Creative Teaching and Learning

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1970s

In Educational Psychology:

- Shift from behaviorism to cognitivism
- Increasing influence of constructivism

In Creativity Research:

- Shift from personality traits to cognitive structures and processes

1980s

In cognitive science, a shift to knowledge as:

- Distributed
- Situated
- Embodied
- Sociocultural

1991

- The first learning sciences conference
- Founding of *The Journal of the Learning Sciences*
- Deep roots in both cognitive and sociocultural perspectives,
  as well as artificial intelligence and computational modeling

1990s

In creativity research, increasing acceptance of the *sociocultural approach*:

- Interdisciplinary
- Studies of individual cognition,
  group dynamics,
  and social and cultural factors
- Increasing studies of group creativity and collaboration

- Better K-12 education
- Increased Higher Education quality and funding
- Increased R&D funding
- Intellectual property protection and tax credits

Missing: An understanding of how innovation works, how people learn for creativity, and how to redesign schools

[1]
From the Industrial Age to the Knowledge Age

Instructionism

- Knowledge is a collection of static facts and procedures
- The goal of schooling is to get these facts and procedures into students' heads
- Teachers know these facts and procedures; their job is to transmit them
- Simple facts and procedures should be learned first
- To evaluate learning, assess how many facts and procedures have been acquired

Creative Schools

- *Knowledge*: Deeper conceptual understanding
- *The goal of schooling*: Prepare students to build new knowledge
- *Teachers*: Scaffold and facilitate collaborative knowledge building
- *Curriculum*: Integrated and contextualized knowledge

Learning for Creativity

- Build on learner's prior knowledge
- Encourage reflection on the learning process
- Carefully scaffold authentic situated practice
- Combine inquiry and project-based activities with information delivery
- Foster learning in collaborating groups

Innovation today is…

- Collaborative
- Organizationally embedded
- Emergent from complex networks and social systems

The Creative Classroom

- The core is *collaborative conversation*
- Constructivist learning conversations are *improvisational*
- Teacher and students build knowledge together
- Unexpected insights emerge

[2]
Creative Learning Environments

Interactive Science Centers

InvenTeams (Lemelson-MIT)

...

Integrated Teaching and Learning Laboratory (UC Boulder)

...

Computer-Supported Collaborative Learning

Wireless Handhelds

[3]
How Do We Get There?

What will drive change?

- Today we are still working with a *linear model*:
  Research findings → Classroom practice
- But innovation in other sectors follows a *system model*

Innovation Systems

- Fluid boundaries
- Flexible organizational structures
- Teams form and disperse spontaneously
- Professionals belong to multiple teams
- There is no separate group tasked with innovation

Creative Schools

In innovative organizations, professionals:

- Continually learn
- Work collaboratively
- Engage in “mutual tinkering” where small sparks add up to big ideas
- Change teams, assignments, and organizations frequently

Other Participants in the System

- Libraries
- Museums
- Science centers
- After-school clubs
- Technical certification (Microsoft, IBM)
- Trade schools
- Corporate universities
- For-profit and on-line learning

[4]
Possible Futures

Rethinking School

- Shift from “just in case” learning to “just in time” learning
- Boundaries between high school, college, and work will become fuzzy
- The real world enters the class: in-school work becomes increasingly project based and authentic
- The class enters the real world: On the job “just in time” learning
- Why should public funding stop at age 18?
- No age grading: Boundaries between primary and secondary will become fuzzy
- Curriculum becomes integrated: Boundaries between traditional content areas fades

Transformation of Teaching

- Teaching will become multi-tiered
  - Master teachers
  - Designers
  - Classroom facilitators
  - Technical support for students
  - Internet-based chat rooms, “customer service”
  - Neighborhood learning center staff (more like Sylvan than today’s schools)
- Teachers will work in teams and will change jobs often
- Student contact hours decline, teamwork and innovation activities increase
- Non-certified experts will be important team members
- Some salaries go way up, some salaries decline
- Teachers will work fewer hours

Out on a Limb…

- No more extended summer break
- Educational knowledge is no longer organized by grade and content, but by project, theme, and learner's current understanding
- Textbooks replaced by a portable learning device
- The private sector becomes increasingly important in curriculum and software development
- Knowledge about learning and curriculum is increasingly codified, building on the existing base of learning sciences knowledge
- Schools not the only child care; a new system of public daycare centers/solitary learning centers emerges
- Existing school buildings will seem increasingly archaic, may be abandoned
- Government funding of education stops at 12, 14, 16, but early leavers can use their accounts for just-in-time adult learning

Conclusion

- The shift to an innovation economy…
  aligns with learning sciences findings about the nature of deep knowledge.
- The learning sciences show us how to give students the kind of knowledge required by the knowledge society.
- It's not just about the economy; everyday life and good citizenship require the same knowledge-based education