Implementation & Evaluation of Vocera in a Canadian Acute Care Academic Hospital

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Objectives

- Review implementation and research process
- Present research results
- Discuss lessons learned
- Outline ongoing and future implementation and research plans

Background

- Communication within the healthcare
  - Vital
  - Complex
  - Impact on patient outcomes
- Communication errors
  - leading cause of in-hospital mortality
    - exceeds mortality due to inadequate clinical skill

Context

Kingston General Hospital

- Acute care teaching hospital
- Workload measurement data
  - significant non-direct care communication time
    - looking for individuals
- Structural design of clinical units
  - Difficult to communicate

Context (cont'd)

- Current portable systems
  - heavy, bulky, awkward, not reliable
- Overhead paging system
  - not conducive to efficient & effective communication
  - intrusive
  - privacy concerns

Our Criteria for a Solution

- Voice-controlled
- Hands-free
- Light
- Easy to use
- Easy to clean
- Inexpensive?

Searched for an Innovative Solution

1. CNIA annual meeting – Vocera (2005)
2. Only 1 study found:
   - Breslin, St. Agnes (2004)
   - Internal nursing communication-related workload time:
     - pre → post Vocera
     - **2.67** minutes → **0.47** minutes (p<.01)

Build Business Case

- Resource constraints at KGH
  - Competing prioities
  - $$$$
  - Time
  - Personnel
  - Hospital structure/layout – old, convoluted...
- Pilot Vocera on 1 unit
- Study process and outcomes

Study Purpose

To assess the use of Vocera in an acute care hospital.

Study Objectives

1. Document the perceptions and attitudes of clinical staff toward a new clinical device (Vocera®) pre and post implementation.
2. Compare communication patterns between unit staff pre and post Vocera® implementation.
3. Document distance travelled pre and post Vocera® implementation.

Methods

Setting

- 456-bed acute care facility
- 38-bed general surgical unit
- Layout

Study Design

- Mixed methods
  - Focus group
  - Survey
  - Time and motion study

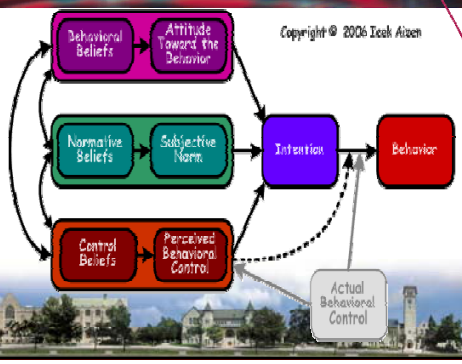
Focus Group

- 5 unit staff

Purpose:

- Identify key communication activities
- Introduce Vocera & obtain feedback
  - Who, challenges trialing & using
- Input on development of survey
- Super users identified

Survey
Theory of Planned Behavior (TPB)



TPB Question – Attitudes

Using a wireless electronic communication tool to communicate with others while working in my nursing unit is: *(circle the number on <u>each line</u> that applies)*

Harmful	1	2	3	4	5	6	7	Beneficial
Good	1	2	3	4	5	6	7	Bad
Pleasant (for me)	1	2	3	4	5	6	7	Unpleasant (for me)
Worthless	1	2	3	4	5	6	7	Useful

Subjective Norms

People who are important to me want me to use a wireless electronic communication tool for communication with others while working in my nursing unit.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Perceived Control

I am confident that I can use a wireless electronic communication tool for communication with others while working in my nursing unit.

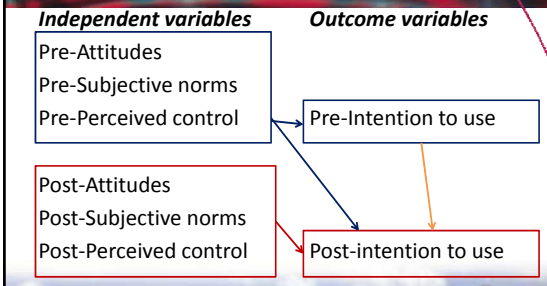
Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Outcome: Behavioural Intent

I expect to use a wireless electronic communication tool for communication with others while working on my nursing unit.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Key Relationships Tested



Time & Motion

- Timed communication practices
  - shadowed
- Distance travelled
  - pedometers

Environmental complexity

- admissions, discharges, and transfers
- sick calls, staffing shortages and overtime

Timed Communication Practices

Identified in Focus Group

1. Walking to phone to respond to calls/pages
2. Walking from phone to resume work
3. Looking for an individual to respond to a call
4. Looking for assistance
5. Looking for a specific individual
6. Looking for medication keys

Distance Travelled

- Pedometers on staff for 8 hour day shifts (0700-1500hrs)
- Pre & post Vocera

Vocera Implementation

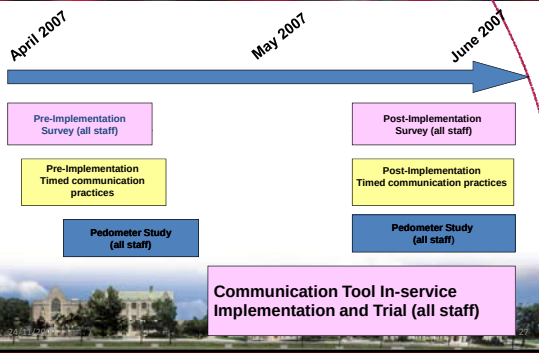
- Super users and focus group spread word
- Posters
- 1- hour orientaton & practice
- Provided with badge & pocket guide
- 70% oriented within 48 hrs
- All oriented within 2 wks

Vocera Implementation (cont'd)

3 weeks later

- Poster campaign
  - reminders & tips
  - "off-unit" teams identified as Vocera users
    - Acute pain team, respiratory therapy, linen….

Study Timeline



RESULTS

TPB Survey Results: Surgical Unit

- Good participation rate!
  - Pre Vocera® → 80% (n=55)
  - Post Vocera® → 74% (n=53)

Demographic Characteristics

- 21% < 25 years old
- 43% ≥ 40 years old
- 50% ≥ 42 months experience on the unit
- 50% ≥ 84 months of total nursing experience

Factors Predicting Behavioural Intent

Pre-Implementation:
- Attitude (r^2=0.25)

Post-Implementation:
- Perceived control (r^2=0.45)

Results: Survey

Pre versus post-implementation:

- The **pre**-implementation attitudes, SN & PC did not predict **behavioral intent** post-implementation
- **Pre-BI** predicted **Post-BI** (r^2=.43)

Results: Time and Motion

Phone-related Activities

- RNs walking to and from the phone
  - 6.8 times/day → 2.9 times per day
  - ↓57%

Results: Time and Motion

Looking for Others

No significant change in the **number** of times nurses looked for others

Time spent looking for others

- 30 → 17 seconds/event
- ↓45%

Results: Time and Motion

Looking for Others

Looking for an individual to respond to a phone call
- 30 → 12 seconds/event
- ↓61%

Looking for assistance
- 32 → 15 seconds/event
- ↓54%

Results: Time and Motion

Searching for medication keys

- 12 → 7.8 seconds/event (↓35%)
- relatively infrequent event

Results: Time and Motion

Distance Travelled

- 5.1 → 4.8 kilometers / day
  - Unit clerks 4.7km → 3.8km (↓19%)
  - RNs 4.9km → 4.7km (↓4%)
  - PCAs 6.7km → 7.8km (↑16%)

No results statistically significant.

Survey Results: Advantages (n)

Pre-Implementation

1. Timed saved/easier communication-looking for people/assistance (25)
2. More prompt & emergency assistance available (8)
3. More efficient & direct communication (5)

Post-Implementation

1. Timed saved/easier communication-looking for people/assistance (38)
2. More prompt & emergency assistance available (12)
3. Saves steps (9)

Survey Results: Disadvantages (n)

Pre-Implementation

1. Interruption in workflow (12)
2. Confidentiality (9)
3. Training/knowledge of use (5)

Post-Implementation

1. Confidentiality (15)
2. Technical problems/ background noise/ specific commands/ signal problems/ static (7)

Comments

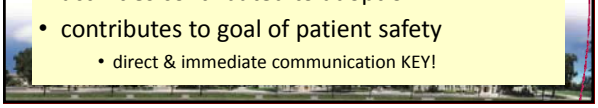
- "This is great, I love it & the time it saves me…"
- "These devices are **so** handy! We need them throughout the hospital."
- "They save a lot of time looking for people which in the end gives us more time with the patients."
- "Please don't take them away!!"

Results: Environmental Complexity

- setting is complex
- admissions/transfers/post-operative admissions lower after Vocera®
- patient census similar pre/post
- major difference = VRE outbreak in post-implementation

Take Away Message

- attitudes predicted the intention to use the device before implementation, but perceived control predicted adoption after implementation
  - account for attitudes when planning
  - staff involvement at all phases KEY!
- improved efficiencies in communication activities contributed to adoption
- contributes to goal of patient safety
  - direct & immediate communication KEY!



Implications of Findings

- This clinically-driven study on one unit had a hospital-wide impact.
- Improved efficiency in communication-related activities.
- **KGH adopted Vocera**

KGH Implementation Plan

- Staged implementation
- 1 unit at a time
- Super users / consultations current users
- Minimal barriers to implementation until…
- NICU!

Implementation in Unique Environments

- NICU
- ICU
- ER

Summary Demographics

Variable	Surgical unit (55)	NICU (29)	ICU (42)	ER (82)
40+ years old	43%	72%	70%	54%
Yrs unit experience (median)	3.5	10	5.5	5
Yrs nursing experience (median)	7.0	20	14.5	11

Psychological Factors that Predict Use: Summary

	Pre Vocera			Post Vocera	
	Sx Unit	ICU	ER	Sx Unit	NICU
Attitudes	√	√	√		√
Perceived control		√	√	√	
Subjective norms			√		

KGH Vocera Stats: Number of Users

- currently 2200
- Increase wireless cover?
  - 500 more?

Current Uses

- All Badge to badge communication
- Telephony integration
- Broadcasts - individual and corporate

Current Clinical Areas

- All medicine units
- All surgical units
- All critical care units
- All Perinatal
- OR
- Paeds

Future Clinical Areas

- ER smart phone in progress

Current Users

- Nurses and nursing staff (unit clerks PCA's etc) including managers and Directors.
- RT, OT, PT Social work
- Speech language Pathology
- Some nutritionists, pharmacy, porters, volunteers, tray passers, ESA's (cleaners)
- A handful of doctors are trialing
- Environmental services

Future Users

- Integration with some devices
  - pulse oximetry
  - bed checks

Future Research

Impact of this technology:

- Patient outcomes
- Healthcare resources
- Work environment

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Questions?

Mobile Communication