

A Pilot Study on the Effects of a Task Analysis Training Program on Self-Efficacy and Work Engagement in Disability Welfare Facility Staff

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Abstract

This study examined the effects of a task analysis training program on Organizational-Based Self-Esteem (OBSE) and Work Engagement (WE) among staff at disability welfare facilities. The training program consisted of two interactive sessions, workplace implementation phases, and a follow-up evaluation. Participants selected a workplace task for improvement, documented current workflows, and identified areas for enhancement. The first session introduced task analysis techniques, incorporating practical exercises and peer feedback. Participants then implemented their proposed improvements and reconvened for the second session to refine their strategies. A five-week implementation phase followed, during which participants documented the impact of their changes. WE, OBSE, personal attributes, and workplace resources were assessed using validated scales, and statistical analyses were conducted using IBM SPSS Statistics 27. The results indicated that task analysis training enhanced self-efficacy and significantly increased OBSE; however, its effect on WE remained inconclusive. These findings underscore the importance of structured training programs in addressing both the practical and emotional challenges faced by staff. Furthermore, when embedded in a supportive organizational environment, such training may serve as a catalyst for employee-driven workplace innovation, contributing to both individual development and broader organizational learning.

Key words: Task Analysis Training Program, Work Engagement, Disability Welfare Facility Staff, Organizational-Based Self-Esteem

1 Introduction

1.1 Work & Job Demands in Disability Welfare Facilities

Staff at disability welfare facilities provide direct care, addressing individuals' health, personal needs, behavioral issues, and overall well-being. They also assist with vocational and daily activities, develop support plans, and coordinate facility operations (Azih et al., 2023). Supporting individuals with intellectual, physical, or developmental disabilities requires staff to acquire appropriate techniques, manage risks, and make informed care decisions.

However, the demanding work environment poses significant challenges, including high emotional and physical stress, job dissatisfaction, and burnout, which negatively affect both staff well-being and service quality (Azih et al., 2023). Role ambiguity and limited organizational support further contribute to workplace stress, making it difficult for staff to provide effective and consistent care (Moran et al., 2024). Studies have shown that disability support workers often experience high levels of work-related stress and burnout, impacting their professional quality of life and job performance (Harries et al., 2015; Holding et al., 2024; Mutkins et al., 2011). Addressing these challenges requires adequate staffing and structured training programs aimed at enhancing staff competencies and optimizing facility management (Moran et al., 2024; Rathmann et al., 2020).

One essential competency for staff is the ability to systematically analyze work processes and implement improvements. Task analysis provides a structured approach to breaking down tasks, optimizing workflows, and allocating responsibilities effectively. Developing these skills can help staff facilitate more effective vocational training for service users while also improving their Organizational-Based Self-Esteem (OBSE) and Work Engagement (WE).

In response to these challenges, this study examines the effects of a task analysis training program on OBSE and WE among disability welfare staff, focusing on how training influences staff perceptions of their work abilities and engagement, rather than directly measuring its impact on service users.

1.2 Task Analysis in Workplace Training

Task analysis is a systematic methodology employed to deconstruct work processes into smaller, manageable components. This approach enables staff to comprehend each stage of a task, identify potential areas for optimization, and allocate

responsibilities with greater precision. In the context of disability welfare facilities, task analysis is particularly advantageous as it provides a structured framework for staff to enhance workflow efficiency and improve the quality of care delivered to service users.

Empirical research has demonstrated that task analysis can substantially enhance staff performance and job satisfaction. For instance, systematic task analysis facilitates a clearer understanding of roles and responsibilities among staff, thereby mitigating role ambiguity and its associated stress. Additionally, this method assists in identifying specific training needs, thereby facilitating the development of targeted training programs aimed at addressing skill gaps (Ferreira et al., 2015; Bansal & Tripathi, 2017). Training in task analysis has been shown to enhance self-efficacy and professional quality of life among disability support workers by equipping them with the requisite skills to manage their tasks more effectively (Bansal & Tripathi, 2017).

The implementation of task analysis enables staff to develop a more comprehensive understanding of their roles and responsibilities, which contributes to the reduction of role ambiguity and work-related stress. Moreover, task analysis fosters a culture of continuous improvement, encouraging staff to engage in systematic evaluation and refinement of their work processes.

The integration of task analysis into workplace training programs has been linked to significant improvements in both staff performance and job satisfaction. Employees who have undergone task analysis training report higher levels of job satisfaction and lower levels of occupational stress (Bansal & Tripathi, 2017). By providing staff with the methodological tools to systematically analyze and enhance their work processes, task analysis serves to reinforce both confidence and professional competence. Consequently, this approach fosters increased staff engagement and motivation, ultimately contributing to a more positive and productive work environment.

Moreover, task analysis training aligns with the principles of workplace innovation (WPI), which emphasizes participatory practices, reflective learning, and employee-driven improvements. As defined by Totterdill et al. (2016), WPI involves "new and combined interventions in work organization, human resource management and supportive technologies," aimed at improving both organizational performance and quality of working life. By engaging staff in analyzing and improving their own work processes, task analysis training contributes to a bottom-up innovation model that fosters employee autonomy, organizational learning, and sustainable change.

1.3 The Relationship Between Task Analysis Training, Self-Efficacy, and Work Engagement

Task analysis training has a significant impact on staff self-efficacy and WE. Self-efficacy refers to an individual's belief in their ability to successfully perform tasks. Task analysis training enhances self-efficacy by equipping staff with the necessary skills to systematically deconstruct tasks and develop effective support strategies. This improvement in skill acquisition fosters greater confidence in their professional capabilities, thereby increasing motivation and engagement in their work.

Empirical research suggests a strong association between self-efficacy and WE. For instance, Bandura (1997) posited that individuals with high self-efficacy exhibit greater motivation and proactivity in their professional roles. Similarly, Schaufeli and Bakker (2004) demonstrated that self-efficacy positively correlates with job satisfaction and performance, ultimately contributing to a more productive work environment.

The implementation of task analysis training enables staff to develop a clearer understanding of their roles and responsibilities, thereby mitigating role ambiguity and its associated stress. This increased role clarity, coupled with an enhanced skill set, fosters a sense of professional competence and confidence, leading to heightened levels of WE. Consequently, staff are more likely to remain motivated, satisfied, and effective in their roles, leading to sustained improvements in service quality and organizational stability.

1.4 The Need for Structured Training Programs in Disability Welfare Work

Staff at disability welfare facilities face numerous stress factors, including heavy workloads, emotional burdens, role ambiguity, and insufficient organizational support. These stressors significantly impact staff well-being and the quality of services provided, often leading to job dissatisfaction and burnout (Harries et al., 2015). Traditional training programs, which typically focus on basic caregiving skills and regulatory compliance, aim to enhance staff capabilities and reduce stress. However, these programs frequently fall short in addressing the practical and emotional challenges encountered by staff. Key limitations include a lack of practical skill development, insufficient ongoing support, and an inability to meet individual staff needs (Holding et al., 2024).

Given these identified stress factors and the limitations of traditional training, there is a clear necessity for structured training programs. Such programs offer a systematic approach to improving staff skills, clarifying roles, and reducing workplace stress.

Additionally, they provide a more comprehensive and practical framework for staff development, addressing both the technical and emotional aspects of their roles. Research has shown that structured training programs can significantly enhance staff competencies and job satisfaction (Ferreira et al., 2015). For example, such programs have been found to reduce role ambiguity and increase job satisfaction among disability support workers (DeOnna, 2002).

In summary, the implementation of structured training programs is essential for improving the well-being and performance of staff at disability welfare facilities. These programs equip staff with the necessary tools and support to manage their work more effectively, ultimately leading to better outcomes for both staff and service users.

1.5 Aim of this study

The aim of this study was to examine the potential effects of a task analysis training program on OBSE and WE among staff at disability welfare facilities. This study was designed as a pilot investigation, assessing both the effectiveness of task analysis-based education in workplace training and its psychological impact on professional confidence and job involvement. We hypothesized that the training program would enhance self-efficacy by improving participants' ability to systematically deconstruct tasks and develop structured support strategies. While we hypothesize that the training program will enhance self-efficacy, its direct impact on WE remains uncertain due to various contextual factors, such as organizational culture, social dynamics, and job autonomy. Investigating these influences is crucial for designing effective training interventions in disability welfare facilities.

2 Methods

2.1 Study design

The study was designed as a within-subjects pre-post study, where participants completed a questionnaire before and after the training (Fig. 1). The training sessions took place over a period of approximately six weeks, and the pre- and post-training surveys were administered in the weeks immediately before and after the training, respectively. To maintain consistency in data collection, all participants completed the surveys on the same scheduled days within each period.

In addition to the quantitative assessments, participants submitted follow-up reports five weeks after the training. These reports were reviewed to extract key themes related to workflow improvements, training effectiveness, and perceived changes in job performance. Thematic patterns were summarized to complement the quantitative findings.

Participants' self-efficacy, WE, and workplace resources were measured before and after the training. Additionally, a follow-up discussion was conducted five weeks after the second session via an open chat platform. This qualitative evaluation aimed to capture participants' reflections on the application of task analysis techniques in their workplace, their perceived effectiveness, and any remaining challenges. Participants were encouraged to share their insights in an open-ended manner to provide a more comprehensive understanding of the training's long-term impact.

The study aimed to assess whether training in task analysis techniques could enhance self-efficacy and WE among disability welfare facility staff.

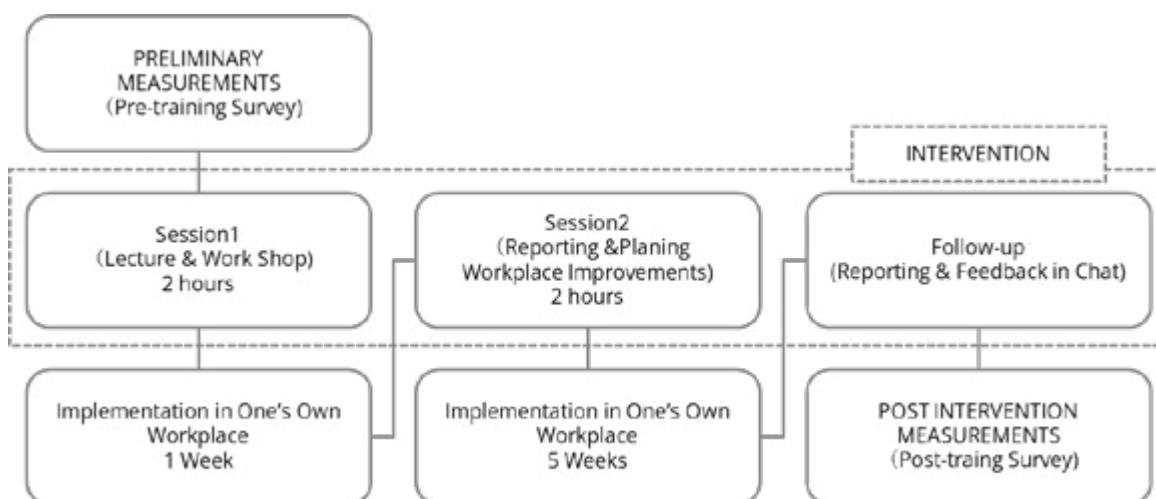


Fig.1 Study design.

2.2 Recruitment and participants

An invitation to participate in the study was sent via e-mail to 11 individuals who had registered for a training program targeted at disability welfare facility staff, organized by the Shiga Prefecture Social Employment Promotion Center. Of these, nine individuals agreed to participate in the study.

To be included in the final analysis, participants were required to attend both training sessions and complete both the pre- and post-training questionnaires. Those who were unable to attend all training sessions or failed to complete either questionnaire was excluded from the study. Additionally, participation in a follow-up discussion held five weeks after the second session was encouraged but not set as a strict inclusion criterion, as all participants took part in this phase. After applying these criteria, seven participants were included in the final analysis.

The participants had an average age of 38.9 ± 10.7 years, consisting of four males and three females. Their roles in disability welfare facilities varied, including one managerial staff member, three life support staff members, two vocational support staff members, and one other staff member.

Before participation, all individuals provided informed consent after being briefed on the study's benefits and potential risks. The study was approved by the Kyoto Tachibana University Research Ethics Committee (24-56).

2.3 Intervention

The intervention was conducted as a training program aimed at enhancing the competencies of disability welfare facility staff through task analysis-based education. The primary goal of this training program was to equip staff with task analysis skills, enabling them to support service users in receiving more effective vocational training. By systematically breaking down tasks and structuring support strategies, staff members were expected to improve the quality of vocational training provided at disability welfare facilities.

The researchers collaborated with the Shiga Prefecture Social Employment Promotion Center to design and implement the program. The intervention consisted of two training sessions held over a one-week period, with participants engaging in workplace implementation between and after the sessions. A follow-up discussion was conducted five weeks after the second session via an open chat platform.

Throughout the sessions, participants were actively engaged in discussions, hands-on exercises, and peer feedback. The training emphasized collaborative learning, requiring participants to present their analyses and actively contribute to the refinement of workplace improvement plans. Rather than passively receiving instruction, participants took an active role in evaluating their workplace tasks, identifying inefficiencies, and

proposing solutions. This interactive approach was designed to enhance their ability to apply task analysis techniques in real-world settings.

In the first session, participants attended a lecture and engaged in practical exercises on task analysis. They learned how to systematically break down tasks and developed initial job improvement plans based on task analysis principles. After this session, they were instructed to implement their job improvement plans in their respective workplaces and document their observations.

A week later, participants reconvened for the second session, where they shared their experiences from the workplace implementation phase. They discussed challenges faced during implementation and refined their job improvement plans based on feedback and further analysis. Following this session, they conducted another round of workplace implementation, applying their revised plans over a five-week period.

A follow-up discussion was conducted via an open chat platform five weeks after the second session. Participants reported on the results of their workplace implementation and received additional feedback from facilitators and peers.

The detailed structure and content of the training sessions are described in the following section.

2.4 Task Analysis Training Program

This program aimed to equip disability welfare facility staff with practical task analysis skills to enhance vocational training effectiveness. Task analysis has been widely applied in industrial and healthcare fields to optimize workflows and support structured learning (DeOnna, 2002; Lee, 2018). The training program consisted of two interactive sessions, two workplace implementation phases, and a follow-up evaluation conducted five weeks after the second session.

Before attending the first session, participants were required to select a workplace task they wished to improve. The selection process was guided by relevance to vocational training, existing challenges in efficiency, clarity, or execution, and the potential for improvement through task analysis. Participants documented the current workflow of the selected task and identified specific areas they aimed to enhance. This preparatory assignment ensured that participants engaged with the training content in a way that directly related to their daily work.

The first session, a two-hour workshop, introduced participants to task analysis and work process optimization. It began with a lecture covering the definition, importance, and applications of task analysis in vocational training settings. Participants learned techniques for breaking down tasks into step-by-step processes and identifying inefficiencies. They then watched a recorded vocational task performed by service users and applied task analysis techniques to evaluate workflow efficiency and identify areas for improvement. This exercise helped participants develop an objective perspective on task efficiency before analyzing their own workplace tasks.

Following the video-based exercise, participants conducted a detailed analysis of the workplace task they had selected prior to the session. In small groups, they discussed their findings, suggested improvement strategies, and provided peer feedback. Each group presented their results, and a certified occupational therapist offered expert feedback. At the end of the session, participants were instructed to implement their proposed task improvements in their workplaces over the following week, documenting their implementation process, observed challenges, and any necessary modifications.

A week later, participants reconvened for the second session, which focused on reflection, refinement, and advanced application of task analysis. They began by sharing their experiences from the initial workplace implementation, discussing both the successes and challenges they encountered. Through group discussions, they analyzed the effectiveness of their modifications and considered further refinements. Participants then assessed the impact of their task modifications based on predefined criteria, including task completion time, reduction of unnecessary steps, service user comprehension, and overall feasibility in daily practice. Each group worked collaboratively to refine their strategies for further improvement, with the occupational therapist providing targeted feedback and additional recommendations.

To reinforce the learning process, participants were required to implement their revised task analysis strategies over a five-week period following the second session. During this phase, they documented the impact of their changes, focusing on user adaptation, workflow efficiency, and staff workload.

Five weeks after the second session, participants submitted a final report summarizing their task improvement efforts. These reports included a description of the implemented modifications, observed outcomes, reflections on the changes, and challenges encountered. The instructor provided individualized feedback and comments on each report, marking the conclusion of the training program.

2.5 Measurements

To evaluate the effects of the intervention, this study measured WE, OBSE, personal attributes, and workplace resources using validated Japanese versions of standardized scales. WE were assessed using the Japanese version of the Utrecht Work Engagement Scale (UWES-9) (Shimazu et al., 2008), while OBSE was measured using the Japanese version of the OBSE scale (OBSE-J) (Matsuda et al., 2011). In addition, personal attributes and career-related factors, including age, gender, highest educational attainment, employment status, years of experience in the current workplace, job position, and role, were collected.

To assess workplace resources, this study adopted 21 items comprising 53 questions from the New Brief Job Stress Questionnaire (New BJSQ), an updated version of the Brief Job Stress Questionnaire (BJSQ). Originally developed through research commissioned by the former Ministry of Labor, Japan, the BJSQ is based on the NIOSH occupational stress model and is widely used to assess occupational stress factors, stress responses, and modifying factors across various job sectors.

The New BJSQ was selected for its ability to provide a more detailed assessment of workplace resources, including workload, job control, social support, job satisfaction, and organizational characteristics. Compared to the original BJSQ, it refines certain subscales and incorporates additional workplace resource factors, making it particularly useful for evaluating the impact of training on staff well-being and engagement.

The reliability and validity of the New BJSQ have been confirmed in previous studies, with Cronbach's alpha coefficients demonstrating the consistency of its subscales (Inoue et al., 2014). All items were rated on a four-point Likert scale, where lower scores generally indicate more favorable conditions. For example, job satisfaction responses ranged from 1 ("Satisfied") to 4 ("Dissatisfied"), while social support responses ranged from 1 ("Very much") to 4 ("Not at all"). The subscales used in this study are listed in Table 1.

Table 1. Overview of the 21 Items and 53 Questions Extracted from the New Brief Job Stress Questionnaire (New BJSQ)

Scales	Question Item	Number of Items
Job Demands		
Quantitative job overload	"I have to handle an excessive amount of work."	3
Qualitative job overload	"My work requires advanced knowledge and skills."	3

Physical demands	"My job requires significant physical exertion."	1
Job resources: Task level		
Job control	"I can decide the order and method of my tasks."	3
Suitable jobs	"My job content is well suited to me."	1
Skill utilization	"I rarely use my skills and knowledge at work."	1
Role clarity	"I understand my duties and responsibilities."	3
Meaningfulness of work	"My job is rewarding and fulfilling."	3
Career opportunities	"I have opportunities to learn new things at work."	3
Job resources: workgroup-level		
Supervisor support	"How easily can you talk to your supervisor?"	3
Coworker support	"How easily can you talk to your coworkers?"	3
Support from family and friends	"How easily can you talk to your family?"	3
Monetary / status reward	"I am in a position that matches my abilities and experience."	2
Esteem reward	"I am treated appropriately by my supervisor."	2
Leadership	"My supervisor provides feedback on my work performance."	3
Workplace where people complement each other	"I receive praise when I do my job well."	3
Workplace where mistakes are acceptable	"I have a chance to recover even if I make a mistake."	2
Job resources: organisational-level		
Respect for individuals	"My workplace values each employee's individuality."	3
Career development	"My workplace provides training and education that enhances career growth."	5
Outcomes		

Job satisfaction	"Are you satisfied with your current job?"	1
Work-self balance (positive)	"What I learn at work helps enrich my personal life."	2
Most items were rated on a four-point Likert scale (1 = "Strongly agree" to 4 = "Strongly disagree"), with lower scores generally representing more favorable conditions.		

2.6 Statistics

All statistical analyses were conducted using IBM SPSS Statistics 27. Descriptive statistics were calculated for all variables. Due to the small sample size and potential non-normal distribution, the Wilcoxon signed-rank test was applied to compare pre- and post-training measurements. Effect sizes for the Wilcoxon test were calculated using rank-biserial correlation (r_b). Spearman's rank correlation coefficient (ρ) was used to explore relationships between changes in WE, OBSE, and workplace resources. Missing data was handled using listwise deletion. Statistical significance was set at $p \leq 0.05$, and effect sizes were interpreted based on standard guidelines (small: 0.10, medium: 0.30, large: 0.50 for rank-biserial correlation).

3 Results

Table 1 presents the demographic, educational, and employment characteristics of the participants. The final sample consisted of seven individuals (four males and three females) with an average age of 38.9 ± 10.7 years. The participants had varying levels of experience in their current workplace, with the majority (57.2%) having three years or less of experience. In terms of educational background, three participants had completed vocational school, one had graduated from junior college, and three held a university degree. Most participants (85.7%) were employed as full-time staff.

Table.2 Participant Characteristics

Variable	Mean \pm SD / n (%)
Age (years)	38.9 \pm 10.7
Gender	
▪ Male	4 (57.1%)
▪ Female	3 (42.9%)
Years of experience in current workplace	
▪ Less than 1 year	1 (14.3%)

• 1–3 years	3 (42.9%)
• 4–6 years	1 (14.3%)
• 7–10 years	2 (28.6%)
Educational background	
• Vocational school	3 (42.9%)
• Junior college	1 (14.3%)
• University	3 (42.9%)
Employment status	
• Full-time employee	6 (85.7%)
• Non-regular employee	1 (14.3%)
Job position	
• Managerial staff	1 (14.3%)
• Life support staff	3 (42.9%)
• Vocational support staff	2 (28.6%)
• Other	1 (14.3%)

3.1 Changes in Work Engagement and Organizational-Based Self-Esteem

Table 3 presents the changes in WE and OBSE before and after the training. Although WE scores showed a slight increase from 3.00 (IQR: 2.78–4.00) to 3.11 (IQR: 2.11–3.78), the change was not statistically significant ($p = 0.31$). In contrast, OBSE scores increased significantly from 3.13 (IQR: 2.88–3.75) to 3.25 (IQR: 3.00–4.00), with a notable effect size ($r = -0.86$, $p = 0.02$). These findings suggest that the training may have contributed to improvements in OBSE, although its impact on WE remains unclear.

Table. 3 Comparison of Work Engagement and Organizational-Based Self-Esteem Before and After Training (n = 7)

Variable	Pre-training	Post-training	Z	r _b	p
	Median [IQR]	Median [IQR]			
Work Engagement (UWES-J)	3.00 [2.78, 4.00]	3.11 [2.11, 3.78]	-1.014	- 0.38	n.s
Organizational-Based Self-Esteem (OBSE-J)	3.13 [2.88, 3.75]	3.25 [3.00, 4.00]	-2.264	- 0.86	0.02*

* $p < 0.05$, Wilcoxon signed-rank test

3.2 Changes in Job Characteristics

Table 4 presents a comparison of job characteristics before and after the training. The Quantitative job overload significantly decreased after the training ($Z = -2.04$, $r = -0.77$, $p = 0.04$). Given that a lower score indicates a higher workload, this result suggests that the workload increased after the training. In contrast, there were no significant changes in Qualitative job overload ($p = 0.78$) or Physical demands ($p = 0.16$). Regarding job resources at the task level, a decreasing trend was observed in skill utilization after the training ($Z = -1.41$, $r = -0.53$, $p = 0.16$), suggesting a potential reduction in opportunities to apply one's skills. However, this change was not statistically significant. For job resources at the department level, coworker support ($Z = -1.36$, $r = -0.51$, $p = 0.18$) and Esteem reward ($Z = -1.89$, $r = -0.71$, $p = 0.06$) showed some improvement, but these changes were not statistically significant. Similarly, there were no significant changes in job satisfaction ($p = 0.66$) or career development opportunities ($p = 0.40$) before and after the training. Overall, these results indicate that while the training led to a significant increase in Quantitative job overload, no statistically significant changes were observed in other job characteristics, including job resources and job satisfaction.

Table.4 Comparison of Job Characteristics Before and After Training (n = 7)

Variable	Pre-training Median [IQR]	Post-training Median [IQR]	Z	r_b	P	
Job Demands						
Quantitative job overload (3)	2.33 [2.33, 2.67]	2.00 [1.33, 2.33]	-2.04	-0.77	0.04	*
Qualitative job overload (3)	2.33 [2.00, 2.67]	2.33 [2.00, 3.00]	-0.28	-0.1	0.78	
Physical demands (1)	2.00 [2.00, 3.00]	2.00 [1.00, 3.00]	-1.41	-0.53	0.16	
Job Resources (Task level)						
Job control (3)	2.33 [2.00, 3.00]	2.33 [2.00, 2.67]	-0.14	-0.05	0.89	
Suitable jobs (1)	2.00 [2.00, 2.00]	2.00 [2.00, 3.00]	-1.41	-0.53	0.16	
Skill utilization (1)	3.00 [2.00, 3.00]	2.00 [2.00, 3.00]	-1.41	-0.53	0.16	
Role clarity (3)	2.00 [1.00, 2.33]	2.00 [1.00, 2.33]	-1.06	-0.4	0.29	
Meaningfulness of work (3)	2.00 [1.33, 2.00]	2.00 [1.33, 2.00]	-0.18	-0.07	0.85	
Career opportunities (3)	2.00 [1.67, 2.67]	2.33 [1.67, 3.00]	-0.6	-0.23	0.55	
Job Resources (workgroup-level)						
Supervisor support (3)	2.00 [1.67, 2.67]	3.00 [1.00, 3.00]	-0.82	-0.31	0.41	
Coworker support (3)	1.67 [1.00, 2.33]	3.00 [1.00, 3.33]	-1.36	-0.51	0.18	

Family & friend support (3)	1.67 [1.00, 2.33]	1.67 [1.00, 2.33]	-0.74	-0.28	0.46	
Monetary / status rewards (2)	2.50 [2.00, 3.00]	2.50 [2.00, 3.00]	-1.63	-0.62	0.10	
Esteem reward (2)	2.00 [2.00, 2.50]	2.50 [2.00, 3.50]	-1.89	-0.71	0.06	
Leadership (3)	2.33 [1.67, 3.00]	2.33 [2.00, 3.00]	-1.00	-0.38	0.32	
Workplace where people complement each other (3)	2.33 [2.00, 3.33]	2.67 [2.00, 3.33]	-0.27	-0.1	0.79	
Workplace where mistakes are acceptable (2)	2.00 [1.50, 2.50]	2.50 [2.00, 3.00]	-1.41	-0.53	0.16	
Job Resources (Organization level)						
Respect for individuals (3)	2.00 [1.67, 2.33]	2.00 [2.00, 2.33]	-0.82	-0.31	0.41	
Career development (5)	2.20 [2.00, 2.40]	2.40 [1.80, 3.00]	-0.85	-0.32	0.40	
Outcomes	2.00 [2.00, 2.00]					
Job satisfaction (1)	2.50 [1.50, 3.00]	2.00 [2.00, 3.00]	-0.18	-0.07	0.66	
Work-self balance (positive) (2)	2.50 [1.50, 3.00]	2.00 [2.00, 3.00]	-0.75	-0.28	0.45	

3.3 Relationship Between Changes in Work Engagement and Job-Related Factors

Table 5 presents the correlation coefficients between changes in WE and OBSE-J and various job-related factors. Regarding changes in WE, a significant negative correlation was observed with Physical demands ($\rho = -0.79$, $p = .03$), indicating that as Physical demands increased, WE also tended to increase. Other factors, including Meaningfulness of work ($\rho = -0.48$, $p = .27$), Supervisor Support ($\rho = -0.61$, $p = .15$), and Career Development ($\rho = -0.36$, $p = .43$), showed moderate to weak negative correlations with changes in WE, but these were not statistically significant.

For changes in OBSE-J, no statistically significant correlations were found with any of the job-related factors. However, Workplace Tolerance for Failure ($\rho = 0.61$, $p = .15$) and Workplace where people complement each other ($\rho = -0.46$, $p = .30$) showed moderate correlations, suggesting a possible trend that requires further investigation.

Overall, these findings suggest that an increase in Physical demands may be associated with higher WE, while changes in OBSE-J do not appear to be strongly related to the examined job-related factors.

3.4 Qualitative Results

To complement the quantitative findings, follow-up reports submitted by participants five weeks after the training were analyzed to identify key themes related to workflow improvements, training effectiveness, and perceived changes in job performance. Several common themes emerged, highlighting the impact of task analysis training on workplace organization, communication, and operational efficiency.

One prominent theme was the importance of workplace organization and efficiency. Participants reported that streamlining task workflows and improving workspace organization led to greater productivity and reduced physical strain. For example, some participants noted that reorganizing storage areas and optimizing material placement minimized unnecessary movement, thereby improving efficiency and reducing fatigue.

Table.5 Correlation Matrix of Work Engagement and OBSE-J with Job-Related Factors (Spearman's ρ)

Variable	Change in Work Engagement		Change in OBSE-J	
	(Post - Pre)	ρ	(Post - Pre)	ρ
Quantitative job overload	-0.33	0.47	-0.63	0.13
Qualitative job overload	-0.02	0.97	-0.36	0.43
Physical demands	-0.79	0.03	0.17	0.71
Job Control	-0.20	0.67	0.07	0.88
Suitable job	-0.63	0.13	0.26	0.57
Skill Utilization	0.63	0.13	-0.26	0.57
Role clarity	-0.20	0.67	-0.18	0.70
Job Meaningfulness	-0.48	0.27	-0.12	0.79
Career opportunities	-0.46	0.29	0.02	0.97
Supervisor Support	-0.61	0.15	0.30	0.51
Coworker Support	-0.56	0.19	0.45	0.31
Family & Friend Support	0.07	0.88	0.43	0.34
Esteem reward	-0.23	0.62	0.13	0.79
Monetary / Status Rewards	0.54	0.21	0.23	0.62
Leadership	-0.52	0.23	-0.40	0.37

Workplace where people complement each other	-0.12	0.80	-0.46	0.30
Workplace where mistakes are acceptable	-0.28	0.54	0.61	0.15
Respect for individuals	-0.53	0.22	0.30	0.51
Career Development	-0.36	0.43	0.12	0.80
Job Satisfaction	-0.40	0.37	0.37	0.42
Work-Self Balance (Positive)	-0.46	0.31	-0.07	0.88

*Correlations are calculated using Spearman's ρ . Bold values indicate statistically significant correlations ($p < .05$). WE = Work Engagement; OBSE-J = Organization-Based Self-Esteem (Japanese version).

Another recurring theme was the role of communication and collaboration. Participants observed that reducing physical distance between workstations not only improved workflow efficiency but also enhanced interpersonal communication. This, in turn, helped reduce errors, facilitated teamwork, and increased overall job satisfaction. Some participants implemented additional measures such as whiteboards to visually share task progress, reducing miscommunication and improving task coordination among staff members.

Additionally, several participants noted improvements in task awareness and proactive problem-solving. By applying task analysis techniques, they became more conscious of inefficiencies and were able to proactively suggest improvements. This heightened awareness extended beyond the immediate training period, with participants expressing a continued interest in refining their work processes and supporting colleagues in similar efforts.

While most participants found the training beneficial, some challenges remained. A few reported that certain process improvements did not yield expected efficiency gains, requiring further adjustments. Others highlighted the difficulty of sustaining changes over time, particularly when faced with fluctuating workload demands and varying levels of staff engagement.

Overall, the qualitative findings suggest that task analysis training fostered a mindset of continuous improvement, encouraging staff to take a more structured approach to problem-solving, improve workplace organization, and enhance communication within their teams. However, the long-term sustainability of these changes requires further support and reinforcement at the organizational level.

4. Discussion

The findings of this study offer valuable insights into the effects of task analysis training on WE, OBSE, and various job characteristics.

4.1 Work Engagement and Organizational-Based Self-Esteem

The training resulted in a significant increase in OBSE scores, suggesting that participants felt more valued and confident within their organization after completing the program. This improvement in OBSE may be attributed to the structured approach and skill development fostered by the training, which likely enhanced participants' perceptions of their roles and contributions. Previous research has shown that OBSE is positively related to in-role performance and can be enhanced through formal training and development-focused feedback (Hahn & Mathews, 2022). However, the slight increase in WE scores was not statistically significant, indicating that while participants experienced a greater sense of esteem, this did not necessarily translate into higher engagement levels. This discrepancy underscores the complexity of factors influencing WE and suggests that additional interventions may be required to enhance engagement more effectively (Phuong & Thi Ngoc Quynh, 2022).

4.2 Job Characteristics

The significant increase in quantitative job overload after training was an unexpected outcome, given that the program aimed to streamline workflows and reduce physical strain. This finding suggests that while the training may have enhanced organizational efficiency, it also contributed to a heavier workload—possibly due to heightened expectations or more efficient task completion leading to additional responsibilities. Previous studies have shown that task analysis can improve productivity and optimize work processes; however, if not properly managed, it may inadvertently increase workload (Keiser & Arthur, 2022; Grant, 2008). The lack of significant changes in qualitative and physical demands, as well as in job satisfaction and career development opportunities, further highlights the need for a balanced approach that not only enhances efficiency but also effectively regulates workload and supports employee well-being (Huang, 2019; Kanuto, 2024).

4.3 Correlation Between Work Engagement and Job-Related Factors

The negative correlation between physical demands and WE suggests that as physical demands increased, participants' engagement also tended to rise. This counterintuitive finding may indicate that participants felt more engaged when physically active or

challenged, possibly due to a sense of accomplishment or the dynamic nature of their tasks. Previous studies have shown that engaging in physically demanding or challenging tasks can enhance WE by fostering a sense of achievement and dynamism (Shimazu et al., 2008; Schaufeli & Bakker, 2004). However, the moderate to weak correlations with other job-related factors, such as job meaningfulness and supervisor support, were not statistically significant, suggesting that these factors alone may not strongly influence changes in WE. This finding aligns with prior research indicating that while job resources like supervisor support and job meaningfulness are important, they may not be sufficient on their own to significantly impact WE without the presence of additional motivating factors (Tanuwijaya et al., 2022; Alshurideh, 2023).

4.4 Qualitative Insights

The qualitative findings complement the quantitative results by highlighting key themes related to workflow improvements, training effectiveness, and perceived changes in job performance. Participants reported enhanced workplace organization and efficiency, improved communication and collaboration, and increased task awareness and proactive problem-solving. These improvements suggest that the training fostered a mindset of continuous improvement and encouraged participants to adopt a structured approach to problem-solving. However, challenges such as sustaining changes over time and managing fluctuating workload demands indicate that ongoing support and reinforcement at the organizational level are essential for the long-term success of such training programs.

Furthermore, the successful application of task analysis practices by participants may be attributed not only to individual motivation, but also to a pre-existing organizational climate that supported collaborative learning and staff initiative. Such an environment—characterized by trust, open communication, and leadership receptivity—reflects what workplace innovation (WPI) literature identifies as “innovation-conducive conditions” (Pot, 2011; Borrás & Edquist, 2013). These conditions enable bottom-up change to take root and evolve into broader organizational learning. Although the training lasted only five weeks, its perceived benefits suggest that the intervention was embedded in a workplace culture that allowed experimentation, reflection, and shared improvement. This underscores the importance of aligning individual-level interventions with supportive organizational structures to achieve sustainable innovation.

Conclusion

Overall, this study demonstrates that task analysis training can significantly enhance OBSE while improving workplace organization and efficiency. However, the increase in quantitative job overload, along with the lack of significant changes in WE and other job characteristics, highlights the need for a more balanced approach that prioritizes both efficiency and employee well-being. Future research should explore additional interventions to enhance WE and examine the long-term sustainability of training outcomes.

In addition, this study suggests that task analysis training may serve as a practical example of employee-driven workplace innovation. By empowering frontline staff to analyze and improve their own work processes, the program exemplifies bottom-up approaches that align with the principles of participatory innovation (Totterdill et al., 2016; Pot, 2011). Embedding such practices within supportive organizational environments may contribute not only to individual development but also to sustainable organizational learning and adaptability.

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Acknowledgments

The Authors would like to express their gratitude to Takashi Shiro, Chikage Fukatsu, and Nozomi Akamatsu for providing the opportunity to conduct this research. Special thanks are also extended to the program participants for their invaluable cooperation and contribution to the study.