Designing open infrastructures for open learning and innovation

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overview

• the problem - six use cases
• inspiration - open source development
• a hypothesis - Learning Networks
• test - design research
• requirements - for learning, for interaction
• solutions - two scenarios
• in summary - some questions for you
the problem

six use cases
update & upgrade

James is a chemical engineer working for an SME. He wants to pursue a career as a water manager with the local water board. He therefore needs to update and upgrade his skills.
Jean, a lawyer working for a pharmaceutical company, finds out she needs to expand her knowledge in order to get a more thorough understanding of the science part of the company, in particular about biotechnology.
A multinational wants to do away with its travelling road show of trainers and stimulate its employees to *study online*. They also want to stimulate the build-up of a collective *knowledge base* and stimulate the emergence of *communities of practice*. 
innovation

The association of public libraries wants to rethink its role in society and retrain its personnel in the process. Collaborative open innovation and creativity as well as joint sense making and learning are key.
keeping up to date

An SME wants to innovate constantly and therefore needs to keep its personnel up to date. Collaborative open innovation and creativity as well as joint sense making and learning are key.
world-wide knowledge sharing

A large international agency wants to distribute existing knowledge on a particular topic more equitably. \textit{Not duplicating existing work} and \textit{world-wide knowledge sharing} are key.
inspiration

open source networks
‘Internet technologies radically undermine organizational structures because they reduce the cost of communications and transactions toward an asymptote of zero (p. 171).’

Hence, go online.
‘This enables the formation of ‘episodic communities on demand’, so-called virtual organizations that come together frictionlessly for a particular task and then redistribute to the next task just as smoothly.’

Hence, use a networked approach.
• There are deeper levels to the book

• micro-foundations, what drives people: pride; being an innovator; self-promotion; doing things together

• macro-organisation, how to make it work: co-ordination (individual incentives, shared norms, and leadership), cope with complexity (division of labour)
a hypothesis
Learning Networks
a hypothesis

All use cases may be addressed by working with *Learning Networks*, online, social networks that have been modelled after networks for open source software development.
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<thead>
<tr>
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<th>formal learning</th>
<th>non-formal learning</th>
<th>informal learning</th>
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<tr>
<td>initial education</td>
<td>‘ordinary’ education</td>
<td>rare occasion</td>
<td>out of scope</td>
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<tr>
<td>post-initial education</td>
<td>‘continuous’ education</td>
<td>lifelong learning</td>
<td>out of scope</td>
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A Learning Network = \( DF \)

an online social network that is specifically designed to support lifelong learning and lifelong professional development

(note: emphasis on post-initial education)
- design
- using web 2.0 technologies for interaction?
- using any resource available, but thriving on open (educational) resources?
- using open source-like business model: make money through additional services?
test
design research
theoretical models

\[ S_1 \xrightarrow{l_a} S_2 \xrightleftharpoons[l_c]{\text{therapy}} S_2 \xrightarrow{l_b} S_3 \]

- Healthy: \( S_1 \)
- Smoke: \( S_2 \)
- Therapy: \( S_2 \)
- Cancer: \( S_2 \)
- Dead: \( S_3 \)
• such models are tested by predicting future behaviour (a hypothesis) and comparing it with actual behaviour (data)

• this leads to confirmation, rejection, but usually adaptation of the model
• a Learning Network is a natural system, but one that is designed for a purpose: artefact

• its design is based on confirmed knowledge and to the extent that that is missing, on assumed knowledge (and we never have full knowledge)

• so artefacts may fail to do what they were designed to do
targeted state of the system (artefact) is different than the obtained (observed) state

the existence of a difference means:

i) our theoretical model is wrong
ii) our assumptions are wrong
• unlike natural systems artefacts are tested for performance (criteria!)

• this leads to rejection, acceptance, but usually redesign
design requirements
for learning & support
judge (interpret, analyse, classify)

requirements for learning competent, expert behaviour

learn

anticipate

act (effectively & efficiently)
specific competent behaviour

knowledge
skills
attitudes

personal
learn and
action theory

personality traits
social learning

• learning is not passively downloading

• learning is interactively (re)organising and extending what you know and can do

  • interact: with other agents (environment)

  • organise: make ‘fit’ in with

  • extend: build upon
design for social learning

Wiebe Bijker: interpretative flexibility of artefacts (philosophy of technology)
support services

- online profile
- e-portfolio
- billing
- assessment of prior competences
- network visualisation
- content provision and matching
- coaching (peer, teacher)
- tutoring (peer, teacher)
- authoring
- collaboration support
solutions

two scenarios
centralised control

• there is an organisation which is in control, acts as a one-stop-shop for services

• an online environment is designed, developed, maintained by them

• you have to ‘go there’ to participate in the network

• it is a closed infrastructure
examples

• VLEs such as Moodle, Blackboard
• Content Management systems such as Sharepoint, Drupal
• portals such as iGoogle, Netvibes, Liferay
distributed control

• your desktop is your environment, no one is in control

• use all kinds of Web 2.0 tools to assemble an open infrastructure for learning

• tools should somehow be interoperable (APIs, specs like open social, IMS spec on Tools Interoperability, widgets)
examples

- LinkedIn, FaceBook, Yammer, Academia
- Mindmeister, Google Docs
- Twitter, Jabber
- Slideshare, Google Docs
- Del.icio.us, Zotero, CiteUlike, Connotea
- Wikipedia, Wikiversity, Wikibooks
in summary

some questions for you
1. the problem - design for professional development, taking personal and organisational interests into account

2. inspiration - open source development shows the way

3. a hypothesis - networks for learning, best modelled after open source networks?
4. test - use a design-research methodology for ‘hypothesis’ testing

5. requirements - look at what we already know about learning and interaction

6. two solution scenarios - differentiate between a centralised and distributed approach
University networks and technical platforms will have to focus on managing the increasingly permeable boundaries among universities, and between universities and the world outside them. University platform design should be focused on ensuring that faculty and students have the greatest degree possible of authority and capacity to act freely, innovate internally, and participate externally.

questions

1. Can one piece together out of existing ‘parts’ a learning environment for the distributed scenario?

2. Is my list of services jointly exhaustive and mutually exclusive?

3. What ‘applications’ match what services?

4. How can this be made economically viable?
Questions?
Follow-up

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