Learning By Doing or Learning by Listening?

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Outline

• Learning by Doing – what is it?
• Curriculum development
• The eBusiness Technology Master’s Program
• Delivery modes
• Lessons learned

• Based on ideas of Herbert Simon (Economics Nobel Prize) and Roger Schank (Learning Methodology)

Learning By Doing

• University teaching is largely “learning by listening” (with some structured homework)
• Studies show:
  – Only 10% of material presented in class is retained by the end of that class
  – Only 3% retained by the final exam
  – Only 1% retained one year later
• Classes do not and cannot teach skills
  – Imagine a lecture on how to ride a bicycle
• Jobs require skills
• Therefore, DON’T GIVE CLASSES to people who want skills

Task-Oriented Curriculum

• What to do instead?
• Develop a realistic scenario
• Give students roles in the scenario
• Have the students do what their characters would do
• Work as teams under the guidance of faculty to produce work product
  – In eBusiness Technology: reports, system designs, software
• Faculty evaluate final work product, assign grades
Creating a Curriculum

- Faculty (often 10 or more) meet regularly to devise a list of skills all students should possess
- Once the skill list is agreed, faculty create tasks
- Each task requires mastery of at least one skill, usually several
- Students work full-time on each task in teams, usually for 2-3 weeks
- Output
  - Professional work-product
  - Public persuasive presentation
  - Individual evaluations

The Task Matrix

- Rows are skills from the skill list
- Columns are tasks
- Each skill is required in at least one task, so each row must have at least one X
- There are usually far more skills than tasks (e.g. 50 vs. 16)

<table>
<thead>
<tr>
<th></th>
<th>Task 1</th>
<th>Task 2</th>
<th>Task 3</th>
<th>Task 4</th>
<th>. . .</th>
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<tbody>
<tr>
<td>Skill 1</td>
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<td>X</td>
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<td>Skill 2</td>
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<td>Skill 4</td>
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Task Materials

- Each task begins with a problem statement, assignment or memo
- The students are given an overview of the field pertinent to the task (a lecture)
- The task is explained in detail
- A large body of references (many irrelevant) is provided
- A “step-by-step guide” is created to provide a starting point

Metaskills

- Team formation and management
- Accommodating different talents, background, cultures
- Interpreting ill-formed and incomplete problem statements
- Triage: dividing reference material into three categories:
  - Irrelevant
  - Clearly relevant
  - Possibly relevant, therefore requiring further attention
### Metaskills

- Consulting skills
- Presentation skills
- Time management
- Dealing with illness, personal crises & difficulties
- HOW TO LEARN, instead of HOW TO BE TAUGHT

### eBusiness Technology

- Master of Science in Information Technology (MSIT)
- Program objective:
  - Graduates who can design and direct implementation of eBusiness systems
- Program orientation
  - Not a business degree, but a technology degree immersed in business applications
- Job objective
  - Manage eBusiness system development
  - eBusiness consulting
  - Startups

#### ebConsultants LLP

- Students are beginning employees in the eBusiness Task Force of ebConsultants LLP
- They report to Ajit Singh, Director of eBusiness Consulting
- Dr. Singh reports to Jocelyn Whitney, Managing Partner
- The faculty are also consultants to ebConsultants
- Receive realistic assignments come from Dr. Singh
- Everything is realistic
Program Design

- 16 tasks
- No eBusiness classes
  - Students learn as teams with guidance from faculty
- Everyone takes one course per semester
  - Fall: 15-600 Introductory/Intermediate Programming
  - Spring: Elective
  - Summer: Elective
- 1 Practicum (8 weeks)

Program Structure

- Teams of five
- Rotate through all 4 practice groups
- Team composition changes each quarter
- Tasks start with a task memo
- Work product is joint
- Tasks end with a presentation to the "client"

eBusiness Tasks

1. Ubiquitous computing
2. Requirements Analysis
3. Contextual Design
4. User Interface Design and Testing
5. Database and Detailed Design
6. Network Infrastructure, Wireless
7. Web Services
8. Web Application Development
9. ERP, Supply Chain
10. Privacy Technology
11. Discovery Technology
12. Data Mining
13. Information Security
14. Mobile eCommerce
15. Negotiation
16. ePayment

eBusiness Curriculum Development

- Staff: 10 faculty (9 Computer Science, 1 Business), 3 educational specialists, 3 scenario writers
- Development time: 1 year
- Cost: $1 million
- Eventually produced list of 51 skills; took 3 months
Grading

- Fundamental problem: how to give fair individual grades for group projects
- Consulting faculty (task experts) evaluate work product
- Program faculty evaluate metaskills
- Consulting faculty generate grades
- ONLY POSSIBLE GRADES: A, B, C, F
- F in any task means the task must be repeated

Task Grading

<table>
<thead>
<tr>
<th></th>
<th>Team Evaluation (1/2)</th>
<th>Individual Evaluation (1/2)</th>
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</thead>
<tbody>
<tr>
<td>Technical Skills (2/3)</td>
<td>1/3</td>
<td>1/3</td>
</tr>
<tr>
<td>Professional Skills (1/3)</td>
<td>1/6</td>
<td>1/6</td>
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Practicum

- A real problem supplied by a real, paying company
- 8 weeks long
- US $10,000 prize for the winning team, determined by independent judges
- We have done over 40 practicums in the past 7 years

eCommerce Practicum

- A real problem from a real company that pays real money for a solution. 33 Practicums from 24 sponsors:
Delivery Modes

- Full-time, on-campus
  - Successful
- Part-time, on-campus
  - Workable
- Full-time, remote
  - Feasible with dedicated students
- Part-time, remote
  - Very difficult to manage; nearly impossible

Lessons Learned

- Learning by doing is MUCH MORE EFFECTIVE than traditional classes
- Students complain about it because it’s a lot of work
- Fair grading is extremely difficult
- Employers have difficulty understanding what it produces
- Students slide easily into professional employment

Q&A