Creighton University 2008 Planning Retreat

External Environmental Analysis

Technology

Technological advances in recent years have occurred at dizzying rates. The rate of implementation of technological advances has also been much faster in most areas than people originally predicted. The following primarily focuses on information and communications technology (ICT); elements of other technological advances are briefly discussed.

Information and Communications Technology:

Typology of ICT Users

The Pew Internet and American Life Project distributed a typology of ICT users. The survey addressed assets (what ICT items people have), actions (how they use these assets), and attitudes (how people see ICT helping them). While respondents were grouped into ten distinct categories, ranging from “omnivores” (voracious users of all things ICT) to “off the network” (people with neither cell phones nor internet connectivity), three broad patterns emerged – elite or high end users (31% of adults), middle of the road users (20%), and low end or few tech asset users (49%). Excerpts form the findings:

• ICT adoption (overall portrait)
  o Assets owned
    ▪ 73% have cell phones
    ▪ 68% have desktop computers
    ▪ 20% have iPod or MP3 player
    ▪ 13% have webcams
    ▪ 11% have PDAs
  o Actions
    ▪ 19% have shared online something they created
    ▪ 18% have posted comments to an online news group or website
    ▪ 12% have created or worked on their own web page
  o Digital activities
    ▪ 62% have gone online for no particular reason (i.e., just for fun)
    ▪ 41% have used text messaging on cell phones
    ▪ 37% have sent instant messages
    ▪ 30% have logged on using wireless access
    ▪ 28% have played a video game
    ▪ 27% have downloaded music
    ▪ 24% have listened to music or radio on device not car or home radio
    ▪ 21% have paid to access or download digital content
    ▪ 7% have downloaded podcasts for later listening
  o Attitudes
    ▪ 81% feel electronic devices help them keep in touch with family
    ▪ 79% feel they could do more with mobile devices
    ▪ 79% feel electronic devices help them learn new things
    ▪ 75% are pleased that mobile devices make them more accessible
    ▪ 62% feel they are more productive because of their electronic devices
- 59% report electronic devices have improved their ability to do their job
- 49% admit someone needs to assist them in setting up new devices
- 42% report being annoyed by intrusions from electronic devices

  o Groupings
  
  - Top four groups (the “elite”)
    - Top 8% (omnivores)
      - Median age 28
      - Average 6 (out of 8 surveyed) IT devices
      - 89% broadband connectivity
    - Next 7% (connectors)
      - Median age 38
      - 5 IT devices
      - 86% broadband
    - Next 16%
      - Median age 40
      - Average 4+ devices
      - Average 75% broadband
  
  - Next two groups (20%)
    - Mobile centric (10%)
      - Cell phone focused
      - Fewer than 4 devices
      - 37% broadband
    - Connected but hassled (10%)
      - Median age 46
      - Find connectivity intrusive
      - 80% broadband
  
  - Bottom 4 groups (49%)
    - Fewer than 3 devices
    - Less than 15% broadband
    - Median age between 47 and 64
    - Technology not a central role in their lives

  o Elite users

    - Omnivores
      - Active participants in shaping cyberspace – use technology to post, manage and share online content; 82% have engaged in activities such as sharing online creations, posting comments, creating webpages, etc.)
      - 57% have watched TV on a non-TV device (5 times the average)
      - Only 10% say they are burdened by information overload (27% average)
    
    Demographics
    - Young (median age 28)
    - Male (75%)
    - White (64%)
    - Students (42%)

    o Connectors
      - Try the cutting edge
      - Go online to pass the time (internet is a destination)
• Demographics
  o Median age 38
  o White (72%)
  o Female (55%)
  o Connected for 9 years – second-wave of adopters

  o Others
    o Older (median age 40)
    o Online for at least ten years (first-wave)
    o Male (65%)
    o Parents of child under 18 (41%)
    o College graduates (47%)

• Middle range users – omitted
• Low-tech users – omitted
• Demographic differences
  o Gender – high tech dominated by males; no real differences on cell phones
  o Income – higher incomes generally have more devices, but many in the low-tech
    groups have incomes > $75,000
  o Education – percentage with college degrees
    o Omnivores 40%
    o Connectors 45%
    o Next two groups 44% (average)
    o Mobile centrics 19%
    o Connected but hassled 41%
    o Lowest groups range from 31% to 7% (lowest group)

Campus IT Security

The Campus Computing Project surveys senior campus IT officials from 555 2 and 4 year public
and private colleges and universities regarding, among other issues, IT Security. Excerpts from
its 2007 survey results:

• Security incidents (changes from 2005 to 2007 surveys, respectively – if only one
  percentage listed, item is from 2007 only) – reported incidents
  o Stolen computers with sensitive data (15% to 17%)
  o Attacks on campus network (51% to 46%)
  o Identity management (no change – about 20%)
  o Spyware infestation (41% to 15%)
  o Virus infestation (35% to 15%)
  o Social networking incidents (12%)
  o Exposed data on servers not managed by central IT (15%)
  o Intentional employee transgressions (8%)

• Emergency notification plans – percentages are for private schools (public have same
  approached but different percentages)
  o Have emergency plan for notification – 48%
  o Use sirens – 21%
  o Use campus web portal – 64%
  o Use email – 73%
• Use SMS/Text messaging – 47%
• Use campus phones – 48%
• Include off-campus phones – 21%
• Include cell phones – 25%

• IT issues identified as single most important over next 2 – 3 years
  o 2007
    ▪ Network and data security (25.5%)
    ▪ Upgrade enterprise resource planning (ERP) software/system (13%)
    ▪ Hiring/retaining IT staff (12.3%)
  o 2006
    ▪ Network and data security (29.5%)
    ▪ Instructional integration of IT (17.3%)
    ▪ Upgrade ERP (16.1%)
  o 2005
    ▪ Network security (30.4%)
    ▪ Instructional integration of IT (18.1%)
    ▪ Upgrade ERP (15.9%)

• Wireless
  o Classroom wireless networks – 60% report classroom penetration (up from 31% in 2004); 70% in private research universities
  o Strategic plan for wireless – 77% report having one (up from 55% in 2004)
  o Faculty backlash (students hiding behind laptop screens)
  o New devices (iPhone, network capable PDAs) create new challenges

• Open Source applications
  o Will play a key role – 57.3% in 2007, v. 51.9% in 2004
  o Viable alternative for key campus applications, such as ERP and student information systems – 27.6% in 2007, v. 28.9% in 2004

• Learning management systems (LMS) – there is a shift away from commercial LMS to open source (Moodle most popular with private 4-year colleges)

• Peer-to-peer downloading – private schools approach to P2P (public have same approaches but different percentages)
  o Explicit policy – 82%
  o Software installed to stem P2P – 22%
  o Loss of net privileges for violators – 72%
  o Other sanctions – 48%
  o Mandatory user education – 15%
  o Survey indicates campuses are more aggressive than consumer market broadband providers in addressing P2P

Undergraduate Students and Technology

EDUCAUSE (a nonprofit association whose mission is to advance higher education by promoting the intelligent use of IT) conducts an annual survey of how undergraduate students use and think about IT. The 2007 report claims that the survey is “widely cited as the richest available source of data” regarding this topic. In the 2007 survey, 27,864 students at 103 colleges and universities. The 2007 schools included few private colleges (St. Mary’s of
Minnesota and Notre Dame) and only one Jesuit school (LeMoyne); public schools included Kansas State, North Dakota State, Missouri-Columbia, South Dakota State and South Dakota. Of the responding schools, 36 were in the Carnegie Masters class (10,515 students), 35 were private, and 21 had total enrollment in the 4,001 – 8,000 range. Survey dates were not included, beyond indicating it was the 2007 survey. Excerpts from the 2007 survey:

- **Technology ownership**
  - 98.4% of respondents own a computer
  - 73.7% own laptops (up from 52.8% in 2005)
  - 52.4% of laptop owners never bring them to class
  - 12% own smartphones (no indication of impact of iPhone)
  - PDA ownership is down form earlier years (features are found on converged mobile devices)
  - Note – **Creighton** does not regularly survey students regarding their ICT device ownership, etc. For several years Residence Life did perform such a survey. The most recent data, from 2004-05, indicate that 95% of students then living in the dorms owned cell phone devices, 96% owned laptop and personal computers, 8% owned PDAs, and 28% owned iPods or MP3 devices. Given national trends, these percentages would be comparable, if not higher, today.

- **Using computers and the internet**
  - Average 18 hours per week in online activities for work, school or recreation
  - 6.6% (mostly male) report spending > 40 hours per week online
  - 21.8% indicate wireless is their primary internet connection
  - Read, create and send email – 99.9%
  - Use instant messaging – 84%
  - Use an institutional library source – 94.7%
  - Create presentations (91.7%) and spreadsheets (83%)
  - Use course management systems (83%)
  - Create or edit video and audio files (32.6%)
  - Create web pages (29.1%)
  - Preferred learning with technologies
    - Running internet searches (72%)
    - Programs they can control; e.g., simulations and gaming (53.3%)
    - Text-based conversations (about 1/3)

- **Communicating with schools**
  - Favor email for official college and university communications – 85%
  - Prefer university email account to commercial account – 82.5%

- **IT skills and training**
  - Self-assess skills as good to very good on presentation software, spreadsheets, course management and library systems
  - Literature indicates they tend to overrate themselves, men more than women
  - Areas students noted as concerns
    - Instructors need to give students more training on technologies required for courses
    - Faculty need more training on IT so they can better use it in courses
    - Central help desks – more negative than positive comments, centering on availability, wait times and fees
• IT in courses
  o 59.3% favor moderate amount of IT in courses
  o Prefer IT does not diminish personal interaction that they see as important
  o Business and engineering prefer more IT
  o Males and older respondents prefer more IT
  o Prefer separation of IM and online networking (viewed as personal space) from coursework (school space) – over 80% want the separation

• Course management system usage (CMS)
  o 82% said they had used CMS (up from 69.7% in 2005)
  o 58.9% are positive about CMS
  o Most valuable to keep track of assignments and grades and to gain access to sample exams and quizzes

• Impact of IT on courses
  o Improved my learning (60.9%; 29.9% were neutral, and 9.3% disagreed)
  o I am more engaged in courses that use IT (40.4%)
  o I receive prompter feedback from instructors in courses using IT (73.1%)
  o IT helps me do better research (70.5%)
  o IT helps me better communicate and collaborate with classmates (58.8%)
  o IT helps me take greater control of course activities (59.5%)

• Digital divide – those who prefer technology are strong in wanting more, and those who make less use of technology (by choice) are strong in wanting little or no technology in courses they take

• Attitudes toward faculty, technology and learning
  o Ways IT enables learning
    ▪ Facilitates organization and control and communication
    ▪ Makes content more accessible
    ▪ Valuable when directly linked to applications useful for future jobs
  o Ways IT is a barrier to learning
    ▪ Problems with technology itself and institutional implementation
    ▪ Proliferation of technology = more complex learning environment; faculty need to factor this into teaching
    ▪ Faculty who use IT poorly
    ▪ Faculty who overestimate student comfort with or access to IT
  o Balance – not a substitute for face-to-face interaction

• Future and emerging trends – Chris Dede (Harvard Graduate School of Education) Ch. 2
  o Changes – from typewriter to word processor; face-to-face discussion to mediated, online discussion groups
    ▪ Today’s faculty may seem pleased that they engage in asynchronous threaded discussions, but their students may wonder why they don’t
      • Create a multimedia presentation with MySpace or YouTude
      • Use email and not instant messaging
      • Create written dialogue instead of reciprocal blogging or co-creating a wiki entry, or develop interrelated structures or tags on a social networking site
• Have avatars meet in an immersive virtual environment instead of co-locating in a classroom, or once in cyberspace, experiencing together an immersive simulation
  ▪ Faculty have typically used IT to automate conventional forms of instruction or made small steps in expanding communicative patterns
    ○ Automation to transformation
      ▪ Academy needs to rethink the creation, sharing and mastery of knowledge
      ▪ Challenge the fundamental nature of research and instruction, e.g.
        • Face-to-face collaborative learning => wikis provide opportunities for multiple participants [not necessarily from same school] to co-create across distance
          ○ Academic research teams are using wikis to develop common terminology and shared meanings
          ○ Skill to provide virtual collaboration will prepare students for work in a global, knowledge-based economy
        • Categorization of knowledge => sociosemantic networking enables students to organize knowledge from the bottom up in patterns that makes sense to them, instead of from the top down in patterns that make sense to the instructor
          ○ Valuable in introductory courses
          ○ Assist faculty in understanding what students do and do not understand about ideas and concepts presented
    ○ New interfaces, “neomillenial” learning styles, and new literacies
      ▪ Interfaces
        • “World to the desktop” provides access to distributed knowledge across space and time through networked media
        • Multiuser virtual environment (MUVE) interfaces enable students to send their digital emissaries to actively engage (in a graphical virtual context) with avatars of other participants
        • Augmented reality (AR) interfaces enable “ubiquitous computing” models; e.g. students carry wireless devices in real world and engage virtual information superimposed on physical landscapes
      ▪ Learning styles and preferences, e.g.
        • Fluency in multiple media
        • Collective seeking, sieving and synthesizing experiences
        • Active learning based on real and simulated experiences with frequent opportunities for reflection
        • Expression through nonlinear, associational webs rather than linear
        • Codesign of personalized learning experiences
      ▪ New literacies, e.g.
        • Experiment with one’s surroundings to solve problems
        • Adopt alternative identities (improvisation and discovery)
        • Interpret and construct dynamic models of real-world processes
        • Sample and remix media content
        • Scan one’s environment and shift focus as needed
        • Interact with tools that expand mental capacities
- Pool knowledge with others toward a common goal
- Evaluate reliability and credibility of different information sources
- Follow flow of stories and information across multiple modalities
- Search for, synthesize, and disseminate information
- Negotiation across diverse communities, respecting multiple perspectives and grasping and following alternative norms

**Online Learning**

The Sloan Foundation, in collaboration with the Babson Survey Research Group, has conducted annual surveys over the last five years on the state of online learning in higher education. Excerpts from the October, 2007 summary of those surveys:

- **Number of students learning online**
  - Online enrollments have grown faster than overall enrollments
  - 3.5 millions students took online courses in fall of 2006, up 10% from 2005
  - 90.7% growth rate for online enrollment, v. 1.5% for overall enrollment
  - 20% of all U.S. higher education students were taking online course in fall, 2006
  - Schools with 3,000 – 7,500 students report a growth rate in online learning from 2002 to 2006 of 17.8%, and Carnegie Master’s schools report a 19.6% rate

- **Growth of online learning**
  - All institutions show growth in online education
  - 2-year associate institutions have highest growth rate in online and have over 50% of online enrollments
  - 4-year baccalaureate institutions have lowest growth rate and fewest enrollments in online courses

- **Motivation for providing online offerings**
  - Improved student access
  - Increased rate of degree completion
  - Reduced or contained costs is the least-cited objective
  - Greater appeal to non-traditional students (i.e., growth in continuing and professional education)

- **Prospects for future online growth**
  - 1/3 of higher education institutions account for 3/4 of all online enrollments
  - Past growth was fueled by new institutions entering online, but this transition phase may be ending (those that intend to offer online already do so)
  - 69% of academic leaders believe student demand for online is growing
  - 83% of institutions with online offerings expect enrollments to increase
  - Future growth will come from institutions already most engaged
  - Almost 60% of chief academic officers agreed that online education is critical to the success of their institution

- **Barriers to widespread adoption of online education**
  - Faculty do not often accept the value of online learning and perceive it takes more time and effort to teach online
    - 32.9% of chief academic officers agreed that faculty valued online education, up from 27.6% the year before
11% disagreed that faculty valued online, down from 14.7% in 2005
  o Higher costs for online development and delivery cited by those that do not use online, but less so by those already committed to online
  o Academic leaders do not believe there is a lack of acceptance of online degrees by potential employers
    ▪ Baccalaureate institutions are the most negative about the value of online degrees (14.9% rate them the same as face-to-face, v. 34.4% for associate degree institutions)
    ▪ Master’s institutions perception is 21.9%, and doctoral is 22%

Wikipedia

The Pew Internet Project surveyed people in April, 2007 on their use of Wikipedia. Excerpts from their report:
  • 36% of adult internet users consult Wikipedia
    o College graduate or higher (50%) versus high school only (22%)
    o Income > $75,000 (42%) v. < $30,000 (32%)
    o Age 18-29 (44%)
    o Male/female about the same
    o Whites (37%), Blacks (27%), English-speaking Hispanics (36%)
  • At the time of the survey, Wikipedia was 6 times more popular than Yahoo!Answers as a destination for information
  • Wikipedia is the #1 site visited after a Google search

Broadband Divide

In its April, 2007 report on broadband adoption, the OECD ranked the U.S. 15th out of 30 countries, with Denmark 1st, and Japan 14th. The OECD bases its rankings on number of subscribers to broadband per 100 inhabitants. The Danish rate is 31.9 per 100, while the U.S. is 19.6 per 100. The Information Technology and Innovation Foundation adds speed and price to the equation of ranking, but under that process the U.S. still ranks 12th. It is interesting to note that in Japan the price per month for 1 mbps of access is $.27 (27 cents, the lowest of all the ranked countries) and the fastest speed is 61 mbps (the fastest of all the ranked countries), while in the U.S. the price is $3.33 for 1 mbps and the speed is 4.8 mbps. Korea is ranked 4th by the OECD and 1st by the ITIF.

The Pew Internet Project offers some editorial comments on the likelihood of closing this gap. It notes that the two large segments of U.S. population without broadband are those who are not internet users, and those who are but use dial-up. Non-internet users are generally older, poorer, and less positive about IT. About 29% of dial-up users have access to broadband at work and 43% of dial-up users indicate ICTs have not improved their personal productivity. Pew suggests that more aggressive and targeted educational outreach efforts are needed to convince the two segments of the U.S. population without broadband of the benefits of expanded internet access.
Other technology:

Although ICT advances seem to dominate our awareness of technological developments, there are significant changes that impact our lives. Medical technology is a significant factor in the cost of healthcare (see the Health Care Trends report). New technologies in environmental sustainability offer cost reductions while mitigating the footprint we leave behind (addressed in the Sustainability report).

Comments:

It is clear that the next and future generations of students will arrive at colleges expecting a greater integration of ICT in their learning programs. Based on current trends, these students do not expect ICT to be the sole or even the dominant mode of learning in their programs, and they continue to value face-to-face interaction. But they are increasingly demanding that faculty and programs recognize that they learn differently and are more likely to respond positively to a variety of learning approaches. These students expect faculty to be well-versed in ICTs and adaptive in helping students learn in new ways. An unspoken, but clear message, is that these students expect faculty to exercise judgment on the proper combination of learning methodologies that will help the students optimize their educational opportunities.

Sources:

EDUCAUSE Center for Applied Research, “The ECAR Study of Undergraduate Students and Information Technology, 2007”
Pew Research Center, “Why It Will Be Hard to Close the Broadband Divide.” (8/1/07)
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