OPEN MODELING METHODS

Greater complexity and wicked problems
Integration of social and technical systems
Growing importance of collaboration in interagency and business unit collaboration

Non-functional requirements
Open modeling methods
Identifying open modeling concepts

Research Projects
  Improving cognition through different perspectives
Modeling Collaboration
Agile Development Processes

The Need for Open Modeling Methods for Complex Environments
MelCa addresses trends from single independent processes

**INCREASING COMPLEXITY**

Continual product improvement

**NOT complicated**

**BUT complex (unpredictable)**

**IMPACT OF COMPLEXITY**

Emergence of new ideas

Importance of process integration

Self organization

Unexpected events

**INCREASING NETWORKING**

Getting expertise

Getting special products

When one process changes other processes are effected.
More and more wicked problems with non functional requirements

Every wicked problem is unique.

Wicked problems cannot be precisely defined. The problem of poverty in Texas is grossly similar but discretely different from poverty in Nairobi, so no practical characteristics describe "poverty."

It’s hard, maybe impossible, to measure or claim success with wicked problems.

Solutions to wicked problems can be only good or bad, not true or false

There is no template to follow when tackling a wicked problem, although history may provide a guide. Teams that approach wicked problems must literally make things up as they go along.

There is always more than one explanation for a wicked problem, with the appropriateness of the explanation depending greatly on the individual perspective of the designer.

No mitigation strategy for a wicked problem has a definitive scientific test because humans invented wicked problems and science exists to understand natural phenomena.

Offering a "solution" to a wicked problem frequently is a "one shot" design.

Making a city safe
Improving health
Better access to drinking water
Securing a food supply
Examples

**SMART CITIES**
- Better transportation
- Easy access to health care
- Flexible education (Connected Campuses)
- Public safety
- A variety of activities

**Building management – monitoring**
- Waste management
- City administration

**Internet of Things**
- Sensors of activities
- Intelligent support
- Improving processes through better context awareness

**Interagency collaboration**
- Sharing knowledge
- Defining knowledge flows
- Improving decision making
- Focusing on emerging requirements
A CITY IS A SYSTEM OF SYSTEMS


they have established, cities must look to the systems on which they are basing their aspirations and make them more efficient and effective, i.e., smarter.

Source: IBM Center for Economic Development analysis.
A more socially oriented enterprise
Becoming a Social Business

Social Business Enterprise Strategy Accelerator

A transformation is taking place in how people interact and how relationships form and develop and this is changing the way we socialise, the way we work and the way we engage with our customers. The new normal is that customers are leading the conversations that define your brand, competitors are crowd-sourcing ideas to bring new offerings to market and employees are using social media in all facets of their lives, including work.

This shift in technology and human behaviour presents an opportunity for organisations to improve everything from reinventing customer relationships to how work gets done. A Social Business embraces
Importance of social structures in the system of systems to include collaboration

Structured processes

Social communities

Systems connected through collaboration between communities

Identify communities and their information flows

Local system

Transaction flows

System 1

System 2

System 3

Social community 1

Social community 2

Social community 3
Evolution of Design Process

Type 1 – agreement on problem, agreement on solution

Make jeans
Sell at home

Type 2 – agreement on problem, no agreement on solution

Make jeans
Where to sell

Type 3 – no agreement on problem, no agreement on solution

What to make
Where to sell
Methodologies to design more complex and adaptive systems

How to design business processes in these environments

Continuous and incremental development

Need ways to:

Develop a holistic picture – showing all relationships between systems

Be agile and manage change
Identifying rather than solving a problem

A Vision

Context for identifying projects

What are the problems to attain vision

Context for project

Projects

Continually changing

Emerging requirements

Agile development

Type 1 – problems and solution agreed on
Type 2 – problem agreed on but solution not clear
Type 3 – there is no agreement on problem or solution

Smart city
Food supply – nobody hungry
Improve health
Making more profit

POLICY LEVEL

BUSINESS LEVEL
Requirements by Storyboards

Story boards to link different levels

Artifact repository – open model
Vision and problem storyboard

VISION
(Improve well-being)

Defining what needs to be done to reach vision

Issues of concern (too many people overweight)
Causes – bad diet, lack of exercise
Define solutions to overcome causes

Solutions needed
(Improved diets
Emphasis on exercise
Aged care)

Propose a project to provide solutions

Stories, activities, features, evaluations
Focusing on different perspectives at Project Level

Knowledge flow
Social networking
Process
Technology

Need a language to define the structure and the operations

Integrate social and system structure

Multi disciplinary and holistic
MeLCa
for
Complex Organisation

In multi stakeholder collaboration

- Organisation perspective
- Business perspective
- Knowledge perspective
- Enterprise Social perspective
Problems

A State Government Structure

- Collaboration with multiple stakeholders – Highlighted with Grey colour
- Dedicated Managers for each Private Firm to coordinate the projects
- Projects involved with around 300 internal & 400 external staff
- Faced with policy/governance/coordination issues
- Faced with record management issues
- Faced with information sharing and managing knowledge issues
System characteristics

**Group** – deals with one or two activities – decisions are simple. Carries out well defined activities.

**Organization** – can coordinate a number of groups – has multiple decisions – can contain groups or other organizations

**Community** – a loose connection of people or systems with common goals and rules of behavior.

Organizations can be part of a community. They can also include a community, For example academics in a University.

Business or Enterprise – is made up of many organizations or groups.
Simple example – a group

**An organization**

**Sales management**
- **Sales manager**
  - Develop strategy
  - Coordinate groups

**Sales organization**
- **Sales manager**
  - Develop sales target
  - Sales group
  - Accounts group
  - Delivery group

**Business**
- **CEO**
  - Financial target
  - Manufacturing organization
  - Sales organization
  - Managing group

**A Group**
- **Sales group**
  - Sales target
  - Salesperson
  - Carry out sales
  - Manage sales program
  - Agree on sales program and monitor progress
  - Sales records
Equivalent hierarchical
Coordination through collaboration

Main Language concepts

Roles, activities, artifacts, interactions

- **Project manager**
- **Human relations manager**
- **Personal assistant**
- **Project facilitator**

Collaboration to find team members:
- Discuss requirements
- List of people
- Discuss suitability
- Potential team members
- Finds potential team members

List of people:
- Finds potential team members

Potential team members:
- Discuss suitability
Organisational Perspective

Identifying boundary roles
Identifying activities and their information needs
Identifying social network
Finding good perspectives
Another Project Enterprise Social Network: XXX Case Study Collaboration

Collaboration Group

- Sponsor and Stakeholder
- Head of Move
- CIO
- Manager North Logistics
- Manager Transport
- Manager DC Operations
- Stakeholder
- Group Facilitator
- Expert
- Contributor
- Expert
- Engineering role
- Interactions of Engineering role
- Observer
- Projects
- Business Case
- Automation
- Low Intensity Messaging
- High Intensity Messaging

Indicates person assigned to other roles that are not part of the collaboration.

Person assigned to an active role relevant to the collaboration.

Passive Observations of Group performance

Passive Group Role

UTS

Sponsor and Stakeholder

Head of Move

CIO

Manager North Logistics

Manager Transport

Manager DC Operations

Stakeholder

Group Facilitator

Expert

Contributor

Expert

Engineering role

Interactions of Engineering role

Observer

Passive Observations of Group performance

Collaboration Group
Integrating into agile development

Context for identified problem

Stories about how a system will work

Combine into processes

Build model based on open concepts

IMPORTANCE OF STORIES

Stories are a way of describing problems and ways to solve them

Combining stories gives an idea of what needs to be done
Stories for identifying issues (Smart Campus)

Vision
Present a learning environment for students to collaboratively learn skills and ways to innovatively apply them in practice.

What are the issues of concern?
- Lectures spread across many days
- Too far to walk between classes
- Hard to arrange group meetings
- I want to live close to the University
- Lecturers all in one day
- I spend too much time travelling
- I spend a lot of time learning things I don’t need
- There are things I want to learn that are not included
- I get conflicting information
- There is too much assessment
- Fixed curriculum

What are the causes?
- Lectures spread across many days
- Too far to walk between classes
- Hard to arrange group meetings
- I want to live close to the University
- Lecturers all in one day
- I spend too much time travelling
- I spend a lot of time learning things I don’t need
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- I get conflicting information
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What are the links between the problems?
- Look at different perspectives
- Collaboration
- Knowledge
Stand up
Innovation and FedEx Days

Our Ideas

Marketing

Teamwork

Feedback
Interactive Traffic Lights with Mobile Devices (Pablo Andres)

Posted by Pablo Andres

Pedestrians walking around the Sydney CBD can utilise their mobile devices to input their walking routes, which will provide a live stream of all pedestrian traffic to avoid crossing traffic.

Tag: idea collaboration digital innovation software

Living City Sensors

Posted by David Asic

Upstream of thousands of unique sensors all around the city, measuring air quality, seismic movements, wind direction, etc. creating a nervous system for the city, uploaded to Head Office & City Council.

Tag: idea business fitness health humanities

Central Surveillance System

Posted by David Asic

A central surveillance system which shows 24/7 live coverage of public areas, assisting with all road and road safety incidents, providing a safer city for the community.

Tag: idea collaboration digital innovation

GPS

Posted by Li Yin

GPS is not only a device where the bus is and tell the next stop the bus is coming, it also can report the accident to bus dispatch center.

Tag: idea

Intelligence Traffic System

Posted by Jenny Lee

Real-time public responses to individuals in demand making policy or service delivery, this can be done via the past actions of neighbourhood which is a new idea.

Tag: idea collaboration humanities innovation

Intelligence Traffic System

Posted by Li Yin

The integration of all good ideas about the protection of public transportation.

Tag: idea

Real-time public transport tracker

Posted by Jenny Lee

Feedback up the second public transport systems, along with community advice to improve the service to possible delays and problems.

Tag: idea collaboration
Interactive Traffic Lights With Mobile Devices (Pedestrians)
Updated 2012-09-30 22:17:06

Pedestrians walking around the Sydney CBD, can utilise their mobile devices, to input their walking routes, which will provide a live stream of all pedestrian "traffic", to assist crossing traffic.

What is the proposed service?
To provide pedestrains with an easy-to-use tool which will assist in traffic flow when walking from one destination to another, based upon volume and history of use.

Who are the users of the service?
Pedestrians, People Driving in the CBD

What are the anticipated/benefits realised by service?
Mobile Device Application (Android/Phone/iWindows), assist in traffic times, pedestrian movement tags

How do you describe the high level process of the service?
Service created by Development team in conjunction with City Council. Consumers download and use app. App content managed and maintained by Development team.

What are the work benefits of the service?
Allows pedestrian to arrive at work/home/etc/boutique destinations by foot, as well as keep the vehicle traffic flowing during times of lower pedestrian flow.

What are the key business goals?
Allow the correct and fastest possible pedestrian movement for a high volume of participants.

How will the idea affect the market?
Will likely be need for manual pedestrian crosswalks. Allow the entire city to track the flow of movement of people.

What are the assumptions around this idea?
The majority of users will have a mobile device with 3G/4G internet access. The existing infrastructure will support the new system.

Who are the stakeholders of the project?
Pedestrians, Road Safety, IT system management, City Council, Telecommunications Companies.
<table>
<thead>
<tr>
<th>MOBILE DEVICES</th>
<th>FEATURES</th>
<th>RULES</th>
</tr>
</thead>
<tbody>
<tr>
<td>User receives a notification from the app when a traffic light changes.</td>
<td>Application requires a user to accept the notification settings to use the app.</td>
<td>User confirms the notification settings when the app is first installed.</td>
</tr>
<tr>
<td>User views real-time traffic updates on their mobile device.</td>
<td>Application logs user data for future analysis.</td>
<td>User’s data is used to optimize traffic flow for others.</td>
</tr>
<tr>
<td>User can share traffic updates with others on social media.</td>
<td>Application provides historical traffic data for reference.</td>
<td>User can view traffic data from previous days.</td>
</tr>
<tr>
<td>User receives a message about potential delays in their designated route.</td>
<td>Application tracks user’s location to provide accurate traffic updates.</td>
<td>User confirms their location when entering their route.</td>
</tr>
<tr>
<td>User receives a message about the availability of alternative routes.</td>
<td>Application provides updates on road closures and construction.</td>
<td>User can view road closure information in real-time.</td>
</tr>
</tbody>
</table>

**Interactive Traffic Lights With Mobile Devices (Pedestrians)**

Updated: 2012-09-04 23:17:36

**ACTIVITIES**

- Bus stop locations logged
  - David Asoci @ 2012-09-04 14:09:15
- Station locations logged
  - David Asoci @ 2012-09-04 14:09:09
- Work addresses logged
  - David Asoci @ 2012-09-04 14:09:07
- Taxi destinations logged
  - David Asoci @ 2012-09-04 14:09:05
- Government requires records of traffic flows, as they wish to commence road works at the most convenient time.
  - David Asoci @ 2012-09-04 14:09:03
- Council worker
  - David Asoci @ 2012-09-04 14:09:01
- View
  - David Asoci @ 2012-09-04 14:09:00
Current development

Story boards to link different levels

Artifact repository – open model

The open model described to today fits into here
Described in new eBook

Agile Business System Design: Using Information Technology to create business value [Kindle Edition]
Igor T. Hawryszkiewycz (Author)

Start reading Agile Business System Design on your Kindle in under a minute. Don’t have a Kindle? Get your Kindle here.

Kindle Price: $7.99 includes free international wireless delivery via Amazon Whispernet

- Length: 121 pages (estimated)
- Don’t have a Kindle? Get your Kindle here.

Book Description
Publication Date: July 27, 2012
Modeling system of systems in partner collaboration
SUMMARY AND FUTURE WORK

Why are open system methods needed

Defined a set of open concepts for collaboration

Illustrated by an example for analysis

Integration into agile development

Need support for dynamic concepts formation