



RESEARCH REPORT

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ID Studio 7 DNB311 Assessment 1

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ABSTRACT

The purpose of this research is to understand the health implications of indoor gardening on people's lives and to identify problem areas as well as potential opportunities for design intervention. For this report, literature review and action research were undertaken. Findings from the literature review highlight that interaction with indoor plants positively impact people's health during covid (SocioEco, 2000). Literature also outlines that indoor gardening was one of the most common activities undertaken during covid (SocioEco, 2000) lockdowns. Further findings indicate that ongoing interaction with indoor plants can improve humans' behavior, physical and psychological health. Action research was deployed across 2 cycles for this report. Surveys research were utilized for both cycles, 20 participants were involved in cycle 1 and 11 participants in cycle 2. Categorical and thematic analysis were conducted to collect research results. Key findings of the results indicated that over 85% of participants found indoor plants to help them through covid times. Plant propagation was referred to as a rewarding and enjoyable indoor plant activity yet challenging. It was also indicated that over 75% of the participants use products to propagate plants. These findings present opportunities for design intervention that can improve plant propagation experience for users by making it less challenging and thus more enjoyable. Likewise, further supporting plants positive effects on humans' health specially during covid (SocioEco, 2000).

INTRODUCTION

The purpose of this research is to understand the health implications of indoor gardening on people's lives and to identify problem areas as well as potential opportunities for design intervention.

Covid 19 implications on human health across the world demands innovative and holistic solutions that aid physiological and psychological health recovery and improvement. Interaction with indoor plant increase exposure to nature in home settings during covid 19 lockdowns. Exposure to nature is known to have benefits on human's health.

This report is going to first introduce literature outlining a range of topics, including covid 19 health consequences, nature, indoor plants and their effects on human health. The literature will also explore tasks involved in indoor gardening activities and the effects of biophilic design on people's life. The impact of indoor gardening and horticultural activity on people during covid 19 lockdowns will also be reviewed in the literature. The second part of this report will outline the research undertaken, the approach and methods used. This is followed by the research analysis in section three, indicating an explanation of how the the research was analyzed. Research findings will be presented, clearly detailing the type of findings identified in section four. Section five of this project is the discussion, where the research findings will be compared with the literature and new knowledge discovered will be highlighted. Design implications will be presented in section six after the discussion, outlining design directions based on the findings. Lastly, the report will be summarized in the conclusion including further directions for design.

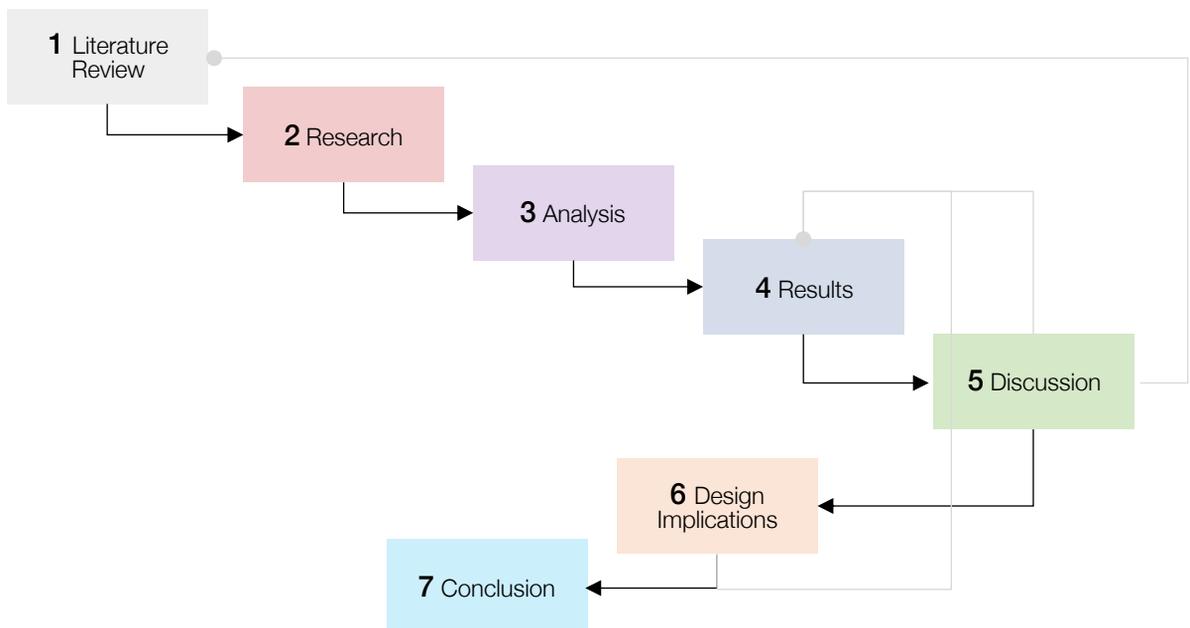


Figure 1: Visual graph of the overall report showing connections between sections.

LITERATURE REVIEW

Covid 19 pandemic has caused detrimental consequences in peoples lives all around the globe (Australian Institute of Health and Welfare, 2021). Some of these consequences include home restrictions, physical isolation, lost of jobs and lost of lives (Australian Institute of Health and Welfare, 2021). Peoples' physical and mental health have been negatively impacted as a result (Australian Institute of Health and Welfare, 2021; Munindradasa, et.al., 2021). Mental illness has been a major concern, with more people developing mental health issues and further deterioration for those with existing mental conditions (Munindradasa, et.al., 2021). Anxiety, stress and depression are some of the reported mental health conditions caused by the global pandemic (Munindradasa, et.al., 2021). Prompt treatment and management of mental health issues has become a priority for governments, organizations and individuals (Munindradasa, et.al., 2021).

Numerous research have found that nature and gardening have a positive impact on people's health and wellbeing (Lee, et.al., 2013; UK Research and Innovation, 2021). Several studies indicate that being in contact with nature improves people's mental and physical health (Lee, et.al., 2013; Queensland Health, 2017). Interaction with plants and engaging in horticultural activities are known to promote soothing, relaxing and comforting feelings (UK Research and Innovation, 2021; Queensland Health, 2017). The presence of plants and ongoing interactions with indoor plants can also reduce stress, improve concentration and productivity according to various studies (Lee et.al., 2013; Lee, et.al., 2015).

The positive effect, love and connection humans have with plants and the natural environment is defined as biophilia (Cambridge Dictionary, 2021; Wijesooriya, & Brambilla, 2021). Biophilia is a concept backed up by decades of researched (Cambridge Dictionary, 2021; Wijesooriya, & Brambilla, 2021). Due to its benefits, humans have been exposed to nature through parks and indoor environments for centuries (Ulrich, 1993; Gillis, & Gatersleben, 2015). The practice of connecting human to nature through built environments is known as biophilic design (Wijesooriya, N., & Brambilla, A. 2021; Ulrich, 1993). Biophilia has been used design for several decades (Gillis, & Gatersleben, 2015; Kellert, & Calabrese, 2015). Biophilic design is applied in several industries including health, recreation, education, community and housing due to its proven benefits on human health (Gillis, & Gatersleben, 2015; Kellert, & Calabrese, 2015). Specifically, biophilic design has proven to have a positive impact on people's behavior, physical and mental health (Kellert, & Calabrese, 2015). Some of the reported benefits include decline in stress and anxiety and increase in motivation and concentration (Kellert, & Calabrese, 2015). Nature has also proven to lower blood pressure, aid pain relief and assist with illness and healing recovery (Lee, et.al., 2015; Gillis, & Gatersleben, 2015).

Gardening involves a series of tasks or activities undertaken to help plants grow and thrive (University of Georgia, 2020). These activities are usually categorized into groups (University of Georgia, 2020). Growing indoor plants involve the following factors and tasks (University of Georgia, 2020; National Parks, 2020):

- External/environmental factors
- Pruning and repotting,
- Pest management,
- Disease,
- Nutrition,
- Propagation

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Environmental factors affecting plant growth include light, temperature, airflow and humidity (University of Georgia, 2020; National Parks, 2020). Pruning is a gardening task done to remove damaged leaves and to maintain a tidy look on the (University of Georgia, 2020; National Parks, 2020). Repotting is done when plants outgrow the existing pot they are in and then potted in a larger pot (National Parks, 2020). Pest management is an ongoing practice, to manage pest or insects that can attack plants throughout their lifetime (University of Georgia, 2020; National Parks, 2020). Indoor plants are known to be more prone to get pest as environment indoors is not favorable (reduced light, airflow, humidity etc) (University of Georgia, 2020; National Parks, 2020).

Plants are also prone to a range of diseases and can often occur when environmental conditions are not optimal for the plant (University of Georgia, 2020; Dong, n.d.). Some of these diseases include rot, fungus and bacteria (Dong, n.d.). Providing nutrients to the plant is part of keeping them healthy and thriving in indoor environments specially when the conditions indoors are not favorable (National Parks, 2020; Dong, n.d.). To upkeep indoor plant nutrients, plants are fertilized in an ongoing basis (National Parks, 2020; Dong, n.d.). To create more plants out of existing plants, plants are propagated (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017). Because of this, plant propagation possess financial benefits, as more plants can be obtained at no cost (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017). However, plant propagation is referred to as a challenging tasks (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017). Several environmental factors such as light, humidity and temperature determine the success of propagated plants (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017).

Increased engagement in horticultural activity and indoor gardening has been reported during the pandemic (Hendersen, 2021; GlobalData, 2020). Various surveys undertaken in different parts of the world indicated that gardening was one of the most common activity during lockdowns (GlobalData, 2020; Perrone, 2021). Other studies found that having plants at home and gardening had positive effects on people's health during covid 19 lockdown (UK Research and Innovation, 2021; Ribeiro, et.al., 2021). Benefits were specially reported on people's psychological health (UK Research and Innovation, 2021; Hendersen, 2021; Beil, 2021). One of the studies found that increasing the frequency of visual interaction with indoor plants was connected to reduced psychological distress (Ribeiro, et.al., 2021). A study founded by the UK and National Institute for Health on the effects of gardening during lockdown showed that participants who spent more time doing gardening reported better health than those who did not do any gardening (UK Research and Innovation, 2021).

However, it must be noted that nature has also reported the opposite effects on some people, displaying no benefits or adverse effects after being expose to nature (Wijesooriya, & Brambilla, 2021; Gillis, & Gatersleben, 2015). A study on biophilic design showed that there were people experiencing negative emotions and fears towards nature - biophobia (Wijesooriya, & Brambilla, 2021). A different study undertaken in an office setting reported a decrease in productivity as the number of plants increased in the space (Gillis, & Gatersleben, 2015).

In summary, numerous studies undertaken across the globe indicate that indoor plants and gardening improve behavior, emotional, psychological and physiological health for many people (UK Research and Innovation, 2021). Indoor plant care involves various activities and

1

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factors, some of them more challenging and others more rewarding (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017). An activity that is considered rewarding and with added financial benefits is plant propagation (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017). Plant propagation allows creating more plants from existing plants through cuttings and other sources (Better Health Channel, 2014; Botanic Gardens of South Australia, 2017). Applying biophilia – the connectedness humans have with nature into design has proven highly beneficial to humans ((Wijesooriya, & Brambilla, 2021; Ulrich, 1993; Gillis, & Gatersleben, 2015). Biophilic design has proven to positively impact humans' overall health with some exceptions (Ulrich, 1993; Gillis, & Gatersleben, 2015). It is important to note that nature also provides the opposite effect to certain people. However, this project will be focusing on those for whom nature is beneficial. Incorporating nature into people's home can be positive specially at present times with covid 19 that continues negatively impacting the health and wellbeing of millions of people around the world (Munindradasa, et.al., 2021).

2 RESEARCH

This project topic is about the experience of interacting with indoor plants and the impact it has on people in home settings specially during the covid 19 pandemic. Action research was conducted to better understand the topic from end users' and experts' perspective. The research involved 2 cycles of surveys using a combination of categorical (quantitative research) and open-ended questions (qualitative research) on both cycles. Convenience sampling was the sampling method used for this research to collect data.

Action research is a research method of systematic enquiry and often seen as a cyclical process used to better understand a topic (James, 2021; SocioEco, 2000). Involving multiple cycles, the insights obtained from the first cycle are used to plan the following cycle of research (SocioEco, 2000).

Survey research refers to the gathering of information from a sample of participants through their answers to questions (Ponto, 2015). Surveys can use qualitative and quantitative research strategies (Ponto, 2015). Qualitative research involves the collection of descriptive data (Edgar, & Manz, 2017). This type of research involves information such as people's emotions and social factors (Edgar, & Manz, 2017). Qualitative data can be ordered and categorized (Edgar, & Manz, 2017). Quantitative research on the other hand, involves gathering numerical data (Edgar, & Manz, 2017). Quantitative research allows quantifying the collected data (Edgar, & Manz, 2017).

Convenience sampling is a sampling method used to collect samples that are conveniently accessed whether it is in terms of location or through the internet (Edgar, & Manz, 2017). To properly utilize this sampling method, the sampling used must be from a population group that adequately represents the larger target population (Edgar, & Manz, 2017).

For the first survey cycle, the focus was to gain understanding and obtain insights on indoor plant experience for people in home settings and the effect during covid 19 lockdown. For the second cycle, the purpose was to further explore any areas of importance that arise on the first cycle, especially problems or areas of interest. A combination of long answers questions and categorical questions were used in both cycles. Long answer questions allowed the participant to better explain thoughts, emotions and experiences whilst categorical questions were used to obtain yes and no answers and numerical data. Convenience sampling was used due to having access through social media to a large group of people who do gardening, have and actively interact with indoor plants at home.

3 ANALYSIS

To analyze the data which includes long answers and categorical questions, a qualitative and quantitative data analysis method were employed. As mentioned in the Research section, long answer questions and categorical questions were utilized in both cycles.

For the categorical questions, quantitative data analysis was undertaken by Survey Monkey for both cycles, cycle one and two. Survey monkey is a software that generates online surveys and collect data to gain insights (SurveyMonkey, 2021). Survey monkey also generated the quantitative findings in the form of graphs.

For the long answer questions, thematic analysis was undertaken. Thematic analysis is used to identify patterns and themes from qualitative data (Maguire & Delahunt, 2017). This is done to view data in a systematic way and to process it using generated coding from the identified themes (Braun & Clarke, 2012). A series of topics (named sub-themes) were identified from the data and then grouped under three identified themes – passive inputs, active inputs and external factors. Color coding was then used for each theme.

Examples of the themes and sub-themes identified from the data include:

Theme – Passive inputs

Subtheme

Watching them grow I have a thing for buying baby plants and watching them become adults
(participant #2)

For this quote, *watching* was labelled as a passive input.

Theme – Active inputs

Subtheme

Propagation, finding right balance of sunlight. Remembering to water my plants when on weird work schedule
(participant #17)

For this quote, *propagation* was labelled as an active input. Propagation is an activity that involve a series of steps.

Theme – External factors

Subtheme

... high humidity, warmth and controlled light, propagations received in greenhouse help them root faster...
(participant #8)

For this quote, *humidity, warmth and light* were labelled as external factors.

4 RESULTS

Qualitative results

The themes and sub-themes obtained from the thematic analysis are shown below, in table 1. Participants mostly mentioned propagation, watching and environmental factors.

Themes	External factors	Active inputs	Passive inputs/outputs
Sub-themes	Light & Temperature Humidity Airflow Pest Space Time (when at work)	Watering Monitoring Propagating Decorating/styling Cleaning Feeding	Watching Remembering tasks Enjoy Stress relief Enjoy Therapeutic

Propagation was a repeated sub-theme mentioned by 50% of the participants when asked about the most fulfilling part of indoor gardening. It was also mentioned when asked about the 3 top problems faced with indoor plants. When asked about the 3 top problems faced with indoor plants participants also frequently mentioned having difficulties with light, humidity, water, space and being away. Another recurrent sub-theme that emerged when asked about the most fulfilling part about indoor gardening was watching plant growth.

Quantitative results

The three most relevant graphs obtained from the categorical data are shown below. In figure 2, the 3 major age groups identified are 25-34, followed by 18-24 and 45-54.

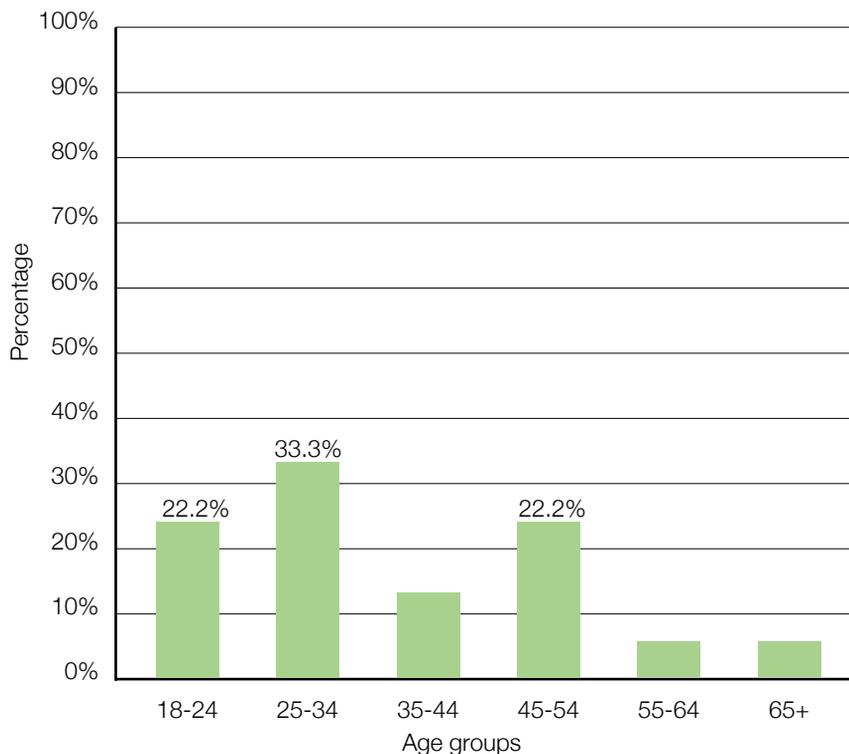


Figure 2: The age range of the participants.

4 RESULTS

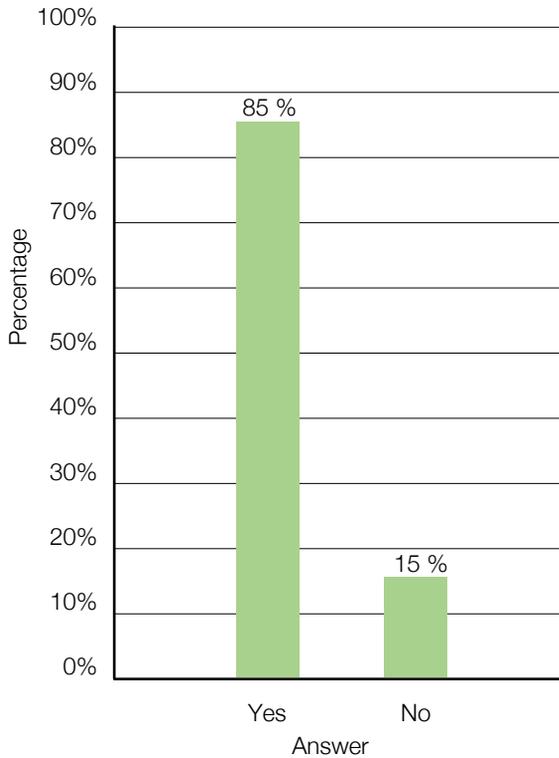


Figure 3: Number of participants that found indoor plants helped them through covid times

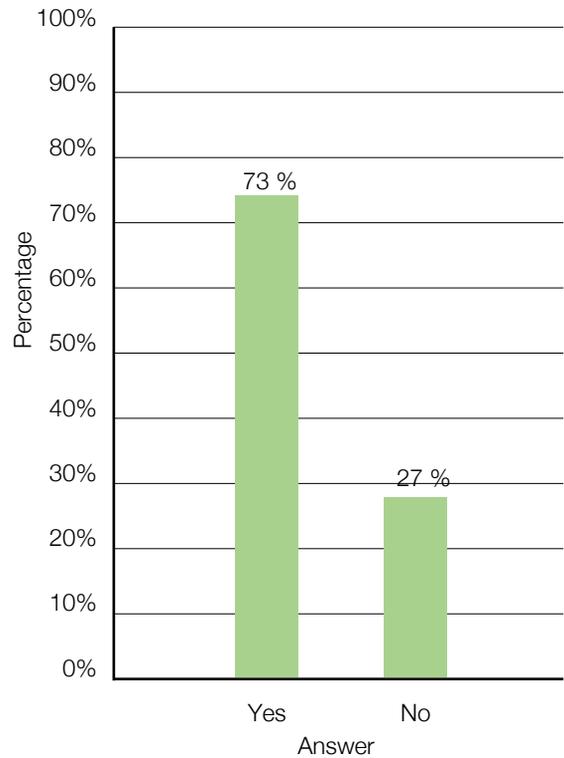


Figure 4: Number of participants that use products during propagation activities

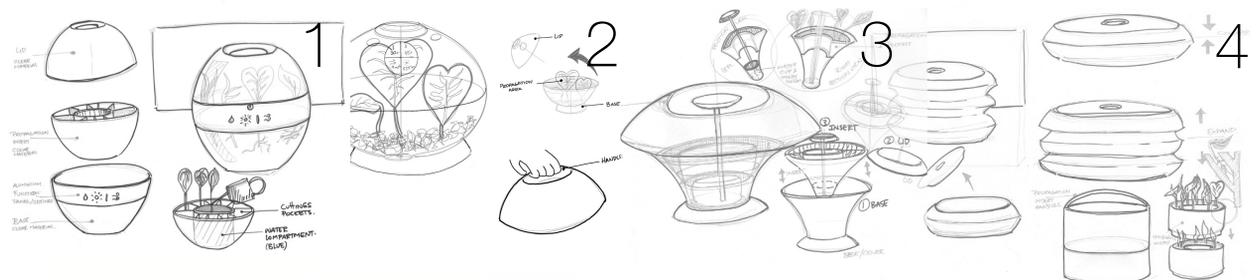
In figure 3, it is shown that 85% of the participants found indoor plants helpful through covid times. It is indicated in figure 4 that over 70% of participants use products during plant propagation activities.

5 DISCUSSION

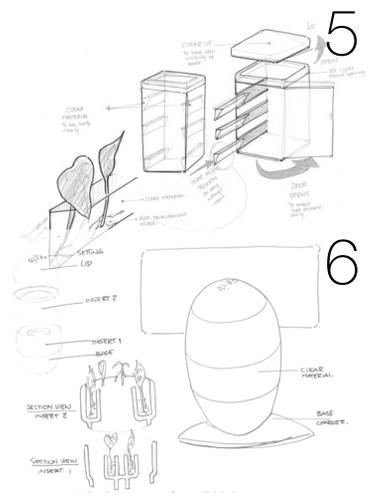
The research conducted is strongly supported by the literature. As indicated in figure 3, section 4, research findings outline that active interaction with indoor plants provide psychological health benefits to participants. As a result of this, interaction with indoor plants have helped participants through covid 19 times. Benefits mentioned by the participants in table 1, section 4, include stress relief and therapeutic. These are some of the health benefits from interaction with indoor plants also found in the literature outlined in section 1 of the report. When asked about 3 major problems about indoor gardening, participants mention plant propagation and balancing light and humidity, this is highlighted in section 3. In the literature, plant propagation also is referred to as challenging. However, research findings provided new insights. The research results indicated that propagation is also seen as a rewarding and enjoyable indoor gardening activity. Other new knowledge that emerged from the research include the possible high need for products to assist users with plant propagation activity. Findings highlighted in figure 4, section 4, indicate that more than than 70% of participants use products to assist them with plant propagation.

6 DESIGN IMPLICATIONS

Interaction with indoor plants at home settings present several opportunities for design interventions. According to research findings, people's overall health can improve through ongoing interaction with indoor plants. This is more relevant and important at present times due to the covid 19 pandemic health consequences. Design intervention opportunities exist across: improving and facilitating interactions with indoor plants in home settings for users to improve their experience and maximize health benefits. Research findings outline that interacting with indoor plants at home present various challenges. Plant propagation was repeatedly referred to by participants as a rewarding and enjoyable part of indoor plants. However, plant propagation was also mentioned by participants when asked about their 3 most common problems faced with indoor plants. The findings showed that 75% of participants use products to assist them with plant propagation tasks. According to the literature, this activity requires a controlled environment for plant cuttings to increase propagation success. Humidity, light and airflow are reportedly some of the variables that must be controlled in plant propagation to improve outcome. Literature highlights that plant propagation also presents financial benefits as more plants can be created from existing ones. Therefore, plant propagation in home settings present several opportunities for product design intervention. Aesthetics and limited space were also mentioned by participants, these factors are also opportunities for product design intervention. There are various opportunities for design ideas as highlighted in section 4, however the chosen direction is a propagating device that assist with this task and maximize space by doubling up as a furniture piece.



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7 CONCLUSION

Literature review and action research were undertaken to understand plants impact on human health and get insights on the experience of interaction with indoor plants in home settings. Literature indicates that increasing exposure to nature and ongoing interactions with indoor plants are linked to improved physical and mental health. Humans' connectedness and love for nature is referred to as biophilia. According to literature, nature has been incorporated in humans' built-environment for centuries due to its health benefits, this is a practice known as biophilic design. Literature shows that gardening and the presence of plants in home settings have been associated with improved psychological health during covid 19 lockdowns. Indoor gardening has reportedly increased and become one of the most common activities during the pandemic in various parts of the world. An action research was undertaken for this report utilizing online surveys across two cycles, the first cycle involved 20 participants and the second cycle involved 11 participants. Supported by the literature, the results of the action research indicated that interaction with plants positively impacts psychological health. Over 85% of participants found indoor plants helpful during covid 19 times, reporting psychological benefits including stress relief. Indoor plants were perceived as therapeutic, enjoyable and challenging by participants. From the findings, problems and opportunities were identified for potential design intervention. These include limited space and plant propagation. Propagation was found to be an enjoyable part of indoor plant and yet a challenging task. Design opportunity lies in a device that improves and facilitates plant propagation in home settings whilst considering users space and time limitations. This would enhance user experience and make plant propagation potentially more enjoyable and less challenging. Decoration and styling were also repeatedly mentioned by participants and can indeed be another opportunity for a product design intervention.

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