

Developing and using information technologies to teach chemistry at Columbia University: a case history.

- I. The wilderness years: 1981-1990: Nothing works
- II. The discovery years: 1990-1993: IR Tutor
- III. The experimentation years: 1993-1995: Web
- IV. The implementation years: 1995-1999: FSIT
- V. The self-sustaining years: 2000-present: CNMTL
- VI. Discussion: Finding out what works

I. The Wilderness Years: 1981-1990

“Something not worth doing is not worth doing well!!!”

A. Computer modules developed but fail to make an impact

1. Delivery systems (no web) and good software and fast hardware unavailable
2. Modules too primitive and unexciting

B. Teaching versus Research. Little interest in effort in enhancing teaching

II. The Discovery Years: 1990-1993

- A. Appearance of faculty innovators and early adopters of IT
- B. Appearance of excellent software for visualizing chemistry
- C. IR Tutor developed
- D. Still not robust delivery systems (no web, no smart classrooms)
- E. Good practices of robust learning discovered (General Chemistry experiment)
- F. Coupling IT with Content, Context, Cognition

III. The Experimentation Years: 1993-1995

A. Appearance of the world wide web: the delivery system!

B. Course on the web: Organic Chemistry 3045

C. Summer NSF undergraduate workshops: VizKids

1. Demonstration that software and delivery systems were now at an acceptable level
1. Demonstration of the power of students teaching students
2. Demonstration of the ability of drawing early adopter faculty into developing IT modules for instruction
3. Demonstration that ordinary undergraduates are capable of learning chemistry as they produce modules
4. Strongly collaborative and interdisciplinary

IV. The implementation years: 1995-1999. Making it happen

“The diffusion of innovation model: Innovators, early adapters, early majority, late majority, laggards.....faculty.”

- A. Undergraduate students trained in IT to assist faculty
- B. Faculty-student information technology cluster established
- C. Faculty assisted in use of IT for instruction
- D. Connections with the use of the Web for instruction explode
- E. University decides to establish Center for New Media, Teaching and Learning

V. The Self-sustaining Years: 2000-present

Creation of a Center for NewMedia Teaching and Learning

- A. Services
 - Course web site development
 - Faculty consultations
 - Workshops

- B. Projects
 - Training and testing web environments
 - Large course solutions

- C. Research and Development
 - Video technologies
 - Course development: Photochemistry

VI. Discussion: Finding out what works

“To develop a green thumb, you’ve go to look at things from a plant’s point of view.”

- A. Base use of IT on pillars of content, context, cognition
- B. Good practices for teaching and learning
- C. Collaborative, active, in time teaching protocols
- D. Find faculty early adopters to lead transformation
- E. Make effective use of undergraduate resources
- F. Faculty-student clusters