The Plug and Play Generation

See How They Learn …

Topics

- **Some Post-Presidency Experiences**
  - ∗ The Media Union
  - ∗ CyberCamp
  - ∗ The Michigan Virtual University
- **The Plug and Play Generation**
- **Education in an Age of Knowledge**
- **A Society of Learning**

The Media Union

Channels Favorites History Search

MEDIA UNION
UNIVERSITY OF MICHIGAN

QUICKLINKS

Course Websites
Presentations
Videoconference
UM CourseTools
UM Lessons
MU Library

MAPS

Basement
First Floor
Second Floor
Third Floor
Campus

SEARCH

Media Union
U of M

About
Faculty Studio
Advanced Technology
Programs
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People

What's in the Media Union

- 250,000 nsf "Postmodernist Temple of Karnak"
- ≈ 1,000 workstations (all types)
- Digital networking (Internet2, wireless, etc.)
- Virtual reality (SGIs, CAVE) and visualization labs
- Digital video and audio production studios
- Soundstage and galleries for performances
- Digital libraries
- Supercomputer Center
- 7x24, year-round operation

What is the Media Union?

A test-bed for developing, studying, and perhaps implementing the new paradigms of the university enabled by information technology.

An environment where students and faculty can join with colleagues beyond the campus, working and learning together. (A "portal to the world"!)

An exploration of merging of media (voice, data, video, virtual reality immersion, etc.) and disciplines (art, architecture, music, engineering, computer science).

An environment for creativity (technology, design, performance, artistic, etc.)

camp caen

The computer exploration camp from The University of Michigan. Summer 2000

Welcome to cyber camp CAEN

Are you new here?

About campcaen

Register for
training session

Are you under training session?

Login:_

Pass word: _

Enjoy our events.

Exhibition

Iron programmer
competition

camp caen news < >

We are developing cyber campcaen.
Plaease give me your feedback. we hope you come and enjoy.

Hi, I'm Craig.

Contact Us
Camp CAEN, University of Michigan

CyberCamp

A world-class computing and technology summer camp offered to middle school and high school students (ages 13 to 17) at the UM's College of Engineering.

CyberCamp has been running for 5 years, with over 1,000 students from around the world who have learned programming in C, C++, HTML, PERL, VRML as well as multimedia and virtual reality techology.

The Camp uses the extraordinary environment of the Media Union for guided exploration, peer teaching, and learning. The sessions are interaction, fun, and LOUD!

What is Camp CAEN?

Camp CAEN is a world class computing and technology camp offered for two-week sessions at the University of Michigan's College of Engineering in Ann Arbor, Michigan. Certified teachers and engineering student mentors teach classes that range from programming, to web site design to virtual reality. The program features some of the most incredible computing technology available–from AVID digital video production facilities to an immersive virtual reality CAVE. The camp base is located in the Media Union, a super high tech facility home to over 500 multi-platform workstations including SGI Iris Indigo2, Sun UltraSPARC 10, Dell Pentium III, Apple G3, and numerous others. Also located in the Media Union is the Center for Parallel Computing, responsible for maintaining 64-Microprocessor super computers from IBM, Convex and others. In a nutshell high-tech is here, and you get to explore for two weeks.

What do we do at Camp CAEN?

Camp CAEN is about learning, exploration and fun. It is a successful educational environment because the students interest is what drives the learning. The lectures last as long as they need to to present the material, and the labs are hands-on, learn by doing, activities. The student/mentor ratio is 5 to 1 so questions never go unanswered. After the structured classroom activities, free time begins. We go outside for soccer, volleyball, capture the flag, frisbee; or to the gaming labs for a network game of Unreal, StarCraft or Quake III. The daily structure is as follows:

8:30 –	class lecture begins
9:30 –	lab
11:45 –	lunch/free time
1:00 –	class lecture begins
2:00 –	lab
3:30 –	free time
5:00 –	commuters leave for home
	residential go to dinner
6:30 -	Rec activity
10:00 -	Dorm check in
11:00 -	Lights out

Curriculum

The following classes are available for the summer 2000 Camp CAEN. You need to choose one morning class and one afternoon class. If you choose the advanced Linux Application Development class, the commitment applies to both the morning and afternoon sessions.

MORNING:

Introduction to C programming
Explore the fundamental concepts of programming in this class, using the language that is the foundation of many Unix operating systems and thus the foundation for the Internet! We will learn about variables, decision logic, data structures, and will also discuss standards for writing software in the language so that the program can be compiled on any platform.

Introduction to Java programming
Java has changed the face of application development forever as the programs written in this language run on any platform that has a virtual machine. We will learn the fundamentals of this internet technology - covering the language structure, variables, loops, and some of the intricacies of the API.

Introduction to C++ programming
The standard for the AP computer science exams for college entry, C++ has been the standby object oriented language in which most modern application are written today. The fundamentals of object oriented programming with C++ will be taught in this class with the standard variable, language organization, and data structure components as discussed in the other Introduction classes.

Object oriented programming with Visual C++
Visual C++ is the language of Microsoft Windows, and is the IDE of choice for Windows developers. As a participant in this class, you should have at least one year of experience in programming. We will cover the intricacies of C++, such as polymorphism, inheritance, and dynamic allocation of objects. In addition, we will build windows applications using the MFC libraries from scratch – yes, skipping the wizards!

AFTERNOON:

Dynamic web sites
Many technologies come together to create high quality, professional web sites, and in this class we will explore many of the possibilities. From javascript, to Java, to perl, we will talk about dynamic animations, interactive menus, server side feedback, and personalization elements. Building a site that rivals MTV.com is the target!

ADVANCED:

Linux application development
In this class, we will explore the application development framework of writing software for the Linux platform. GUI libraries and C/C++ code streams will be explored as well as large scale software architecture. This class is an all day program that requires the submission of the programming project listed below for acceptance. Last year, many students took an introductory class when they should have been in the advanced program. Try the sample either way. Partial submissions are accepted if the programming style and algorithm is competent.

Programming Project:
1. Ordered Fractions – Consider the set of all reduced fractions(rational numbers) between 0 and 1 exclusive with denominators less than or equal to N. Write a program that, given an integer N between 1 and 40 inclusive, prints the reduced fractions in order of increasing magnitude. You should also print the total number of fractions within the set. (This program may be written in C, Pascal, Java, or C++)

SAMPLE RUN:
Enter the maximum denominator: 5
There were 9 fractions:
1/5 1/4 1/3 2/5 1/2 3/5 2/3 3/4 4/5

(Hint: You may want to create two arrays for this, an array of strings that represent the fractions, and an array of decimals that represent the value of the fractions. The decimal array could be used for the sorting algorithm – you needn't use any other sorting algorithm other than the standby bubble sort – unless you want to show off!)

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A F T E R N O O N:

Multimedia Studio

Multimedia is that technology that adds pizazz to the web! Macromedia Director, Flash, and the export of dynamic elements to the web will be explored in this class. Topics such as using Adobe Photoshop for digital photo proofing will also be covered.

Digital video production

Creating digital video with a Sony quick cam is as simple as pressing the record button, but how about creating your own movies with digital effects and editing? In this course we will create digital videos and use Adobe Premier as well as the multimedia rooms in the Media Union to create professional quality productions.

Building virtual worlds

Virtual reality is the technology that makes Quake, Unreal, and many other first person shooter games possible. We will build our own virtual worlds in the class using Autodesk 3D Studio Max and export these models to VRML for placement on our web sites as well as Inventor files for exploration in the VR CAVE.

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application ⊙▷Ⅱ⊙ for admission to Camp CAEN

Personal Information:

APPLICANT NAME (LAST, FIRST, MIDDLE)

GENDER

GRADE COMPLETED BY SUMMER 2000

PARENT/GUARDIAN NAME (LAST, FIRST, MIDDLE)

HOME STREET ADDRESS

CITY   STATE   ZIP

HOME PHONE   WORK PHONE

School Information:

SCHOOL NAME

ADDRESS

PHONE

LIST PREVIOUS COMPUTER TRAINING AND/OR EXPERIENCE

Camp Selection Information:

Select Camp session to attend
____ Session 1: June 18 – June 30
____ Session 2: July 9 - 21
____ Session 3: July 23 - Aug 4

Camp status selection
____ Daily Commuter
____ Residential

T- Shirt size
S   M   L   XL   2XL

Class Preference

Morning class:
(Rank in order of preference: 1=most preferred)
____ Introduction to C
____ Introduction to Java
____ Introduction to C++
____ OOP with Visual C++

Afternoon class:
(Rank in order of preference: 1=most preferred)
____ Dynamic web sites
____ Multimedia
____ Virtual Reality
____ Digital video

–OR–

Advanced Curriculum

Advanced Programming curriculum
____ Linux application development

Payment Information: (check one)   ____ Check   ____ Credit Card   ____ Jet Fuel

Credit Card (Visa/MasterCard Number) _____

Name as it appears on Credit card _____

Amount to Charge $ _____   Card Expiration Date _____

Signature _____

Mail application and payments to: Camp CAEN-Computer Aided Engineering Network • University of Michigan •
2161 Media Union • 2281 Bonisteel Blvd. • Ann Arbor, Michigan • 48109-2094

The Michigan Virtual University

- 1996: Michigan Virtual Auto College
  - 501(c) 3 Corporation
  - UM, MSU, State of Michigan
  - State provided $10 M in startup funds
  - Focused on needs of automobile industry
- 1999: Michigan Virtual University
  - Non-profit corporation
  - State provided $20 M in startup funds
  - Online, adult education

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INFORMATION TECHNOLOGY COLLEGE

IT INTERNSHIPS

MICHIGAN VIRTUAL HIGH SCHOOL

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WELCOME!
YOU CAN LEARN VIRTUALLY ANYTHING™

FIND COURSES FAST @ MVU

● Find courses from four-year colleges and universities. Click here or on the Virtual Campus tab above to search by keyword, provider, or start date.

● Find non-credit training and special interest courses. We specialize in continuing education!

● Find community college courses that transfer to all 28 Michigan public community colleges. Click here or on the graphic, left.

High school students -- act quickly to get one of 1,100 scholarships for Advanced Placement classes. Plan ahead for winter semester!

Start anytime in convenient non-credit courses from MVU's Information Technology College! Get the computer skills and tips you need to move up the earnings chart!

Free Tutorials! Try these easy "how to" lessons in everything from operating systems to hand-held computing to gaming!

Help Wanted!
Join the e-lite of e-education companies and hang with the digirati!

MVU Virtual Football Team 1-0

MEGARAMS

TOP STORIES

● MVU unveils Ameritech Information Technology Career Services Center

● Wanted Immediately! Postings for fall internships, work-study and co-op opportunities in information technology. Get your company staffed, get more kids into technology!

● Central Michigan University to offer complete online degrees through MVU

What is MVU?

- A broker
  - ∗ No campus
  - ∗ No degrees
  - ∗ No faculty
- Works primarily with corporations
  - ∗ Develops RFPs for educational services
  - ∗ Solicits existing universities as "suppliers"
  - ∗ Provides technology platforms, standards, and customization

Today's College Student

Today's College Student: The Myth

- 18-22 year old high school graduates
- Enrolled in "liberal arts" degree programs
- Attend classes, listen to lectures, read assignments, write papers, take tests
- Live in residence halls or fraternities/sororities
- Participate in social and athletic activities
- Preparing themselves for "good jobs" while searching for mates …
- Beer and circus …

Today's College Student: The Reality

- Only 20% fit the 18-22 residential stereotype.
- Average age is 25 (with one-quarter over 30).
- Most are commuters.
- Over 40% are part-time students (with jobs and families).
- Most are pursuing college students for career purposes (to get a better job, not to get away from home or grow up …).

Today's College Student

Most of today's college students see a college education as critical to their future quality of life, the key to a good job, financial security, and well-being.

Most have definite career objectives, majoring in professional or pre-professional programs such as business, engineering, pre-med or pre-law.

While they may have strong academic abilities and enjoy learning, both financial and family responsibilities motivate a utilitarian approach to their education.

Since the residential college experience is not as central to their lives, they seek a different kind of relationship with the university, much as they would other service providers such as banks or filling stations.

They approach their education as a consumer, seeking convenience, quality, relevance, and low cost.

The Plug and Play Generation

The Plug and Play Generation

- Citizens of the digital age.
- Have spent their early lives surrounded by robust, visual, interactive media – Nintendo, home computers, the Internet, MUDs and MOOs (Doom and Quake), and virtual reality.
- Learn by experimentation and participation, not by listening or reading.
- Take no one's word for anything, rather they want to control and shape their own learning.
- Comfortable with the uncertainty that characterizes their change-driven world.

Computer Literate

- At UM, over 90% of students arrive on campus with at least three years of computer experience.
- Over 60% arrive with computers; 80% will own computers when they leave.
- Spend 12-14 hours a week on computers, roughly half of this on the Web.

The Old Paradigm

- Linear, sequential college curriculum
- Based on lectures to passive students
- Students discouraged from interacting with one another (particularly on exams …)
- Student learning activities include reading, writing, and taking exams

The New Students

- Active learners, building their own knowledge structures and learning through action and collaboration
- Use nonlinear learning ("hyperlearning")
- Develop peer groups of learning and build sophisticated learning environments
- Faculty will be challenged to shift from development and presentation of content to designing learning environments and mentoring (coaching) active learners

Some Learning Characteristics of the Digital Generation*

- Multiprocessing
- Multimedia literacy
- Knowledge navigators
- Discovery-based learning that merges with play
- Bricolage
- A bias toward action

*John Seely Brown, Xerox PARC

Lifelong Learning

- Students increasingly accept that in an era in which knowledge in most fields doubles every few years, lifetime learning will be necessary for survival.

- Today's graduates expect to change not simply jobs but careers many times during their lives. At each stage further learning will be necessary.

- A shift from "just in case" to "just in time" to "just for you" learning.

The Skills Race

The Skills Race

Ask any governor: The skills race of the 21st Century knowledge economy has become comparable to the space race of the 1960s in priority.

This is likely to remain a dominant issue at both the state and federal level in the years ahead.

Although this is seen by many as a K-12 issue, the increasing educational demands of the high-performance workplace, coupled with the income stratification associated with graduate education, also make it a concern of the research university.
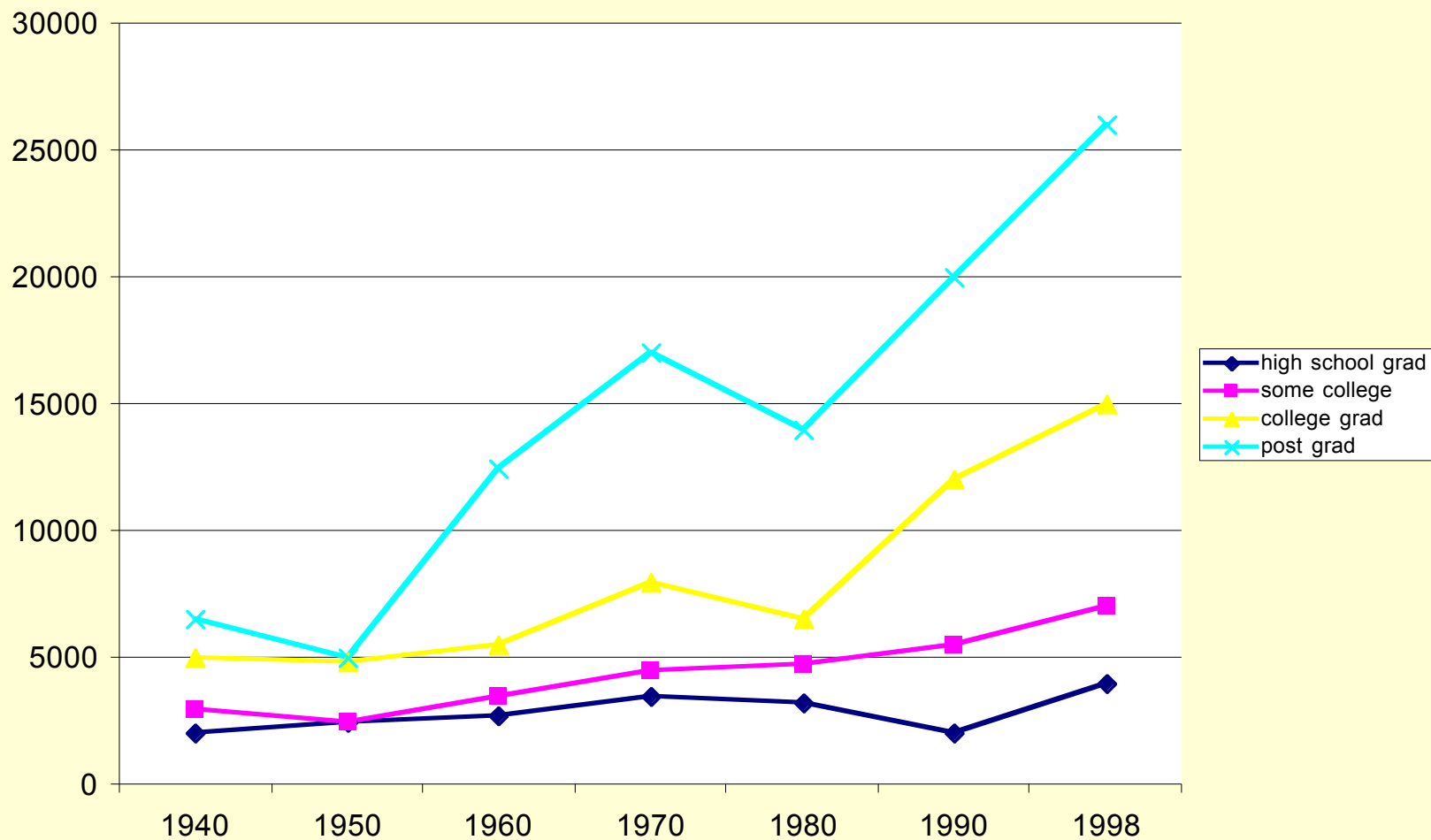
Educational attainment of U.S.Population

Highest Level of Education Attained by Year
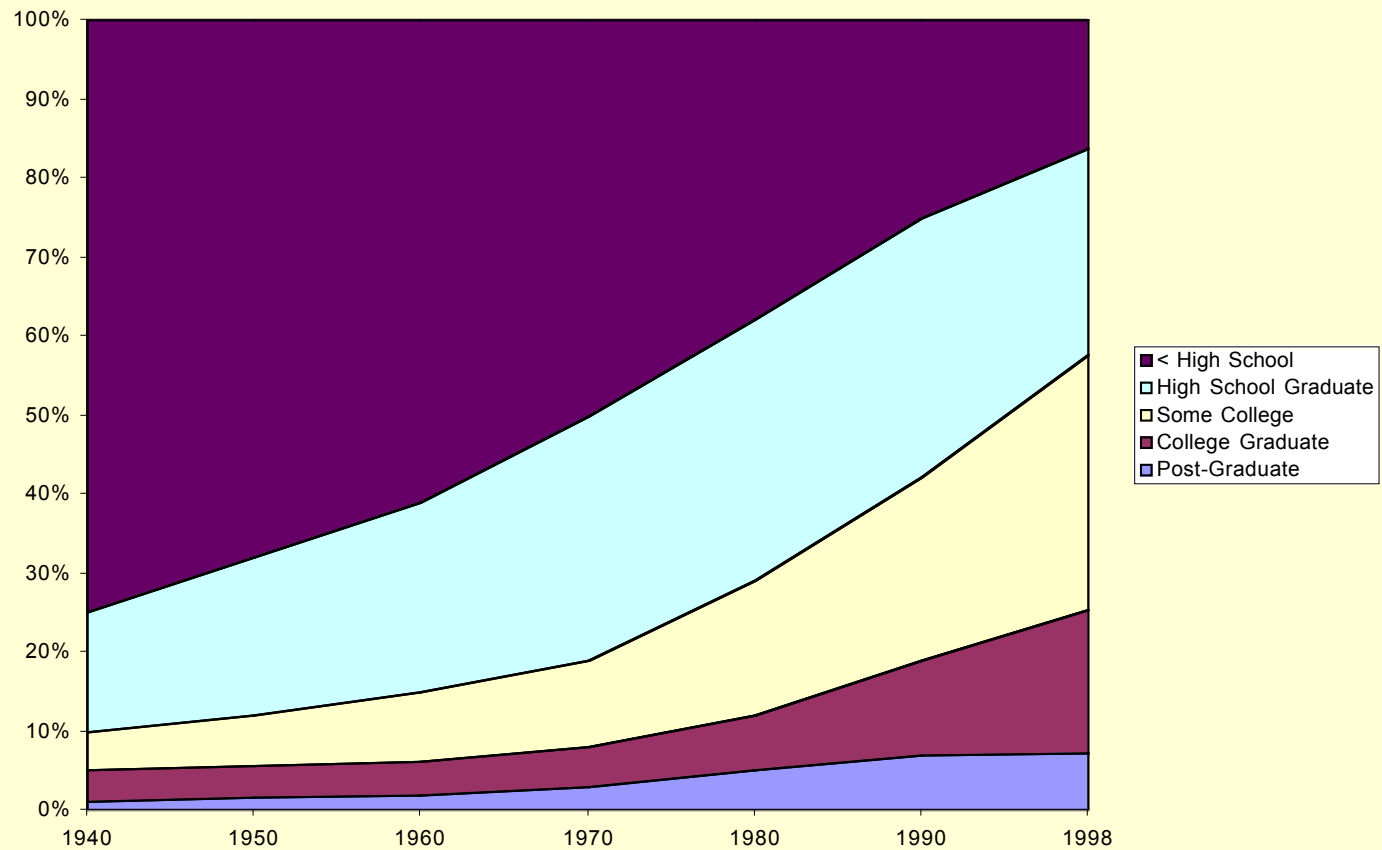
Monetary returns for education, 1940-98 (men)

Monetary returns for education, 1940-98 (women)
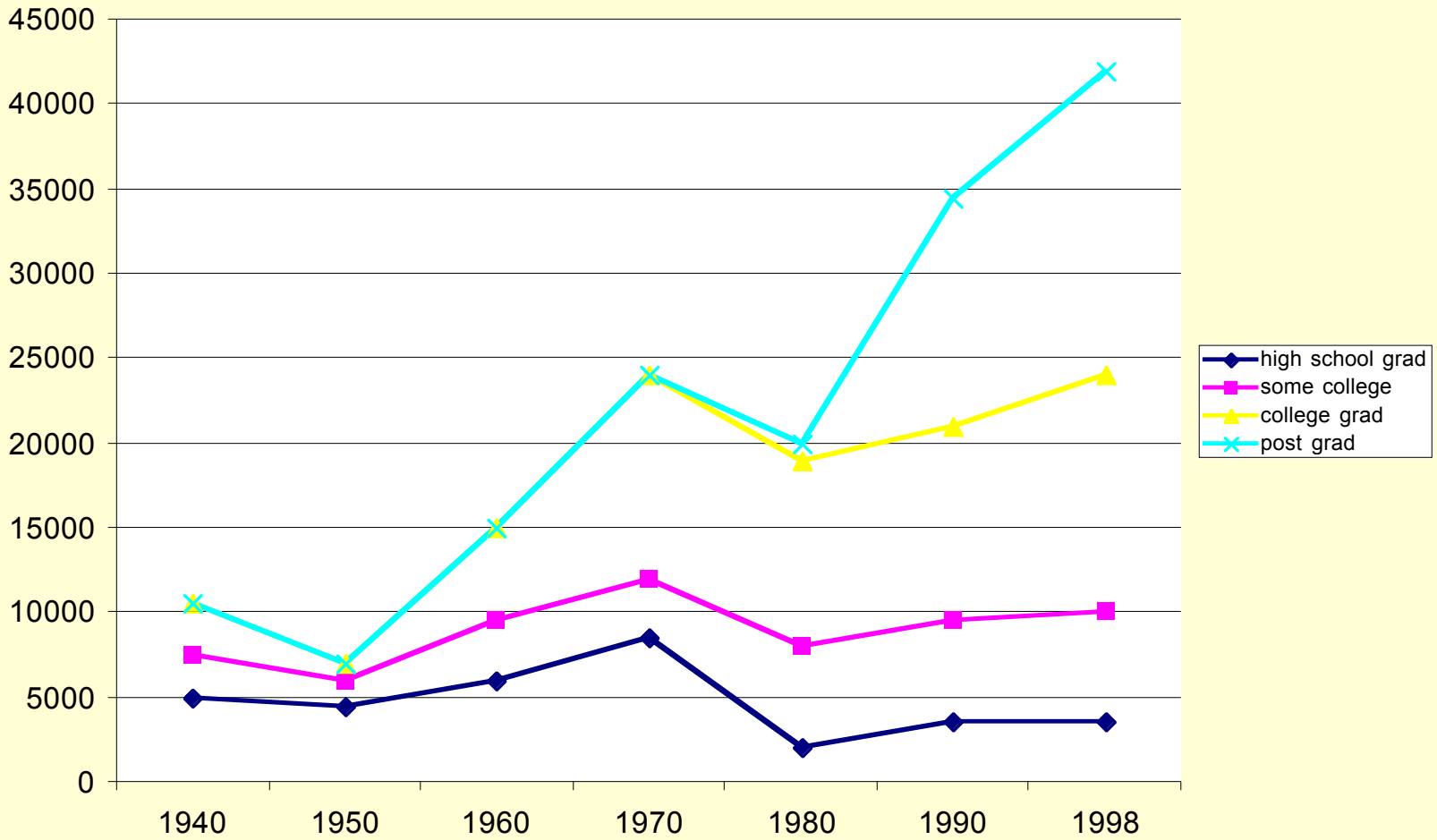
Monetary returns for education, 1940-98 (women)

Some Data Points

1. 50% of economic growth is driven by new technology.

2. 90% of new jobs require college-level education.

3. The single most important factor in determining personal income is the level of one's education, with the most pronounced impact from graduate education.

4. Corporate leaders estimate that the "high-performance workplace" will require that 20% of a worker's time will be spent in formal education.

5. Today's graduates believe that in an age of knowledge, learning must be a lifetime commitment. Hence they will seek employment where they are provided with the richest set of learning opportunities.

Today's college graduates …

- Believe that their future will be one of great uncertainty in which they will have many careers.
- Realize that the key to their future has become lifelong learning.
- Seek careers and employers that can provide them with continual access to advanced learning opportunities.

The Importance of Graduate Education

1. Clearly, as advanced education becomes a more pervasive need of the high-performance workplace, and as the best college graduates seek careers requiring lifelong learning, employers are under great pressure to provide graduate educational opportunities.

2. The fact that the number of corporate "universities" has increased during the past decade from 450 to over 1,600 suggests that many companies are finding that building inhouse capability is more advantageous than relying on "outsourcing" educational programs from traditional colleges and universities.

Another Issue …

Over half the world's population is under 20, including two billion teenagers!!! Yet higher education in most of the world is mired in a crisis of access, cost, and flexibility. The United States may have the world's strongest university system, but our high-cost, campus-based paradigms and our belief that quality in education is linked to exclusivity of access and extravagance of resources* is irrelevant to the rest of the world.

*The "Harvard Model" …

The Restructuring of the Higher Education Enterprise

Market Forces

Powerful economic forces, changing societal needs, and rapidly evolving technology are creating powerful market forces.

The Role of Markets in Higher Education

Accustomed to competing for:

- For students (particularly the best)

- For faculty (particularly the best)

- For public funds (research grants, state appropriations)

- For private funds (gifts, commercial)

- For everything and everybody

But only with other universities, not the for-profit sector!

Scenario 1

A massive restructuring of the higher education industry

or

Swept away by the tsunami of market forces

The current monopoly

Universities operate with a monopoly sustained by geography and credentialling authority.

But this is being challenged by

- a demand that cannot be met by status quo

- antiquated cost structures

- evolving information technology

- open learning environments

Restructuring

Hypothesis: Higher education today is about where the health care industry was a decade ago, in the early stages of a major restructuring.

However, unlike other industries such as energy, telecommunications, and health care that were restructured by market forces after deregulation, the global knowledge and learning industry is being restructured by emerging information technology, that releases education from the constraints of space, time, and credentialling.

A Quote from a Venture Capital Prospectus

"As a result, we believe education represents the most fertile new market for investors in many years. It has a combination of large size (approximately the same size as health care), disgruntled users, lower utilization of technology, and the highest strategic importance of any activity in which this country engages . . . . Finally, existing managements are sleepy after years of monopoly."

The Core Competencies of the University
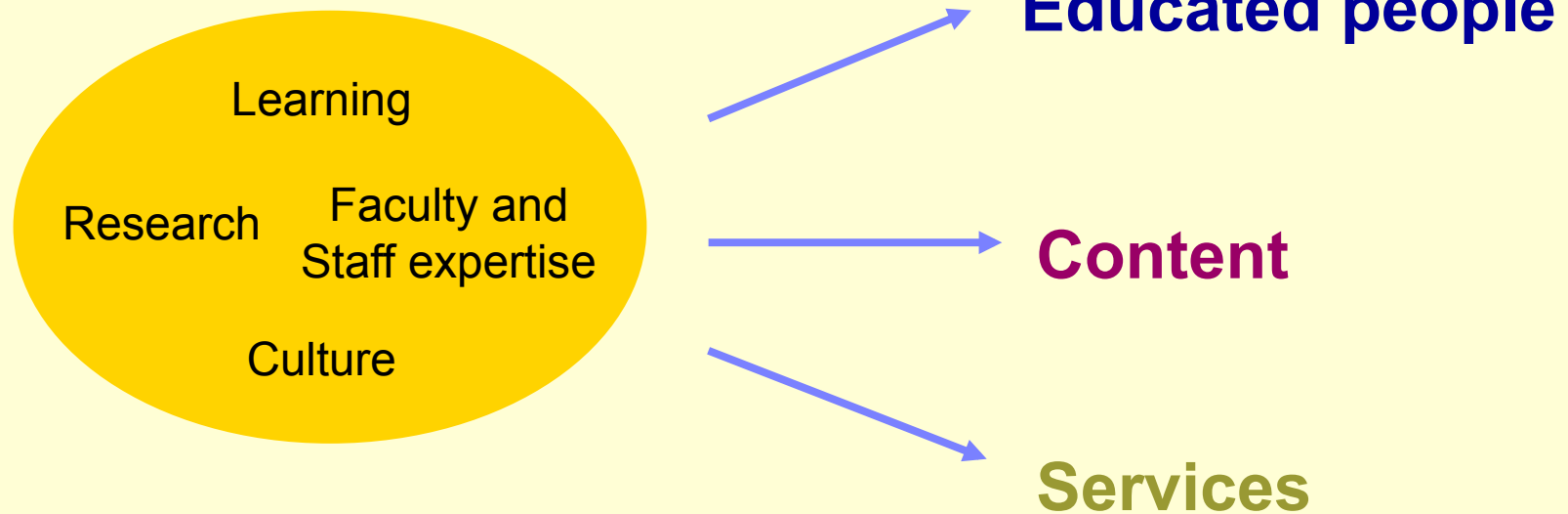
A Possible Future

- $300 billion ($3 trillion globally)
- 30 million students
- 200,000 faculty "facilitators"
- 50,000 faculty "content providers"
- 1,000 faculty "celebrity stars"

(compared to 800,000 current faculty serving a $180 billion enterprise with 15 million students …)

Some Implications

- Unbundling
- A commodity marketplace
- Mergers, acquisitions, hostile takeovers
- New learning lifeforms
- An intellectual wasteland???

Scenario 2

A Society of Learning
or
Renewing the Social Contract

A Society of Learning

Since knowledge has become not only the wealth of nations but the key to one's personal prosperity and quality of life, it has become the responsibility of democratic societies to provide their citizens with the education and training they need, throughout their lives, whenever, wherever, and however they desire it, at high quality and at an affordable cost.

Key Characteristics

- Learner-centered
- Affordable
- Lifelong learning
- A seamless web
- Interactive and collaborative
- Asynchronous and ubiquitous
- Diverse
- Intelligent and adaptive

Evolution or Revolution?

Many within the academy believe that "this too shall pass".

Others acknowledge that change will occur, but within the current paradigm, i.e., evolutionary.

Some believe that both the dramatic nature and compressed time scales characterizing the changes of our times will drive not evolution but revolution.

Some even suggest that long before reform of the education system comes to any conclusion, the system itself will have collapsed.

Some Quotes…

"Thirty years from now the big university campuses will be relics. Universities won't survive. It is as large a change as when we first got the printed book."

–Peter Drucker

"If you believe that an institution that has survived for a millennium cannot disappear in just a few decades, just ask yourself what has happened to the family farm."

–William Wulf

"I wonder at times if we are not like the dinosaurs, looking up at the sky at the approaching comet and wondering whether it has an implication for our future."

–Frank Rhodes

The Key Policy Question

How do we balance the roles of market forces and public purpose in determining the future of higher education in America. Can we control market forces through public policy and public investment so that the most valuable traditions and values of the university are preserved?

Or will the competitive and commercial pressures of the marketplace sweep over our institutions, leaving behind a higher education enterprise characterized by mediocrity?

Which of the two scenarios will be our future: the brave, new world of commercial education, or the renaissance vision of a society of learning?

Concluding Remarks

We have entered a period of significant change, driven by

1) the ever intensifying needs of our society for knowledge and educated people,

2) the sharply different learning characteristics of the "plug and play" generation,

3) and the need for new paradigms in how we develop, finance, and deliver educational opportunities.

The most critical challenge before us is to develop the capacity for change in our educational infrastructure. **The status quo is no longer an option.**

Only a concerted effort to understand the important traditions of the past, the challenges of the present, and the possibilities for the future can enable our educational institutions to thrive during a time of such rapid and radical change.

A Renaissance?

Certainly the need for education will be of increasing importance in our knowledge-driven future. Certainly, too, it has become increasingly clear that our current paradigms for learning, our schools and our universities, how we finance education, all must change rapidly and perhaps radically.

Hence the real questions is now whether the educational enterprise will be transformed, but rather how and by whom.

If we set our national priority to develop a "society of learning", then what is currently perceived as the challenge of change may become the opportunity for a renaissance in education in the years ahead.