# Teaching with Technology

*Learning is seen as essentially a social process, requiring communication among learner, teacher and others. This social process cannot effectively be replaced by technology, although technology may facilitate it.* (Bates & Poole, 2003, p. 35)

*The word technology can take on different meanings for different people…*

To assist those who use technology in the classroom, literally hundreds of books, articles and Internet sites have been written about teaching and learning with technology. Many of these resources focus on the principle that technology is only as good as it is used in the classroom. In other words, we should use technology "at the right time, in the right way, and for the right purpose," (Lever-Duffy & McDonald, 2008, p.1). In addition, by following educational theory and practice, technology can have more purpose and help generate more positive outcomes.

**Technology Terminology**
Over the years a number of terms have been used in educational settings in reference to technology. The word technology can take on different meanings for different people and technology can be subject- or domain-specific such as "engineering technology," "instructional technology" or chemical technology." To help clarify and better understand various "technology" terms, some definitions are provided here.

*Technology can be a process…[and] can refer to the physical tools…used for instruction and learning…*

*Technology*—can be a process such as the systematic design of a class session, editing a video for a podcast, or engineering the design and production of a product. On the other hand, technology can refer to the *physical tools* (often associated with computers) used for instruction and learning such as PowerPoint presentations, clickers, white boards, MP3 players and computer hardware. Technology tools can also refer to books (both paper and electronic), musical instruments, 3-D models, mathematical formulae, statistical notation, and computer software. Even pens, pencils and sticky notes are a form of technology. Finally, computer software, virtual technologies and the Internet (in the sense of its use) are forms of non-material technology tools.
Smaldino, Lowther and Russell (2008) bring together the varying definitions of technology as,

1. "A process of devising reliable and repeatable solutions to a task

2. The hardware and software (i.e., the product) that result from the application of technological processes

3. A mix of process and product, used in instances where the context refers to the combination of technological processes and resultant products of where the process is inseparable from the product" (p. 374).

*Instructional/Educational Technology*—specifically selected "hardware, software [tools], and/or processes [crafts] to facilitate learning" (Smaldino, Lowther, & Russell, 2008, p. 371).

*Information Technology*—"Anything related to computing technology, such as networking, hardware, software, the Internet, or the people that work with these technologies" (TechTerms, 2008, para. 1).

**Technology and Instruction**
Using an instructional design model can be helpful when designing instruction which incorporates technology. Many instructional design models comprise the five steps below which are presented in the order in which instruction should be planned. By following a systematic approach to instruction, you can be assured that you have provided meaningful learning opportunities for all students. Following each step is a "technology link," which illustrates how technology can be used during the entire design process.

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**Design**—theoretical principles and procedures of theories and research found in general systems theory; psychological theory and research; instructional theory and teaching-learning research; and communications theory and perception-attention research.
*Technology link: Bloom's taxonomy; journals; online resources*

**Development**—print, audiovisual, computer-based, and integrated technologies further defined through theoretical principles but namely from communication such as television and mass media; visual thinking and learning such as the elements and principles of line, shape, color, texture, composition, arrangement, balance and unity.
*Technology link: Computer-generated documentation*

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**Utilization**—teaching, diffusion of, and use of knowledge.
*Technology link: Document camera to project an object*

**Management**—coordination and administration of resources as well as support and transformation of knowledge.
*Technology link: Blackboard or spreadsheets to maintain course grades*

**Evaluation**—the systematic and (often) criterion-referenced assessment and analysis of performance in a meaningful and helpful way.
*Technology link: Scantron forms; rubrics*

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**Media**
Media are defined as the technology used for communicating information between the source (instructor) and the receiver (student) or vice versa. Types of instructional media are categorized as follows:

*Print*—handouts, workbooks and rubrics (with or without images)

*Models*—3-D structures representing real objects (architectural structures/machines/furniture) or concepts (molecular structures/organizational hierarchies)

*Projected visuals*—using PowerPoint, document camera and computers

*Non-projected visuals*—typically involve images on bulletin boards and walls (posters, flyers, maps)

*Audio*—podcasts: voice, musical and sound recordings

*Video*—digital capture of motion, sound and imagery (typically in the form of a CD or DVD); videoconferencing

**Technology Support**
Selecting and using appropriate technology can be of benefit to both you and your students. Being familiar with selected technologies allows you to seamlessly integrate technology in the teaching. There are times, however, when new technologies necessitate the need for training and times when the technologies do not function as planned. Various campus support units are available to assist everyone involved in learning new technologies and their effective integration in the classroom as well as technical assistance.

*Selecting and using appropriate technology has been shown to benefit both the instructor and his or her students.*

### Faculty Development and Instructional Design Center
- Offers monthly and other special workshops on a wide range of technologies which include hardware, software and/or processes to facilitate learning.
- Provides consultations, guidance, tips and techniques for best practice in technology-supported teaching activities.

### Information Technology Services (ITS)
- Provides technical assistance in campus-wide technologies such as Blackboard, Clickers, Smart classrooms, Internet and communications (email and telephone).

### Media Services
- Provides a wide variety of media production and technical support services including video, audio, graphics and photography production, video and audio facility design and installation, Smart Classroom and mediated facility design and support and live, real-time video streaming.

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**Considerations When Using Technology**
**Accessibility**—ask yourself, "Are all students equally prepared to utilize all forms of technology in the classroom?" What alternative strategies will be employed to accommodate those students who do not have access to a computer as required in the course?

**Disabilities and equal access**—when developing instruction which involves technology, you must consider those students with visual, auditory,

cognitive and mobility impairments. For example, when using projected technology such as PowerPoint, pay attention to document length, design considerations, automated functions, text presentation (for persons with visual impairments), tone and articulation of voice, speed at which information is presented and availability of course material (for persons with auditory impairments).

**Ethical considerations**—technology allows for information to be quickly accessed and communication to flow in an instant. Information is available at the click of a button and must be considered for its validity and whether or not it is properly cited. Communicating a message via technology can easily be misinterpreted and may not be appropriate for a particular audience. Quickly typed and unedited email messages, poorly designed PowerPoint presentations and use of certain words and phrases all can lead to incorrect messages received by an audience. Care must be taken to ensure intended messages are appropriately received.

### Where to Begin

Here are some ways to help you integrate technology in your teaching:

1. Start small, using those technologies with which you are familiar and are relatively simple and easy to integrate in your teaching.
2. Observe and discuss with colleagues their use of technology in the classroom.
3. Self-assess current teaching practices for currency and effectiveness in the dissemination of information which can be affected by the integration of technology.
4. Learn how to effectively integrate technology in your teaching by following a systematic approach of instructional design (Faculty Development and Instructional Design Center offers workshops on course design and related topics).

### Summary

"Technology will play a large role in instigating the changes in both our society in general and education in particular," (Lever-Duffy & McDonald, 2008, p. 425) and Moore's Law claims that the power of computers doubles every 18 months. Whether or not these statements are true, technology is making significant changes in the way we teach. Classrooms of the future will continue to draw on common pedagogic practices but the role of the instructor may change as new technologies emerge. Careful planning along with continued training and accepting new technologies will assist you as you continue to improve your teaching and learning experiences.

### References

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