Chapter 3

Personalized Integrated Educational Systems: Technology for the Information-Age Paradigm of Education in Higher Education

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ABSTRACT

This chapter presents a detailed description of the powerful and necessary role technology can play in higher education in the current information-age. This article calls for a Personalized Integrated Educational System (PIES), a comprehensive and integrated application of technology to the learning process, which will provide four primary roles for student learning: record keeping, planning, instruction, and assessment. Each of these four major roles is described in terms of the functions it provides to support student learning. Finally, secondary roles such as communication and general data administration are described in order to illustrate the systemic nature of PIES technology necessary to fully support the learner-centered approach that is essential in the information-age paradigm of higher education.

INTRODUCTION

Higher education institutions are facing unprecedented pressures for fundamental change. The digital natives or the Net generation think and learn differently than those who grew up without interactive digital technology as an everyday part of life (Prensky, 2006; Beck & Wade, 2004), and they now comprise the student bodies of today’s higher education institutions. The manner in which the higher education system will need to reflect the changing cognitive processes of digital natives is critical, and their expectations regarding the learning process reflect this.

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Oblinger and Oblinger (2005) note that the Net Generation has learning preferences that match their general attributes, including preferences for: working in teams, interactive learning experiences supporting inductive discovery and experimentation, visual and kinesthetic rich learning experiences, clear structure and the opportunity for achievement, and the ability to contribute to issues they perceive as important. These preferences call for engaging and personalized instruction and student choice. However, the current approach of most higher education classes focuses on knowledge delivery through lectures rather than learner control, engagement, and skill building. The enrollment attrition of many institutions attests to the disconnect for many Net Generation students entering higher education and how institutions often fail to retain those students who struggle to achieve in a model designed to sort them into those who can and those who cannot, rather than ensure their learning. With institutions under pressure to cut budgets, class sizes can be large and students lack the personalized attention they need to succeed.

The harsh reality is that with faculty attention stretched between teaching and other responsibilities and large class sizes, the personalization of learning processes for higher education students is not feasible without technology. And yet, the needs of the information age demand a transformation to a learner-centered, personalized paradigm of learning, regardless of the degree that students have grown up using technology.

Although members of the Net Generation are often grouped by age (individuals born after the use of Internet and information technology became commonplace), a more accurate grouping is made by grouping those who are heavy technology users (Oblinger & Oblinger, 2005). This has been confirmed by a number of recent empirical studies and reviews that have found that current higher education students have varied experiences, skills, and perspectives on the use of Internet and computer technology (Bennett & Maton, 2010; Jones, Ramanau, Cross, & Healing, 2010; Kennedy, Judd, Dalgarnot & Waycott, 2010). These differences do not alter the fact that modern society is currently in the information age marked by movements towards knowledge economies, easy access to information, and a focus on customization, collaboration, and complex problem solving, among other attributes (Reigeluth, 1994).

The information age, ushered in by information communications technology, has created new educational needs, tools, and realities. Regardless of whether individuals are heavy technology users, given our increasing reliance on information technology and as more and more people are born into and live in this information-technology-rich environment, the distinctions between those who were raised on technology and those who were not will lesson (Prensky, 2009).

Furthermore, with the existing demands of the information age and its knowledge economy, a new paradigm of education is needed that focuses on ensuring student learning, rather than merely sorting learners. This chapter presents a vision for a systemic application of technology to the learning process to support the learner-centered paradigm of learning necessary to meet the needs of the Net Generation and all students in the information-age society.

**BACKGROUND**

The new educational *needs* include preparing far more students for the information age, versus the industrial age. The information-age economy now requires students to be prepared for knowledge work (which typically entails solving ill-structured problems), collaboration, initiative, self-direction, systems thinking, use of advanced technologies, widely varying skill sets (which requires customization), and much more (Reigeluth, 1994). Recent educational literature by the American Psychological Association, the National Research Council, and others, have called for a shift to the
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