The University of Nottingham

UNITED KINGDOM · CHINA · MALAYSIA

Ladan, Muhammad Awwal and Wharrad, Heather and Windle, Richard (2017) Understanding technology adoption and use by healthcare proferssionals using models of technology acceptance and q-methodology. In: EMDoc Conference 2017, 13 Sep 2017, University of Nottingham, UK.

Access from the University of Nottingham repository:
http://eprints.nottingham.ac.uk/49076/1/UNDERSTANDING%20TECHNOLOGY%20ADOPTION%20AND%20USE%20BY%20HEALTHCARE%20PROFESSIONALS.pdf

UNDERSTANDING TECHNOLOGY ADOPTION AND USE BY HEALTHCARE PROFESSIONALS USING MODELS OF TECHNOLOGY ACCEPTANCE AND Q-METHODOLOGY

Ladan Muhammad Awwal, Wharrad Heather and Windle Richard
School of Health Sciences, University of Nottingham

Contact:
Muhammad.Ladan@nottingham.ac.uk

Background

Information and communication technologies (ICTs) and more specifically e-health are viewed as important tools within healthcare. They are used to support clinical activities such as interactions between healthcare professionals and patients, clinical self-development, patient education, routine clinical activities, and also have the potential to address many challenges affecting healthcare sectors globally. However, there is still limited information on how technologies are adopted and used within clinical practice by health professionals particularly in countries in Sub Saharan Africa (**SSA**).

Method

This study used models of technology acceptance (Technology Acceptance Model-**TAM** and Unified Theory of Acceptance and Use of Technology-**UTUAT**) together with Q-methodology (a methodology that explores subjectivity) to understand the factors that influence ICT adoption among HCPs in clinical practice in SSA. Thirty-six participants were recruited and ranked 46 statements derived from the literature around e-health adoption and use and were organised around six combined themes of both the TAM and UTAUT, relating to their interaction with e-health in their clinical practice.

Results:

Four perspectives/Factors emerged after By-person factor analysis. Crib sheets and agreement/disagreement statements were used in the interpretation in line with Q-methodology analysis.

Patient-focused e-health advocates

This has seven significantly loading participants and explains 13% of the study variance. It has an eigenvalue of 4.68. Five of the loading participants are physicians and two are nurses. There are two females and five males with an average age of 37.7 years (34-45 years).

Healthcare professionals (HCPs) within this factor recognise that clinical ICT/ e-health improves their work efficiency without the influence of their personal characteristics such as age and gender or their previous ICT experience. HCPs here ranked ten out of twelve perceived usefulness/ performance expectancy (PU/PE) statements from +5 to 0 indicating agreement with the statements as facilitators to their adoption and use of e-health. Their placement of social influence/subjective norm (SI/SN) statements in bloc suggest their consideration of patient/families and colleagues influence to their e-health use. Facilitating conditions (FC) are the major barriers to these HCPs.

FACTOR 1 MODEL Q-SORT

Traditionalistic-pragmatists

Factor 3 has six significantly loading participants and explains 10% of the study variance. It has an eigenvalue of 3.6. Three of the participants are nurses and three are physicians. There are three females and three males within this Factor and they have an average age of 42.8 years (34-52 years).

Having identified that their use of clinical ICT resources as voluntary and within their control, HCPs within this factor ranked the PU/PE statements from +5 to -4 and the PEOU/EE statements from +3 to -1. These HCPs in this group see e-health as separate from their clinical activities and can thus do without it.

This is despite their confidence in the technology but they prefer to rely on their traditional routines and experience rather than use technology in clinical activities. They also ranked SI/SN statements as barriers because they do not consider patient/families preferences could influence their choice to adopt and use e-health within their clinical practice.
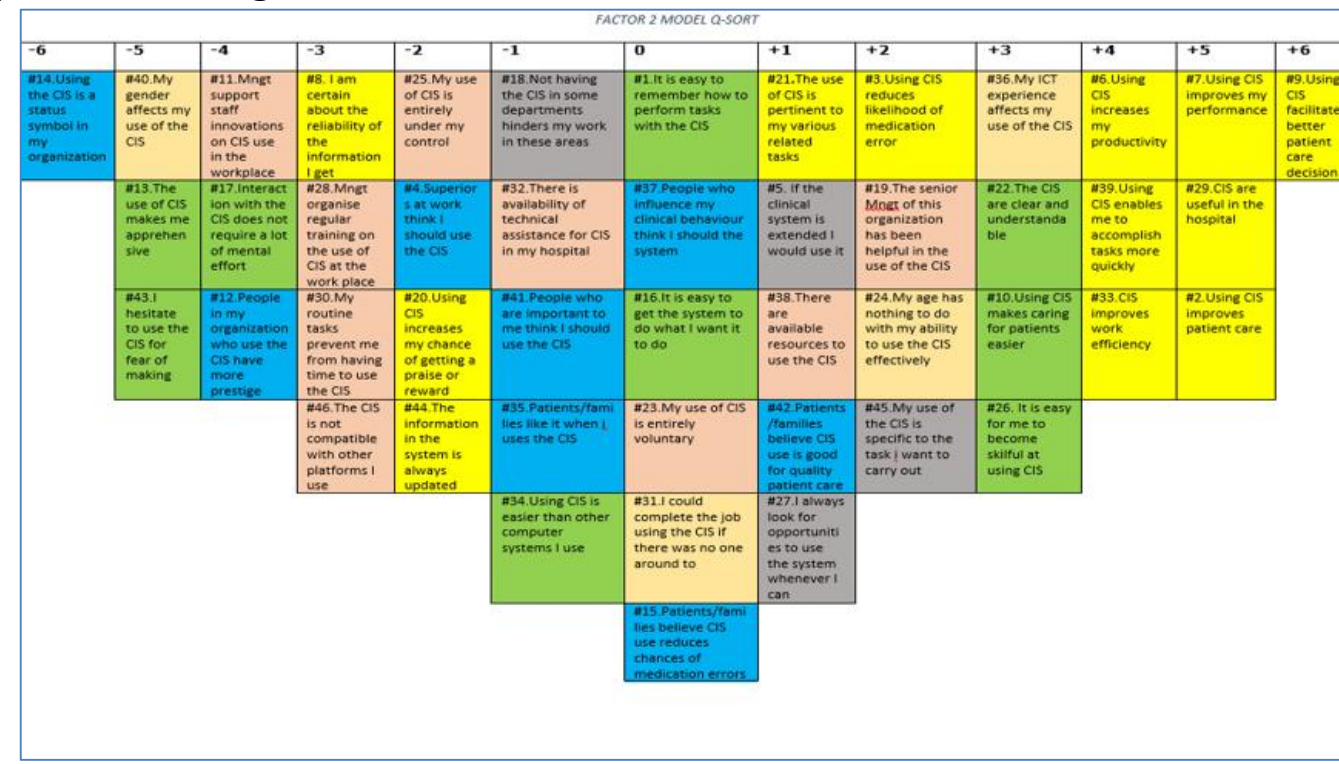

FACTOR 3 Q-SORT

Task-focused e-health advocates

This has seven significantly loading participants and explains 13% of the study variance. It has an eigenvalue of 4.68. Five of the loading participants are physicians and two are nurses. There are two females and five males within this factor and have an average age of 42.6 years (33-54 years).

HCPs within this Factor show high value of e-health resources within their clinical practice. Accordingly, they use these technologies specifically for the tasks they want to perform and without interruption to their routine activities. This is shown by their ranking of PU/PE statements.

HCPs in with this perspective like in Factor 1, they see the FC as barriers to the e-health use. In addition, SI/SN statements were also not seen to motivate adoption of technologies within their clinical practice. Statements on perceived ease of use/ effort expectancy (PEOU/EE) were ranked from +3 to -5. The main motivator for the adoption and use of e-health by these HCPs is convenience of the e-health to within their clinical tasks.

FACTOR 2 MODEL Q-SORT

Tech-focused e-health advocates

Factor 4 has eight significantly loading participants and explains 15% of the study variance. It has an eigenvalue of 5.4. Five of the participants are nurses and three are physicians. There are four females and four males within this factor and they have an average age of 44.9 years (34-54 years).

HCPs acknowledge the importance of the clinical ICT/ e-health within their clinical practice. They recognise that the use of the e-health in their individual clinical practices and even look for opportunities to use it. This is why HCPs here ranked all PU/PE statements from +6 to -1 which is higher than all other Factors. However, they ranked FC statements lower within the Factor indicating it as the most important barrier to their adoption and use of e-health in clinical practice. Nevertheless, HCPs recognise the contribution of both PEOU/EE and SI/SN statements towards their adoption. This is seen by their ranking of PEOU/EE from +4 to -3 and SI/SN from 0 to -3. Behavioural intention (BI) is an important motivator for e-health adoption by this group.

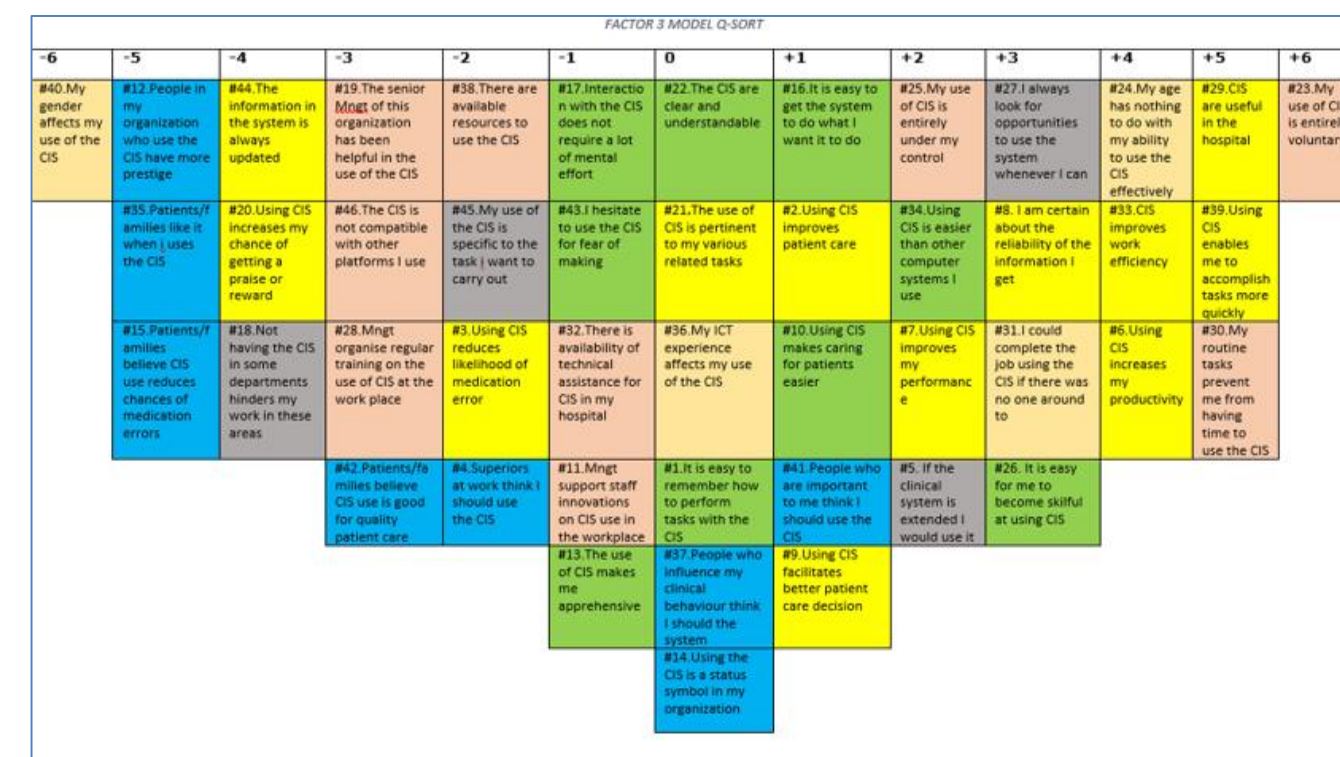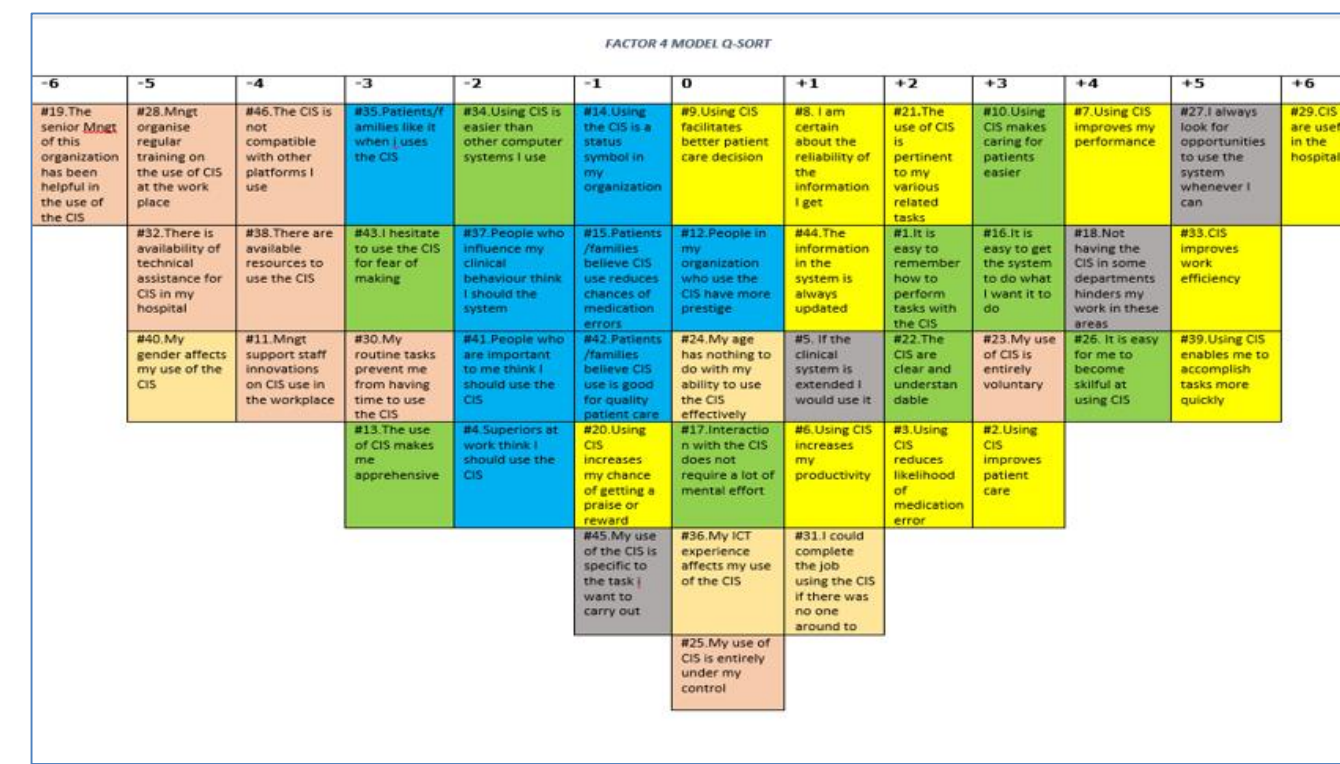FACTOR 4 MODEL Q-SORT

Consensus statements

All the study perspectives/Factors agree that their gender as an item within the individual differences (ID) construct/theme does not influence their choice to adopt and use the clinical e-health resource for their clinical practices. Moreover, participants across all the four perspectives agree that clinical information systems are useful in the hospital, and they agree on the positive contributions of the e-health resources towards their clinical efficiency (PU/PE). However, participants across the four factors acknowledge that their superiors do not support them towards the adoption and use of these e-health resource at the workplace (SI/SN) . In addition, participants across the four factors also recognise that though it might be easy to become skilful in using the e-health resources, remembering how to use it may not be as easy (PEOU/EE).

Consensus Statements	Rank			
	Factor 1	Factor 2	Factor 3	Factor 4
It is easy to remember how to perform tasks with the clinical information systems	2	0	0	2
Superiors at work think I should use the clinical information systems	-1	-2	-2	-2
It is easy to become skilful at using the clinical information systems	1	3	3	4
Clinical information systems are useful in the hospital	5	5	5	6
Clinical information systems improves work efficiency	5	4	4	5
My gender affects my use of the clinical information systems	-5	-5	-6	-5

Colour Key

- Perceived usefulness/Performance expectancy
- Perceived ease of use/effort expectancy
- Social influence/ subjective norm
- Facilitating conditions
- Individual differences
- Behavioural intention

Discussion

The **patient-driven adopters** suggests that the HCPs choice of e-health is influenced by the patient preferences to use it in their care (Trivedi et al., 2009). The **task-driven adopters** like in Hains et al. (2009), use the e-health resource only due to convenience and its ability to consolidate the information that they need. The **traditionalist-pragmatists** were similar to the HCPs captured by Hains et al. (2009) and Verhoeven et al. (2009) as clinically autonomous who don't see e-health as part of routine clinical practice. The **e-health champions** look for opportunities to use e-health. Heir et al. (2004) and Joos et al. (2004) describe such HCPs as positive and efficient towards e-health adoption and use.

Conclusion

Using models of technology acceptance and Q methodology, the study explored issues influencing HCPs adoption and use of e-health in their clinical practice. HCPs prioritised sample statements based on how each statement influence their clinical practice. Findings suggest four different perspectives to the adoption and use of e-health resources in clinical practice by HCPs in SSA. These may help understand how they make their choices about e-health and suggest conceptual application in other similar settings. HCPs should be provided with both appropriate facilitating conditions and social support and should also share in decisions on e-health adoption and use in clinical practice. Hypothesis could be generated around these four factors to test application in wider a context for future studies.

References

HAINS, I. M., FULLER, J. M., WARD, R. L. & PEARSON, S.-A. 2009. Standardizing care in medical oncology. Cancer, 115, 5579-5588.; HIER, D. B., ROTHSCHILD A FAU - LEMAISTRE, A., LEMAISTRE A FAU - KEELER, J. & KEELER, J. 2004. Differing faculty and house staff acceptance of an electronic health record one year after implementation. Stud Health Technol Inform, 107, 1300-3.; JOOS, D., CHEN, Q., JIRJIS, J. & JOHNSON, K. B. 2006. An Electronic Medical Record in Primary Care: Impact on Satisfaction, Work Efficiency and Clinic Processes. AMIA Annual Symposium Proceedings, 2006, 394-398.; TRIVEDI, M. H., DALY, E. J., KERN, J. K., GRANNEMANN, B. D., SUNDERAJAN, P. & CLAASSEN, C. A. 2009. Barriers to implementation of a computerized decision support system for depression: an observational report on lessons learned in "real world" clinical settings. BMC Med Inform Decis Mak. 9, 6-6.