Case Report

Embracing DDMT Teaching Model and Design Thinking for Organization Development

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Abstract: The multi-generational workforce presents challenges for organizations, as the needs and expectations of employees vary greatly between different age groups. To address this, organizations need to adapt their development and learning principles to better suit the changing workforce. The DDMT Teaching Model of Tsing Hua STEAM School, which integrates design thinking methodology, aims to address this challenge. DDMT stands for Discover, Define, Model & Modeling, and Transfer. The main aim of this study is to identify the organization development practices (OD) and gaps through interdisciplinary models such as DDMT and design thinking. In collaboration with a healthcare nursing home service provider, a proof of concept using the DDMT-DT model was conducted to understand the challenges in employment and retention of support employees between nursing homes under the healthcare organization. The paper highlights the rapid change in human experiences and mindsets in the work culture and the need for a design curriculum that is more relevant to the current and future workforce. The DDMT-DT approach can help organizations address these challenges by providing a framework for HR personnel to design training curricula that are more effective in addressing the issues of hiring and employee retention. By applying the DDMT-DT model, HR personnel can better understand the needs and motivations of the workforce and design training programs that are more relevant to their needs. The proof-of-concept research pilot project conducted with the healthcare nursing home service provider demonstrated the effectiveness of the DDMT-DT model in addressing the issues of hiring and employee retention. The project provides a valuable case study for other organizations looking to implement the DDMT-DT model in their HR practices. Overall, the paper highlights the importance of adapting HR practices to better suit the changing workforce. The DDMT-DT model provides a useful framework for organizations looking to improve their HR practices and better address the needs of their workforce.

Keywords: DDMT teaching model; design thinking; organization development; organization learning; Tsing Hua STEAM School

1. Introduction

The post-2000 era has witnessed significant changes in the global environment, which has resulted in an increased need for organizations to adapt and evolve to stay relevant and sustainable. The world has become more volatile (V), uncertain (U), complex (C), and ambiguous (A), and organizations are finding it challenging to keep up with the changing times [1]. The COVID-19 pandemic has only accelerated this need for change, pushing businesses to adopt new ways of working, communicating, and collaborating [2].

In addition to the changes in the external environment, the mindset and persona of employees [3] are also evolving, particularly with the rise of Gen Z and beyond. These new generations of employees have different expectations and priorities, and organizations
need to manage them differently to ensure their engagement, retention, and performance. Moreover, technological advancements, such as artificial intelligence, machine learning, and automation, are disrupting the traditional workplace and redefining the future of work [4].

In response to these challenges, business leaders are increasingly focusing on mental models, which are the fundamental beliefs, assumptions, and values that shape an organization’s culture, strategy, and operations. Renewing an organization’s mental models [5] is critical to integrating the evolving employee mindset into the work culture and ensuring alignment with the changing environment. This requires a fundamental rethinking of how organizations approach their development and learning agendas to stay relevant and effective. The main aim of this research study is to identify the organization development (OD) practices and gaps through interdisciplinary models such as DDMT and design thinking.

In the component of OD, organization learning is present in the three healthcare nursing homes. Curriculum design is a critical component of the development and learning agenda, and organizations need to adopt a more dynamic learning approach that enhances relevance and fosters applied learning. This approach should be learner-centered, based on design thinking [6] and DDMT teaching model (see https://trh.gase.most.ntnu.edu.tw/en/article/content/74) principles [7], and enable learners to relate, comprehend, query, analyze, and develop solutions to real-life issues and emerging needs [8,9]. It should also result in accelerated learning [10], creativity [11], critical thinking [12], constructivism [13], and computational thinking [14].

The value integration of DDMT teaching model and Design Thinking can enable corporates to design learning programs that nurture applied learners. This approach involves experimenting with corporations, observing their behaviors, and adopting an agile and iterative process to refine the approach continually. Ultimately, this will enable organizations to adapt and evolve to stay relevant, sustainable, and effective in the post-2000 era.

In the application of DDMT teaching model and design thinking in the context of healthcare business cum operations, VUCA [15,16] can manifest in various ways, such as emerging diseases, changing patient needs and preferences, technological disruptions, regulatory changes, and economic uncertainties. Healthcare leaders need to embrace VUCA and its associated challenges by developing adaptive and resilient strategies that can enable them to respond quickly and effectively to changes and uncertainties.

However, equating VUCA with change can lead to fear and resistance among employees, who may feel overwhelmed and uncertain about the future. A case in point was the recent COVID-19 pandemic in Singapore. Therefore, it is important for leaders to communicate clearly and transparently with their employees, providing them with the necessary support, resources, and training to adapt to new situations and challenges.

In the organization context, attracting and retaining employees have become critical priorities for leaders, particularly in light of the changing expectations of the younger generations, such as Gen Z and beyond. These generations tend to value flexibility, work-life balance, purpose-driven work, and a positive organizational culture.

To meet these expectations, leaders need to focus on creating a work environment that is inclusive, diverse, and supportive, with opportunities for growth and development. They also need to leverage technology and innovation to enhance productivity and efficiency while maintaining a human-centered approach that prioritizes the well-being and happiness of employees.

According to McKinsey Report 2022 [17] details how Gen Z and other generations view themselves, their ability to work effectively, and their futures. The young people responded to the survey, and it suggested concerning levels of distress among young people, including an astounding 55 percent reporting having either been diagnosed with or having received treatment for mental illness [17]. This is a rising concern for organizations in managing the people, the type, and the amount of work assigned to the employees.
Empathy and sensitivity in managing people have heightened. This is one lever for the
great resignation or quiet resignation that we are hearing today.

To address this issue, this study has provided observations on the healthcare organi-
zation’s need to adopt more empathetic and sensitive approaches to managing their
employees. They need to prioritize their employees’ mental health and well-being by
providing resources and support, such as counseling services, flexible work arrangements,
and regular check-ins with managers.

The World Economic Forum has emphasized the importance of workplace learning
in building successful businesses of the future and has recommended the development
of strong cultures of continuous learning [18]. To achieve this, organizations should
incorporate micro-learning, mobile learning, peer learning, and adaptive learning into
their learning strategies. Micro-learning delivers content in small, easy-to-digest chunks,
while mobile learning provides access to learning content on mobile devices. Peer learning
encourages collaboration and knowledge sharing, and adaptive learning personalizes the
learning experience to an individual’s needs. By embracing these channels, organizations
can create more effective and engaging learning experiences for employees, leading to
increased productivity and better business outcomes.

Adaptive learning is a personalized approach to medical education and professional
development in the hospital context [19]. It uses technology to assess individual learning
needs and preferences, providing targeted training materials to fill knowledge gaps and
enhance clinical skills. By tailoring training to the needs of healthcare professionals,
adaptive learning can improve learning outcomes and reduce the costs and time associated
with training. Ultimately, this approach has the potential to improve patient care and
outcomes in hospitals by keeping healthcare professionals up to date with the latest medical
research and developments.

Dynamic learning is an effective approach to employee training and development
that allows for a more personalized learning experience based on individual needs and
goals. Additionally, coaching and mentoring are valuable tools for employee development
that provide a supportive learning environment where employees can receive guidance,
feedback, and encouragement. Singapore has seen a growing coaching and mentoring
community, and organizations recognize the benefits of investing in their employees’
professional growth through these methods. By embracing dynamic learning and coach-
ing/mentoring approaches [20], organizations can foster a culture of continuous learning
and development that can lead to increased job satisfaction, retention, and, ultimately,
business success.

content/74) can be applied in a hospital context to improve various aspects of healthcare,
such as patient care, employee development, and organizational performance. Here are
some examples of how the DDMT teaching model can be used in a hospital setting:

1. Discover: The first step in the DDMT teaching model is to discover areas that require
improvement. In a hospital context, this could involve identifying gaps in patient
care, such as longer wait times, communication breakdowns, or inconsistent treat-
ment protocols. It could also involve identifying employees’ training needs, such as
improving infection control practices or enhancing communication skills.
2. Define: Once areas for improvement have been identified, the next step is to define
specific goals and objectives. For example, a hospital might define a goal of reducing
patient wait times by 50% or increasing employee satisfaction scores by 20%.
3. Model: The third step in the DDMT teaching model is to model effective strategies
and techniques for achieving the defined goals. This could involve implementing best
practices from other hospitals, training employees on new protocols, or using data
analytics to identify areas of improvement.
4. Transfer: The final step in the DDMT teaching model is to ensure that the learning
is transferable to real-world situations. This involves testing new strategies and
techniques, evaluating their effectiveness, and making any necessary adjustments.
It also involves sharing best practices and lessons learned with other hospitals and healthcare organizations to promote continuous learning and improvement.

The DDMT teaching model can help hospitals improve patient care, employee development, and organizational performance by providing a structured approach to continuous learning and improvement. By following its four-step process of discovering, defining, modeling, and transferring, hospitals can identify areas for improvement, set specific goals and objectives, implement effective strategies and techniques, and continually evaluate and adjust their practices for optimal results.

In this study, design thinking was applied in the healthcare nursing home context to improve patient outcomes, employee satisfaction, and operations. This involves empathizing with patients, caregivers, and hospital employees to understand their needs and challenges, defining the problem, ideating potential solutions, prototyping low-fidelity solutions, and testing them in a real-world setting to refine them further. By using design thinking, hospitals can create more effective, efficient, and user-friendly solutions that enhance the overall hospital experience while facing the pandemic situation [21].

In the healthcare industry, attracting and retaining skilled workers is crucial for the provision of quality patient care. However, the current global phenomenon of the Great Resignation, coupled with the shortage of healthcare workers in many regions, has made it increasingly challenging for hospitals to maintain an adequate workforce. To mitigate the impact of the Great Resignation [22], hospitals are investing in talent development and training to improve employee retention and satisfaction. These efforts not only enhance the skills and knowledge of healthcare workers but also contribute to a positive work environment that fosters teamwork [23], innovation, and professional growth. The COVID-19 pandemic has also highlighted the need for healthcare workers to be adaptable and well-equipped to handle rapidly changing situations. Hospitals that invest in employee learning and development can ensure that their employees have the necessary skills and knowledge to respond effectively to new challenges and provide the best possible care to patients.

2. Methods

It sounds like the goal of the proof of concept was to gather data on hard-to-hire and hard-to-retain roles, specifically nursing aides and care support positions, across different nursing homes within a healthcare organization. A proof of concept typically involves creating a small-scale implementation of a particular idea or technology to demonstrate its feasibility and effectiveness. In this case, it seems like the proof of concept was used as a way to test the hypothesis that certain roles within the healthcare organization were particularly difficult to hire and retain employees for. By collecting data on these roles across different nursing homes, Human Resources would be able to gain insights into the root causes of the difficulties in hiring and retaining employees, as well as identify potential solutions or interventions that could be implemented to address these issues. Overall, the proof of concept seems like a valuable tool for HR to use in their efforts to improve the recruitment and retention of employees in these critical healthcare roles.

2.1. Research Design

In the research design (Figure 1), both the DDMT teaching model and design thinking practices have been embraced in carrying out this study.

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Figure 1. Research design.
2.2. Data Collection

The methodology used in the data collection and analysis was a combination of STEAM-based DDMT-DT and STEM-based LEAN Principles [24], along with Time Motion Study [25]. DDMT-DT and design thinking are processes that emphasize understanding the end user’s needs and desires, while STEAM (science, technology, engineering, arts, and mathematics) focuses on the integration of the arts and design into STEM-based fields. LEAN Principles are a set of methodologies used to minimize waste and optimize processes, while Time Motion Study is a technique that involves measuring the time it takes to perform a task or a set of tasks. The methodology also involved analyzing work processes, job functions, operating procedures, cycle time, client touchpoints (the job to be done for the client), empathy interviews, observation of job scope, daily activities, workflow, human motion, areas for optimization, areas not aligned to the job role, and technology utilization. In all, the methodology appears to be a comprehensive approach to analyzing work processes and identifying areas for improvement, with a focus on optimizing client experience and minimizing waste.

In this study, quantitative research in the form of job shadowing focused on measuring operating process cycle time, employee distribution numbers, and work hours via Time Motion Study. Two interns from the client were dedicated to working on the Time-Motion Study, which will capture work processes such as but not limited to job functions, operating procedures, cycle time, stakeholders, report writing, equipment, and technology utilization. The team observed 33 nursing aides (NA) and 7 health attendants (HA).

A two-hour qualitative research interview was carried for 20 nursing aides (NA) and 3 health attendants (HA) in conversation style where the consultants understood the job scope, daily activities, motivations, and meaningfulness, areas for optimization or areas not aligned to the job role, and their stakeholders.

The following tasks were completed as part of the research:

1. Job shadowing: 40 employees members were observed while performing their duties in nursing homes. The job shadowing sessions were 15 min each.
2. Interviews: 23 employee members were interviewed to gain more insight into their work practices.
3. Task comparison: The researchers compared the tasks performed by the employees in different locations and nursing homes, taking into account individual management practices.
4. DDMT-DT: The DDMT-DT approach was applied to understand the tasks performed by employees. The researchers sought to determine what tasks were performed, how they were performed, why they were performed, who benefited from them, when they were performed, and where they were performed.
5. Analysis: The data collected through job shadowing and interviews were analyzed using DDMT-DT in tandem with LEAN methodologies. This involved using tools such as stakeholders mapping, persona development, journey mapping, user stories, solutions, and recommendations.

The ultimate goal of this research was to arrive at a deeper understanding of the tasks performed by employees in nursing homes and to identify areas where improvements could be made. By analyzing the data using DDMT-DT and other tools, the researchers were able to gain insights into the specific challenges faced by employees and the ways in which these challenges could be addressed.

3. Results

The collated results comprised of the following areas:

1. via observations, the employees’ tasks (taken in mins) for the three nursing homes (Table 1). In Table 1, the tasks and the time spent were captured and analyzed. This table shows percentages. These percentages represent the percentage against the average of three nursing homes. A negative percentage shows that the task-performed cycle time is faster
than the average of three homes. In reference to Duan et al. [26], such data can be used to identify the impact it has on causing nursing and healthcare workers’ burnout.

Table 1. Employees Tasks.

<table>
<thead>
<tr>
<th>Task (Time in mins)</th>
<th>Fixed/Variable</th>
<th>NH1 4th Floor Plan</th>
<th>% of Work Hour per Day (7 h per Day, NH1 4th Floor Plan)</th>
<th>NEA Benchmark (Where Applicable)</th>
<th>Average (All NH)</th>
<th>NH2</th>
<th>% from Avg</th>
<th>NH1</th>
<th>% from Avg</th>
<th>NH3</th>
<th>% from Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clean Room—Sweep Room &amp; Corridor</td>
<td>F</td>
<td>6 rooms with 8 beds</td>
<td>5.7%</td>
<td>4.07 mins sweep</td>
<td>4.0</td>
<td>3.2</td>
<td>−20.0%</td>
<td>4.7</td>
<td>17.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Room—Mop Room &amp; Corridor</td>
<td>F</td>
<td>6 rooms with 8 beds</td>
<td>8.1%</td>
<td>7.88 mins mop</td>
<td>5.7</td>
<td>5.4</td>
<td>−5.3%</td>
<td>6.0</td>
<td>5.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Nursing Station</td>
<td>F</td>
<td>2 nursing stations</td>
<td>2.5%</td>
<td>1.2 mins sweep/mop</td>
<td>10.5</td>
<td>10.5</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Storage Room</td>
<td>F</td>
<td>1 storage room</td>
<td>0.4%</td>
<td>1.2 mins sweep/mop</td>
<td>1.5</td>
<td>1.5</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Connecting Lift Corridor</td>
<td>F</td>
<td>2 corridors</td>
<td>0.7%</td>
<td>1.5 mins sweep</td>
<td>1.5</td>
<td>1.5</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare Meals to Dietary Needs</td>
<td>V</td>
<td>Per meal</td>
<td>3.6%</td>
<td>NA</td>
<td>15.2</td>
<td>15</td>
<td>−1.3%</td>
<td>14.2</td>
<td>−6.6%</td>
<td>16.7</td>
<td>9.9%</td>
</tr>
<tr>
<td>Clean Isolation Room</td>
<td>F</td>
<td>1 isolation room</td>
<td>1.0%</td>
<td>4.4 mins sweep/mop</td>
<td>4</td>
<td>4.5</td>
<td>12.5%</td>
<td>3</td>
<td>−25.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Treatment Cohort Room</td>
<td>F</td>
<td>1 cohort room</td>
<td>1.4%</td>
<td>7.6 mins sweep/mop</td>
<td>6</td>
<td>6</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Toilet</td>
<td>F</td>
<td>14 toilets</td>
<td>35.0%</td>
<td>9.31 mins</td>
<td>10.5</td>
<td>20</td>
<td>90.5%</td>
<td>10.5</td>
<td>0.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NGT Feeding 2</td>
<td>V</td>
<td>2 staff 1 Resident</td>
<td>6.4%</td>
<td>NA</td>
<td>13.4</td>
<td>13.8</td>
<td>−2.6%</td>
<td>11.8</td>
<td>−11.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passing Report</td>
<td>F</td>
<td>1 per shift</td>
<td>3.3%</td>
<td>NA</td>
<td>13.9</td>
<td>15.5</td>
<td>11.5%</td>
<td>12.2</td>
<td>−12.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer Bed to Wheelchair</td>
<td>V</td>
<td>1 Resident per transfer</td>
<td>0.5%</td>
<td>NA</td>
<td>2.2</td>
<td>2.1</td>
<td>−4.5%</td>
<td>2.3</td>
<td>4.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer Wheelchair to Bed</td>
<td>V</td>
<td>1 Resident per transfer</td>
<td>0.9%</td>
<td>NA</td>
<td>3.7</td>
<td>4</td>
<td>8.1%</td>
<td>2.3</td>
<td>−37.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incidental Change Bed Linen</td>
<td>V</td>
<td>1 Bed per change</td>
<td>1.0%</td>
<td>NA</td>
<td>4.3</td>
<td>4.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routine Change of Bed Linen 1 Staff (per bed)</td>
<td>F</td>
<td>1 room per day</td>
<td>1.2%</td>
<td>NA</td>
<td>5</td>
<td>3.75</td>
<td>−25.0%</td>
<td>5.0</td>
<td>0.0%</td>
<td>6.4</td>
<td>28.6%</td>
</tr>
<tr>
<td>Routine Change of Bed Linen 2 Staff (per bed)</td>
<td>F</td>
<td>1 room per day</td>
<td>0.4%</td>
<td>NA</td>
<td>1.5</td>
<td>1.5</td>
<td>0.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Cont.

<table>
<thead>
<tr>
<th>Task (Time in mins)</th>
<th>Fixed/Variable</th>
<th>NH1 4th Floor Plan % of Work Hour per Day (7 h per Day, NH1 4th Floor Plan)</th>
<th>NEA Benchmark (Where Applicable)</th>
<th>Average (All NH)</th>
<th>NH2 % from Avg</th>
<th>NH1 % from Avg</th>
<th>NH3 % from Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Diapers</td>
<td>V</td>
<td>2 staff Resdent 1.0% NA 2.1 2.4 14.3% 1.5 −28.6% 2.5 19.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bedridden Resident 2 staff</td>
<td>V</td>
<td>32 resi- dents 5.6% NA 23.4 38.5 64.5% 15 −35.9% 10 −57.3%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply Moisturizer</td>
<td>V</td>
<td>2 staff 1 Resi- dent 5.7% NA 11.9 8.7 −26.9% 14.2 19.3% 10 −16.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assist Shower</td>
<td>V</td>
<td>2 staff 1 resident 7.1% NA 15</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Bedridden Resident 2 staff</td>
<td>V</td>
<td>2 Day space per shift 3.0% 3.7 mins sweep 6.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean DaySpace After Lunch—Sweep</td>
<td>F</td>
<td>2 Day space shift 6.1% 7 mins mop 12.8 10 −21.9% 13.5 5.5%</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Clean DaySpace After Lunch—Mop</td>
<td>F</td>
<td>2 Day space per shift 9.1% NA 19.2 15 −21.9% 20.3 5.7% 14.5 −24.5%</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Deliver Rubbish to Central Collection Centre 1 Staff</td>
<td>F</td>
<td>1 Staff 1 Trip per shift 3.4% NA 14.2 15 5.6% 15 5.6% 10 −29.6%</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Deliver Rubbish to Central Collection Centre 2 Staff</td>
<td>F</td>
<td>2 Staff 1 Trip 2.4% NA 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare Change of Clothes for Shower</td>
<td>V</td>
<td>1 Change Per Resident 1.0% NA 4 4.4 10.0% 2.5 −37.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wipe Down Wheelchair 1 Staff</td>
<td>V</td>
<td>1 staff per wheelchair 0.8% NA 3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wipe Down Wheelchair 2 Staff</td>
<td>V</td>
<td>2 staff per wheelchair 1.3% NA 2.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean Sluice Room</td>
<td>F</td>
<td>1 sluice room 0.6% 2.3 mins 2.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washing Rubbish Bins 2 Staff</td>
<td>F</td>
<td>2 staff 10 bins 5.7% NA 1.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serving Meals 4 Staff</td>
<td>V</td>
<td>4 staff serving meal 14.8% NA 15.5 12.6 −18.7% 20 29.0% 16.5 6.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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<th>NH3 % from Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving Meals Bedridden per 1 Staff</td>
<td>V</td>
<td>1 staff 1 resident</td>
<td>1.9%</td>
<td>NA</td>
<td>8</td>
<td>8</td>
<td>0.0%</td>
<td></td>
</tr>
<tr>
<td>Serving Bids per 1 Staff</td>
<td>V</td>
<td>1 staff 1 resident</td>
<td>0.1%</td>
<td>NA</td>
<td>0.355</td>
<td>0.36</td>
<td>0.0%</td>
<td></td>
</tr>
</tbody>
</table>

Note: Percentage against average of 3 nursing homes; Negative percentage means the performed task cycle time faster than average of 3 homes; Shaded grey box mean unable to collect data during that day of observation.

2. via interviews, the following areas were solicited from the employees: Challenges in the job (Table 2). From the interviews, we have discovered several job challenges, such as the need for physical fitness, the additional workload each worker needs to handle, managing the emotions of residents’ family members, handling residents’ discomfort cum behaviors, and decreasing employees’ benefits. From a person-oriented approach to burnout [27], the below variables are to be managed.

Table 2. Challenges in Jobs.

<table>
<thead>
<tr>
<th>Residents</th>
<th>Physical Fitness</th>
<th>Manpower</th>
<th>Family of Residents</th>
<th>Compensation/Benefits/Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handle to handle residents with difficult behaviors</td>
<td>Need physical strength</td>
<td>Physically fit and strong</td>
<td>Need to do more tasks per person</td>
<td>Behaviors of colleagues</td>
</tr>
<tr>
<td>Behavior of residents such as aggressive, uncooperative, elderly issues such skin tears, throwing feces</td>
<td>Physically fit and strong</td>
<td>Physically fit and strong</td>
<td>Cover employees on MC</td>
<td>Meals provided from 3 cut to 1. Monthly meal allowance not sufficient to replace 2 previously provided meals</td>
</tr>
<tr>
<td>Language/communication, e.g., dialects, Malay</td>
<td>Fussy and demanding</td>
<td>Often escalate to employees nurse without discussion</td>
<td>Complaint by family</td>
<td>Lower salary than other nursing homes</td>
</tr>
<tr>
<td>Do not feel empowered to do things that are helpful</td>
<td>Keeps talking to busy employees</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. What makes work enjoyable (Table 3). In reference to Rinnan et al. [28] 5 dimensions to Joy of Life working in a nursing home, the challenges found the following reasons that make the work enjoyable, such as the purposefulness in the work, supporting colleagues, the organization putting an effort to encourage the employees, and affirmation from the residents and managers.

4. Things to remove from the job (Table 4). According to a Norway study [29] on nursing homes, quality and safety challenges include structure, coordination, organization politics, and external demands. In this study, from the nursing aides and health attendants, in addition to focusing on the core medical tasks, the employees were looking to reduce tasks such as changing diapers, floor mopping, manual documentation, dealing with difficult colleagues, and over-supporting colleagues.
Table 3. What makes work enjoyable.

<table>
<thead>
<tr>
<th>Passion/Calling/Meaningfulness</th>
<th>Colleagues</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Passion, meaningfulness</td>
<td>• Value teamwork</td>
</tr>
<tr>
<td>• See this job as a calling to provide love to others</td>
<td>• Colleagues become friends—bonding</td>
</tr>
<tr>
<td>• Providing best care to the residents</td>
<td>• Colleagues are helpful, friendly, enjoyable</td>
</tr>
<tr>
<td>• Enjoy the friendship of residents</td>
<td>• Entrusted and valued by colleagues</td>
</tr>
<tr>
<td>• Able to handle and build relationships with residents because they are lonely</td>
<td></td>
</tr>
<tr>
<td>• Feel appreciated by the residents</td>
<td></td>
</tr>
<tr>
<td>• Provide for family in home country</td>
<td></td>
</tr>
<tr>
<td>• Learning new things every day</td>
<td></td>
</tr>
<tr>
<td>• Organization</td>
<td></td>
</tr>
<tr>
<td>• The gatherings/freebies/benefits from the organization</td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Things to remove from job.

<table>
<thead>
<tr>
<th>About the Job</th>
<th>About the People</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Transferring residents because it is physically demanding</td>
<td>• Difficult and gossipy colleagues</td>
</tr>
<tr>
<td>• Change diapers because it is smelly</td>
<td>• Dealing with family members</td>
</tr>
<tr>
<td>• Showering because there are only 3 employees to shower 40 residents at night, and follow timetable (start from 5 a.m. to 7 a.m.—manpower shortage)</td>
<td>• Stress from unexplained difficult behaviors from the residents, e.g., non-stop crying</td>
</tr>
<tr>
<td>• Floor mopping because it is menial work, prefer to practice medical skills</td>
<td>• Heavy workload due to manpower shortage (high attrition date)</td>
</tr>
<tr>
<td>• Documentation (lots of paperwork)</td>
<td></td>
</tr>
<tr>
<td>• Some recording that can be reduced</td>
<td></td>
</tr>
<tr>
<td>• Equipment checklist maintenance</td>
<td></td>
</tr>
<tr>
<td>• Cleaning the wheelchair (daily 47 residents)</td>
<td></td>
</tr>
<tr>
<td>• Manual work due to equipment breakdown for long period without repair</td>
<td></td>
</tr>
<tr>
<td>• Overlapping work with HA; do not mind helping but not regularly. Job scope definition between NA and HA is not very clear in some parts. E.g., housekeeping is the job of HA as a result of labor shortage.</td>
<td></td>
</tr>
</tbody>
</table>

5. Advice for job seekers (Table 5). According to Stone and Dawson (2018) [30], healthcare workers are essential for good patient care. Job seekers need to understand the roles of nursing aide and health attendant require a mindset of treating this as a calling will be sustainable. The need for tact in communication, handling the stakeholders, long working hours, and duty beyond self would be expected.

6. Opportunities for nursing home improvements (Table 6). Chua [31] suggests in his article ‘Challenges Confronting the Practice of Nursing in Singapore’ that there is a need to deploy the Industry Transformation Map (ITM) and creative use of technology to circumvent the labor dependency. The resident-centricity would need to be reimagined, and all work processes adhered to in delivering good medical care to residents cum families and motivating the employees.
Table 5. Advice for job seekers.

- Work environment is different from other industries
- Must have passion and interest, patience, and enthusiasm
- Job as a calling rather than just a job
- Physically, mentally, and emotionally prepared
- Sweaty, physically uncomfortable
- Pray duty is free from troubles.
- Expect to clean rubbish like a janitor
- Have initiatives
- Learn how to interact with the residents and colleagues
- Appreciate your colleagues and be helpful in all ways
- Trust in yourself to do the job well
- Related healthcare skills will be helpful
- Expect overtime
- Need to manage own work-life balance
- May need to work for full 10–11 days before 1 off day is given.

Table 6. Opportunities for nursing home improvements.

<table>
<thead>
<tr>
<th>Cleaning Technology</th>
<th>ITM Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology in the cleaning industry</td>
<td>Healthcare Industry Transformation Map for aging population and rising chronic diseases [33]</td>
</tr>
<tr>
<td>Office Cleaning Template</td>
<td>Raising productivity through innovations and patient-centric solutions</td>
</tr>
<tr>
<td>Washroom Cleaning Template</td>
<td></td>
</tr>
</tbody>
</table>

Residents Welfare

- Resident-centric
- Maintain level of independence in movement
- Greater understanding between employees and residents
- Support for caregivers and relatives of residents
- Workflow that requires articulation of cost and benefits
- Detail workflow for implementations may include items from the other 3 categories.
- Workflow which requires further studies to unleash hidden values using LSS BB/YB Projects

4. Discussion

Caregivers in healthcare nursing homes face numerous challenges and difficulties in their work. They are responsible for providing care to elderly residents who may have complex health conditions and require specialized care. Caregivers may have to assist residents with activities of daily living, such as bathing, dressing, and feeding, as well as managing medications, monitoring vital signs, and providing emotional support. The work of caregivers can be physically and emotionally demanding, leading to stress, burnout, and turnover. Caregivers may work long hours with little time for breaks, which can contribute to physical exhaustion and mental fatigue. Additionally, caregivers may experience emotional strain from dealing with the illness or death of residents with whom they have formed close relationships. Therefore, researchers echoed that a better theoretical understanding of the mechanisms describing the relationship between human resource management (HRM) and performance [34] should be developed. According to Mohammad’s (2021) study [35], the results indicate that social exchange can play an essential role in explaining the HRM-performance indirect relationship—a result that partly unlocks the elements of the so-called ‘black box’ in HR research.

To address these challenges, it is important to adopt a human-centered approach to caregiving. This approach involves understanding the needs and challenges of caregivers and developing solutions that are tailored to their needs. One way to do this is by involving caregivers in the design of solutions. By doing so, we can gain a better understanding of their work and develop solutions that are more effective and easier to use. Design thinking
methodologies, such as DDMT-DT, can be particularly useful in this context. DDMT-DT is a human-centered design approach that prioritizes empathy, experimentation, and iteration. This methodology involves identifying user needs, defining the problem, ideating solutions, prototyping, and testing. By applying DDMT-DT to caregiving, we can identify the needs and challenges of caregivers and develop solutions that address these challenges. For example, we might develop technologies or tools that help caregivers manage medications or monitor vital signs more easily. We might also develop training programs or support groups that help caregivers manage the emotional strain of their work.

While delivering the healthcare service performance standards, leaders in the organization would need to keep a learning heart. Learning should be one of the DNAs in organizations. As mentioned in Maqbool et al. (2022) study [36], most teachers (leaders) give preference to strategic leadership over instructional leadership, and coupled with cultural leadership, it enables sustainable performance.

**Research Limitations**

There were challenges in the application of DDMT-DT in the hospital context. DDMT-DT can be a valuable approach for hospitals to improve patient care, employee experience, and organizational efficiency. However, there are several challenges in using design thinking in a hospital context, such as tension between what HAs/NAs want and what providers and researchers believe to be beneficial based on research and expertise [37]. Below are some of the most significant limitations:

- **The complexity of healthcare systems:** The healthcare system is complex, involving multiple stakeholders, regulations, and processes. Design thinking requires a deep understanding of the context and the problem to be solved, which can be challenging in the healthcare system due to its complexity.
- **Resistance to change:** Hospitals are conservative organizations, and there can be resistance to change from employees, patients, and other stakeholders. Design thinking often requires a willingness to experiment and iterate, which can be challenging in a context where failure is not an option.
- **Limited resources:** Hospitals often have limited resources, and implementing design thinking solutions can require additional funding, time, and employees. This can be a barrier to using design thinking to solve problems in hospitals.
- **Data privacy and security:** Healthcare data are highly sensitive and subject to strict privacy and security regulations [38]. Design thinking often involves collecting and analyzing data, which can be challenging in a healthcare context due to privacy concerns.
- **Hierarchy and power dynamics:** Hospitals are hierarchical organizations, and power dynamics can make it challenging to involve all stakeholders in the design thinking process. It can be difficult to obtain support from senior management, and employees may feel their input is not valued.
- **Time constraints:** Hospitals operate 24/7, and there can be time constraints on employees and resources. Design thinking requires time and resources to develop and implement solutions, which can be challenging in a hospital context.

Despite these challenges, design thinking can be a valuable approach for hospitals to improve patient care and organizational efficiency. To overcome these challenges, hospitals should invest in building design thinking capabilities, prioritize stakeholder engagement, and allocate sufficient resources to design thinking initiatives.

Continued research and innovation are crucial for improving the work of caregivers and the care provided in nursing homes. We need to better understand the challenges that caregivers face and develop solutions that address these challenges. By doing so, we can help to ensure that elderly residents receive the high-quality care they deserve and that caregivers are supported in their important work.

Overall, this research study has several limitations that merit acknowledgment. Firstly, the cross-sectional study design employed in this research impedes the ability to draw causal conclusions. Although the present findings suggest that certain HR practices [39]
may enhance organizational performance, the cross-sectional approach does not permit the ruling out of the possibility of reverse causation. A longitudinal approach could be employed to enhance the possibility of detecting reverse causation and time-lag effects in relation to the link between human resource management and organizational performance [40].

Moreover, the study’s focus was confined to only three healthcare nursing homes, which may not be representative of the broader healthcare industry. To ensure comprehensive coverage of the industry, a larger and more diverse sample would be necessary. Additionally, the research primarily concentrated on the frontline operational context and did not consider the healthcare nursing home’s operating modus operandi and policies. Consequently, the findings may not be generalizable to other contexts.

It is also worth noting that job shadowing by five individuals may have resulted in the capture of varying information. Moreover, the study was conducted during typical workdays, and during festive and pandemic seasons, employee management and resident family visits may differ, potentially leading to different observations.

Furthermore, this research did not examine the employment history of each employee observed under job shadowing in terms of the number of years and prior work experience. Prior experience may have positive or negative correlations with the demonstrated competencies in the observed tasks. Positive correlations may indicate that certain work experience and prior skills correlate with better performance, while negative correlations may indicate that certain skills or the lack of certain prior skills may impede performance.

5. Conclusions

In conclusion, the research conducted on the tasks performed by employees in healthcare nursing homes involved a thorough and comprehensive approach. Job shadowing and interviews were used to gain insights into the work practices of employees, and the DDMT-DT methodology was applied to understand the tasks performed and identify opportunities for improvement. The use of lean methodologies, stakeholders mapping, persona development, journey mapping, user stories, solutions, and recommendations further enabled the researchers to arrive at a deeper understanding of the challenges faced by employees in nursing homes. The findings of this research will be invaluable in informing policy decisions and improving the quality of care provided to residents in healthcare nursing homes.

Our research study has shown that embracing the DDMT teaching model and design thinking was useful for the researchers in soliciting information and insights from the healthcare aides. This research study provided 15 recommendations, including immediate implementations and further research. This research study has impacted the Agency for Integrated Care Singapore to conduct nationwide studies, including nursing homes, hospitals, hospices, and day-care centers.

In this research study, the main theories covered were the DDMT teaching model, design thinking, and Human Resource Management. This study reinforced DDMT teaching model, particularly in the Discover and Define phases, validated in a non-academic institution setting. For design thinking, taking the mindset to empathize has enabled the focus on human-centricity and uncover the underlying needs of users. This study also reinforces the need for strategic leadership styles and cultural leadership in a multi-cultural and multi-generational workforce. From a management point of view, there is a need for policies to streamline their processes and ensure that employees can focus on their core responsibilities to improve the quality and safety of care provided to residents. Addressing these challenges will require a multifaceted approach that takes into account the various factors that contribute to them, including organizational structure and culture, employee levels, and external demands. By doing so, nursing homes can create a more supportive and effective work environment that benefits both employees and residents alike. From this study, one other learning was the ability of employees to equip multiple lens in sustaining their career. This learning has contributed to the Career In Sight book (Elliot, 2022) [41].
For future research studies, it is suggested to include healthcare nursing home dynamics such as festive seasons and pandemic situations. Researchers’ close rapport with caregivers will enable deep sharing. Critical skills are required for researchers to conduct the study with critical thinking, process design, and recognition of relevant data and patterns.

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