CS 290 Methods of Research

Study on the Application of a Blended Approach to Online Learning in the Corporate Environment

William Emmanuel S. Yu
Department of Information Systems and Computer Science
Ateneo de Manila University
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Introduction
Background of Study

- Increasing need for **Information Technology** in the corporate environment
  - Financial Institutions
  - Transactional Processing
  - Network and Communications
  - Decision Support Systems

- Need to ensure reliable, available and serviceable **Information Technology** Infrastructure

- High turnover of **IT technical support professionals**
  - Two to three year turnover (6 months for call centers)
  - Must be sustainable
How do we best support and sustain technical support skills transfer in the corporate environment?

Will Deluca, Savery and Duffy's Blended Learning approach to online learning be effective in a technical support environment?
Significance of Study

- **Minimize service disruptions** due to:
  - Unavailability of qualified support personnel
  - Errors and mistakes due to unfamiliar engineers

- **Minimizing work stoppage** by providing:
  - Faster turnover between old and new employees
  - Faster employee replacement

- **Cost savings.** Use of online learning results in 60% savings versus traditional training

- Answer the apparent limitations of existing corporate skills transfer programs
Objectives of Study

- Is the “Blended” learning strategy advocated by Deluca and Savery effective? Will it work?

- Provide a learning modules with the following characteristics:
  - Location and Time Independence
    - Save Instructor Time
  - Learner Centric
    - Maximize learner schedules
    - Self-paced learning
  - Non-intimidating
    - Prevent drop-out
  - Re-usable and Updatable
  - Flexible Delivery
Scope and Limitations

- Use of “Blended” learning strategy
  - Combination of both instructional and constructivist
  - Advocated by Deluca, Savery and Duffy
  - Applied to a technical support environment

- Does not attempt to generalize the use of this “Blended” learning strategy in all corporate scenarios and environments

- Use of the Moodle Course Management System
  - For structured course development
  - However, other CMS can be used
  - Alternative media and technologies can also be used
Framework
Corporate Skills Transfer

- **Classroom-type Instruction**
  - Learners have to be logistically connected
  - Possibly different locations, but “same-time”
  - Loss instructor time
  - Tendency to push too much information

- **Apprenticeship**
  - Takes too much time
  - Some scenarios are not encountered
  - Quality tends to vary dramatically

- **Computer-based Training (CBT) Modules**
  - Does not require “same-time” and full-time instructors
  - Inflexible. Costly and difficult to development
  - Provides limited interaction
Nature of Technical Support

- **Preventive**
  - Focuses on doing routine tasks
  - Execute defined steps and procedures
  - Requires application of existing knowledge
  - Comprises >80% technical support engineer's work (contrary to public perception)

- **Reactive**
  - Focuses on resolving problems and issues
  - Need to think out of the box in most cases
  - Requires integration of existing knowledge
  - Comprises <20% technical support engineer's work
<table>
<thead>
<tr>
<th>Instructivist Approach</th>
<th>Constructivist Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge moves from outside in</td>
<td>Knowledge is developed internally</td>
</tr>
<tr>
<td>Focused on learning concepts and artifacts</td>
<td>Focused on developing mental models</td>
</tr>
<tr>
<td>Simply absorbing this information</td>
<td>Adjusting mental models to experiences</td>
</tr>
<tr>
<td>Technical support work is procedural</td>
<td>Technical support work requires synthesis and integration</td>
</tr>
</tbody>
</table>

- So what should be use???
Blended Learning Strategy

- Advocated primarily by Deluca, Savery and Duffy
- On-line training should use both instructivist and constructivist approaches

Instructivist Components
- Simple CBT-like modules and material
- Used to convey concepts and artifacts

Constructivist Components
- Use Scaffolded Learning
- Aims to provide methods for better interaction (both amongst themselves and the facilitator)
- Make it easy to learner to access additional information
- Develop a knowledge base to benefit future learners
Methodology
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■ **SVI Technologies Inc.** The Shared Services IT Support Arm of the SVI Group of Companies
■ **Fifty (50)** Full-Time Technical Support Engineers
■ **800** issue tickets / **150** L1 issues per month

■ **24 x 7 Operations** in three (3) locations
  - Pasig City, Metro Manila, Philippines
  - Redwood City, California, USA
  - Yorktown City, New York, USA

■ Divided into four (4) groups:
  - Support Services
  - Infrastructure Services
  - Desktop Management and ICT Services
  - Call Center Services
General Plan

■ Use a blended approach when developing modules
  • Instructivist approach to presenting objective and procedural knowledge units
  • Constructivist approach to synthesize instructivist learnings and apply them in production scenarios

■ Develop a online learning module using the Moodle Course Management System
  • Has modules that support constructivist style learning such as the lesson and the glossary modules
  • Has support for automated checking and validation
The module will have a number of blocks
Each block will be of a particular type:

- **Informational Blocks**
  - Contains objective, static, sequential or linear info
  - Best taught using instructivist methods
  - Supplemented with scaffolded learning

- **Scaffolded Learning**
  - Provide additional means of interaction
  - Components
    - Collaborative Forums
    - Inline Glossary and Wiki
    - On-line Consultation
  - Lesson and Quiz modules support instant feedback
Case Blocks

- Aims to allow learners to utilize learnings obtained from the informational blocks
- Simulated learning environment uses a real non-production support system
- Problems and issues are simulated
Success Factors

- Measurement will use two (2) main methods:
  - **Lesson and Quiz Results**
    - Measure ability to retain objective facts
    - Measure completion of lesson modules
  - **Case Results**
    - Measure ability to integrate and apply objective facts in a simulated environment
    - Uses an actual non-production system
Results and Discussions
The highest two (2) takers were also the most technically competent engineers in the group.

The lowest two (2) takers had low score due to non-completion of the Last Lesson Module.

Quiz average is at 80%.

Case average is at 89%.
Strongest points on Relevance and Tutor Support
Weakest points on Interactivity and Peer Support
Unexpected Benefits

- **Horizontal Learning**
  - Scaffolded learning components point to additional material
  - Some engineers became interested in learning other technology fields

- **Institutionalized Processes**
  - Force the documentation of processes and procedures
  - Determine possible fault scenarios and remedies

- **Constant Practice**
  - Simulated failures can be regularly created to continually test engineers
Recommendations

- Need to find a way to improve interaction
  - Approach and technology was new. Learning Curve
  - Use other senses. Multimedia.

- Perform quantitative studies on how much better is this strategy compared to others
  - Cognitive, Traditional Classroom, Etc ...
  - Was not done due to time constraints

- Faster way to develop Blended Online Learning modules
  - Currently with the Moodle CMS, it is as tedious as developing traditional CBTs
  - Probably develop a templating engine
Conclusions

- **Online Corporate Skills Transfer**
  - Provides numerous obvious benefits
  - Must be implemented well to be effective

- **Marriage of Approaches**
  - Benefits of both instructivist and constructivist
  - CBT-like modules placed emphasis on the procedural nature of the work
  - Cases provided a real-world continuing test environment

- **Scaffolded Learning**
  - Furnishes learner with additional avenues for learning
  - Increased interactivity of instructivist components
  - Provide instantaneous feedback to learners
Screenshots
Lesson Module
Glossary Module

TCY 100 - The Technical Support Engineer

Internet:

This article is about the Internet, the extensive worldwide computer network available to the public. An Internet is a more general term for a set of interconnected computer networks that are connected by internetworking.

The Internet is the publicly available worldwide system of interconnected computer networks that transmit data by packet switching over the Internet Protocol (IP). It is made up of thousands of other, smaller business, academic, and government networks that provide various information and services, such as electronic mail, online chat, and the World Wide Web. Because it is the largest, most extensive Internet (with a small 'I') in the world, it is often called the Internet (with a capital 'I').

For glossaries (students can add entries and get bonus points!)

Linux Networking

- Broadcast Mask
- Network Mask
- Subnet Mask
Forum Module
Quiz Module

TCY 100 - The Technical Support Engineer

Quiz 3: Network Connectivity

1. `ifconfig` is the tool used to determine the routing information of a particular machine.
   - [ ] True
   - [ ] False
   Answer: [ ] True

2. The network configuration files are located in `/etc/systemd/network-scripts`. These files can be manually edited to change network settings.
   - [ ] True
   - [ ] False
   Answer: [ ] True

3. `ipconfig` is the tool used to configure network interfaces in Linux.
   - [ ] True
   - [ ] False
   Answer: [ ] True
Questions and Comments