Implementation of Specialized Software in Hospital Food Service Departments: A Multi-Case Study Approach

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General Background

- Increasing pressure for hospital foodservice departments to improve efficiency (Puckett, 2013)
- Focus on patient perception of all hospital inpatient services, including foodservices
- Introduction of an innovation brings uncertainty and challenges

Statement of the Problem

- Capital funds in hospitals are limited
- Direct patient care items often prioritized over support services (foodservice, housekeeping, transport services) needs (Puckett, 2013)
- Modernization of hospital foodservices lag behind other areas of the hospital
- Lack of information regarding the impact and outcomes of specialized hospital foodservice software

Research Questions

1. What effect does the implementation of specialized food service software have on hospital food service departments’ efficiency?
2. What were diet office employees’ expectations and level of readiness for change as related to the implementation of automated diet office software?
3. What factors were identified by the food service staff and directors as barriers and/or facilitators regarding the implementation of specialized food service software?
4. How did employees of the department perceive the communication provided prior to and during software implementation?
5. What benefits and disadvantages related to the use of the specialized food service software did the department employees and department leadership perceive post-implementation?
6. What effect does the addition of specialized food service software have on patient satisfaction as measured through the Press-Ganey HCAHPS® survey?
7. What modifications to procedures did diet office personnel adopt post-implementation and why?
8. What is the attitude of hospital food service employees toward the perceived benefit and adoption of technology for personal and work use?

Review of Literature

- Technology in Hospital Foodservice
  - Uses in Hospital Foodservice
    - Technology is becoming more common in hospital foodservice, however, there are some departments using manual systems (Puckett, 2013)
    - Examples of uses include: purchasing and inventory management, nutritional analysis, foodservice systems management, and communication (Hoggle et al., 2006)
  - Foodservice Patient Satisfaction
    - Not measured on the HCAHPS survey; often added by the hospital to the survey
    - Hospital foodservice quality includes: menu items, portion sizes, presentation, temperature, and interaction with staff (Kim et al., 2010)
    - High patient satisfaction with foodservices related to higher overall patient satisfaction (Woodside et al., 1989)
Review of Literature

- Information Technology Adoption
  - Diffusion of Innovation (Rogers, 1995)
    - Four components: the innovation, communication channels, time, and social system
  - Willingness to adopt: the rate of adoption varies
    - Five adoption rate categories: innovators, early adopters, early majority, late majority, and laggards

Methods

- Case Study Approach
  - A mandatory implementation of software into hospital food service.
  - 5 Hospital foodservice departments
    - A division of 17 hospitals
    - For-profit large corporation
  - Qualitative and quantitative methods
    - Data sources include: questionnaires, interviews, observations and secondary data

<table>
<thead>
<tr>
<th>Site Characteristics</th>
<th>Size</th>
<th>Title</th>
<th>Position</th>
<th>Function</th>
<th>Technology</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site 1 Large</td>
<td></td>
<td>Registered Chief Dietitian</td>
<td>RD</td>
<td>Traditional Computerized diet office</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site 2 Small</td>
<td></td>
<td>CDM</td>
<td></td>
<td></td>
<td>Manual</td>
<td></td>
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<tr>
<td>Site 3 Medium</td>
<td></td>
<td>Executive Chef</td>
<td>RD</td>
<td>Traditional Computerized diet office</td>
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<td></td>
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<tr>
<td>Site 4 Medium</td>
<td></td>
<td>CDM/ MBA</td>
<td></td>
<td>Traditional Computerized diet office</td>
<td></td>
<td></td>
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<tr>
<td>Site 5 Large</td>
<td></td>
<td>CDM</td>
<td></td>
<td></td>
<td>Manual</td>
<td></td>
</tr>
</tbody>
</table>

Methods

- Questionnaire
  - Technology Readiness Index (TRI 2.0)
    - 10 question survey used with permission of Parasuraman & Colby (2015)
  - Sections two and three
    - 31 questions related to technology adoption, and adapted from Moore and Benbasat (1991), Davis (1989), and Boettger (2009)
  - Demographics
    - age, sex, education, average hours worked/week, job title

Methods

- Interviews
  - In-depth responsive interviews
    - Main interview questions based on research questions
    - Follow-up questions used to explore answers and gain understanding (Rubin & Rubin, 2012)
  - Participants – a purposeful sample (Tracy, 2013)
    - Individuals invested in the implementation of the software
      - Food service directors
      - Diet office employees
      - Registered Dietitians
      - Diet office supervisors

Methods

- Observations
  - Diet office and patient trayline functions
  - Provide context additional sources of evidence as recommended by Yin (2003)
- Secondary Data
  - Secondary data included financial and quality reports
  - Included data from six months pre-implementation through six months post-implementation
Methods

- Pilot test – The questionnaire and interview guides were tested at a hospital within the studied division but was not designated as a case study site
- Interviews were transcribed, coded
  - Themes and trends were identified
  - Three individuals coded and analyzed the interviews
- Triangulation of data
  - Multiple sources of data analyzed to draw conclusions

Results and Discussion

1. What effect does the implementation of specialized food service software have on hospital food service departments' efficiency?
   - Staffing
     - Previously automated diet office sites added labor hours
     - Diet office procedures and diet clerk job duties in manual offices changed
   - Financial
     - Site 1 experienced an increase in FC/PD and FC/ADP
     - Sites 2, 3, 4, & 5 experienced a decrease in FC/PD and FC/ADP

2. 27 individuals were interviewed
   - Five foodservice directors
   - Three diet office supervisors
   - Eight registered dietitians
   - Eleven diet clerks

3. What factors were identified by the food service staff and directors as barriers and/or facilitators regarding the implementation of specialized food service software?

   **Barriers**
   - Poorly Defined Vision
   - Lack of Support, Tools, resources
   - Deficiency of Skills and Knowledge
   - Implementation Timeline
   - Database
   - Lack of needed Equipment
   - Employee Emotional Barriers
   - Software Functionality
   - Written Division Menu
   - Department Specific Barriers

   **Facilitators**
   - Leadership
   - Commitment of employees to their patients
   - Cheerleading
   - Registered Dietitian engagement in the process
   - Awareness
   - Management of the process
   - Employee Characteristics
   - Ability of the diet office staff to learn
   - Tools and resources available
Results and Discussion

6. What effect does the addition of specialized food service software have on patient satisfaction as measured through the Press-Ganey HCAHPS® survey?

- Four of five sites experienced a decrease in patient satisfaction during the quarter of implementation.
- Site 4's Foodservice Director (FSD) added a room service program to a hospital unit during the implementation. The FSD concluded the functionality of the software provided an opportunity to add room service.
- Site 5's FSD was running a room service program prior to implementation. The FSD concluded the functionality of the software was not adequate to continue with the room service menu.
- Interviewers perceived the software had varying effect on patient satisfaction.
- The range of patient satisfaction "very good" scores decreased from pre-implementation to post-implementation.
- A standardized patient menu was implemented along with the software implementation.

Conclusions and Practical Applications

- The necessity of a vision.
- Involvement of the registered dietitians in the process did not improve the implementation process; however, those diet offices were operating at a higher level and understood the software at a greater depth.
- When multiple layers of an organization and an outside company are involved in an implementation, having defined roles and responsibilities is needed.

Results and Discussion

6. What effect does the addition of specialized food service software have on patient satisfaction as measured through the Press-Ganey HCAHPS® survey?

Results and Discussion

8. What is the attitude of hospital food service employees toward the perceived benefit and adoption of technology for personal and work use?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean 23.00</th>
<th>Mean 46.50</th>
<th>SD 4.50</th>
<th>Mean 29.90</th>
<th>SD 1.49</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am among the first in my circle of friends to acquire new technology</td>
<td>3.80</td>
<td>5.00</td>
<td>1.00</td>
<td>4.20</td>
<td>1.00</td>
</tr>
<tr>
<td>Too much technology distracts people to a point that is harmful</td>
<td>2.69</td>
<td>3.28</td>
<td>0.95</td>
<td>3.32</td>
<td>0.99</td>
</tr>
<tr>
<td>Other people at least find it as inconvenient as other technologies</td>
<td>3.76</td>
<td>4.00</td>
<td>0.88</td>
<td>3.88</td>
<td>0.88</td>
</tr>
<tr>
<td>I think that technology systems are not designed for use by regular people</td>
<td>3.69</td>
<td>4.00</td>
<td>0.88</td>
<td>3.88</td>
<td>0.88</td>
</tr>
<tr>
<td><em>People are too dependent on technology to do things for themselves</em></td>
<td>2.53</td>
<td>3.00</td>
<td>0.88</td>
<td>2.53</td>
<td>3.00</td>
</tr>
</tbody>
</table>

Table 3: Likert scale 1 = Strongly Disagree; 5 = Strongly Agree

Conclusions and Practical Applications

- When a change is occurring the foodservice directors must own the process.
- Include the end users and the foodservice directors in the process of building and designing the customizable parts of the software.
- A skills inventory of the diet clerks pre-implementation is needed, so knowledge and skills can be developed prior to the use of the software.
- Hospital foodservice employees are willing to adopt technology.
Limitations and Future Research

- Study took place in five hospital foodservice departments undergoing a mandatory implementation of specialized software. The hospitals belonged to one corporate division within a for-profit healthcare corporation.
- The study followed one software program. Other software programs are available for use in hospital foodservice.
- Future research:
  - Investigate an implementation of specialized software into a hospital foodservice department that chose to adopt the software.
  - Follow an implementation in a non-profit hospital.
  - Study the implementation of another software program.
  - Investigate an implementation of the same software in another division within the same corporation in which recommendations from this study were implemented.
  - Study the impact the written patient menu has on patient satisfaction.

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Thank you FSMEC for supporting this research.