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ECO-FARM SIMULATION RECREATION THERAPY KIT PROMOTES SENSE OF COHERENCE AMONG THE ELDERLY – A FEASIBILITY PRODUCT ANALYSIS

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ABSTRACT

Background: *The aging population across the world and in America, the mental distress of chronic illnesses, the projected shortage of caregivers, and the anticipated burden healthcare will face are identified as interconnected problems through systemic design principles. A human centric wellness solution is crafted through the product development of a comprehensive DIY (Do it yourself) recreational therapy kit, integrating three evidence-based interventions: horticultural therapy, journaling, and whole health coaching. This product also aims to engage users in a simulated real-life experience of crop cultivation on a farm. A feasibility analysis was then conducted to determine the effectiveness of this point-of-care human-centered design product.*

Objective*: The primary aim of this educational activity is to test the effectiveness of a product called Eco-Farm Simulation, Recreation Therapy Kit (EFS RT) . It engages users in a simulated experience of crop cultivation on a farm within a controlled indoor environment requiring minimal complexity and skill.*

Methods*: N=28 participants aged 65-83 living in the states of Florida and Virginia used this RT Kit over two weeks. A pre- and post-survey consisting of nine questions were administered using a modified sense of coherence scale that measured the three components of comprehension, manageability, and meaningfulness. The post-survey also included two open-ended questions querying user experience with the kit.*

Results*: EFS RT Kit resulted in significant positive changes in all three components of elderly individuals' sense of coherence.*

Conclusion*: The EFS RT Kit increases comprehension, manageability, and meaningfulness among its users in period of less than 2 weeks. This paper aims to lay a solid foundation for future exploration in the field of point-of-care product development. The content presented in this paper serves as an educational endeavor and should not be regarded as equivalent to formal research on the subject. Additional investigations employing larger sample sizes, diverse cohorts of institutionalized and disabled individuals, and more rigorous protocols are necessary.*
Furthermore, The paper aims to prompt stakeholders and decision-makers to embrace systems design principles for anticipating future problems, prioritize a human-centric approach in solution design, and promote acceptance of environmentally friendly healthcare solutions. It calls upon industry leaders to offer top-down support for the implementation of straightforward innovations such as the EFS kit, which demands multidisciplinary acceptance in healthcare institutions. These products hold the potential for evidence-based practice implementation.

KEYWORDS: *Farm, simulation, recreation therapy, sense of coherence, Whole health, Systems design, human centric, point of care, product development, horticulture, journaling, wellness, coaching, Evidence based*

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INTRODUCTION

Product Description

An incremental design approach is applied to "microgreen trays," a popular product on Amazon. In this socially sustainable product development exploration, we've created an RT Kit for a simulated desk top crop cultivation experience. The kit enables users to engage in real-life farming within a controlled indoor environment using a desktop kit, completing a cultivation cycle in two weeks. It includes organic grow mats, serving as soil replacement, and features self-watering mechanisms for practicality and minimal maintenance. Anticipating user needs, it includes a harvesting surface mat, blunt scissors, a spray water bottle, and storage bags. The integrated instructional manual encourages SMART goals, supported by health coaching prompts. Reflecting lessons learned, incremental development considers diverse requirements, including those of disabled users. The EFS RT Kit, with variable costs based on product quality, is presented in appealing packaging. In developing the "EFS" coaching solution, the initial target audience was the healthcare industry, but challenges in obtaining organizational support led to a redirection of the EFS RT Kit's feasibility analysis toward community residents. While the desktop microgreen kit produces highly nutritious harvests, the emphasis remains on the simulation experience rather than consumption. The kit is reported to have no known side effects, but a safety and quality assessment for consuming the greens was not undertaken. The user manual cautions grower's personal responsibility for checking the product before consumption, addressing potential variations in nutritional value and offering guidance on mold signs and allergen considerations. Users are advised to consult healthcare providers before consumption

OBJECTIVE

The primary aim of this educational activity is to test the effectiveness of a product called EFS RT Kit.

METHODOLOGY

A preliminary exploration focused on evaluating EFS's potential in enhancing the well-being of the elderly. The sample size was 28 and included residents from Florida and Virginia in the United States of America. The Sense of Coherence (SOC) scale, a 9-item quantitative questionnaire rooted in salutogenic theory, measured a potential improvement in "sense of coherence" over 14 days using the EFS RT product. Of 28 recruited retired independent-living adults, three dropped out, citing commitment, time management, and travel plans. The study spanned 10 months, encompassing fall, winter, and summer, with Virginia participants using the kit in summer and winter and Florida participants in summer and fall. The principal investigator, the author, provided contact information for participant queries. Six participants were actively involved throughout the project, posing questions, while the remainder required minimal instructions, relying primarily on the manual

RESULTS

Demographic analysis

The majority of participants were aged 70-80. The gender ratio of the participants was relatively even, with more female elderly individuals in both states. Of the two states where the project took place, Florida had 17 participants, while Virginia had 11. Participants from Virginia did not engage in the project during the fall season, and those in Florida did not participate in the winter season. Sixteen participants were involved in the summer, seven in the winter, and five in the fall.

Effectiveness of each of the three constructs of SOC.

All three aspects of SOC significantly improved with EFS RT Kit usage. Participants notably enhanced comprehension, with mean scores increasing from 11.4±2.901 to 13.68±1.651 post-survey, a +2.28point improvement (p-value=0.00001**). Manageability also rose by +3.72 points post-survey, indicating increased belief in handling life situations. Sense of meaningfulness improved by +3.56 points (p-value=0.00001**), with scores rising from a pre-survey mean of 9.64 to 13.2, reflecting a heightened appreciation for life's meaning and increased satisfaction.

Qualitative analysis

Responses to open-ended questions on EFS RT Kit use revealed four key themes. Theme 1, "Connection to nature and personal growth," highlighted participants' joy, purpose, and personal development. Theme 2, "Social interaction and bonding," emphasized family conversations and strengthened relationships during the activity. In response to toolkit suggestions, Theme 3, "Instructional Resources and Engagement," emerged, expressing a desire for videos, instructions, and community interaction. Theme 4, "Expansion and Exploration," reflected an interest in broadening the activity's scope, seeking information on other plants, and exploring new possibilities. These themes underscore the significance of instructional resources, engagement, and encouraging exploration for sustained interest.

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Addressing the design principles of the EFS RT Kit, a commitment to systemic design principles guided its development(Bijl-Brouwer & Malcolm, 2020). Adhering to the five core principles of systems design, the identification of a problem necessitating the development of a social solution was pursued. (Eriksson & Lindström, 2006).

1. Recognizing aging challenges of Americans,
2. Developing empathy with the system,
3. Focusing on human relationships to foster learning and creativity within the project,
4. Recognizing challenges in influencing mental models, and
5. Adopting an evolutionary design approach.

Human-centered design and design thinking methodologies were employed during ideation, involving input from recreational therapists and iterative processes(Ahmed & Demirel, 2020).

Examining previous studies on SOC as a survey instrument in RT product design, existing evidence highlights effects on SOC levels in horticultural programs and arts-based activities(Wu et al., 2020). There is preliminary evidence about the effectiveness of a 12-week horticultural activity program on strengthening SOC levels among 86 participants studied from older adults without clinically significant dementia recruited from 12 LTCFs (long-term care facilities) in northeastern Taiwan(Jueng & Chen, 2022).

Discussing incremental improvements for the EFS RT Kit, the integration of a mobile application is proposed(Buehler et al., 2015). Features include comprehensive instruction guidance, motivational coaching, personalized reminders, education, an interactive chatbot, community support, and guided imagery with virtual reality technology(Tetzlaff et al., 2021). This approach aligns with the increasing digital literacy among the elderly, promoting engagement and personalized assistance(Klimova & Maresova, 2016).

Considering implications, the study highlights the positive impact of user-friendly human centric innovations on participants' sense of coherence(Vogt et al., 2016). It advocates for systemic thinking in social innovation and product development, challenging perceptions about sustainable solutions in healthcare institutions(Bijl-Brouwer & Malcolm, 2020). The paper aims to influence stakeholders and decision-makers toward the acceptance of sustainable solutions.

CONCLUSION

Applying systemic design principles, this paper addresses a social concern by introducing the EFS RT Kit—an incremental, human-centered innovation. The product combines horticulture therapy, therapeutic journaling, and whole health coaching, aiming to simulate real-life crop cultivation. Feasibility analysis indicates statistically significant improvements in users' sense of coherence—comprehension, manageability, and meaningfulness. Despite valuable insights, limitations highlight the need for a more rigorous trial.

AREA FOR FURTHER RESEARCH

Our project underscores a noticeable gap in the existing body of knowledge and suggests the potential utilization of SOC (Sense of Coherence) as a survey instrument for further investigations in programs such as equine therapy, music/dance therapy, and other RT arts and crafts.

ACKNOWLEDGMENTS

The authors of this project would like to extend their gratitude to the community elders who participated in this initiative. The authors also would like to express their gratitude for utilizing 'ChatGPT,' a generative AI tool that played a pivotal role in summarizing and rephrasing.

CONFLICT OF INTEREST STATEMENT

The authors of this narrative acknowledge the presence of potential biases, including but not limited to selection/familiarity bias, volunteer bias, social desirability bias, and self-funding bias. While we have made every effort to mitigate these biases, it is essential to note that the authors are not financially or personally affiliated with any entities that could potentially benefit or be adversely affected by the outcomes of this narrative. Our primary commitment is to the pursuit of objective and unbiased scientific inquiry regarding wellbeing of elderly in a community setting.

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Figure 1: Composition of Fully Grown Eco-Farm Simulation Kit

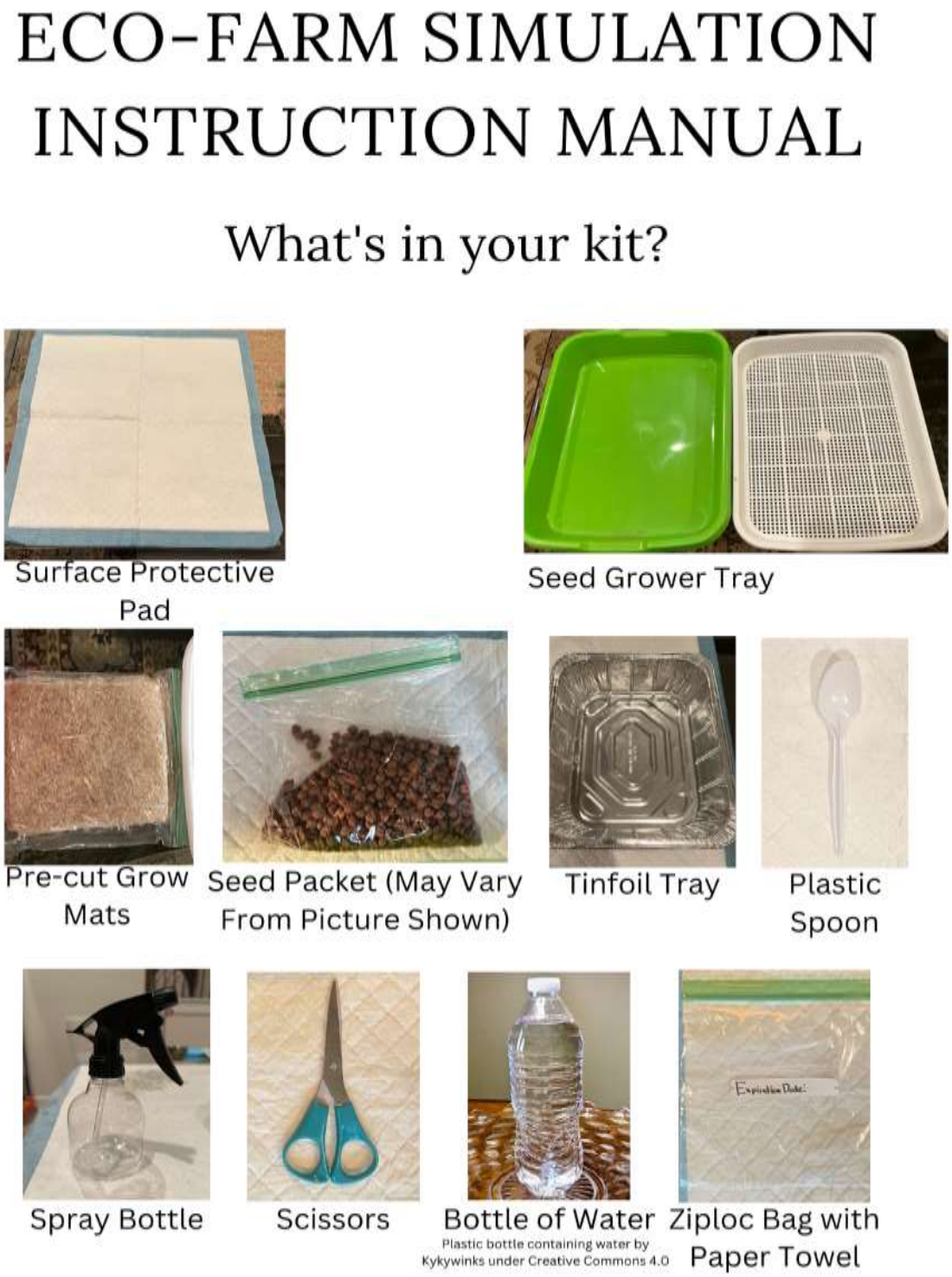

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Figure 2: Depiction of Fully Grown Eco-Farm Simulation Kit

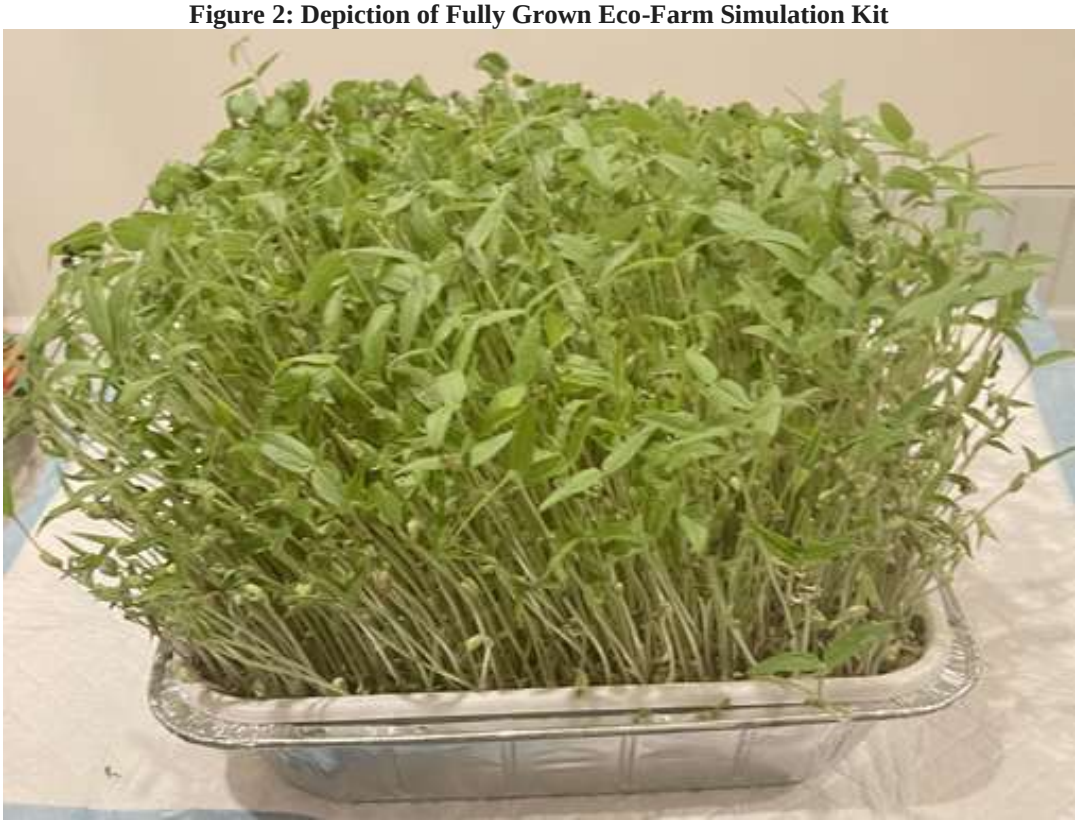

Table 1: Modified Sense of Coherence Questionnaire and Post Usage of Eco-Farm Simulation

On a scale of 1-5 (1: very low, 2: little bit low 3: so so 4: a little bit high 5: very high) Over the last 2 weeks
COMPREHENSION
1) I engaged in an activity that challenged me to read with speed and efficiency
2) I engaged in an activity that challenged me to comprehend & gain understanding of the information I read
3) I engaged in an activity that helped me think critically, analyze and evaluate the purpose, and credibility of the content of the text I read
MANAGEABILITY
4) I engaged in an activity that needed troubleshooting to resolve a problem
5) I engaged in an activity that allowed me to monitor my progress on a project
6) I engaged in learning a new activity and develop a new skill that I didn't do before
MEANININGFULNESS
7) I engaged in an activity that allowed me to reflect on what matters to me in life
8) I engaged in an activity that made me feel hopeful
9) I engaged in activity that made me feel confident

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Questionnaire for Post Usage of Eco-Farm Simulation
(Participants were also asked to answer the following qualitative questions post activity)

1. Please describe the impact of doing this activity.
2. What suggestions do you have to improve this activity?

Table 2: Frequency distribution of the study participants

Variables	Frequency	Percent
Age Group		
65 to 70	10	35.7
70 to 80	16	57.1
above 80	2	7.2
Gender		
Male	12	42.9
Female	16	57.1
Location		
Florida	17	60.7
Virginia	11	39.3
Season		
Fall	5	17.9
Winter	7	25.0
Summer	16	57.1

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Table 3: Individual survey question analysis Pre and Post Activities among Participants Using Paired -T-Test

Individual questions		n	Mean Score	SD	CI		MD	t-test	p-value
					LC	UC			
	Comprehension								
Q1	Pre	25	3.56	1.158	3.0821	4.0378			
	Post	25	4.48	0.653	4.2103	4.7500	0.92	5.0593	0.00001**
Q2	Pre	25	3.84	1.028	3.4157	4.2643			
	Post	25	4.6	0.646	4.3336	4.8664	0.76	4.8787	0.0001*
Q3	Pre	25	4	0.957	3.6048	4.3952			
	Post	25	4.6	0.577	4.3617	4.3952	0.60	4.2426	0.0003*
	Manageability								
Q4	Pre	25	3.48	1.005	3.065	3.8948			
	Post	25	4.68	0.476	4.4834	4.8765	1.20	6.2668	0.00001**
Q5	Pre	25	3.56	0.870	3.2010	3.9191			
	Post	25	4.52	0.510	4.3100	4.7305	0.96	5.7100	0.00001**
Q6	Pre	25	3.12	0.917	2.7190	3.5209		7.7741	0.00001**
	Post	25	4.68	0.557	4.4502	4.9098	1.56		
	Meaningfulness								
Q7	Pre	25	3.16	0.943	2.7706	3.5494	1.08	6.2633	0.00001**
	Post	25	4.24	0.597	3.9935	4.4865			
Q8	Pre	25	3.36	0.700	3.0710	3.6490		9.3333	0.00001**
	Post	25	4.48	0.510	4.2695	4.6904	1.12		
Q9	Pre	25	3.12	0.833	2.7762	3.4637		9.7143	0.00001**
	Post	25	4.48	0.5099	4.2695	4.6905	1.36		

*p-value<0.05 ** * = significant; n= Sample Size; SD= Standard Deviation; CI= Confidence Interval; LC= Lower limit; UL=Upper Limit; MD= Mean Difference; (Comprehension: Q1 I engaged in activity that challenged me to read with speed and efficiency; Q2 I engaged in activity that challenged me to comprehend & gain understanding of the information I read; Q3 I engaged in an activity that helped me think critically, analyze and evaluate the purpose, and credibility of the content of the text I read) (Manageability: Q4 I engaged in an activity that needed troubleshooting to resolve a problem; Q5 I engaged in an activity that allowed me to monitor my*

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progress on a project; Q6 I engaged in learning a new activity and develop a new skill that I didn't do before) (Meaningfulness: Q7 I engaged in an activity that allowed me to reflect on what matters to me in life; Q8 I engaged in an activity that made me feel hopeful; Q9 I engaged in an activity that made me feel confident).

Table 4: Effectiveness of each of the three constructs of SOC.

	Components	*n*	*Mean*	*SD*	*CI*		*MD*	*t-test*	*p-value*
	Comprehension				**LC**	**UC**			
Pair 1	Pre	25	11.4	2.901	10.2025	12.5975	2.28	5.3981	0.00001**
	Post	25	13.68	1.651	12.9984	12.9984			
	Manageability								
Pair 2	Pre	25	10.16	2.444	9.1516	11.1689	3.72	9.9994	0.00001**
	Post	25	13.88	1.054	13.4451	14.3149			
	Meaningfulness								
Pair 3	Pre	25	9.64	2.039	8.7984	10.4816	3.56		
	Post	25	13.2	1.414	12.616	13.7838		11.4344	0.00001**

*p-value<0.05 ** * = significant; n= Sample Size; SD= Standard Deviation; CI= Confidence Interval; LC= Lower Limit; UL= Upper Limit; MD= Mean Difference*

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