is highly subjective, in that, some think that it can greatly negate the impact of workplace stress, others think that it can only have limited use in this regard and yet others have expressed strong negative opinions about possible impact that VR can have on stress.

Strong Positive Attitude towards VR:

R: Do you think it would be helpful as an intervention for organizational stress? As the problems and stress at the workplace are constantly increasing, do you think it could be used to solve them?

P: Yes, absolutely because this would distract you from whatever you are thinking about while working; divert your mind from it. And then, when you are thinking about something else, you can relax and decrease the work pressure.

(Participant 1, Pos. 18-19)

Weak Positive Attitude towards VR:

P: Such different things can help in reducing stress, temporarily.

(Participant 7, Pos. 6)

Strong Negative Attitude towards VR:

P: It is not real, so it cannot have any real impact. The only thing that can impact us is something which is real, which can be felt and touched. So, it can only divert your mind for a few seconds but cannot give any real results. For stress, the best thing to do is yoga.

R: Alright, so did you feel at all relaxed after using this?

P: No, I did not feel relaxed, and it can never result in any relaxation, not for me at least.

(Participant 5, Pos. 4-7)

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The kind of environments that each participant prefers is also different from what the other prefers. Some participants have pointed towards the audio being too loud, others have commented that it was low and non-intruding. A few of the participants have claimed to like scenes with sand hills and desserts, others have mentioned about preferring scenes with snow. Some excerpts to demonstrate this viewpoint.

P: I found myself very close to nature like I had gone to Dhanaulti some time back, so some places were similar to that. I found that I could have some time for myself and watch the snow as it never snows here, so I could experience that. The scenes were very beautiful like the seashores and the rivers.

(Participant 9, Pos. 19)

R: How completely were your senses engaged? How much did you feel that you were in the place that you saw?

P: Yes, definitely, I felt like I was there and that it is front of me, I could feel it. People were coming and going and at the last scene, there was some desert and sand hills where people were taking pictures and I liked that.

(Participant 16, Pos. 9-10)

Also, people showed awareness about the fact that there are individual differences in what would people like so the application should be custom-based.

R: Would you recommend this to somebody else? Perhaps someone who is dealing with stress?

P: Yes, I suppose the video can change according to preference, so that could be good as the person would be able to choose.

(Participant 1, Pos. 24-25)

R: What would tell your company if they asked your opinion about implementation of VR at your workplace?

P: It can be implemented with custom changes according to people's needs.

(Participant 6, Pos. 27-28)

Participants also displayed awareness that it depends on the subjective opinion and experiences of the person, if VR works for them or not, and they themselves should decide this.

R: Would you recommend it to somebody else?

P: Yes, I would because one never knows. I can cope up with stress using something else, others wouldn't. I could have a cup of coffee, some won't. Everybody has different bodies, different psyche, so I would definitely recommend and ask them to try it out and see if it helps.

(Participant 11, Pos. 17-18)

From these findings, the need for the virtual reality applications to be custom-based becomes explicit.

Unique Responses Worthy of Consideration

During the interview sessions, a number of responses have emerged which are worth mentioning in a separate category. These responses are not related to each other and do occur frequently enough to receive a distinct categorization and thus, have been grouped together here as they still, from the perspective of the researchers, are salient enough to provide direction for further research.

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Firstly, there has been an instance where a participant has talked about preferring to have only the auditory experience, as the visuals require him to concentrate on them. When wanting to relax he would prefer not to have something additional to focus on. This aspect, perhaps, can be used to determine which is more beneficial in the context of the workplace, audio-visual or perhaps just the audio.

R: Okay, so if you wanted to relax, what kind of environment would you prefer?

P: In terms of what we just saw?

R: Yes.

P: I would rather prefer having only the music, not the visuals because then I have to focus more and if it is for work, for stress at work I would actually prefer it to have one dimension less. To see a 2D screen or even a stabilized visual where I can actually just connect the music and not have something additional to focus on because for something like this for which I have to move, I have to concentrate even more. So, if I am working for 9-10 hours, I would rather not do this during my break time.

(Participant 11, Pos. 3-6)

Another aspect worthy of attention is the fact that it is very much possible that employees might develop an addiction for this technology and the various ways in which it can be used. Especially with the availability of custom based virtual environment, we would have to ensure that it doesn't become addictive and lead to the deterioration of productivity.

P: We would have to make sure that the brain doesn't become dependent on this. Because everything has a process and some side effect, so the process is good, but we have to see that the brain doesn't create a dependency on this because the blue light is addictive so if the brain get conditioned according to this like Ivan Pavlov had made the dog become conditioned, so we have to make sure we don't become a new kind of subject in that way. So conditioning is one thing, the only concern that if people at work make a habit out of this then it will become a huge problem.

(Participant 14, Pos. 24)

Lastly, some suggestions have been made by a participant regarding the incorporation of audios of various frequencies according to their effects on the human brain and determining if that somehow improves the results or helps in achieving the desired results.

P: These days, technology has evolved to a great extent and alpha, theta waves and gamma waves are being used for relaxation so that can be included. Like frequencies of 936 Hz and 963 Hz, they affect the brain in different ways, so those can be included after scientific studying.

(Participant 14, Pos. 32)

The understanding of this complex phenomenon can open gates to new opportunities, can positively impact employee health, and result in organizational achievements as never seen before. But in order to attain these outcomes, the negative impacts have to be dealt with, and more research has to be conducted.

DISCUSSION

Workplace stress is an issue which never lost its topicality, and virtual reality is increasingly gaining popularity. Where on one hand it is suggested that technology is resulting in additional workplace stress and is resulting in the deterioration of subjective well-being of the employees (Ladner, 2008; Meretz and Andysz, 2014), the present study has determined that VR can, in fact, also be an effective solution to workplace stress and can be incorporated in workplaces to help employees relax and improve their focus.

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The results presented above puts emphasis on certain prime findings about employees' perceptions with regard to virtual reality and its applications as an effective solution for the ever-rising workplace stress.

The key findings of the present research are in accordance with the objectives of the study. Firstly, the results suggest that virtual reality is indeed an efficient stress-management tool with the majority of the participants providing an overwhelmingly positive response, which is consistent with the literature (Presch, 2020; Soni & Shete, 2020).

It appears that the socio-physical environment in which a person dwells impacts how much relaxation he feels while immersed in the virtual environment. Therefore, a person who lives in a place where there are a lot of environmental stressors like noise, pollution and crowding would be more affected and would experience more relaxation as compared to a person who already lives in an environment exempt of such stressors. The perceptions of people are also determined by novelty and rarity in that, people feel more relaxed when they are able to interact with such elements in the virtual environment which are not usually present in their physical environment. For example, people who live in places where it never snows would enjoy snow in the virtual environment. Consistent with previous findings (Ahmaniemi, 2017), this also increases engagement and immersion which are beneficial in diverting the mind, and in turn help the person deal with the stress they might be under.

When the virtual environment features such element which the person is passionate or enthusiastic about, it results in a higher level of relaxation. This finding has been typified in this research with the mentioning of preference of artistic elements in the virtual environment by a person who is passionate about art and colors, and this in turn impacted her relaxation, increasing it greatly. One reason participants had positive views about the virtual environment was, that it allowed them to have time for themselves, away from everybody else, perhaps, something which they may not be able to enjoy otherwise. It has also been found that the virtual environment was calm and soothing and was successfully able to alter the mood of the user, thereby inducing relaxation and helping them deal with stress. The environment was also highly immersive and attractive, helping participants relax. Results show that participants wanted the VR application to be implemented at their workplace, another reason to interpret that it had successfully resulted in perceived relaxation. It was accompanied by the view that the application should be implemented after making custom changes based on employee needs, highlighting the subjectivity in preference of the participants in particular and people in general, a finding consistent with prior research (Anderson et al, 2017). Participants also mentioned instances about VR's ability to help employees improve their focus, resulting in improved productivity.

However, there are certain properties of the headset which hinder the relaxation of the participants including the device being excessively heavy to the point of discomfort, having improper grip so that the user is continuously cautious about the device falling off, and people with weak eyesight having problems seeing the virtual environment clearly with the visuals being blurry. Some other complaints were also made by the participants about the noise being too loud and the scenes changing suddenly, but these claims were infrequent and subject to the preference of the user.

Participants have, consistently, talked about their dislike for artificial sound inserted in the video and preference for the natural sounds of the application. This is coherent with the consolidation of findings about preference biophilia by the participants with majority of

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them preferring natural environment in order to relax and preferring natural elements such as sunset, sunrise, hilly regions, greenery, etc., (Yin et al, 2020; Biber, 2020;)

There was special focus on the aquatic elements of biophilia like rain, rivers, and with beaches receiving even more focused attention.

Participants displayed an awareness about the subjectivity of preference of the virtual environment based on individual differences and mentioned that every person should, for themselves, find out what kind of elements they like in the virtual environment and should decide for themselves if it works for them or not.

Some unique responses were also identified like people not preferring the visuals at all as it would be something additional, they would have to focus on, and would not be suitable when they want to relax. Some suggestions were also made by the participants regarding the possibility of VR becoming an addiction and instead of solving a problem becomes a problem, in itself. Participants also mentioned the possibility of integration of VR with other such technologies like audios of various frequencies which are proven to have positive impact on the human brain like alpha waves, delta waves, etc.

Implications

Overall, it can be gathered that VR can be used to successfully divert the mind of the employees from the workplace stressors for a specific period of time, allowing them time to recover and not face constant burnout due to overwhelming workload, consistent with the literature (Wiederhold et al, 2016). It would help freshen up the mood of the employees, allowing them to look at workplace issues from a different perspective. It would boost creativity by providing an incubation period for different ideas. Implementation of virtual reality applications would boost employee loyalty by allowing the management to show that they care about their staff, it would boost employee morale as well.

It would boost productivity by allowing employees to get relaxed, even by taking short breaks from work. By decreasing burnout and increasing employee morale, it would be able to successfully counter turnover, a major organizational concern. Future research should focus on longitudinal studies to identify benefits and disadvantages of virtual reality and consolidate the findings mentioned in this research. Further research is required to identify if the speculations mentioned in the 'unique responses' section hold any weight.

Limitations

Due to the restrictions posed by Covid-19, a number of restrictions were posed on this research. It was not feasible for the researcher to conduct this research at the workplace of the employee. Further research should attempt to gather data in the workplace of the respective employee. Also, convenience sampling was used for data collection and thus, a representative sample was unavailable, as such more research is required to ensure generalizability.

REFERENCES

Ahmaniemi, T., Lindholm, H., Muller, K., & Taipalus, T. (2017, December). Virtual reality experience as a stress recovery solution in workplace. In *2017 IEEE Life Sciences Conference (LSC)* (pp. 206-209). IEEE.

Virtual Reality as a Solution for Workplace Stress

- Anderson, A. P., Mayer, M. D., Fellows, A. M., Cowan, D. R., Hegel, M. T., & Buckey, J. C. (2017). Relaxation with immersive natural scenes presented using virtual reality. *Aerospace medicine and human performance*, 88(6), 520-526.
- Biber, B., Dodge, M., Gonzalez, M., Huang, R., Johnson, O., Martin, Z., ... & Barnes, L. E. (2020, April). Investigating the Efficacy of Virtual Experiences on Stress Reduction. In *2020 Systems and Information Engineering Design Symposium (SIEDS)* (pp. 1-6). IEEE.
- Bouchard, S. (2019). Applications of virtual reality in clinical psychology and clinical cognitive neuroscience—an introduction. In *Virtual reality for psychological and neurocognitive interventions* (pp. 1-13). Springer, New York, NY.
- Cikajlo, I., Staba, U. C., Vrhovac, S., Larkin, F., & Roddy, M. (2017). A cloud-based virtual reality app for a novel telemindfulness service: rationale, design and feasibility evaluation. *JMIR research protocols*, 6(6), e6849.
- Crescentini, C., Chittaro, L., Capurso, V., Sioni, R., & Fabbro, F. (2016). Psychological and physiological responses to stressful situations in immersive virtual reality: Differences between users who practice mindfulness meditation and controls. *Computers in Human Behavior*, 59, 304-316.
- Cruz-Neira, C., Sandin, D. J., & DeFanti, T. A. (1993, September). Surround-screen projection-based virtual reality: the design and implementation of the CAVE. In *Proceedings of the 20th annual conference on Computer graphics and interactive techniques* (pp. 135-142).
- Hesse, K., Schroeder, P. A., Scheeff, J., Klingberg, S., & Plewnia, C. (2017). Experimental variation of social stress in virtual reality—feasibility and first results in patients with psychotic disorders. *Journal of Behavior Therapy and Experimental Psychiatry*, 56, 129-136.
- Kim, M. S. (2020). *Taking a break is not a guilty pleasure: improving employees' (Gen Y) well-being through work breaks using virtual reality* (Doctoral dissertation).
- Ladner, S. (2008). Laptops in the living room: Mobile technologies and the divide between work and private time among interactive agency workers. *Canadian Journal of Communication*, 33(3).
- Meretz, S. (2014). Socialist Licenses? A Rejoinder to Michel Bauwens and Vasilis Kostakis. *tripleC: Communication, Capitalism & Critique. Open Access Journal for a Global Sustainable Information Society*, 12(1), 362-365.
- Milgram, P., & Kishino, F. (1994). A taxonomy of mixed reality visual displays. *IEICE TRANSACTIONS on Information and Systems*, 77(12), 1321-1329.
- Naylor, M., Ridout, B., & Campbell, A. (2020). A scoping review identifying the need for quality research on the use of virtual reality in workplace settings for stress management. *Cyberpsychology, Behavior, and Social Networking*, 23(8), 506-518.
- Pretsch, J., Pretsch, E., Saretzki, J., Kraus, H., & Grossmann, G. (2020). Improving employee well-being by means of virtual reality—REALEX: an empirical case study. *European Journal of Economics and Business Studies*, 6(1), 95-105.
- Roche, K., Liu, S., & Siegel, S. (2019). The effects of virtual reality on mental wellness: A. *Ment Health*, 14, 811-818.
- Soni, A., & Shete, S. (2020, February). Mixed Reality for Stress Relief. In *Proceedings of the Fourteenth International Conference on Tangible, Embedded, and Embodied Interaction* (pp. 937-942).
- Tichon, J. G., & Mavin, T. (2016). Using the experience of evoked emotion in virtual reality to manage workplace stress: Affective Control theory (ACT). In *Integrating technology in positive psychology practice* (pp. 344-362). IGI Global.

Virtual Reality as a Solution for Workplace Stress

- Thoondae, K. D., & Oikonomou, A. (2017, July). Using virtual reality to reduce stress at work. In *2017 Computing Conference* (pp. 492-499). IEEE.
- Wiederhold, B. K., Riva, G., Gaggioli, A., & Wiederhold, M. D. (2016, April). Physician Burnout: Improving Treatment Efficacy with Virtual Reality. In *MMVR* (pp. 454-458).
- Yin, J., Yuan, J., Arfaei, N., Catalano, P. J., Allen, J. G., & Spengler, J. D. (2020). Effects of biophilic indoor environment on stress and anxiety recovery: A between-subjects experiment in virtual reality. *Environment International*, *136*, 105427.

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Conflict of Interest

The author declared no conflict of interest.

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