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Abstract

The impact of many well intentioned technology integration projects has not always been viewed favourably. In fact, many projects are destined to fail from the outset by not considering fundamental IT system inves tment risks (technical failure, data failure, user failure, organizational failure) [Lyytinen & Hirschiem, 1987]. With any new technology 'an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them' [Bagozzi et al, 1992]. Uncertainty towards adopting new technologies is not solely the domain of decision makers. Apart from chief technology and information officers, system administrators and help desk personnel, those who ultimately feel the greatest impac t and transformation upon work practices from any newly adopted technology application or process are end-users. In mandated technology integration environments, impressions may exist whereby any form of consultative input from end-users is inherently removed, leaving end-users disillusioned with the mandated technology. This research uses an adapted version of Kline's Groupware Adoption Scale [Kline, 2001] in a preliminary study to ascertain end-user perceptions towards the proposed mandated implementation of a PDA-based point-of-care information system (ePOC) in The Ambulatory Care Team (TACT), Northern Illawarra, South Eastern Sydney Illawarra Health Service.

Keywords

Exploring, end, user, perceptions, towards, mandated, deployment, PDA, based, health, information, systems, within, Ambulatory, Care

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Exploring end-user perceptions towards *mandated* deployment of PDA–based health information systems within Ambulatory Care

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Abstract

The impact of many well intentioned technology integration projects has not always been viewed favourably. In fact, many projects are destined to fail from the outset by not considering fundamental IT system investment risks (technical failure, data failure, user failure, organizational failure) [Lyytinen & Hirschiem, 1987]. With any new technology 'an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them' [Bagozzi et al, 1992]. Uncertainty towards adopting new technologies is not solely the domain of decision makers. Apart from chief technology and information officers, system administrators and help desk personnel, those who ultimately feel the greatest impact and transformation upon work practices from any newly adopted technology application or process are end-users. In mandated technology integration environments, impressions may exist whereby any form of consultative input from end-users is inherently removed, leaving end-users disillusioned with the mandated technology. This research uses an adapted version of Kline's Groupware Adoption Scale [Kline, 2001] in a preliminary study to ascertain end-user perceptions towards the proposed mandated implementation of a PDA-based point-of-care information system (ePOC) in The Ambulatory Care Team (TACT), Northern Illawarra, South Eastern Sydney Illawarra Health Service.

1   Introduction

The combination of cost-effective technology convergence, an increasing number of mobile workers ('road warriors') and growing levels of familiarity and acceptance of mobile devices continue to impact upon work practices in a diverse range of industries; from private sector tourism, transport and media to public sector defence, education and health. The resultant impact of many well intentioned technology integration projects

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however has not always been viewed favourably. Anecdotal evidence (often embellished as 'horror stories') abounds in regards to poorly planned, stalled or failed projects [Betts, 2003, Hierl, 2003, Phillips & O'Bryan, 2003] and many projects are simply destined to fail from the outset by not considering fundamental IT systems investment risks (technical failure, data failure, user failure, organizational failure) [Lyytinen & Hirschiem, 1987]. Goulielmos suggests that such failures are still regarded as a technical effort and not as a socio-technical process that unfolds within an organization. [Goulielmos, 2003].

With any new technology 'an element of uncertainty exists in the minds of decision makers with respect to the successful adoption of them' [Bagozzi et al, 1992]. Uncertainty towards adopting new technologies is not solely the domain of decision makers. Apart from chief technology and information officers, system administrators and help desk personnel, those who ultimately feel the greatest impact and transformation upon work practices from any newly adopted technology application or process are *end-users*. In mandated technology integration environments, impressions may exist whereby any form of consultative input from end-users is inherently removed, leaving end-users disillusioned with the mandated technology. Within the Australian public health sector these scenarios present unacceptable risks for management to contemplate. Budgetary constraints and resource deployment must be managed cost-effectively as the Australian population continues to age[1] and the care burden upon the national health system rises proportionately[2]. In such cases, successful full-term integration of technology projects is vital.

Therefore, prior consideration of the role of end-users, their perceptions towards mandated technology implementations and uncertainties over possible, sometimes detrimental changes in work practices need to be acknowledged and addressed. Socio-cognitive models which aim to predict and explain end-user adoption and acceptance of information systems (IS), including the Theory of Reasoned Behavior (TRA) [Azjen & Fishbein, 1980] and the Technology Acceptance Model (TAM) [Davis, 1985] both assume that given sufficient time and knowledge about a particular behavioral activity, an individual's intention will closely resemble how they do behave. [Rawstorne et al, 2000]. However, Rawstorne contends that the TRA is ill equipped to predict situations in which individuals have low levels of volitional control [Azjen, 1985]. This paper discusses a research project that utilises Kline's Groupware Adoption Scale [Kline, 2001] framework to assess user perceptions (throughout the project lifecycle) towards a mandated PDA-based information system implementation in Ambulatory Care. This approach differs from more traditional approaches (post-implementation frameworks) by iteratively assessing and addressing end-users needs, requirements and perceptions. The authors contend that addressing user concerns as they arise throughout the system development lifecycle will lead to greater levels of user acceptance.

The ePOC (*electronic* Point-of-Care) PDA project is involves the design and development of a prototype Personal Digital Assistant (PDA) based point-of-care information delivery system for TACT. The philosophy of the project is to utilize generic, reusable and scalable components which have the capacity to exchange or message data between existing legacy area health systems (such as hospital/community, patient, pathology, radiology and medical reference database systems) via a suite of HL7[3] compliant middleware applications. This project is funded by the Australian Government's Australian Research Council (ARC) and is part of their industry Linkage

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[1] The Australian over 85 age group is expected to almost quadruple as a proportion of the population, from 1.3% today to around 5% by 2051 [Australian Bureau of Statistics, 2003]

[2] In 2000-03, patients aged 70 years and over accounted for 34.9% of total patient days (all hospitals, all Australian states and territories) [Australian Institute of Health and Welfare (AIHW), 2002-03]

[3] HL7 is a protocol for formatting, transmitting and receiving data in a healthcare environment [HL7]

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Scheme; an agreed partnership between researchers and industry, government and community organizations as well as the international community [Australian Research Council, 2005]. The ePOC project is a multi-phase, collaborative research venture between: researchers from three of Australia's leading universities (University of Wollongong, Flinders University and the University of South Australia), The Ambulatory Care Team (TACT) Northern Illawarra, South Eastern Sydney Illawarra Health Service and a leading Australian-based health informatics systems development company - Pen Computer Systems Pty Ltd. The overall aim of the ePOC project is to deliver a software product based on PDAs to replace a current paper base system. The new product will specifically assist in the management of client (patient) information, such as personal information, clinical information, electronic assessment and health care plans in an Ambulatory Care (point-of-care) environment.

In addition to the development of a product one of the research outcomes of this project is to address the issue of levels of uncertainty for end-users regarding perceived usefulness and ease of use of proposed technology applications that are mandated. This paper reports on this aspect of the project, that is, it investigates the factors that are perceived to represent the greatest barrier to successful implementation. By identifying and addressing these barriers early it is hoped to maximise user acceptance of the new software product being developed. ePOC end-users, through recognition of their perceived expectations, technology application wish-lists and consultative involvement will help to drive the design and development of the ePOC solution for the Ambulatory Care Team (TACT) Illawarra. This paper reports the preliminary outcomes of the survey on end-user perceptions.

2   Background

2.1   The Ambulatory Care Team (TACT)

Community based health services within New South Wales (NSW), Australia currently deliver over eight million occasions of service per annum. These are carried out by more than 7,000 clinicians from more than eight hundred and fifty health service locations across NSW. The cost of this service is estimated to be almost $450 Million dollars per annum [NSW Health CHIME Overview]. The Ambulatory Care Team (TACT) Northern Illawarra is one such area health initiative which is based on providing patients with a choice of having treatment in their usual place of residence (including aged care facilities)[4] or other locations as an alternative to hospital. The TACT team is a small unit with 21 staff members consisting of (3 Doctors (including the team's Medical Director), 1 x Nurse Manager, 13 x nurses (4x full-time and 9x Part-time), 2 x Pharmacists, 1 x Physiotherapist and 1 x COPD[5]).

In 2004, TACT Northern Illawarra provided medical, nursing and Allied-health professional services (such as physiotherapy and pharmacy services) to more than 1,300 patients, with an average of 114.4 separations[6] per month. TACT receives referrals from several sources: Hospitals, General Practitioners (GPs), Visiting Medical Officers (VMOs) and Staff Specialists (SS) and Peri Operative Clinics. The two largest referral sources (2004) were Wollongong Hospital (50.3%) and GPs/ VMOs/ SSs (29.3%).[7]

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[4] Ambulatory Care literally refers to '*Hospital in the Home*'
[5] Chronic Obstructive Pulmonary Disease Specialist.
[6] Separation (Discharge) numbers are equivalent to referral source numbers
[7] TACT Referral Sources (2004), TACT Illawarra.

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2.2 ePOC (*electronic* Point-of-Care) Project

A PDA based point-of-care system is significant as it will provide for *collection, delivery and exchange* of timely information (both text and images) at the point-of-care leading to a more efficient health care system. Effective healthcare delivery within community based health services depends upon efficient information access[8]. The current systems used by TACT are paper-based and are limited to what the healthcare worker can effectively carry. The key advantages of a PDA system will be its high mobility and flexibility in matching complex healthcare workflow requirements as well as immediate updating of healthcare records. Such a system has the potential to save people's lives or at least significantly improve their health outcomes by responding more quickly and with more appropriate action. ePOC is intended to:

- be easy to use and integrate with work practices
- be used at point-of-care
- *'Push'* information to healthcare providers to minimize time searching for information for decision making

ePOC will also address the following issues:

- Generic software for use by healthcare workers at point-of-care
- Interface Software
- Security, Authentication and Privacy solutions including policies
- Communication technology interface issues [Walsh, 2003]

3 Research Approach

From the outset the research approach adopted by the ePOC project has been centred around a consultative, open approach with all project team members. In particular, project team health area managers (Clinical, Research and IT) and the intended end-users (TACT Doctors, Nurses and Para-Health Professionals) of the PDA application. To facilitate this approach, the ePOC project incorporates a number of research and development phases.

Phase 1 of ePOC involved preliminary workflow and process analysis, requirements specifications and development and testing of a system prototype. Several iterations of components from Phase 1 have continued ('rolled over') into Phase II of the project. The main focus of Phase II is to assess end-user perceptions towards the implementation of ePOC. This involves:

- Development of a viable pre-implementation user acceptance instrument (scale);
- Survey (Stage One data collection)
- Focus Group interviews (Stage Two data collection)

These research components are interspersed with a number of additional ongoing data gathering and process verification workshops. Workshop participants include software development manager/s (technical project partners), TACT medical director and nurse manager (health project partners) and researchers representing the academic project partners.

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[8] NSW Health Information Management and IT Strategic Plan, 2001

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3. 1   Stage One Data Collection

The instrument used in the study was adapted from Kline's Groupware Adoption Scale [Kline, 2001] and refined for the project, taking into account Cavana *et al's* [Cavana et al, 2001] three focus areas: firstly, the wording of the questions, secondly, planning the categories, scaling and coding of responses and thirdly, the general appearance of the questionnaire.

3.1.1   Development of the Pre-implementation instrument

Kline's Groupware Adoption Scale [Kline, 2001] was developed for the purpose of measuring user acceptance of Groupware Systems post implementation. A major aim of the ePOC project is to involve end-users in each stage of the project through an open consultation process. The focus of this approach is to identify the factors that might present the greatest barrier to user acceptance of the point-of-care system. The project sought to gain end-user perceptions of the proposed new system highlighting points where intervention may be required to ensure higher levels of user acceptance and support for the ePOC system. Kline's scale was adapted to meet this need.

Kline's six subscales: Ease of Use; Training; Technical Support; Consultation; Work Needs Met and System Capabilities were incorporated into the instrument. Additionally, the three commitment items also used in Kline's scale to assess employee commitment to using the system was included. A five point Likert scale with responses ranging from "Agree completely" through to "Disagree completely" was utilized.

The intention of the ePOC pre-implementation instrument is twofold; firstly, to discover the perceptions of TACT end-users towards PDA technology adoption/integration and secondly, to test the instrument for validity and reliability as a measure of user acceptance of mandated mobile technology implementations in healthcare environments.

3.2   Procedure

TACT staff were approached by the services' medical director and nurse unit manager and asked to participate. Information regarding the ePOC project, proposed methodological approach and expectations of participants in regard to role and requirements was disseminated in writing to each member of the 21 member TACT team. Participation was voluntary and anonymous. The survey instrument was distributed to all 21 TACT staff in mid December 2004. Participants were not remunerated for their participation. University and Regional Health Service approved ethical clearance for the study was obtained prior to contact with the TACT team members.

4   Results and Discussion

The survey instrument was completed by all twenty one TACT staff and returned to the ePOC project team in early January 2005. This represented a 100% response rate from a small unit of 21 staff. . Survey data was entered into a Microsoft Excel spreadsheet and graphs generated for each of the items in the subscales. The purpose of the descriptive analysis of the data was to get an indication of the perceptions of the TACT staff towards the implementation of the ePOC system. While Kline initially undertook reliability and validity testing of the survey instrument used in this project we intend to undertake a more rigorous analysis of the data. Using SPSS an analysis of the data is

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currently underway to determine validity and reliability of the instrument. The results of this analysis are outside the scope of this paper.

The preliminary results of the survey are categorized according to the six subscales and the three commitment items included in the instrument and discussed below. The questions in each subscale have been aggregated to provide an overall view of the TACT member's perceptions to each of the items identified by the subscales.

4.1   Ease of Use

From the preliminary analysis of the results of the questions in the sub-scale "ease of use" it is apparent from Table 1 that the majority of TACT staff (>70%) expect that the new system will be easy to use. However, given that TACT is a relatively small group of healthcare workers (21), it will be important that the project team investigate further the reasons that some staff (for example, 8 respondents neither agreed or disagreed that they would be able to transfer current technology skills to the new system) have reservations about perceived "ease of use" of the proposed system. It may be that staff are unaware of exactly what skills will be required to use the new system effectively. This issue will be explored further in the focus group interviews that are currently underway.

Ease of Use	
Disagree completely	0%
Disagree somewhat	8%
Neither agree or disagree	17%
Agree somewhat	41%
Agree completely	33%

Table 1

4.2   Training

Training needs do not appear to be an issue, evidenced from Table 2 that seventy five percent (75%) of TACT staff either agreed completely or somewhat with the items in the training subscale. Staff acknowledged that they would need to retrain and were generally supportive of undertaking further training (13/21), however, stated that they would require time out from normal duties to undertake training. The remaining twenty five percent (25%) of staff responded with "neither agree nor disagree". Although this response is relative small, that is, twenty five percent (25%), for a small group is large enough to warrant further investigation by the project team.

Training	
Disagree completely	0%
Disagree somewhat	0%
Neither agree or disagree	16%
Agree somewhat	22%
Agree completely	62%

Table 2

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4.3 Technical Support

The "technical support" subscale sought responses to questions regarding whether technical support would be available and whether or not this would be provided in a timely manner. Fifty percent (see Table 3) of TACT staff agreed that technical support staff would be available if needed and that they would respond in a timely manner. However, thirty (30%) and forty (40%) percent of respondents respectively did not respond to this question, preferring to take a neutral standpoint. This may be a result of a lack of knowledge or full understanding of what technical support needs may be required once the system is in place. This is another issue that will need to be investigated further in the focus group interviews.

Technical Support	
Disagree completely	0%
Disagree somewhat	17%
Neither agree or disagree	29%
Agree somewhat	7%
Agree completely	48%

Table 3

4.4 Consultation

Table 4 shows that the TACT staff have a strong perception (greater than 70% either agreed completely or agreed somewhat) that they will be consulted during the system design and development phases of the ePOC project and that their needs will be taken into consideration and incorporated into the final version of the system. It is imperative that the project team continues to ensure that end-users are actively engaged in all phases of the project.

Consultation	
Disagree completely	2%
Disagree somewhat	10%
Neither agree or disagree	17%
Agree somewhat	38%
Agree completely	33%

Table 4

4.5 Work Needs Met

Table 5 indicates there is obviously a diverse range of staff expectations and perceptions as to whether their "work needs" will be met through the implementation of the ePOC system.

Work Needs Met	
Disagree completely	2%
Disagree somewhat	10%
Neither agree or disagree	16%
Agree somewhat	32%
Agree completely	40%

Table 5

Favourable responses were received to questions regarding accomplishing more work in the same time frame (77%); enhanced quality of work (76%) time savings (74%) and increased capacity to carry out work (75%). However, in regard to meeting imposed deadlines, twenty six percent (26%) of staff were unable to respond. This again will need further investigation by the project team to ensure that staff understand how the system will address their work needs.

4.6   System Capabilities

The project team will need to work closely with users with respect to system capabilities. A majority (75%) of the staff at TACT have a high expectation that is, agreeing completely, on what the system "should" be capable of, however their perceptions of what the system "will" be capable of are less strong. In fact, Table 6 shows a considerable portion of staff (up to 60%) answered "neither agree nor disagree" to this item. The project team is hopeful that this issue will be addressed through information sessions and updates to TACT staff throughout the project.

System Capabilities	
Disagree completely	0%
Disagree somewhat	2%
Neither agree or disagree	36%
Agree somewhat	7%
Agree completely	55%

Table 6

4.7   Commitment

The final subscale indicates the level of commitment of staff to the use of the new system when it is introduced. Table 7 clearly indicates a strong commitment by staff to using the system if introduced, with only one staff member disagreeing completely to supporting the Organization in its decision to implement the new system. Again, some staff responded with "neither agree" nor "disagree" to this question. In terms of using the new system, eight five percent (85%) of respondents stated that they would be committed to using the ePOC system and learning to use it.

Commitment	
Disagree completely	2%
Disagree somewhat	0%
Neither agree or disagree	11%
Agree somewhat	25%
Agree completely	62%

Table 7

5   Current Status of the Research

At the time of writing, ePOC continues to progress through Phase II. The analysis of results from the pre-implementation survey is in the process of being incorporated into Focus Groups where issues raised in the survey can be further investigated. Statistical analysis of data collected in the survey will occur using the SPSS statistical software package to determine reliability and validity of the refined instrument in determining user acceptance of mandated POC technologies in the mobile healthcare setting. In

particular, Focus Groups and Information Sessions were imperative to building the consultative approach of the ePOC project. Such research components however cannot by themselves alleviate identified negative end-user experiences such as evidenced in end-user remarks regarding a NSW Health PAS/POC pilot study, '[T]hey had not been party to the development of the strategy, had little involvement in the selection of the system, and had little other than sales presentations on which to base their expectations: "I didn't get to see it until four months into the implementation process"[Sauer et al, 1997]. To assist in ensuring project success a consultative approach must be carried into subsequent stages and phases of ePOC.

The task of software development planning by ePOC project technology partners continues in parallel with the research components detailed in this paper. Currently, this task is focused on the development of middleware interface applications for accessing Ambulatory Care systems via the mobile PDA device. Embedded within this component are issues related to security and authorization. Protocols and business rules must be developed for addressing the security of the hand-held device (PDA) while located at the TACT office and traveling to and from TACT client's homes. On a fundamental level, protocols and business rules should also incorporate physical security of the device (what happens if the device is misplaced or stolen?), as well as issues such as, which TACT member 'inherits' ownership of the PDA in a multi-person team, who is responsible for charging batteries, reporting faults and similar scenarios. Authorization issues will be more complex to address considering privacy laws in relation to accessing and distributing patient medical records. Security and authorization issues under consideration for the ePOC project include wireless security standards, biometric ID, store and forward versus real-time data acquisition and reporting and verification of Unique Patient Identifiers (UPIs) across disparate community health databases.

6   Conclusion

The results of the survey indicate that the majority of TACT staff generally have a positive perception of the ePOC system and are committed to using it once implemented. However, there appears to be some confusion about how the ePOC system will meet existing work needs and whether or not adequate technical support will be available once the system is implemented. This could be due to a lack of understanding of what support will be required. These issues will be explored further in the focus groups which are currently underway. Key areas where intervention will be required in terms of meeting user requirements are highlighted in the data collected via the pre-implementation survey. The results of the survey also highlight the need for a highly consultative process particularly throughout the analysis and design phases of the project. Minimal disruption to existing work practices at TACT and development of a "user-friendly" interface are key aims of the project and are imperative to a successful "user" outcome.

Further information regarding the ePOC PDA project can be found on the ePOC website: http://www.itacs.uow.edu.au/cear/ehealth/ePOC/

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References

Azjen, I. (1985). *"From Intentions to Actions: A Theory of Planned Behaviour,"* in *Action Control: From Cognition to Behaviour*, J. Kuhl and J Beckmann (eds.), Heidelberg: Springer, 1985, pp.11-39.

Azjen I., and Fishbein, M. (1980).Understanding Attitudes and Predicting Social Behaviour, Engelwood Cliffs, NJ: Prentice Hall, NJ.

Australian Bureau of Statistics. Yearbook Australia 2003, Income and Welfare Feature Article: An ageing Australia. Available Online:
http://www.abs.gov.au/Ausstats/abs@.nsf/94713ad445ff1425ca25682000192af2/f61931 89c8ad3007ca256cae0005a250!OpenDocument
Last accessed: 19/01/2005.

Australian Institute of Health and Welfare (AIHW). Australian Hospital Statistics 2002-03. Table 7.4. Available Online:
http://www.aihw.gov.au/publications/hse/ahs02-03/ahs02-03-c07.xls
Last accessed: 19/01/2005.

The Australian Research Council. Linkage-Programs. Available Online:
http://www.arc.gov.au/grant_programs/linkage_projects.htm
Last accessed 29/01/2005.

Bagozzi, R. P., Davis, F. D., & Warshaw, P. R. (1992). 'Development and test of a theory of technological learning and usage'. *Human Relations*, 45(7), 660-686.

Betts, M. (2003). 'Why IT projects fail?' *Computerworld.* August 25, 2003. Available Online:
http://www.computerworld.com/managementtopics/management/project/story/0%2C108 01%2C84266%2C00.html
Last accessed: 19/01/2005.

Cavana, R.Y., Delahaye, B.L. and Sekaran, U. (2001). Applied business research: qualitative and quantitative methods. John Wiley & Sons. Milton, Qld. 227-228.

Davis, F. D. (1985). A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results, Unpublished Ph.D. Dissertation, Massachusetts Institute of Technology.

Goulielmos, M. (2003). Outlining Organisational failure in information systems development. Disaster prevention and Management, Vol 12, Number 4, pp. 319-327.

HL7. What is HL7?. Available Online: http://www.hl7.org/
Last accessed 28/01/2005.

Hierl, M. (2003). 'Why most technology projects fail: how to become the exception to the rule'. New Jersey Tech News. Available Online:
http://www.pacesettergroup.com/NJTech%200903TechFail%20wo%20date.pdf#search= 'why%20technology%20projects%20fail'
Last accessed 19/01/2005.

Kline, T.J.B. (2001). The Groupware Adoption Scale: a measure of employee acceptance. Human Systems Management, 20, 59-62.

Jason Sargent, Lois Burgess, Joan Cooper, Carole Alcock and Dr. Damian Ryan

Kline, T.J.B., & Gardiner, H. (1997). The successful adoption of groupware: Perceptions of the users. Human Systems Management, 16, 301-306.

Lyytinen, K and Hirschheim R. (1987). 'Information systems failures: A survey and classification of the empirical literature', *Oxford Surveys in Information Technology*, Vol. 4, 257-309.

NSW Health. Community Health Information Management Enterprise: Overview. What is CHIME? Available Online:
http://www.chime.gov.au/iasd/chime/chime/overview/index.html
Last accessed 20/01/2005.

NSW Health. Community Health Information Strategy: Overview. Available Online:
http://www.chime.gov.au/
Last accessed 20/01/2005.

Phillips, D and O'Bryan, R. (2003). 'It Sounded Good When We Started: A Project Manager's Guide to Working with People on Projects', John Wiley & Sons, New Jersey.

Rawstorne, P., Jayasuriya, R., and Caputi, P. (2000). Issues in predicting and explaining usage behaviors with the technology acceptance model and the theory of planned behavior when usage is mandatory. International Conference on Information Systems. Proceedings of the twenty first international conference on Information systems. Brisbane, Queensland, Australia. pp 35 – 44.

Sauer, C,. Southon, G., and Dampney, C.N.G. (1997). Fit, failure, and the house of horrors: toward a configurational theory of IS project failure. International Conference on Information Systems. Proceedings of the eighteenth international conference on Information systems. Atlanta, Georgia, United States. Pp. 349 – 366.

Walsh, D. (2003). *Discovering the requirements for a Personal Digital Assistant Based Electronic Medical Records System for Ambulatory Care Services*. Unpublished honour's thesis, University of Wollongong, Wollongong, NSW, Australia.

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Appendix 1. List of questions in the study Pre-Implementation Questionnaire

Please note, all questions included the following possible responses

1   Disagree completely
2   Disagree somewhat
3   Neither agree or disagree
4   Agree somewhat
5   Agree completely

1. I would like the electronic POC system to be introduced into The Ambulatory Care Team
Ease of Use

*The following questions are used to determine your **perceptions** and **expectations** on the Ease of Use of the new technology prior to a PDA-POC being developed and trialed in TACT.*

2. I would be able to easily learn to use the system
3. I would be able to transfer easily what I learned from the current system to the new system
4. The PDA ePOC has the potential to significantly reduce the time taken to perform a similar manual-based task

Training
*The following questions are used to determine your **perceptions** and **expectations** regarding Training in the use of the new technology prior to a PDA-POC being developed and trialed in TACT.*

5. If an electronic POC system was introduced into your workplace that requires you to be retrained for that task, I would you be willing to do so?
6. I would require time allowed for my formal training
7. I would require ongoing training

Technical Support
*The following questions are used to determine your **perceptions** and **expectations** on Technical Support issues of the new technology prior to a PDA-POC being developed and trialed in TACT.*

8. If I have technical difficulties in using the new system the technical support personnel will be easy to reach at any time?
9. If I have technical difficulties in using the new system the technical support personnel will respond in a timely manner?

Consultation
*The following questions are used to determine your **perceptions** and **expectations** on the level of Consultation end-users will receive in the design and ongoing development of the new technology prior to a PDA-POC being finally developed and trialed in TACT.*

10. I will be consulted adequately about my needs as a user of the system before the decision to adopt the new system is made?
11. I will be asked whether the system is meeting my expectations?
12. A decision to adopt a particular system will reflect any concerns I may have as an end-user of the system?

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Work Needs Met
*The following questions are used to determine your **perceptions** and **expectations** on the level of you Work Needs Met by the new technology prior to a PDA-POC being developed and trialed in TACT.*

13. The new system should allow me to accomplish more work in the same time frame?
14. The new system should enhance the quality of my work?
15. The new system should save me time?
16. The new system should allow me to meet imposed deadlines?
17. The new system should increase my capacity to carry out my work?

System Capabilities
*The following questions are used to determine your **perceptions** and **expectations** on the System Capabilities of the new technology prior to a PDA-POC being developed and trialed in TACT.*

18. The system's software and hardware <u>should</u> be reliable (does not crash)?
19. The system's software and hardware <u>will</u> be reliable (does not crash)?
20. The system's software and hardware <u>should</u> be powerful enough for my work needs?
21. The system's software and hardware <u>will</u> be powerful enough for my work needs?

Commitment
*The following questions are used to determine your **perceptions** and **expectations** on the level of Commitment of end-users of the new technology prior to a PDA-POC being developed and trialed in TACT.*

22. If TACT introduced the electronic POC system, I would use it?
23. I would be committed to learning to use the new system?
24. I would support TACT and Illawarra Health's decision to use the new system

Persuasion
*The following questions are used to determine your **perceptions** and **expectations** on the level of Commitment of end-users of the new technology prior to a PDA-POC being developed and trialed in TACT.*

25. Management is actively promoting the benefits of the new system
26. Managers at the unit are encouraging staff to use the new system when implemented
27. I am confident that management will use the new system
28. I regularly receive information/updates regarding the development and implementation of the new system

------------------------- End of Questionnaire -------------------------

Jason Sargent, Lois Burgess, Joan Cooper, Carole Alcock and Dr. Damian Ryan

Authors

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Lois Burgess is a lecturer in the School of Information Technology and Computer Science (SITACS) at the University of Wollongong. Lois has a BInfotech (Hons) Degree (University of Wollongong) and is a PhD candidate. She lectures in IT Strategic Planning, Business Online and E-Commerce, Security, Risk Management and Control. Lois has 20 years experience in the public sector holding positions in Administration Management, Personnel and Training and Development. Research Interests include: Online Service Quality, eTourism and eHealth. Lois is a member of the Health Informatics Research Centre at the University of Wollongong (HIRC), and CollECTeR, and has a number of publications in the areas of e-health and e-Commerce.

Professor Joan Cooper is Deputy Vice-Chancellor(Academic) at Flinders University, Adelaide, Asutralia. She was the foundation Professor of Information Technology at the University of Wollongong and was the first female professor of IT in Australia. She is one of the three founders of Australia's first inter-university electronic commerce research and consulting group CollECTeR (Collaborative Electronic Commerce Technology and Research). Her most recent research is in the field of electronic commerce and health informatics. She has a strong interest in privacy and confidentiality.

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Dr Damian Ryan is Medical Director for The Ambulatory Care Team (TACT), Northern Illawarra. Damian is a medical graduate from Sydney University and has worked for IAHS since 1992 with experience in Emergency Medicine and General Practice. He became a fellow of the Royal Australian College of General Practitioners in 1999. Damian was selected for the position of Medical Director of Ambulatory Care Northern Illawarra (TACT) in March 1999. Since then, TACT has grown to one of the largest Ambulatory Care services in Australia. Damian is also involved in medical education both at an undergraduate and post graduate level. He was appointed a Conjoint Lecturer of the University of NSW in 2001 and has been an examiner for the Royal Australian College of General Practitioners for five years.