Techtalk:
Developing Tech-Knowledge

By David C. Caverly and Lucy MacDonald

In an effort to develop professionally, we read newsletters and journals, join discussion groups, attend professional conferences, and read articles like "Techtalk." These opportunities allow us to garner ideas for our programs, to compare our current practice with new theory and research, and to improve our skills. Here, we interpret two frameworks for how institutions and individuals can grow in "tech-knowledge" and then review technology growth opportunities for developmental educators.

Catalysts for the Development of Tech-Knowledge

Institutional Developmental Phases of Tech-Knowledge

At the institutional level, developmental growth in technology consists of systemic, institution-wide reform (Apple Computer, 2003): that is, a change in thinking from technology as hardware and software to technology as accessibility, allowing administrators, faculty, and students to teach and learn more effectively and efficiently. Providing access is more than simple availability or training. Reform means education to learn how to teach ourselves strategies for effective technology integration.

The integration of technology into an educational institution can be seen in three phases (CEO Forum on Education and Technology, 1997). First, there is *planning, investigation, and experimentation* through which a few educators explore and use technology in new ways. In this phase they become advocates and convince others of the viability of technology.

As the institution becomes convinced, a second phase of *initial capital investment* provides technology for others within the institution. Some institutions never go beyond this second phase of development and remain mired in maintaining, upgrading, and training the status quo. Professional development stagnates here because investments are in hardware or software capital rather than human capital. Ideally, investment should balance at 1/3 hardware and software, 1/3 infrastructure, and 1/3 professional development.

When resources are balanced and professional development is included, a third phase of *readjustment* can occur leading to the comfort level increasing and educators expanding their integration. Consequently, individuals collaborate, support each other, and find arenas for technology expertise. These three phases at the institutional level form an iterative process of cycling through each emerging technology. This allows individual faculty and administrators to develop through the following five developmental stages.

Individual Developmental Stages of Tech-Knowledge

Dwyer, Ringstaff, and Sandholz (1990) completed a longitudinal study over 4 years of integration of technology among 32, K-12 teachers. They found that individual teachers and administrators pass through similar stages of development. We suggest that college teachers and administrators will develop through the same five stages. At the first stage, *entry into technology*, one develops basic technology lit-

eracy and selects technologies to benefit personal life, though seldom integrating it into instruction. Often frustration occurs with technology at this stage and caution is warranted to encourage perseverance.

Once confidence develops in personal use of technology, it leads to a second stage of *adopting technology* to support instruction. However, little ownership occurs because technology is chosen by someone else. Technology is an "add-on" rather than being integrated into teaching and learning. Instruction typically remains unchanged, though learning begins to improve.

With comfort and knowledge of extended use, individuals begin to *adapt technology* into existing instructional activities. Consequently, technology integration grows exponentially and develops into stage three. Here, technology is credited with improving productivity in learning, teaching, and administrative activities.

The realization of learning benefits moves individuals to stage four, *appropriating technology* within their developmental programs. Rather than adapting technology for instruction, instruction is adapted for technology. Spreadsheets are used to teach algebra, databases are used to organize and manage information, and hypermedia reports are produced to share one's new knowledge. Knowledge is constructed through the use of technology rather than technology delivering information. Students learn faster, with higher levels of understanding and more collaboration.

Driven by these successes, individuals grow into stage five, beginning to *invent with technology.* Teachers redesign lessons, searching for activities that make technology necessary. Such lessons develop students' knowledge-creation skills, which include reading/listening and speaking/writing critically and persuasively; applying math and scientific principles to solve real-world problems; weighing current events through a lens of global and multicultural views; or mining the web through understanding data in charts, graphs, audio, video, and animation. Through such lessons, students develop skills necessary for life-long learning.

To be successfully traversed, these five stages take time and require encouragement, opportunities, and nurturing. Research suggests 3 to 5 years is needed for individuals to develop through these five stages (Apple Computer, 2003). Still, the immediate and long-term benefits to developmental students make the effort worthwhile.

Opportunities to Develop Tech-Knowledge

Extensive opportunities exist for fostering development in tech-knowledge. Perhaps the most relevant is the *Technology Institute for Developmental Educators* (TIDE, 2003). Here faculty and administrators at any developmental stage can immerse themselves in a week-long technology boot-camp guided by developmental educators.

Other opportunities for learning technology are developmental education workshops/institutes/conferences. For example, during the latest *Winter Institute for Learning Assistance Professionals* (Learning Support Centers in Higher Education, 2003b), the program focused on learning in a digital age. Previous institutes have featured sessions on integrating technology or the effectiveness of technology (Learning Support Centers in Higher Education, 2003a). At the *Kellogg Institute* technology at stage one is interwoven throughout the professional development of educators (Sandy Drewes, personal communication, December 2, 2003). Similarly, at the *NCLCA Summer Institute*, sessions are presented on technology (National College Learning Center Association, 2003). Pre- and postconference institutes and sessions on technology appear at the NADE and CRLA national and state meetings. Special interest groups (SIGs) of these organizations—such as the Technology SIG within CRLA (Johnson, 2003) or the Technology SPIN within NADE (Caverly, 2003a)—have a primary focus on technology in developmental education.

Specific web sites inform developmental educators about technology integration. Useful are the *Lucy Online* (MacDonald, 2003), *Links* (OKAIDE, 2003), and *Developmental Studies Program Resources* (Pellissippi State Technical Community College, 2003). These sites provide examples of technology integration, links to hardware and software resources, professional organizations, online classes, publications, research, teaching tips, and online tutorials.

Conclusion

In the knowledge-based environment that is postsecondary education, professional development in technology must be ongoing as as technology changes. Fortunately, a myriad of opportunities exist to guide us and our institutions through the developmental stages. To learn how to integrate technology will not be accomplished in a few "one-shot" workshops. Take advantage of every available opportunity and begin to develop along with us.

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