A SSM Driven Knowledge-Portal Design

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ABSTRACT

Portal design, regarded as a human-activity centric process, defines: (a) what users want in the context of their activity flows and information-resources; and (b) how information systems can be designed to address these needs. On this basis, the Breast Cancer Knowledge On-line (BCKO) project is trialling soft system methodology (SSM) in transforming its system development lifecycle (SDLC) approach into a human activity centric system design model to develop a user sensitive and intelligent knowledge-portal.

INTRODUCTION

The BCKO project (http://www.sims.monash.edu.au/research/eirg/BCKprojectdescr.html) is a two-year action-research program between Monash University, BreastCare Victoria and Breast Cancer Action Group.

The portal resolves the lack of availing relevant, quality and in-time information for the Australian Breast Cancer (BC) communities. Its characteristic features are marked by its user sensitive and intelligent knowledge management functionality that would help users find what they expect to know, as and when required, and in a form that would effectively empower them to make and take appropriate decisions and actions (Fisher, Burstein, McKemmish, Manaszewicz, Anderson & Williamson, 2002).

LITERATURE REVIEW

The literature review on portal definitions, human-computer interaction, information systems, knowledge and service management paradigms concluded that:

1. Portals are not just evolutionary representations of information systems (IS) that are built on newer technologies, but are also human-activity system solutions that connect people, process and technology for resolving users problems and realising opportunities that enhance their lives.
2. Design is a process that concerns the ability of people to use their experiences, skills and knowledge to change their environments for meeting their living needs, and involves the use of rationale logic and linear structure to build design artefacts, systems and environment changes (Bilton, 2002).
3. User centricity is an emerging concept of and success factor for designing and delivering IS for supporting people to carry out their work efficiently and effectively (Dix, 1998 and Preece, Rogers, Sharp & Benyon, 1994). Dix views portal design as a process that not only specifies the task decomposition of human based knowledge activity flows, but also the socio-technological system framework of how they are represented and effected by system artefacts.
2. The SSM approach of Checkland and Scholes (1999) is a suitable user-centric problem solving technique for probing the notion of purposeful human activities, social roles and political drivers in defining user requirements and for guiding the logical and physical architecture-designs of systems.

RESEARCH METHODOLOGY

This section examines why and how SSM is currently being tried in the BCKO project.

Why?

The project team views the BCKO project as an iterative-prototyping based action-research that would deliver a portal that is capable of helping users locate and find web resources in a manner and form that they want, as and when (and where) required.

User needs analysis has been carried out using socio-oriented, qualitative methods to describe the problem situation and confirmed through interpretative research that the portal is the problem resolution. From an IS perspective, this user analysis lacks vigour in system context that developers can effectively use for designing the portal's logical and physical system architectures. This instigated exploring SSM and the literature review concluded that it is most suitable because SSM:

1. Uses system-modelling concepts that developers can easily relate to in defining user requirements in terms of human activity flows.
2. Enhances project success by revealing critical success factors that lie hidden in stakeholders' cultural and political drivers, which relay to their different expectations of and preferences for development approaches, project scope and management drivers, and portal functionality.
3. Provides an effective management approach for supervising a multidisciplinary team, which according to Denley and Long (2001), brings about as many benefits as there are problems. These problems arise from differences in team-members' opinions, interests, language, communication styles, entrenched training, skills and knowledge, etc. SSM not only enables multidisciplinary team members to view their different definitions and ideas, but also foster them to collaborate and agree on common views of human activities, social roles and political motivators that constitute problem situations and solutions. This approach would result in a defendable model of user requirements that BCKO developers can rely on during system development (Lane & Galvin, 1999).

How?

The project's research methodology uses SSM during its project planning and iterative SDLC process execution.

During project planning, SSM is used to scope the problem situation by modelling the CATWOE-definition to specify user requirements.

This first level of user requirements is then translated into theory-based conceptual models that describe the macro and micro interactions of individual human and enterprise activities (because individual stakeholders use the portal services for engaging personal and/or enterprise activities).

Established muli-disciplinary theories are used to describe user requirements as follows:

- **Personal requirements** concern how a user uses the portal to locate, organise, share and use web information to address decision-making or action-taking. *Knowledge management* (such as that of Alavi's knowledge activity model (1997)) and *human-computer interaction* principles can be used to describe these knowledge flows and conative styles of users.
- **Enterprise requirements** expressed in terms of:
  - Customer service provisioning when enterprise users use the portal or refers their customers to use the portal to access reliable BC information resources. *Service management* paradigms can be used to model how enterprise users service their customers on-line.
  - Strategic leverage of the portal to increase operational efficiency and effectiveness, and manipulate competitive and share-market advantage. *Industry structures, value chain, financial systems, e-business design* and *strategic thinking* paradigms can be used to model the integration of enterprise workflows (in the context of value chains), industry structures and financial systems for competitive positioning.

A work-in-progress framework of modelling user requirements in the manner described as in Figure 1.

Integration of these individual and enterprise activity interactions provide the micro to macro views of user requirements for developers when executing SDLC activities. They would specify what and how individual and enterprise activities interact, including revelations of their consequential socio-economic-political dynamics.

These user models provide the complete "*cause and effect*" framework of modelling and verifying user requirements that developers can use when designing and carrying out other SDLC activities.

INTERMEDIATE SSM OUTCOME
Root Definition
The BCKO knowledge-portal alleviates the issues of the Australian Breast Cancer communities in accessing in-time, relevant and quality information for supporting their critical health and lifestyle management activities.

CATWOE Descriptions
Three SSM analysis iterations worked out the general, cultural and political dimensions of the problem situation to describe the CATWOE elements.

Analysis 1 describes the CATWOE elements as follows:
1. The **C**ustomers are the:
- BC users and their support communities, who would use the portal solution for deciding and effecting critical health care choices and lifestyle changes
- Enterprise users, i.e., the small and institutional service providers, who would leverage the portal for servicing their customers and fulfilling other enterprise purpose/s.
2. The **A**ctors are the project team (Monash University) and the two sponsors (BreastCare Victoria & the Breast Cancer Action Group) who would respectively develop and market/deploy the portal. All parties are joint financiers. The sponsors are also candidate portal owners.
3. The **T**ransformation process enables the project's customers to access in-time, relevant and quality on-line information, as and when (and where) required, throughout different disease stages.
4. The **W**eltanschauung (worldwide) view that would make the transformation possible when:
- Monash University can leverage the project as their action-research process.
- The project delivers a prototype that the:
  • Sponsors can *take to market* the portal to a small group of BC users in 2004
  • The selected BC users can use to locate, store and share information regarding disease management and their experiences, and apply the knowledge acquired to make appropriate decisions and take effective actions.
  • Enterprise users (who service the selected users) can leverage the portal for improving their customer servicing, financial bottom-lines and other enterprise purposes.
5. The **O**wners are the sponsors. They are also prospective enterprise users and portal owners, who play a major role in referring the Australian public to use the BCKO portal. Without these parties, long term economic and referral support of the portal is not easily viable.
6. The **E**nvironment is servicing people affected by breast cancer in finding WWW information to support them in decision-making and action-taking regarding matters of critical health care and lifestyle management.

Cultural Analysis 2 expands the CATWOE-description by profiling the social roles played by the stakeholders and generalises their behavioural norms and value-standards, which help in identifying expectations and mindset drivers. The social roles are those of university, government, non-profit making community care, small to institutional health servicing organisations, and the people communities of breast cancer.

Political Analysis 3 finalises the CATWOE-description by revealing the stakeholders' vested interests and how they can potentially leverage power from their inter-relationships, processes and resources. In doing so, the analysis discloses that the critical success factor of the project requires the development process and the portal functionality to show support for and value-adds:
1. The research agendas of the project team/Monash University

Figure 1. A SSM and theory based user modelling framework
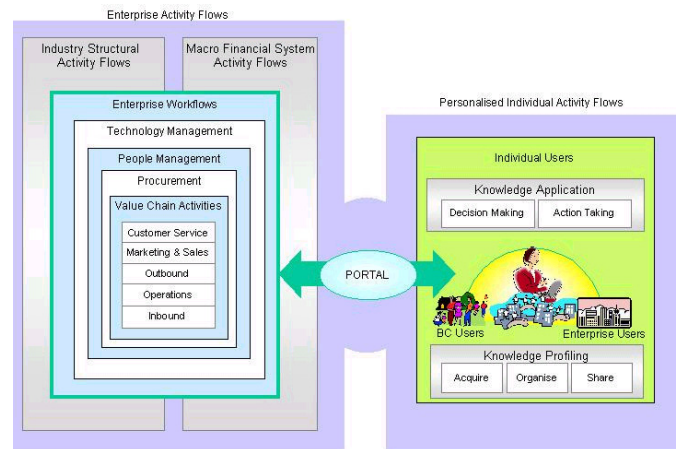
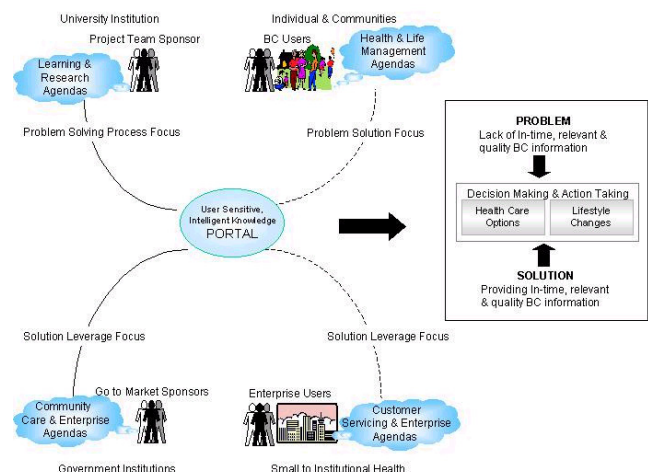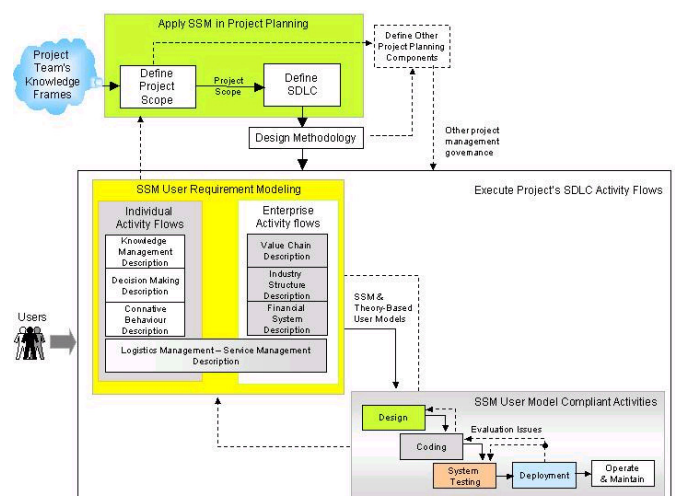

Figure 2. CATWOE rich picture summary

Figure 3. Overview of the BCKO research methodology

2.   The personal decision-making and action-taking of the BC users and their support communities
3.   Delivering customer servicing and enterprise (including financial) benefits for the:
•   Enterprise users
•   Other two sponsors.

CONCLUSION

Through continuous advances in technology, information systems have transformed to become portal-solutions that not only meet the information needs of users, but also support and enhance their human activities, social roles and political aspirations. As part of this new paradigm shift, user centricity is an emerging important design concept and success factor. The concept views portal design as a human activity centric system development process that identifies what users need and how a socio-technical system can be designed (and deployed) to meet these needs.

The BCKO project is incorporating SSM into its research methodology as a strategy of adopting a human activity centric design approach for building its portal system. The research methodology uses SSM for increasing user requirement clarity and design focus during

•   Project planning, where the project scope is enhanced by the CATWOE-definition and better guides project managers in crafting their SDLC and other project management frameworks.
•   SDLC execution, where the CATWOE root definition is translated into conceptual user models that use theories from different business and technology management disciplines to describe user requirements. The descriptions would make logical and/or theory-based sense to all stakeholders, especially providing a system-modeling context that developers can easily understand and use for guiding their system design and other SDLC activities.

REFERENCES

1.   Fisher, J., Burstein, F., McKemmish, S., Manaszewicz, R., Anderson, J. and Williamson, K. (2002). Building A User Sensitive Intelligent Portal to Breast Cancer Knowledge To Meet Diverse Information Needs. A proceeding of the 13th Australian Conference on Information Systems – Enabling Organisations & Society Through Information Systems. School of Information Systems, Victoria University, Australia.
2.   Bilton, J. (2002). An on-line paper (http://atschool.eduweb.co.uk/trinity/watdes.html) "What is design?" issued by the UK Technology Centre found as an URL link of the University of Colorado at Denver, School of Education website http://carbon.cudenver.edu/~mryder/itc_data/idmodels.html.
3.   Dix, A, et al. (1998). The Human-Computer Interaction. Prentice Hall Europe, Second edition.
4.   Preece, J., Rogers, Y., Sharp, H. and Benyon, D. (1994). Human-Computer Interaction. Addison-Wesley.
5.   Denley and Lane (2001). Multidisciplinary Practice in Requirement Engineering: Problems & Criteria for Success. Joint Proceedings of HCI and IHM 2001, edited by Blandford, A., Vanderdonckt, J. and Gray, P. Springer.
6.   Lane and Galvin, K. (1999). Methods for Transitioning from SSM Models to Object Oriented Analysis developed to support the Army Operational Architecture and an Example of its Application. www.dodccrp.org/1999CRTS/pdf.files/track-6/092galvi.pdf, December 2001.
7.   Checkland, P. and Scholes, J. (1999). Soft Systems Methodology in Action. John Wiley & Sons Ltd.
8.   Alavi, M (1997). Knowledge Management and Knowledge Management Systems - Workshop at ICIS'97 12/19/97, [on line] http://www.mbs.umd.edu/is/malavi/icis-97-KMS/index.htm.

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