From PLATO to Web Based Learning

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University of Pennsylvania
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Three Topics

• Computer used for situational awareness
• Computer used for simulation training systems
• Computer used for education systems
The Systems Engineer

- Physics
- Biology
- Chemistry
- Math
- History
- Language
- Art
- Music
- Theatre

- Science
- Math
- Civil
- Mechanical
- Chemical
- Electrical
- Biological

- Science Practice
- Systems Practice
- Maintenance
- Training
- Support
- Verification
- Validation
- Operations
- Shutdown
- Sustainability

- History
- Stakeholders
- Context
- Requirements
- Functions
- Interfaces
- Architecture
- Tradeoffs
- Human Factors

- Liberal Arts
- Science Math
- Engineering Specialty
- Systems Practices

- INCOSE

International Council on Systems Engineering
Semi Automatisics Ground Environment

- Initially awarded to RCA but later given to IBM
- Production started in 1958, 24 sector direction centers completed by 1963
- Buildings, internal power supply, communications, integration test by Western Electric
- Phone lines by Bell System
- 500,000 lines of assembly language, by spin-off of RAND Corporation, System Development Corporation (SDC)
- MITRE was systems lead
SAGE Computer

55,000 vacuum tubes
0.5 acre (2,000 m²)
275 tons
3 megawatts

Multiply by 2 for redundancy

Multiple centers networked via phone lines
SAGE Console

Computer driven
Light Pen
User data input
150 operators / center
FAA: Boise Airport will keep air-traffic system
By Jason Ford Published: June 8, 2010 Posted in: Idaho, National, News
http://www.koze950.com/2010/06/08/faa-boise-airport-will-keep-air-traffic-system
Shipboard Information Center Training System

Seymour Cray, developed first NTDS processor, AN/USQ-17

Joined CDC

CDC => PLATO

Photograph from NOSC TD 1940, Fifty Years of Research and Development on Point Loma, 1940 – 1990,
PLATO

- **Programmed Logic for Automated Teaching Operations**
- First computer based instruction system
- G.I. Bill provided free college education greater enrollment by early 1950s
  - Many new students serious concern to universities
- 1957 Sputnik
  - University of Pennsylvania
  - Studies presented including IBM
PLATO

• University of Illinois Around 1959
  – Physicist Chalmers Sherwin, suggested computerized learning system to William Everett, engineering college dean, who, in turn, recommended Daniel Alpert, another physicist, convene meeting with engineers, administrators, mathematicians, and psychologists.
  – Unable to suggest system, Alpert mentioned issue to lab assistant Donald Bitzer

• Bitzer, regarded as Father of PLATO
  – Good graphics were critical
  – Developed the PLASMA display specifically for PLATO
March 11, 1961: PLATO II demo

Demonstration

Computer-based education

Time-sharing

Remote access of computer system
PLATO

- Created in 1960 at University of Illinois, initially ran as one-terminal system connected to ILLIAC computer
- 1963, running on CDC 1604 with multiple simultaneous users, donated by CDC CEO William Norris
- 1972, expanded to run thousand simultaneous users on CDC CYBER mainframe
- Control Data Corporation (CDC) began marketing PLATO commercially in 1976
- Many systems interconnected, enabling email remote logins through network
- For nearly ten years, more users on PLATO than on ARPANET, precursor to Internet

www.platohistory.org
PLATO was one of the first systems to offer a graphic as a function of the date

In this case a Turkey as Thanksgiving approached

In mid 90’s people offered Internet web pages where graphics and or text were offered as a function of date, usually using a server side include
PLATO IV Terminal

Plato IV Architecture, Jack Stifle, University of Illinois, Urbana Illinois, April 1971, revised May 1972
PLATO Classroom Setting

Plato Users Guide, Control Data Corporation CDC, April 1981
PLATO Curriculum Structure 2

- CURRICULUM
  - COURSE
    - MODULE
      - Objectives
      - Lessons
      - Tests
      - Study materials
    - MODULE
      - Objectives
      - Lessons
      - Tests
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    - COURSE
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      - MODULE
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Plato Users Guide, Control Data Corporation CDC, April 1981
What Happened Next

• Massive miniaturization
• Massive hardware cost reduction
• Movement to distributed processing
• Commercial adoption of training simulators
• Rise of Computer Based Instruction (CBI) / Computer Based Training (CBT) software packages
• Then the Internet
Common Console circa 1990
Common Console circa 1990
Common Console circa Apr 1984

[Diagram of a console with ergonomic reach zones indicated]
Simulator circa May 1985
Simulator circa May 1985
Tower Trainer Apr 1996
Training Air Route Traffic Control Center

Washington Center
Control room has software to simulate flight & ground systems in launch configuration

Launch team runs system through integrated simulation

Simulation introduces problems to prepare team for worst-case scenarios
Simulator Based Training

• Fidelity based on cost
• Used to imprint automatic responses
  – Reach, tactile feedback, view
  – Doctrine / rule based responses
• Typically starts with theory then function and performance
• Usually starts with lecture, then classroom, then moves to simulator
Simulator Functions

• Site / configuration authoring
• Scenario authoring
• Instructor controls
  – stop, resume, restart, rewind, slow, fast
• Student or students emersion in environment
• Student performance data gathering & results
  – Weaknesses identified
  – Worked with new scenarios
• Instructor debriefing reports
Computer Based Simulator

- Workstations
  - Scenario Authoring
  - Site Authoring
  - Instructor Control
  - Student Control

- Simulation Engine
  - Sim Data
  - Rec Data

- Output
  - Displays
  - Actuators
  - Speakers
  - Microphones
  - Keyboards
  - Pointing
Education Training Mechanism

Market
- Books
- Film
- TV
- Music
- Lecture
- Class Room
- Simulator
- PLATO
- Internet Based

Educators

ETU / Hour

Student
E-Learning 1.0

Group
E-Learning 2.0

INCOSE
International Council on Systems Engineering
CBI circa 1980’s Advantages

• Location independent, remote access
• Schedule independent
• Self Paced, student decides
• Ability to go back
• Can stay in topic until proficiency shown
• Alternative teaching methods per topic
• Animation and video to augment text
• Can be integrated with lecture and classroom
Internet Advantages

- Ubiquitous
  - No more CBI / CBT custom frameworks needed
- Rich high fidelity collaboration
  - Video, virtual blackboards / presentation areas
- Synchronous
  - Live text chats
  - Live video chats
- Asynchronous collaboration
  - Message boards
Software

- Blackboard
- WebCT
- Desire2Learn
- Moodle
- Sakai Project
- Instructure
- SharePointLMS
- OLAT
- ATutor
- ANGEL Learning
- Alphastudy
- Apex Learning
- CCNet
- Chamilo
- Claroline
- Coggno
- Cornerstone OnDemand
- CyberExtension
- Democrasoft
- Dokeos
- eCollege
- eFront
- Elluminate Live
- FirstClass
- Heritage Key
- ILIAS
- itslearning
- ITWorx_CLG
- JoomlaLMS
- LAMS
- Mingoville
- Pass-port
- Rcampus
- Saba
- Saba Centra
- School VLE
- Spiral Universe
- Studywiz
- WebTrain
Tools

Common Course Tools
- Announcements
- Syllabus
- Calendar
- Discussions
- Assessments
  - Quizzes, surveys, self tests
- Assignments
  - Homework, midterm, final
- Mail
- Learning Modules
- Media Library
- Web Links
  - Live chats, video, audio
- University Library

Instructor Tools
- Manage Course
- Assessment Manager
- Assignment Drop Box
- Grade Book
- Group Manager
- Tracking
- Notes
- Release Control
- Media Library
- Grading Forms

Student Tools
- Grades
- Progress
- Notes
- Files

Designer Tools
- Manage Course
- File Manager
- Release Control
- Grading Forms
Test Questions

- Calculated
- Combination
- Fill in Blank
- Matching
- Multiple Choice
- Paragraph Essay
- Short Answer
- True False

- Calculated Formula
- Calculated Numeric
- Either / Or
- Hot Spot
- Jumbled Sentence
- Multiple Answer
- Opinion Scale
- Ordering
Course Main Page

EGMT 680 Systems Engineering Analysis

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Video Lectures when prompted enter:
User Name: systems
Password: analysis

Fall 2011 - 2012

Week 1 Sep 19 - Week 7 Oct 31
Week 2 Sep 26 - Week 8 Nov 07
Week 3 Oct 03 - Week 9 Nov 14
Week 4 Oct 10 - Week 10 Nov 21
Week 5 Oct 17 - Week 11 Nov 28 Last week
Week 6 Oct 24 - Week 12 Dec 05 Finals Start Week 12 Dec 10 Finals End
Weekly View

Welcome to Week 3

Activities Summary

- Please read textbook chapter 10
- Use the general discussion board
- Listen to the lectures
- Do the homework
- Take the quiz
- Work your project

- Participate in discussions
- Download and review library items
- Download and install software

You must read the textbook material. We will not have enough time in the lectures to cover all the content details. Especially the examples and author comments.

Lecture Videos

- Lecture 3.1 - 30 min Chapter 10
- Lecture 3.2 - 42 min Chapter 10
Links

• Systems Practices as Common Sense
  – Amazon.com, barnesandnoble.com, etc

• Sustainable Development Possible with Creative System Engineering
  – Amazon.com, barnesandnoble.com, etc