

Assessing the Motivation of MDs to use Computer-based Support at the Point-of-Care in the Emergency Department

Dympna O'Sullivan¹, Julie Doyle², Wojtek Michalowski³, Szymon Wilk⁴, Ken Farion⁵, Craig Kuziemsky³

MET Research Group, University of Ottawa, Canada

in collaboration with

¹Aston University, UK

²Dundalk Institute of Technology, Ireland

³Telfer School of Management, Canada

⁴Poznan University of Technology, Poland

⁵Children's Hospital of Eastern Ontario, Ottawa, Canada



Outline

- Acceptance of Clinical Decision Support Systems (CDSS) in practice
 - Intrinsic motivation
 - Intrinsic Motivation Inventory
 - Case Study
 - Results
 - Discussion
-

Acceptance of CDSS

- Devices and applications ranging from e-mail, alerts, reminders, PACS systems, to data- and expert-driven decision support
 - Focus on the usability of systems
 - E.g. using Technology Acceptance Model (TAM)
 - Perceived usefulness
 - Perceived ease of use
-

Technology acceptance outside the clinical domain

- Motivation theory

- Extrinsic

- Incentives and rewards

- Intrinsic

- Inherent satisfaction a person derives from an activity

- Self-determination theory

- Intrinsic motivation is the core type of motivation underlying participation in many types of activities including those associated with computing
-

Intrinsic Motivation Inventory (IMI)

- Multidimensional scale intended to assess a persons' subjective experience related to a target activity
 - IMI consists of a number of subscales:
 - Interest and enjoyment
 - Perceived choice
 - Perceived competence
 - Value and usefulness
 - Relatedness
 - Pressure and tension
 - Effort
-

Case study

- Prospective study of the MET3-AE (Mobile Emergency Triage – Asthma Exacerbation) CDSS
 - Treating and managing pediatric asthma patients
 - 39 MDs
 - Pediatric Emergency Fellows
 - Senior Medical Residents
 - Staff ED MDs
 - Participating MDs used Motion Computing C5 tablet computers
-

Case study design

- Two questionnaires
 - Part 1:
 - Usability evaluation of the MET3-AE CDSS
 - Part 2:
 - Motivation to use computer-based support at point-of-care measured using IMI tool
-

Usability: MET3-AE CDSS

- 60% of MDs found data collection using MET3-AE quicker than pen and paper and 20% found no noticeable difference between the two methods
 - 80% found the system very easy or easy to navigate
 - 100% found data entry features very intuitive or intuitive
 - 80% felt all the functionality they required, or anticipated requiring, was available in MET3-AE; whereas 20% of users were not sure how MET3-AE managed saved data
 - Overall experience: 40% found MET3-AE very easy or easy to use and 40% rated the experience as average
 - System is efficient, effective, and easy-to-use as per ISO definition of usability
-

IMI: Interest and enjoyment

- Mean score of 5.58 (7)
 - Enjoyment is considered the most integral factor of intrinsic motivation
 - MDs find computer usage enjoyable and interesting and is a positive sign for the adoption and continued usage of computer-based support
-

IMI: Value and usefulness

- Mean score of 5.22 (7)
 - MDs value clinical applications that they are most familiar with
 - MDs find mobile devices valuable and useful
 - Positive predictor for CDSS acceptance

Application	V&U
Browsing medical websites	5.97
Searching online repositories	4.22
Creating/modifying documents	5.69
Creating/modifying spreadsheets	4.1
Sending and receiving email	6.94
Viewing images on PACS	6.11
Using clinical repositories/EHRs	6.03
Research databases/statistics s/w	2.69

Tablet functions	V&U
Digital pen	5.1
Data entry	4.7
Access to EHR	4.73
Use at bedside	4.94

IMI: Effort

- Mean Score of 3.2 (1)
 - Overall the device was relatively easy to use
 - Easiest feature to use was the digital pen
 - Most difficult was data entry and accessing EHR

Tablet functions	Effort
Digital pen	2.95
Data entry	3.3
Access to EHR	3.26
Use at bedside	3.06

IMI: Perceived competence

- Mean IMI score of 4.26 (7)
 - Second lowest score
 - Considered themselves somewhat more competent than their peers - 4.5 (7)
 - Relatively low prior exposure to computer-based support - 3.83 (7)
 - Negative predictor for CDSS acceptance

Application	PC
Browsing medical websites	4.86
Searching online repositories	4.44
Creating/modifying documents	4.92
Creating/modifying spreadsheets	4.28
Sending and receiving email	5.19
Viewing images on PACS	4.47
Using clinical repositories/EHRs	4.53
Research databases/statistics s/w	3.1



IMI: Pressure and tension

- Mean score of 6.33 (1)
 - Lowest score recorded in the study
 - MDs feel significant pressure and tension using computer based support
 - Negative predictor for the acceptance of CDSS
-

IMI: Overall

IMI Subscale	Mean IMI Score (Ideal Score)	Standard Deviation
Interest and enjoyment (I&E)	5.58 (7)	1.13
Value and usefulness (V&U)	5.22 (7)	1.34
Effort (E)	3.2 (1)	1.4
Perceived competence (PC)	4.26 (7)	1.23
Pressure and tension (P&T)	6.33 (1)	1.9

Mean scores across all IMI subscales

Case study limitations

- One centre
 - One CDSS
 - One type of mobile device
 - One clinical group
 - No control group
 - No observational study (infeasible to implement)
-

Conclusions

- Positive predictors for CDSS acceptance
 - MDs perceive computer-based support to be interesting, enjoyable, valuable, and useful
 - Mobile devices are, in general not considered obstacles

 - Negative predictors for CDSS acceptance
 - Pressure and tension when asked to use technology at point-of care
 - Pressure emanates from limited prior experience with computer-based support in practice

 - Implications for practice
 - Invest in training MDs with the underlying technology of computer-based support and not just specific CDSSs
-

Recommendations

- Expand usability analysis of CDSS to assess subjective factors that intrinsically motivate MDs to use computer-based support
 - IMI or similar tools

 - Good practice in CDSS design
 - “Examine clinicians’ intrinsic motivation to use a system before commencing design and implementation of CDSSs”
-

Thank you.

Please visit MET research at:

<http://www.mobiledss.uottawa.ca/site/>
