The Open University

The implications of social constructivism for technology-enhanced learning and potential lessons for public engagement with research

Public Engagement with Research Seminar

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Overview

- Social constructivism
- Implications
  - teaching and learning
  - human-computer interaction (HCI)
  - technology-enhanced learning (TEL)
- Example: Field Studies Council
- Diffusion of innovations
- Lesson for public engagement with research

Social constructivism

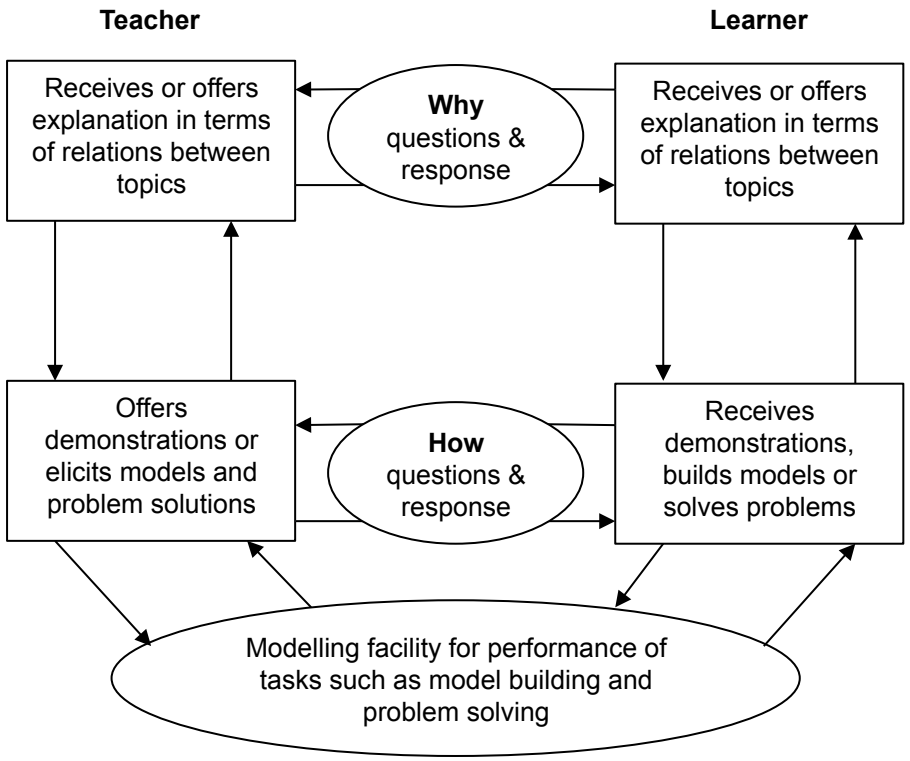
- Knowledge is constructed in groups that collaboratively create cultures of shared artifacts with shared meanings (Vygotsky, 1978)

Implications: teaching and learning

- “From the sage on the stage, to the guide on the side” (King, 1993)
- A move from instruction to activity and dialogue
- Promoting active learning (thinking about it)
  - skills: analysing, synthesising, evaluating
  - techniques: group participation, interaction and feedback, connections to real-world
  - example scripts: think-pair-share and jigsaw

OU teaching and learning

- Conversation theory (Pask, 1976)
- OU “dialogue in print” distance learning course material design (Rowntree, 1990)
- Conversational framework (Laurillard, 2002)



Implications: HCI

- Computer-centered to human-centered design
  - "know your users" (tools adapt to people)
- Human-centered design to activity-centered design
  - "tools define the activity" (people adapt to tools)
- Activity-centered design informed by
  - activity theory
  - distributed intelligence
  - social construction of technology

Activity theory

- Understanding how computers mediate our daily activities (Bodker, 1997)
  - activity mediated by artifacts
  - artifacts as historical devices (shaped and reshaped)
  - although collective, activity conducted through actions and operations of individuals
  - activities are interwoven with other activities
- Metaphors: system, media and tools
- Analysis: Why, what and how

Distributed intelligence

- "Intelligence as distributed and manifest in activity" (Pea, 1993)
  - people in action (from activity theory Leont'ev, 1978)
  - resources that shape and enable activity are distributed across people, environments and situations
  - computer tools as "reorganizers of mental functioning" (Pea, 1985)
  - change from computer as a delivery tool (efficiency) to computer's potential for activity and participation

Social construction of technology

- "In SCOT the developmental process of a technological artifact is described as an alteration of variation and selection" (Pinch and Bijker, 1987, p. 28)
  - relationship between a social group and perceived problems
  - relationship between a problem and possible solutions

Implications: TEL

- Action research cycles (Lewin, 1946)
  - plan, act, observe, reflect
- Design-based research (Brown, 1992)
- Systemic technology innovations (Fishman et al., 2004)
  - sustainability, scalability and usability
  - usability cube (Blumenfeld et al., 2000)
    - capability, culture, policy and management
- From product development to sustainable social change

Example: Field Studies Council

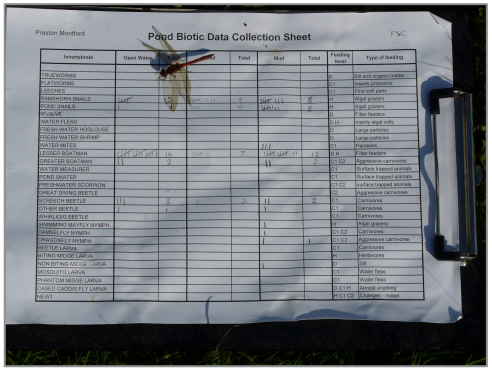
- Wolfson funded OpenScience Lab
  - Collaboration with Field Studies Council
    - Explore use of mobile technology to enhance outdoor learning
  - Field Network System
    - Portable communications network
    - Mobile devices in fieldwork
    - Activity-specific website

Field Network System

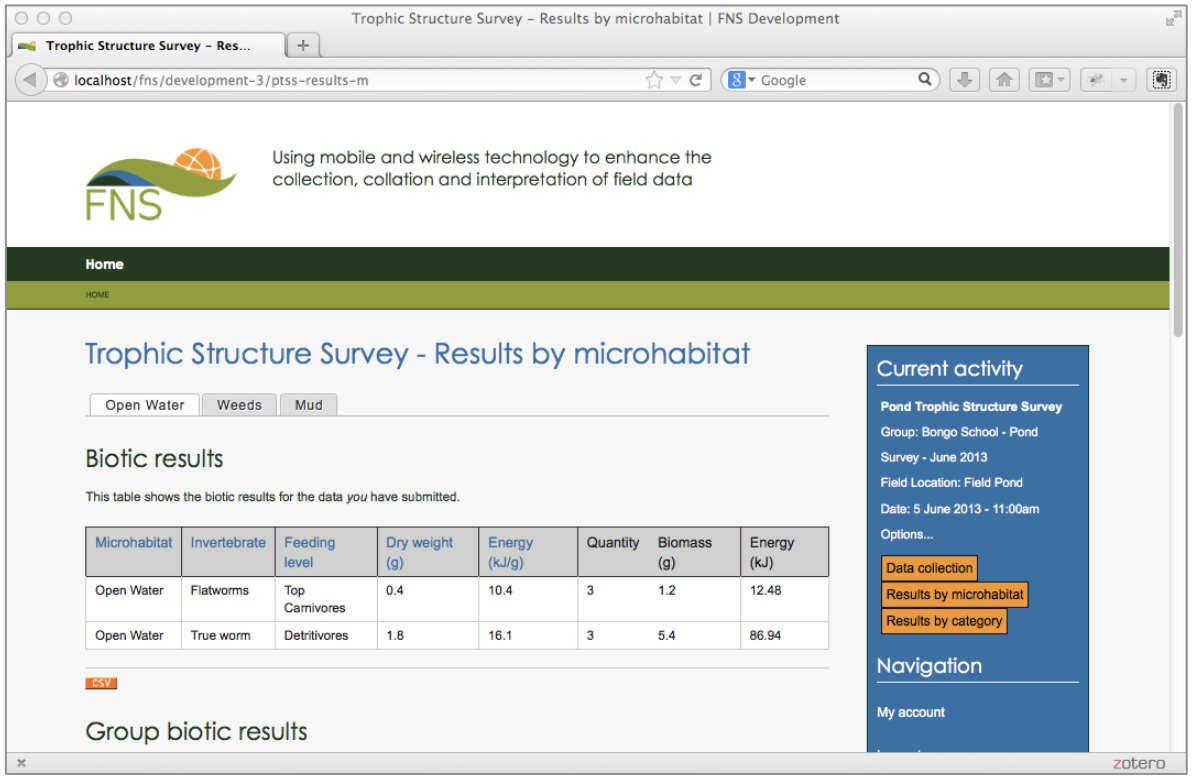
- Collaborative research
  - FSC outdoor learning
  - OU technology-enhanced learning
- Design and development
  - participatory
  - context-based
  - activity-centered
- Learning activities
  - pond trophic structure, wet system, river discharge

A day at the FSC

- Classroom
  - introduction, hypotheses, methodology, risk assessment
- Field site
  - data collection
- Classroom
  - data entry, cleaning, collation, analysis, interpretation



Field Network System



FSC stakeholders

- Tutors, IT, curriculum development, biodiversity training, grant funding, communications, publications, operations

Usability cube

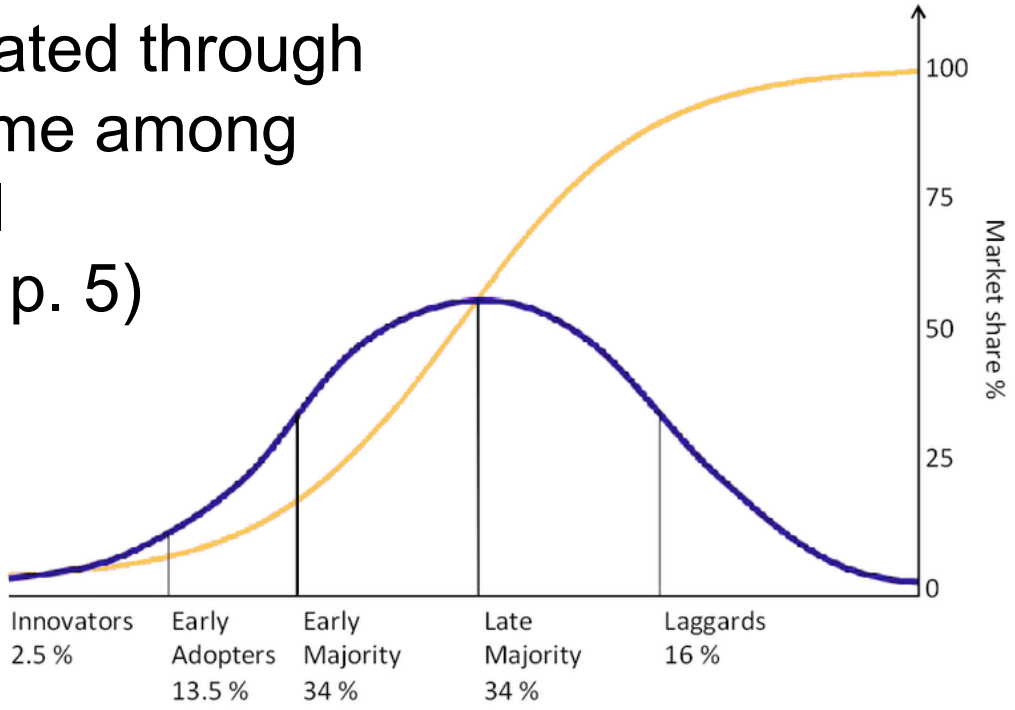
- Capability
  - Tutors and IT team
- Culture
  - Outdoor experiential learning
  - Engaging and fun
- Policy and management
  - IT policy and practices
  - Staff training and development

Sustainable and scalable

- Website content-management system (Drupal v7)
  - Web forms for configuration and maintenance
- Minimal configuration and set-up for each group
  - Configuration: Customer, booking and activities
  - Accounts: Generic mobile accounts (signed-in)
- Usable across centers
  - Metadata: Field center, field location, site, habitat, microhabitat (activity, date, time and author)

Diffusion of innovations

- “Diffusion is a process in which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003, p. 5)



Diffusion of innovations

- Factors influencing rate of adoption
  - relative advantage, compatibility with values, perceived complexity, trialability and observability
- Innovation-decision process
  - knowledge of innovation, forming an attitude, decision to adopt, implementation of innovation, confirmation of outcome
- Re-invention
  - adoption may also involve re-invention

Lessons for TEL

- Usability, scalability, sustainability
- Diffusion of innovations
  - rate of adoption: relative advantage, compatibility with values, perceived complexity, trialability and observability
  - innovation-decision process: knowledge, attitude, decision, implementation and confirmation
  - flexibility to re-invent

Lessons for PER

- Purposes of public engagement (NCCPE)
  - informing, consulting, collaborating
- Social constructivism: knowledge is constructed in groups that collaboratively create cultures of shared artifacts with shared meanings (Vygotsky, 1978)
- “Diffusion is a process in which an innovation is communicated through certain channels over time among the members of a social system” (Rogers, 2003)

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