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# Examining the Relationship Between Web-Based Meal Ordering System Attributes and Nurses' Satisfaction: A Case Study in a Healthcare Institute

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**Abstract:** The rapid advancement of technology within the healthcare industry has simplified the process of patient meal ordering, though it has introduced new challenges for nursing staff. A noticeable gap exists between traditional and computerized ordering systems, which this study aims to address. Specifically, the research examines the relationships between organizational context, timeliness efficiency, interface characteristics, and individual differences, and how these factors influence nurses' satisfaction with a web-based meal ordering system. Data collection was conducted using a primary survey method with a questionnaire utilizing a 5-point Likert scale, distributed to a select group of respondents. The collected data were analyzed with the Statistical Package for the Social Sciences (SPSS) version 25. Findings indicate a strong positive relationship between organizational context and user satisfaction, while timeliness efficiency displayed only a weakly supportive effect. Both interface characteristics and individual differences were found to have moderate support. These results suggest that system developers should consider periodic updates to enhance performance and address user needs more effectively.

**Keywords**: *Hospital Information System, Web-Based Meal Ordering System, Nurses' Satisfaction*

## 1. Introduction and Background

The digitalization of healthcare services has progressively transformed the management of hospital foodservice operations, signaling a departure from conventional manual practices toward data-driven and technologically supported systems. Traditionally, the meal ordering process in hospitals relied heavily on paper-based mechanisms in which diet clerks distributed and collected menu cards from patients. Although this approach enabled direct communication and personal interaction, it was vulnerable to operational inefficiencies such as high workloads, difficulty in interpreting handwritten notes, and delays in transmitting orders to the kitchen. Such processes also consumed a significant portion of nurses' time, interrupting their clinical priorities and creating potential risks for patient nutrition management.

In response to these limitations, healthcare systems worldwide have adopted computerized and web-based ordering platforms designed to streamline dietary communication and support clinical workflows. These systems allow nurses to input patient meal selections electronically based on dietitian-specified nutritional requirements, enabling instantaneous transfer of information to foodservice personnel. The transition to digital platforms has been associated with improved clarity, reduced errors in patient dietary interpretation, enhanced workflow, and increased job productivity (Hsu & Wu, 2017). With the rising complexity of clinical care and the continuous expansion of hospital caseloads, the ability of digital systems to accelerate processes, eliminate redundant tasks, and coordinate multidisciplinary work makes them crucial for modern healthcare operations.

Despite these advantages, system adoption is not without challenges. Shifting from a manual system to a digital interface introduces new layers of complexity that must be recognized and addressed to ensure successful implementation. Research consistently indicates that technology success depends not only on the functional capabilities of the system but also on the perceptions, competencies, and contextual work environments of its users (Wixom & Todd, 2005; Topaz et al., 2016; Hussey, Adams & Shaffar, 2015). For nurses who function as both clinical caregivers and frontline users of information systems, satisfaction with a digital meal-ordering platform is intertwined with multiple dimensions of their work experience. Factors such as alignment with organizational workflow, timeliness of system responsiveness, clarity and usability of the interface, and individual differences in technological capability collectively influence whether the system is perceived as

helpful or burdensome.

User satisfaction has long been recognized in the information systems literature as a fundamental criterion for evaluating system success because it reflects the extent to which technology supports task completion and meets expectations. In the healthcare context, the implications of satisfaction are far-reaching because ordering errors and miscommunication can jeopardize patient safety. Adequate nutrition is a critical component of treatment and recovery, and therefore, nurses' ability to manage meal orders efficiently has a direct impact on dietary fulfilment, food waste reduction, and overall hospital service performance (McCray et al., 2018). While digital meal ordering is now common in many hospitals internationally, empirical research focusing on nurses' satisfaction in non-commercial foodservice settings particularly within the Malaysian healthcare landscape remains scarce.

Given the practical and clinical importance of meal-ordering processes, it is crucial to understand the determinants of nurses' satisfaction with the digital system implemented in Malaysian hospitals. By examining how organizational context, timeliness efficiency, interface characteristics, and individual differences affect system satisfaction among nurses, the present study aims to bridge the existing knowledge gap and provide evidence-based recommendations for improving digital foodservice informatics. Findings from this study are expected to offer theoretical contributions to the limited literature on hospital foodservice technologies and generate actionable insights for foodservice administrators, health informatics developers, and healthcare managers seeking to optimize digital meal-ordering practices and promote sustained technology adoption in clinical environments.

## 2. Literature Review

### *Hospital Foodservice Operation*

Hospital foodservice is a major component of patient care because the nutritional adequacy of meals influences recovery, treatment tolerance, and overall well-being. Foodservice operations are broadly divided into commercial and non-commercial segments, with hospitals falling within the non-commercial category since meals are prepared for patients without profit intention (Umap et al., 2018; Krishna et al., 2015). While commercial foodservice settings focus on financial gain and consumer satisfaction, non-commercial hospital foodservice prioritizes therapeutic objectives through diets tailored to patients' medical conditions. To manage diverse patient dietary needs, most hospitals adopt cycle menus developed by dietitians to maintain standardization, reduce menu-planning time, and ensure compliance with nutritional guidelines (Krishna et al., 2015). These menus help control food cost and ensure nutritional consistency across patient groups. However, when cycle menus are repeated too frequently, long-stay patients may perceive the food as monotonous, creating dissatisfaction or reduced food intake. This has implications for healing and recovery since inadequate food consumption contributes to malnutrition risk, extended hospitalization, and reduced treatment tolerance.

Because foodservice activities involve multiple personnel namely dietitians, diet clerks, kitchen staff, and nurses, accuracy in dietary communication is crucial. Miscommunication at any stage may lead to mistakes such as incorrect ingredients, missing texture modification, or allergen exposure, which can endanger patient safety. For this reason, the efficiency of the meal ordering system becomes central to service quality within the hospital foodservice workflow. A system that supports timely and accurate information transfer not only protects patients but also improves operational fluidity across departments. From an administrative perspective, foodservice quality is evaluated not only by meal flavor or nutrition, but also by precision in dietary communication, consistency in serving the right food to the right patient, and minimization of wastage arising from incorrect orders.

### *Meal Ordering Systems in Hospitals*

Traditionally, hospitals used manual ordering systems whereby nurses distributed menu cards to patients, collected completed forms, and communicated orders to diet clerks manually. This approach allowed personal interaction and provided flexibility for clarifying orders face-to-face, yet it required significant time from nursing staff and created a risk of delayed order submission, overlooked dietary notes, and documentation errors. For nurses managing multiple patients and clinical responsibilities simultaneously, manual ordering often became a burden and reduced available time for direct care. As hospitals increasingly face staff shortages,

high patient turnover, and rising administrative complexity, manual systems are no longer sustainable for efficient foodservice coordination.

With increasing patient volume and time-sensitive responsibilities, many healthcare institutions have migrated toward computerized or web-based meal ordering systems. These digital systems are designed to reduce reliance on face-to-face communication by allowing dietary information to be stored, updated, and transmitted electronically. Systems that integrate with hospital information records provide immediate access to patient medical and dietary history, improving accuracy and reducing the risk of serving meals that could endanger patient safety (Hsu & Wu, 2017). When dietary restrictions are automatically tied to patient profiles, ordering becomes safer, faster, and more consistent across shifts.

Web-based systems now support ordering activities in many Malaysian facilities. They allow nurses to key in orders, update remarks, track meal delivery status, and interface with foodservice departments in real time (McCray et al., 2018). These systems also help minimize food wastage and reduce operational costs by decreasing the likelihood of duplicated or incorrect orders. Even so, adoption is not uniform across hospitals, indicating a lack of standardization and highlighting the need for deeper research on nurses' experience and satisfaction with such systems in Malaysia. Understanding staff perceptions is essential because digital systems may succeed technologically but still fail operationally if they are not aligned with the needs and working styles of nurses.

***Organizational Context and Nurses' Satisfaction***

Organizational context refers to how well the information system aligns with workflow practices, terminology, reliability, and communication structures within the organization. A positive organizational context is achieved when the system reflects actual job practices, offers consistent and trustworthy information, and avoids disruption to work routines (Vernim & Reinhart, 2016; Lu, Hsiao & Chen, 2012). Organizational factors influence whether nurses view a web-based meal ordering system as a supportive tool or an additional burden. When digital systems replace existing communication pathways without improving efficiency, users may perceive them as time-consuming rather than helpful.

System reliability is of particular importance. A system that consistently provides accurate information and operates without downtime contributes to higher levels of trust and perceived usefulness. Conversely, errors, inconsistent data, or sudden system crashes can disrupt workflow and contribute to negative attitudes toward technology adoption. Furthermore, alignment with the terminology used in clinical practice affects comprehension. If nurses encounter unfamiliar wording or counterintuitive menu pathways, additional cognitive effort is required, which may lead to dissatisfaction. Thus, considering organizational context at the system design and implementation stages is essential to foster long-term engagement and satisfaction.

***Timeliness Efficiency and Nurses' Satisfaction***

Timeliness efficiency refers to how rapidly the system communicates information and supports completion of tasks. In environments where time is highly constrained, even minor delays can create workflow bottlenecks. Technology in healthcare has been widely praised for improving job performance by reducing administrative workload and improving response time (McCray et al., 2018). From the nurse's perspective, timeliness efficiency is reflected in the system's speed when retrieving patient information, processing orders, and transmitting updates to the foodservice department.

Real-time system response is especially critical because new patient admissions and dietary adjustments may be received moments before mealtime. When a web-based system allows newly admitted patients to be included in the meal cycle immediately rather than waiting for the next distribution cycle, perceived efficiency increases. Moreover, fast turnaround helps reduce stress among nurses who must balance heavy clinical workloads with administrative duties. Therefore, timeliness efficiency contributes directly to perceived usefulness and determines whether nurses view the system as a facilitator or an obstruction to workflow.

***Interface Characteristics and Nurses' Satisfaction***

Interface characteristics include usability, readability, clarity of information, and navigation pathways. A well-designed interface reduces the cognitive load required to locate data, interpret dietary requirements, and enter

meal orders. Usability relates to how simple and intuitive the system is during use. A usable interface reduces operating errors, saves time, and improves job performance. Readability and visibility influence nurses' ability to scan dietary details accurately (Vernim & Reinhart, 2016). When information is structured clearly with appropriate fonts, logical grouping of menu items, and visibility of dietary instructions, users can complete tasks more efficiently and confidently.

Navigation refers to how easily users move between screens and locate the right information within the system. If pathways are messy or mislabeled, users may struggle to identify the correct patient or dietary notes. Poor navigation causes confusion and disorientation (Chavan et al., 2015; Chouhan, 2017), and repeated experiences of difficulty can shape negative attitudes toward the system. Conversely, systems with strong interface characteristics increase ease of use, reduce frustration, and ultimately elevate user satisfaction. In the hospital context where mistakes have serious consequences, intuitive interfaces play a vital role in supporting safe task execution.

***Individual Differences and Nurses' Satisfaction***

Individual differences reflect the diversity of nurses' technological capabilities, confidence, and cognitive approaches to learning new systems. Evidence consistently shows that computer experience predicts performance level when interacting with digital platforms (Boechler et al., 2016). Nurses with higher digital exposure tend to adopt hospital information systems more smoothly and show greater resilience when facing system updates or interface redesigns.

Self-regulation also affects system acceptance. Self-regulated individuals seek knowledge actively, monitor their learning progress, and apply problem-solving strategies independently (He et al., 2018; Hoendervanger et al., 2018). These individuals tend to explore the system more confidently and reach proficiency faster. By contrast, nurses with low digital literacy or insufficient understanding of clinical nutritional terminology may feel overwhelmed when navigating the system, potentially resulting in anxiety, avoidance, or errors. Therefore, even if the system is well-designed, the experience of using it may vary widely between individuals depending on their technological and domain knowledge.

***Nurses' Satisfaction with Technological Systems in Hospitals***

Studies have shown that nurses' satisfaction with digital systems improves when technology provides tangible benefits to daily practice and reduces the possibility of error (McCray et al., 2018). Satisfaction is an important indicator because it predicts long-term system use, willingness to learn new functions, and compliance with digital documentation requirements. In contrast, dissatisfaction reduces motivation to use the system and may lead to reliance on informal workarounds, thereby compromising standardization and increasing risk.

In hospital foodservice operations, the stakes are especially high because nutritional errors directly affect patient health outcomes. If technological systems support accurate ordering and efficient communication, user satisfaction strengthens, and nurses gain confidence in technology as a tool that enhances rather than obstructs care delivery. However, if systems increase workload, delay task completion, or cause frequent mistakes, dissatisfaction forms quickly. Consequently, understanding the determinants of satisfaction is critical for healthcare managers, system developers, and policymakers to ensure successful long-term technology adoption in hospital foodservice divisions. Satisfaction research also supports the strategic allocation of training resources and informs system upgrades to better meet operational needs.

## 3. Research Methodology

This study employed a descriptive, cross-sectional research design to examine the factors influencing nurse satisfaction with the web-based meal ordering system at a national healthcare institute. The name of the institute, however, cannot be revealed. Utilizing a quantitative approach, a structured questionnaire was distributed to 362 nurses across healthcare wards, incorporating items on organizational context, timeliness, interface characteristics, individual differences, and overall satisfaction, measured via a 5-point Likert scale. The sample was selected through purposive sampling, focusing on nurses regularly using the system. Data analysis involved descriptive statistics, reliability analysis, and Pearson's correlation, conducted using SPSS version 25 to assess relationships among variables and test hypothesis validity. The design aligns with natural,

non-contrived settings, allowing for authentic user feedback on system effectiveness and satisfaction.

## 4. Results

This section presents the analysis and findings derived from data collected within the study period, analyzed using SPSS version 25. The data address the following research objectives: to evaluate the effect of organizational context on nurses' satisfaction with the healthcare institute's web-based meal ordering system, to examine the impact of timeliness on nurse satisfaction, to assess the influence of interface characteristics on satisfaction, and to determine how individual differences affect satisfaction with the system.

**Profile of Respondents:** Table 1 presents a summary of the demographic characteristics of the nurses who participated in the study.

**Table 1: Demographic and Information About Nurses**

| VARIABLE | FREQUENCY | PERCENTAGE |
|---|---|---|
| **GENDER** | | |
| Males | 62 | 20.0% |
| Females | 248 | 80.0% |
| **Total** | **310** | **100%** |
| **EDUCATION LEVEL** | | |
| High School | 62 | 20.0% |
| Diploma | 127 | 41.0% |
| Degree (pre-registered) | 55 | 17.7% |
| Degree (post-registered) | 66 | 21.3% |
| **Total** | **310** | **100%** |
| **JOB POSITION** | | |
| Staff | 262 | 84.5% |
| Supervisor | 48 | 15.5% |
| **Total** | **310** | **100%** |
| **TOTAL WORKING EXPERIENCE (YEARS)** | | |
| 0-5 | 37 | 11.9% |
| 6-10 | 95 | 30.6% |
| 11-15 | 102 | 32.9% |
| 16-20 | 41 | 13.2% |
| More than 20 | 35 | 11.3% |
| **Total** | **310** | **100%** |
| **HOSPITAL INFORMATION SYSTEM (HIS) EXPERIENCE (YEARS)** | | |
| 0-5 | 37 | 11.9% |
| 6-10 | 112 | 36.1% |
| More than ten years | 161 | 51.9% |
| **Total** | **310** | **100%** |
| **DIFFICULTY OF USING THE SYSTEM** | | |
| Yes | 32 | 10.3% |
| No | 278 | 89.7% |
| **Total** | **310** | **100%** |
| **USAGE INTENSITY** | | |
| Daily | 264 | 85.2% |
| More than once a week | 40 | 12.9% |
| Weekly | 5 | 1.6% |
| Occasionally | 1 | 0.3% |
| Never | 0 | 0% |
| **Total** | **310** | **100%** |

**Descriptive Statistics:** Descriptive statistics for the web-based meal ordering system attributes and nurses 'satisfaction were conducted and Table 2 below displays the outcome. These provide the average mean scores

regarding their organizational context, timeliness efficiency, interface characteristics, individual differences, and overall satisfaction.

**Table 2: Descriptive Statistics**

| Variable | Descriptive Statistics<br>Factor Name | Mean | Std. Dev. |
|---|---|---|---|
| OC | Organizational Context | 4.1640 | 0.70579 |
| TM | Timeliness Efficiency | 3.0738 | 0.91865 |
| IC | Interface Characteristics | 3.9640 | 0.82331 |
| ND | Individual Difference | 3.9830 | 0.74618 |
| SF | Overall Satisfaction | 4.3420 | 0.66112 |

The mean scores ranging from 4.1640, 3.0738, 3.9640, 3.9830, and 4.3420 were obtained from the organizational context, timeliness efficiency, interface characteristics, individual differences, and overall satisfaction. These results indicate that respondents, on average, concur with the items contained in these variables.

**Pearson's Correlation Coefficient and Hypothesis Testing** were used in this study to analyze the relationship's strength between variables and highlight the factors that influence the nurses' satisfaction in using the web-based meal ordering system (i.e., organizational context, timeliness efficiency, interface characteristics, individual differences, and overall satisfaction. The correlation analysis results are displayed in Table 3.

**Table 3: Result of Pearson's Correlation Analysis for the Relationship between Organizational Context and Nurses' Satisfaction**

| Correlations | | | |
|---|---|---|---|
| | | Organizational Context | Overall Satisfaction |
| Organizational Context | Pearson's Correlation | 1 | .520** |
| | Sig. (2-tailed) | | .000 |
| | N | 310 | 310 |
| Overall Satisfaction | Pearson's Correlation | .520** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 310 | 310 |

** Correlation is significant at the 0.01 level (2-tailed)

**Table 4: Result of Pearson's Correlation Analysis for the Relationship between Timeliness Efficiency and Nurses' Satisfaction**

| Correlations | | | |
|---|---|---|---|
| | | Timeliness Efficiency | Overall Satisfaction |
| Timeliness Efficiency | Pearson's Correlation | 1 | .296** |
| | Sig. (2-tailed) | | .000 |
| | N | 310 | 310 |
| Overall Satisfaction | Pearson's Correlation | .296** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 310 | 310 |

** Correlation is significant at the 0.01 level (2-tailed)

**Table 5: Result of Pearson's Correlation Analysis for the Relationship between Interface Characteristics and Nurses' Satisfaction**

| Correlations | | | |
|---|---|---|---|
| | | Interface Characteristics | Overall Satisfaction |
| Interface Characteristics | Pearson's Correlation | 1 | .473** |
| | Sig. (2-tailed) | | .000 |
| | N | 310 | 310 |
| Overall Satisfaction | Pearson's Correlation | .473** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 310 | 310 |

** Correlation is significant at the 0.01 level (2-tailed)

**Table 6: Result of Pearson's Correlation Analysis for the Relationship between Individual Differences and Nurses' Satisfaction**

| Correlations | | | |
|---|---|---|---|
| | | Individual Difference | Overall Satisfaction |
| Individual Difference | Pearson's Correlation | 1 | .457** |
| | Sig. (2-tailed) | | .000 |
| | N | 310 | 310 |
| Overall Satisfaction | Pearson's Correlation | .457** | 1 |
| | Sig. (2-tailed) | .000 | |
| | N | 310 | 310 |

** Correlation is significant at the 0.01 level (2-tailed)

The correlation conducted on these variables with overall satisfaction (i.e., organizational context, timeliness efficiency, interface characteristics, individual difference) displayed the following: organizational context r=.520, timeliness efficiency r=.296, interface characteristics r=.473, individual difference r=.457.

**Table 7: Summarized Results for Hypotheses**

| Code | Hypotheses | Result |
|---|---|---|
| $H_1$ | There is a significant relationship between organizational context toward nurses' satisfaction with the web-based meal ordering system for patients in a healthcare institute. | Supported: Strong relationship |
| $H_2$ | There is a significant relationship between timeliness efficiency toward nurses' satisfaction with a web-based meal ordering system for patients in a healthcare institute. | Supported: Weak relationship |
| $H_3$ | There is a significant relationship between interface characteristics toward nurses' satisfaction with the web-based meal ordering system for patients in a healthcare institute. | Supported: Moderate relationship |
| $H_4$ | There is a significant relationship between individual differences in nurses' satisfaction with the web-based meal ordering system for patients in a healthcare institute. | Supported: Moderate relationship |

From Table 7 above, the study's findings on factors influencing nurses' satisfaction with a web-based meal ordering system at a healthcare institute. Results indicate that organizational context has a strong positive relationship with satisfaction, suggesting its critical role in system acceptance. Timeliness efficiency shows a

weaker relationship, indicating that, while appreciated, it may not be a central determinant of satisfaction. Both interface characteristics and individual differences exhibit moderate relationships, highlighting that system design and personal variations among users moderately impact satisfaction. These insights underscore the complex, multifaceted factors shaping nurses' satisfaction with healthcare technology.

**Discussion**

The study's findings highlight significant relationships between independent variables and nurses' satisfaction with a web-based meal ordering system in a healthcare context. Pearson's correlation analysis confirmed a moderately strong positive relationship between organizational context and satisfaction (r = .520), suggesting that system integration within the organizational environment enhances usability for nurses, consistent with prior research on the role of context in perceived usefulness (Vernim & Reinhart, 2016). Timeliness efficiency showed a weaker yet significant association with satisfaction (r = .296), indicating that while timely performance is valued, it alone may not drive satisfaction due to possible misalignment with nurses' workflow (Sockolow et al., 2014). Interface characteristics also demonstrated a moderate correlation with satisfaction (r = .473), showing that a functional and navigable system design facilitates ease of use and enhances user experience. Collectively, these findings underscore that satisfaction with digital systems in healthcare is multi-dimensional, driven by organizational integration, functional efficiency, and user-centered design — aligning with previous literature on technology acceptance in healthcare.

## 5. Managerial Implications and Recommendations

This study highlights essential managerial implications for optimizing Hospital Information Systems (HIS), particularly web-based meal ordering systems used by nurses. Practically, these findings emphasize the need for seamless integration with the organizational context to support nursing workflows and patient care, reinforcing findings by Buntin et al. (2011) that electronic systems positively influence caregiving processes. Familiarity with system-specific medical terminology, as discussed by Hitt and Tambe (2016), is crucial for efficient usage, enabling nurses to manage dietary requirements and patient documentation effectively. To maintain adaptability, developers should design intuitive interfaces that allow nurses to navigate updates independently, minimizing disruptions to patient care. Organizational training should account for individual differences in technological skills, leveraging prior experience with similar systems to enhance usability. Theoretically, this study contributes to understanding key HIS satisfaction drivers, including timeliness efficiency, interface design, and individual differences. Future research could build on these findings by studying larger and more diverse healthcare samples and exploring constructs such as perceived quality and risk to deepen insights into nurses' satisfaction with HIS. Additionally, examining various healthcare contexts and conducting qualitative comparisons of different systems would provide valuable perspectives on system improvements, while exploring the psychological readiness of healthcare providers could further clarify the factors influencing technology adoption and satisfaction in complex medical environments.

**Conclusion**

This study examined key factors influencing nurses' satisfaction with a web-based meal ordering system in a hospital context, specifically focusing on organizational context, timeliness efficiency, interface characteristics, and individual differences. Targeting nurses at a healthcare institute in Putrajaya, the research successfully addressed all objectives and provided comprehensive answers to the research questions. Findings confirmed that these factors significantly predict nurses' satisfaction, highlighting the critical role of a well-integrated hospital information system (HIS) in supporting efficient patient record management and streamlined communication between nursing staff and hospital foodservice departments, particularly for meeting patients' dietary requirements. This system minimizes the need for nurses to leave the wards for dietary coordination, thereby enhancing workflow and operational efficiency. Overall, this research underscores the vital relationships between HIS attributes and user satisfaction, offering a foundation for future studies to explore this area on a broader scale and contribute further to advancements in healthcare technology and nurse-driven service optimization.

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