Advanced Teaching Methods for the Technology Classroom

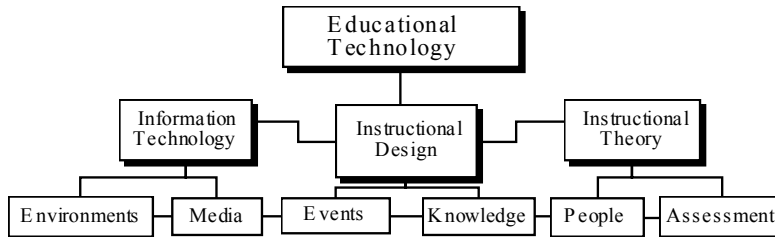Stephen Petrina
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Figure 10. Audio-visual education

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                    │   Educational    │
                    │   Technology     │
                    └──────────────────┘
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      ┌──────────────────────┼──────────────────────┐
┌──────────────┐    ┌──────────────┐       ┌──────────────┐
│ Information  │    │ Instructional│       │ Instructional│
│ Technology   │────│   Design     │───────│   Theory     │
└──────────────┘    └──────────────┘       └──────────────┘
      │                    │                        │
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┌────────────┐┌───────┐┌───────┐┌───────────┐┌────────┐┌────────────┐
│Environments││ Media ││Events ││ Knowledge ││ People ││ Assessment │
└────────────┘└───────┘└───────┘└───────────┘└────────┘└────────────┘
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technologies were used for organizers (Figure 9). TE deals with animation, computer aided design, information and communication technology and digital video, and there is little reason to differentiate between technology education and what has been called educational technology.

Audio-visual education (AV) began as a response to the proliferation of visual resources created for education during the late 1800s and early 1900s, and the introduction of motion pictures and radio into education during the 1920s. Educators were initially interested in the production of AV aids for teachers and AV effects on students (Figure 10). However, high schools began to develop infrastructure and studios for AV programming, production. recording and repair. Through the 1950s and innovations with teaching machines, computers, and systems theory, AV morphed into technology education and educational technology (Petrina, 2003).

Educational technology (ET) has a wide range of connotations and generally refers to any use of technology for teaching and learning (e.g., books, computers, projectors, etc.) (Petrina, 2003) (Figure 11). ET basically derives from Audio-Visual Education, where artifacts such as AV materials, projectors, and teaching machines constituted the discipline. In universities, educational technology continues this tradition of instructional design and the current focus is on Web-based instruction and the efficient use of technologies for learning. ET has lost its currency, hence in countries such as Canada, England, and the USA, ET is referred to as information technology, information and communication(s) technology (ICT), or technology education (see Chapter VIII, Figure 2). Some teachers have moved from a neglect of design tools and implications to an integration of design and information. ET deals with a variety of design tools and hence the new trend in switching the combination of words from ET to TE. These blurred boundaries are evident in schools where content and practices in ET and TE are indistinguishable (Petrina, 2003). The pioneering work of Seymour Papert and the MIT Media Lab had much to do with the blurring.

Information technology or information and communication(s) technology (ICT) spans most economic sectors. Given the intensive automation that is currently taking place

Figure 11. Educational technology
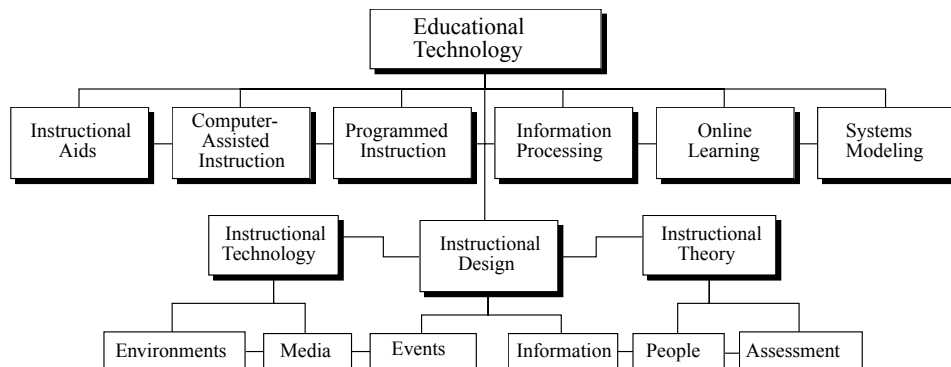
in industrial technology and service, ICT is currently the fastest growing economic sector. As a field of study, information technology is a sub-discipline of computer science, business management and engineering technology and a school subject. In the schools during the late 1970s and 1980s, courses called computer science or computer studies continued the practices of educational technologists, whose focus was on programming and applications. While a general literacy was advocated, little was done on the issues of implications. The courses were renamed information technology in the early to mid 1990s. In BC for example, the computer courses were renamed in 1996 when computer studies had little currency. Like computer science and studies, information technology reflects preoccupations with applications and in business education is information technology management. Currently, the *term* (not the practices) "information technology" is losing its currency, as most researchers argue that the new digital technologies extend well beyond information and communication. They engage a wide range of actions and are not merely conveyances of information with technology. New media is becoming the new term of choice. In the universities, cultural studies of information technology and of cyberculture are part of a larger practice of technology studies (Figure 12).

Digital media design can be defined as simply design of, and with, new media (Figure 13). New media reflects the convergence of communication, media, and information:
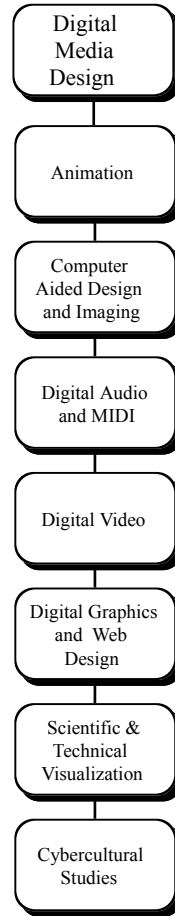
- Technologies (camera, computer, copier, fax, messaging, phone, printer, audio and video player etc. convergences)
- Modalities (image, print, sound, etc. convergences)

Figure 12. Information technology and computer science
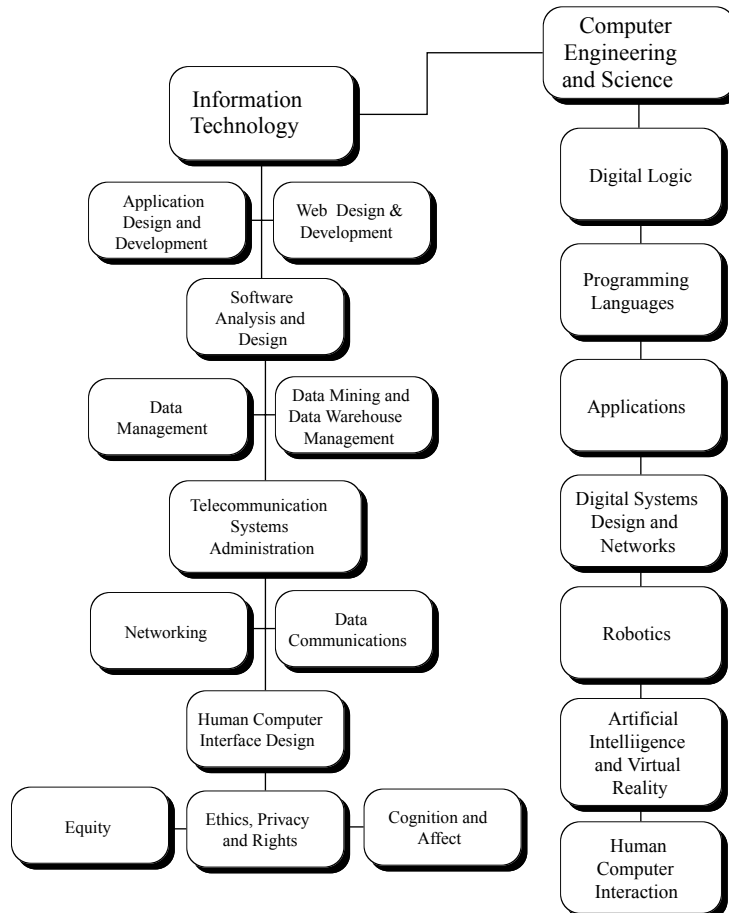
- Practices (art, communication, design, fashion, film, marketing, media, medicine, programming, technology, etc. convergences)
- Corporate formations (cable and internet providers, music, newspaper, radio, and television convergences)

Digital design refers to a branch of electrical engineering that deals with the design of digital hardware. However, the accessibility and applicability of software accompanying the convergences noted have resulted in a new knowledge worker and a new field of discourse, practice, and study. Like industrial design, new media occupies a necessary space between art and computer engineering and science.

Figure 13. Digital media design

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│ Digital         │
│ Media           │
│ Design          │
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┌────────┴────────┐
│   Animation     │
└────────┬────────┘
         │
┌────────┴────────┐
│ Computer        │
│ Aided Design    │
│ and Imaging     │
└────────┬────────┘
         │
┌────────┴────────┐
│ Digital Audio   │
│ and MIDI        │
└────────┬────────┘
         │
┌────────┴────────┐
│ Digital Video   │
└────────┬────────┘
         │
┌────────┴────────┐
│ Digital Graphics│
│ and  Web        │
│ Design          │
└────────┬────────┘
         │
┌────────┴────────┐
│ Scientific &    │
│ Technical       │
│ Visualization   │
└────────┬────────┘
         │
┌────────┴────────┐
│ Cybercultural   │
│ Studies         │
└─────────────────┘
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New media focuses on the design of animated and interactive content for the inter-
net, TV, CD, DVD, and other media environments. New media create experiences
environments with time-sensitive data. New media involve the design of interactive,
malleable, and motion and sound oriented messages, and expand to bidirectional
communication in which content responds, adapts, and changes in response to us-
ers, hosts, or circumstances. Motion allows content and form to utilize an added
dimension of time to transform the capacity of still images while sound provides
additional sensory capacities. New media or digital media design signifies the new
digital curriculum in the schools, such as animation, Web design, and video, and
has more currency than IT or ICT in education.

Design can be simply defined as "a structure adapted to a particular purpose" (Figure
12) (Perkins, 1986a, p. 2). But this definition fails to capture design as a process, as