Learning Networks for Lifelong Learning

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Paper at:
http://jasss.soc.surrey.ac.uk/8/2/5.html

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Learning Networks for Lifelong Learning

A learning network is a group of persons who create, share, support and study learning activities & units of learning in a specific knowledge domain.
So, a network in the following sense

A group of persons:

- connected to each other in a **social** sense
- connected to each other in a **technical** sense
- connected to relevant **learning activities (& uols)**
- connected to each other in order to **learn** from & with each other
  (also producing new learning resources)

✔ as independent as possible of constraints like:
  location, institution, job, time, specific technologies

✔ persistent over time to support lifelong learning in a certain field
How to realise Learning Networks for Lifelong Learning?
Several views of a Model of a Learning Network

- Learning Network modelled as a Graph
- Use Case Model
- Architectural Model
A *learning network* can be represented as a graph of ‘*activity nodes*’ (runs of units of learning) within some knowledge domain.
LN Graph with a learner track
Patterns of Collective Tracks Emerge
Learner Positions and Objectives
Planned Learner Routes (“curriculum”)
What activities do users perform in a Learning Network?

=> Use Case Model
use case

Learning Network

- create (sub-)LN
- search AN
- get/access AN
- study AN
- CRU AN
- feedback
- communicate
- collaborate
- perform support activities
- CRU learning dossier
- training
- enrollment

role X eg student eg tutor

role Y

lifelong learner

provider

LN member

individual group

software agent

role: LN manager
What are the functional components that can be identified in a Learning Network Infrastructure?

=> Architectural Model
Architecture
(see: special issue BJET Technology & Lifelong Learning Nov. 2004)
Architecture
(see: special issue BJET Technology & Lifelong Learning Nov. 2004)

LD tools
Three Core Issues in a Learning Network

1. How to **make & use** pedagogical well designed, interoperable and reusable units of learning in the LN?
2. How to **position** learners in a LN?
3. How to help learners to **navigate** in the LN?
ad 3. Now in more detail: How to setup **Navigational** support within a Learning Network
Navigation questions within LNs

- I want to know something more about topic X, is there an adequate unit of learning available?
- What is, for me, the best route to attain a certain learning objective (or certificate, diploma, ...)?
- I have done X and Y, what would you advise me to do next?
- ...
- ...
Problems with navigation in LNs

- In any field per definition a very large number of possible units of learning,
- of a variable quality
- The number of units of learning change rapidly over time
- Nobody has a real overview of actual quality, number of possibilities, ...
So,

How to Organize a Learning Network under such constraints?
Our Approach

- Use of self-organisation principles from complexity theory, specifically principles of indirect social feedback ('stigmergy')
- Use of bio-inspired theories ('pheromones')
The paths of successful predecessors are used for advice
Netlogo Simulation of a LN

- Multi-agent simulation environment for research
- See Draft publication in handouts
Learners + Units of Learning in a LN
Properties

```plaintext
patch 0 12
pxcor 0
pycor 12
pcolor 15.0
plabel
plabel-color 9.9999
an-type "exercise"
an-objective "A"
an-level 5
an-studytime 25
an-quality 7
an-student-contribution 0.0
an-number-started 0.0
an-number-succeeded 0.0
an-avg-studytime 0.0
```
One of the Experiments with the Simulation

- Problem: what is the effect of indirect navigational feedback on study success (number of students that attained objective)?
- $2^4$ factorial design:
  - pheromone strength (0 or 100%)
  - matching error (0 or 100%)
  - disturbance in learner environment (0 or 100%)
  - quality of the unit of learning (0-100% or 100%)
- N=12 replications in every condition
- Every replication runs 260 simulation weeks (5 years). In total 49920 week cycles (runs about 10 hours on fast computer)
Outcome

- All main effects significant + interactions: pher-strength * matching error
  pher-strength * quality of unit of learning
Interaction Pher * Matching-error
best versus worst case

no matching error, 100% quality and no disturbance (F = 0.7816)

100% matching error, 0% quality and 100% disturbance (F = <.0001)
Outcome

- Overall influence Pheromones: 9% increase in proportion of students who attained their objective
- Matching-errors are compensated by pheromones
- Some quality variance is compensated by pheromones

(more details: see draft paper)
Thank You

More info:
www.learningnetworks.org
dspace.ou.nl