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Learning Networks: Theory and Practice

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Traditional Online Learning

- Institution Based
 - Online courses, learning management system
 - Content ‘federations’ – closed network
- Product Based
 - Content packaging and CD-ROM delivery
 - Digital rights and authentication
- Content Based
 - The idea of courseware, course packs
 - Learning design and sequencing

Learning Networks

– Not Institution Based

- Resource based, learning integration
- Open access, content networks

– Not Product Based

- Web based, content not packaged but aggregated
- Identity used to enable access, not restrict it

– Not Content Based

- E-learning as engagement, conversation
- Focus on services and interaction

Networks: Basic Elements

– Entities

- The things that are connected
- Sends and receives signals

– Connections

- Link between entities – may be link, channel, etc
- May be represented as physical or virtual

– Signals

- Message sent between entities - physical
- Meaning *not inherent* in signal, must be interpreted

Some Properties of Networks

- Density
 - how many other entities each entity is connected to
- Speed
 - How quickly a message moves to an entity
 - Can be measured in ‘hops’
- Flow
 - How much information an entity processes
 - Includes messages sent, received plus transfers
- Plasticity
 - How frequently connections created, abandoned

Network Design Principles

- Specifies how networks differ from traditional learning
- The idea is that each principle confers an *advantage* over non-network systems
- Can be used as a means of evaluating new technology

1. Decentralize

- Centralized networks have a characteristic ‘star’ shape
 - Some entities have many connections
 - The vast majority have few
 - Eg., broadcast network, teacher in a classroom
- Decentralized networks form a mesh
 - The weight of connections, flow is distributed
 - Balanced load = more stable
 - Foster connections between entities, ‘fill out’ the star

2. Distribute

- Network entities reside in different physical locations
 - Reduces risk of network failure
 - Reduces need for major infrastructure, such as powerful servers, large bandwidth, massive storage
- Examples:
 - Peer-to-peer networks, such as Kazaa, Gnutella
 - Content syndication networks, such as RSS
- Emphasis is on *sharing*, not copying
 - ‘Local’ copies are temporary

3. Disintermediate

- Mediation – barrier between source and receiver
- Examples:
 - Editors, peer review prior to publication
 - Traditional media, broadcasters
 - Teachers between knowledge and student
- Where possible, provide direct access
 - The purpose of mediation is to manage flow, not information
 - It is to reduce the volume of information, not the type of information

4. Disaggregate

- Units of content should be as small as possible
 - Content should not be ‘bundled’
 - Organization, structure created by receiver
 - Allows integration of new information with old
- This is the idea behind learning objects
 - smallest possible unit of instruction
 - Assembling into pre-packaged ‘courses’ defeats this

5. Dis-integrate

- Entities in a network are not ‘components’ of one another
 - Thus., eg. Plug-ins or required software to be avoided
- The structure of the message is logically distinct from the type of entity sending or receiving it
 - The message is coded in a common ‘language’
 - This code is open, not proprietary
 - No particular software or device is needed to receive the code
- This is the idea of standards, but:
 - Standards are not created, they evolve
 - Standards adopted by agreement, not requirement

6. Democratize

- Entities in a network are autonomous
 - Have the freedom to negotiate connections
 - Have the freedom to send, receive information
- Diversity is an asset
 - Diversity confers flexibility, adaptation
 - Diversity enables the network as a whole to represent more than just the part
- Control is Impossible
 - Even where control seems desirable, it is not practical
 - Creating control effectively destroys the network

7. Dynamize

- A network is a fluid, changing entity
 - Without change, growth, adaptation are not possible
 - It is through the process of change that new knowledge is discovered
- The creation of connections is a core function

8. Desegregate

- Example: Learning is not a Separate Domain
 - Do not need learning-specific tools, processes
 - Learning is a *part* of living, of work, of play
 - The *same* tools we use to perform day-to-day activities are the tools we use to learn
- The Network as Infrastructure
 - Computing, communicating, not something we ‘go some place to do’
 - The idea of network resources as a utility, like electricity, like water, like telephones – the network is everywhere

Network Semantics

- How Meaning is Created in Networks
- Tells us how people learn using networks
- Tells us how networks create new knowledge

Elements of Network Semantics

– Context

- Localization of entities in a network
- Each context is unique – entities see the network differently, experience the world differently
- Context is required in order to *interpret* signals

– Salience

- The relevance or importance of a message = the similarity between one pattern of connectivity and another
- Meaning is created from context and messages via salience
- In other words: knowledge is *shared understanding* (and not *copied* understanding)

Elements of Network Semantics (2)

- Emergence
 - The development of patterns in the network
 - A process of resonance, synchronicity, not creation
 - Example: commonalities in patterns of perception
 - Requires an *interpretation* to be *recognized*
- Memory
 - Persistence of patterns of connectivity
- Other elements: stability, weighting...

Connectivism: Network Pedagogy

- Think of as ‘Network Pragmatics’
- Deals with how to use networks to support learning
- Embraces the idea of ‘distributed knowledge’
 - Example: knowing how to build a 747
 - ‘I store my knowledge in my friends’
 - Recognizes explicitly that what we ‘know’ is *embedded* in our network of connections to each other, to resources, to the world
- George Siemens
<http://www.elearnspace.org/Articles/connectivism.htm>

Principles of Connectivism

- Learning is a process of connecting entities
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Capacity to know more is more critical than what is currently known
- Decision-making is itself a learning process

Practice: Content Authoring and Delivery

- Numerous content authoring systems on the web...
- Weblogs – blogger.com wordpress.org
- Content Management Systems – Drupal, PostNuke, Plone, Scoop, and many more...
- Audio – Audacity – and audioblogs.com – and Podcasting
- Digital imagery and video – and let's not forget Flickr

Practice: Organize, Syndicate Sequence, Deliver

- Aggregation of content metadata – RSS and Atom, OPML, FOAF, even DC and LOM
- Aggregators – NewsGator, Bloglines – Edu_RSS
- Aggregation services – Technorati, Blogdex, PubSub
- More coming – the Semantic Social Network

Practice: Identity and Authorization

- A raft of centralized (or Federated) approaches – from Microsoft Passport to Liberty to Shibboleth
- Also various locking and encryption systems
- But nobody wants these
- Distributed DRM – Creative Commons, ODRL...
- Distributed Identification management – Sxip, LID...

Practice: Chatting, Phoning, Conferencing

- Bulletin board systems and chat rooms, usually attached to the aforementioned content management systems such as Drupal, Plone, PostNuke, Scoop
- Your students use this, even if you don't: ICQ, AIM, YIM, and some even use MSN Messenger
- Audioconferencing? Try Skype... <http://www.skype.com/>
- Or NetworkEducationWare... <http://netlab.gmu.edu/NEW/>
- Videoconferencing? Built into AIM...

Practice: Collaboration

- One word: wiki
- Others, of course:
- Hula: http://hula-project.org/Hula_Server
- Much more info: <http://sohodojo.com/techsig/>

Going Home: Our Reformation

- E-Learning has been based on centralized systems
- But these centralized systems, such as the LMS, are like a dysfunctional crutch...
- There's so much going on out there... you have to leave the cocoon and experience the web..
- Stop trying to do online what you do in the classroom... it's a different world online...

**And where we had thought to find an abomination,
we shall find a god; where we had thought to slay
another, we shall slay ourselves; where we had
thought to travel outward, we shall come to the
centre of our existence; where we had thought to
be alone, we shall be with all the world.**

Going Home (Robert Patterson)

http://smartpei.typepad.com/robert_patersons_w_eblog/2005/02/going_home_our_.html

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