The Impact of Hospital Nursing Website Design and Online Application Process on Staff Nurse Recruitment Time: A Comparison Between Magnet and Non-Magnet Hospitals

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We were afraid we would forget to ask these questions, so we wrote them down.

- How many of you are from the service sector? Academia?
- How many of your organizations have websites?
- How many of you had an opportunity to contribute to the design of the website? Organization/Department?
- How many of you used web site design criteria to design your website?
- How many of you had potential users or experts critique your website using criteria?
Learning Objectives

1. Describe the critical elements of hospital nursing website design.
2. Discuss the impact of hospital nursing website design and online application process on staff nurse recruitment time.
3. Discuss study findings and implications for staff nurse recruitment time between Magnet and non-Magnet hospitals.
What Is Medical Informatics?

... is a discipline that advances the use of information technology to improve healthcare delivery.

Major components of safe healthcare delivery include:

- Improved communication among caregivers
- Decision support at the point of care
- Biomedical information storage and retrieval
- Adequate nursing and medical staffing***
Website Design

- perform design assessment of user interfaces
  - applicant savvy and technological skills
  - generational differences of applicant pool
- support organization’s ability to deliver quality care by contributing to low staff vacancy rates
- designing attractive and functional websites
  - assist healthcare organizations to attract, recruit, and retain top nursing and medical talent in a time efficient manner
  - patient safety
Gap Analysis

- U.S. hospitals need 118,000 registered nurses to fill vacancies nationwide (American Hospital Association, 2006)

- nation’s nursing shortage will grow to more than one million nurses by the year 2020

- 90% of large U.S. companies are already recruiting via the Internet

- job seekers in healthcare are using the Internet more readily than healthcare employers are designing user-friendly recruitment websites*****

- to recruit successfully during the current nursing labor shortage, it is imperative that employers adopt and expand online nursing recruiting

(Health Resources and Services Administration (2006))
Gap Analysis

- 55 million Americans search for jobs online \textit{(Pew, 2002)}
- 80% of hospitals (N = 4690) have web sites \textit{(AHA 2004; AHA 2005)}
Gap Analysis (Kasoff, 2006)

- Magnet and non-Magnet hospital websites
  - compared 72 websites
  - analyzed for image and presence of nursing
  - statistically significant differences in the image of nursing and nursing website user interface
- Staff nurse vacancies advertised on the website
  - Magnet = 70%; non-Magnet = 42%
- Online application process
  - Magnet = 89%; on-Magnet = 67%
- Statistically significant decrease in recruitment time and staff nurse vacancy rates were reported from Magnet hospitals when compared to non-Magnet hospitals (ANCC, 2007; Kasoff, 2006)
Magnet-Designated Organizations

- consistently outperform other organizations in recruiting and retaining nurses resulting in increased stability in patient care
- benefit from reduced costs due to low nurse turnover that result in greater institutional stability  (Aiken, 2005)
Research Question

What is the difference between Nursing website design and online application process on staff nurse recruitment time between Magnet and non-Magnet hospitals?
Research Objective

to analyze the impact of hospital nursing website design and online application process on staff nurse recruitment time between Magnet and non-Magnet hospitals in the New York City metropolitan area.

6 Hospitals
- 3 Magnet
- 3 Non-Magnet
- 1 paperless Magnet***
Hypotheses

- **Null Hypothesis**
  - There is no difference in Nursing website design and online application process on staff nurse recruitment time between Magnet and non-Magnet hospitals

- **Alternative Hypothesis 1**
  - The Nursing websites of Magnet Hospitals will achieve a higher overall score on the User Interface Rating Tool and will have an online application process resulting in decreased staff nurse recruitment time when compared to non-Magnet hospitals

- **Alternative Hypothesis 2**
  - The Nursing websites of Magnet Hospitals will score higher for each of the criteria on the User Interface Rating Tool and will have an online application process resulting in decreased staff nurse recruitment time when compared to non-Magnet hospitals
Definitions

- staff nurse
- online recruitment
- recruitment time
- Magnet Recognition

Website design
- ease of use
- navigation
- cognitive lead
- mapping
- screen design
- knowledge space
- compatibility
- information presentation
- media integration
- aesthetics
- overall functionality

User Interface Rating Tool (Reeves & Harmon, 1993)
Recruitment Time

- the number of business days between the receipt of an applicant’s application to the date that the applicant is cleared for work and made an offer of employment
Website Design *(Reeves & Harmon, 1993)*

1. **Ease of Use**
   - perceived facility with which a user interacts with an interactive multimedia program

2. **Navigation**
   - perceived ability to move through the contents of an interactive program in an intentional manner

3. **Cognitive load**
   - mental efforts of performing tasks via print or other media

4. **Mapping**
   - program's ability to track and graphically represent to the user his or her path through the program

5. **Screen Design**
   - text, icons, graphics, color, and other visual aspects of interactive programs
Website Design *(Reeves & Harmon, 1993)*

6. **Knowledge Space Compatibility**
   - network of concepts and relationships that compose the mental schema a user possesses about a given phenomena, topic or process

7. **Information Presentation**
   - information contained in the knowledge space of an interactive program is presented in an understandable form

8. **Media Integration**
   - how well an interactive program combines different media to produce an effective whole
9. Aesthetics

- artistic aspects of interactive programs in the sense of possessing beauty or elegance

10. Overall Functionality

- perceived utility of the program
  - related to the intended use of the program
  - must be judged in relation to the specific intended use that exists in the mind of the users
Methods

- Convenience sample
  - 6 hospitals
  - 3 Magnet
  - 3 non-Magnet

- User Interface Rating Tool
  (15 medical informatics graduate students)
  1. ease of use
  2. navigation
  3. cognitive lead
  4. mapping
  5. screen design
  6. knowledge space compatibility
  7. information presentation
  8. media integration
  9. aesthetics
  10. overall functionality
      *(Reeves & Harmon, 1993)*

- Online application process
User Interface Rating Tool

(Reeves & Harmon, 1993)

- 1-10 Likert Scale
- Semantic Differential
  - 10 - 100
  - Aggregate
  - Individual Item

- 10 – 30 = low
- 40 – 70 = medium
- 80 – 100 = high

1. ease of use
2. navigation
3. cognitive lead
4. mapping
5. screen design
6. knowledge space compatibility
7. information presentation
8. media integration
9. aesthetics
10. overall functionality
Data Analysis

- Two sample independent $t$-tests
  - website design
    - aggregate
    - individual item
  - Recruitment Time
    - online application
    - traditional
- Paired $t$-tests
  - combination of online and traditional
  - recruitment time
- Pearson Product-Moment Correlation (Pearson’s $r$)
  - correlations among the variables of interest
- each pair of variables for Magnet and non-Magnet hospitals
  - nursing website design
    - recruitment time
  - online application process
    - recruitment time
- Multivariate analysis
  - Combination of online and traditional (pencil and paper mail-in) application process
Findings: Website Design

- Significant Difference Magnet v. non-Magnet
  - Magnet = 58 – 100 (Aggregate)
  - non-Magnet = 40 - 91 (Aggregate)

- Significant Correlation (Aggregate)
### Differences in Means for Website Design Ease of Use Between Magnet and Non-Magnet Hospitals – Aggregate Scores

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease of Use (Aggregate Scores)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnet</td>
<td>15</td>
<td>82.53</td>
<td>12.97</td>
<td>28</td>
<td>0.02*</td>
</tr>
<tr>
<td>Non-Magnet</td>
<td>15</td>
<td>68.53</td>
<td>17.80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05 (two-tailed)
## Correlation Matrix of Study Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Magnet Status (Magnet v. Non-Magnet)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Significance)</td>
</tr>
<tr>
<td>Ease of Use (Aggregate)</td>
<td>.422*</td>
</tr>
<tr>
<td></td>
<td>(.020)</td>
</tr>
<tr>
<td>Cognitive Load</td>
<td>.482*</td>
</tr>
<tr>
<td></td>
<td>(.007)</td>
</tr>
<tr>
<td>Media Integration</td>
<td>.383*</td>
</tr>
<tr>
<td></td>
<td>(.037)</td>
</tr>
<tr>
<td>Aesthetics</td>
<td>.363*</td>
</tr>
<tr>
<td></td>
<td>(.048)</td>
</tr>
</tbody>
</table>

* $N = 30$, $*p < .05$ (two-tailed)
Alternative Hypothesis 2 Rejected

- Significant Difference
- Significant Correlation
  - Cognitive load (.007*)
  - Media Integration (.037*)
  - Aesthetics (.048*)
  - Mapping
  - Screen Design
  - Knowledge Space Compatibility
  - Information Presentation
  - Overall Functionality

- Not Significant
  - Ease of Use
  - Navigation
  - Mapping
Findings: Recruitment Time

Online v. traditional (pencil & paper, mail in)
- Statistically significant
- Online < Traditional
- Combination of online and traditional had highest correlation to decreased recruitment time
## Differences in Means for Application Process Between Magnet and Non-Magnet Hospitals

<table>
<thead>
<tr>
<th>Variables</th>
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<th>M</th>
<th>SD</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Line and Pencil and Paper Application Processes</td>
<td>4</td>
<td>-24.50</td>
<td>8.43</td>
<td>3</td>
<td>.010*</td>
</tr>
</tbody>
</table>

* *p < .05 (paired; two-tailed)
## Correlation Between Application Process, Recruitment Time, and Magnet Status

<table>
<thead>
<tr>
<th>Variables</th>
<th>Magnet Status (Magnet v. Non-Magnet) (Significance)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-Line Application</td>
<td>-.881* (.119)</td>
</tr>
<tr>
<td>Traditional Pencil-and-Paper Application</td>
<td>-.716* (.110)</td>
</tr>
</tbody>
</table>

\[ N = 30. \quad *p < .05 \text{ (two-tailed)} \]
### Multivariate Analysis of Application Process, Recruitment Time, and Magnet Status

<table>
<thead>
<tr>
<th>Variables</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Both On-Line Application and Traditional Application Processes</td>
<td>123.803</td>
<td>.008*</td>
</tr>
</tbody>
</table>

* $p < .05$ (two-tailed)
Hypothesis Testing

- Null Hypothesis: Rejected
- Alternative Hypothesis 1: Accepted
- Alternative Hypothesis 2: Rejected
Implications

- Hospitals and Departments of Nursing should evaluate websites based on criteria.
- Special emphasis for website design should be placed on:
  - Cognitive load
  - Media integration
  - Aesthetics
- Online and Traditional application methods had the most significant correlation to decreased recruitment time.
- Recruitment data should be mined, tracked, and evaluated.
Future Study

- convenience sample
  - hospitals
  - students

- small sample size
  - 6 hospitals
  - 15 students

- Nurse Recruiter Interviews
  - different methods of collecting information
That's All Folks !!!
Thank You!