

CEdMA E-Learning/Virtual Classroom SIG – June, 2013

A Research-Informed Study on the Use of Technology in Technical Training

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Steps in the Discussion

- Setting the Frame
 - The Challenge of Technical Training
 - The Research Project
 - The Company and Their Technical Training Strategy
- Findings
- Analysis
- Recommendations

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The Challenge of Technical Training

- Technical training is vital to technology-oriented companies
 - Technology advances rapidly
 - Workforce must be knowledgeable on new technologies for the business to derive benefits
- Educational technologies support technical training
 - Profit-and-loss mission means that it is often used to support efficiency and scale
 - Research shows: educational technologies also supports deepening learning
- Core question: What does education research have to say about improving technical training through educational technologies?

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The Research Project

- An in-depth study of the use of educational technology in the technical training practices of one CEdMA company – PTC
 - Interviews with technical training leaders
 - Highlighting typical, interesting practices
- Three types of reporting:
 - **Findings:** Key practices reported by the leaders from a qualitative review of the evidence
 - **Analysis:** Examining the Findings through the lenses of education research
 - **Recommendations:** From the Findings and Analysis, developing some research-based extensions

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Overview of PTC

- Provides software that supports creating and servicing products across the product lifecycle
 - Conception and design
 - Sourcing and service
- Complex products, wide learner base:
 - 6,000 employees (1,500 providing services)
 - 27,000 customer businesses (1.7M active seats)
 - 800+ business partners
- PTC divides technical training into separate *external-facing* and *internal-facing* organizations

PTC®

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PTC's Technical Training - External

- External-facing: PTC University (PTCU)
 - Supports 50,000+ learners (including business partners) annually
 - Business model: Profit-and-loss
- Interviewee: Spencer Cutting
 - VP, Portfolio and Development



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PTC's Technical Training - Internal

- Internal-facing: PTC Service Academy (PTCSA)
 - Serves 1,500 employees who are service professionals: consultants, service managers, and solution developers
 - Business model: Non-profit
- Interviewee: Uwe Waeger
 - Director, Training Development Lead



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Findings

- Two organizations, slightly differing visions
 - Approaches to development and delivery
 - Using educational technology
 - Integrating learning with learners' work

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Development and Delivery Approaches

- PTCU: Skill-building and *revenue* creation
 - Goal: Long-term relationships with learners
 - Offerings:
 - Traditional ILT (more than ½ of revenue)
 - 6,000+ hours of 3-5 minute videos (most learners)
 - Range of for-fee services for larger customers
 - ~250 team members; ~25 developers
- PTCSA: Skill-building and *capability* creation
 - Goal: Expand and deepen employee expertise
 - Offerings: Synchronous events with blended content
 - ~80 team members

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Using Educational Technology

- PTCU: *Efficiency* and scalability
 - Content development is highly structured, using PTC lifecycle mgmt. tools (similar to LCMS)
 - Content is topic-based – re-use, maintenance
 - Other tools: LMS, virtual classroom, virtual lab
- PTCSA: *Flexibility* and scalability
 - Leverage PTCU content for skills training
 - *Instructor-Supported Self-Study (IS3)*: Blended content, weekly synchronous sessions, online activities for capability-oriented classes

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Learning-Work Integration

- PTCU: Integration with PTC software
 - LearningConnector: PTCU's video libraries are integrated with PTC software's Help functions
 - Videos are licensed-based for revenue
- PTCSA: Flexibility in scheduling
 - IS3 classes require 2 consecutive hours/week
 - easier to schedule
 - Virtual classes are recorded – employees can access without having to attend live

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Analysis

- Looking at PTCU and PTCSA through the lenses of education research, five themes were seen:
 - Implicit theory of education (traditional vs. progressive)
 - How learners create knowledge
 - Distance between training and work
 - Connecting learning in training to learning in work
 - Effect of the business model on PTCU and PTCSA

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Implicit Theory of Education

- John Dewey (1938): Two opposing theories
 - Traditional: *To* the learner, *by* the educator
 - Progressive: *By* the learner, *with* the educator
- PTCU: More traditional, some progressive
 - Traditional: Pre-defined, static video content
 - Progressive: Sense of choice (schedule of courses, learner choice of which content)
- PTCSA: Some traditional, more progressive
 - Progressive: Online communities, use of case studies

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Learner Creation of Knowledge

- Wiske et al. (2006): Piaget's theory of adaptation
 - *Assimilation*: Fit new ideas into old practice (shallow)
 - *Accommodation*: Change practice to fit new ideas (deep)
- PTCU: Mostly assimilation
 - New skills presented in terms of existing knowledge of PTC or related products
 - Works well with customers; challenges for business partners
- PTCSA: Some assimilation, some *negotiated accommodation* (Wiske)
 - Skill development *and* changes in thinking and practice over time (IS3)

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Relevance of Training Activities to Work

- Seymour Papert's (1983) "knowledge-in-use": aid learners by shortening the distance between working and learning
- PTCU: LearningConnector
 - Learning happens in the moment, when needed
- PTCSA: Case studies
 - *Analogical reasoning* (Holyoak et al, 2001): Reviewing cases supports finding solutions in later, novel situations

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Connecting Learning in Training to Learning in Work

- J. S. Brown and Adler (2008): Two types of knowledge
 - *Explicit*: Factual knowledge; tip of the iceberg
 - *Tacit*: Practitioner knowledge; below the waves
- PTCU and PTCSA: Mostly explicit, little tacit
 - PTCU: Investigating adding social media
 - PTCSA: IS3 uses online discussions, but only within the class

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Effect of Business Model - PTCU

- Business model: Profit-and-loss
- Positive: Revenue for investment; long-term planning supporting leveraging
- Challenges: Efficiency can constrain, as discussed by Larry Cuban (1986)
 - Sterile professional narration: “emotions fuel the drive for understanding”
 - Instructor utilization: “DNA of classroom life... a repertoire of practical methods”

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Effect of Business Model - PTCSA

- Business model: Non-profit
- Positive: Pursue deeper, accommodation-oriented learning; embrace flexibility
- Challenges: Lower investments can constrain
 - Recorded virtual classrooms: good enough for employees, not good enough for revenue
 - IS3 uses flipped classroom concepts (Bergmann and Sams, 2012), but is still farther from work than LearningConnector

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Recommendations

- The strengths of PTCU and PTCSA could be extended through three research-support methods:
 - PTCSA: Increase employee learning opportunities, particularly for experts
 - PTCU: Increase business partner effectiveness
 - Both groups: Better connect learners with their day-to-day practice

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Employee Learning Opportunities

- Framework: Illich's (1971) "opportunity webs" philosophy - facilitate learners' access to learning resources
 - Reference services to educational objects
 - Skill exchanges
 - Peer-matching
 - Reference services to educators-at-large
- Implementation: Leverage existing resources to manage costs
 - Reference services to objects: LearningConnector
 - Other webs: LMS, internal communities

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Business Partner Effectiveness

- Framework: Wiske et al.'s (2006) model of negotiated accommodation
 - Develop deeper understandings
 - Improve business/revenue capabilities
- Implementation: Leverage the IS3 model used by PTCSA and supported by Wiske
 - Gain support from other PTC groups so that training can be scheduled to maximize instructor utilization

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Connecting Learners to Day-to-Day Practice

- Framework: Lave and Wegner's (1991) communities of practice (e.g. CEEdMA!)
 - Learning doesn't just happen *apart* from work/life – it's *integral* to the social practice of life
- Framework: Barab et al.'s (2004) socio-technical interaction networks (STINs)
 - Support a range of activities around participation, making meaning, encountering diverse views and skills
- Implementation: LearningConnector + LMS + online communities + social media (blogs and Twitter)

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Other Questions

- How does technical training practice compare with adult development theory (*andragogy*)?
- Can technical training drive deeper changes in thinking and acting?
- How can technical training better support the informal learning that our learners do every day?

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Conclusions

- PTC is a growing firm seeking innovative ways to support their learners through technical training
 - Annually train tens of thousands of customers, business partners, and employees
 - Their technology use supports business goals, but also deeper learning (negotiated accommodation)
 - Technology use has increased in sophistication (LearningConnector, IS3 model)
 - Willing to visit their own practice through the eyes of academic research (thank you!)
- Education research supported some activities, and informed recommendations

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Q & A

- Thanks for your time and attention!
- Follow-up: harvshaw@gmail.com,
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