E-Learning Strategies to Accelerate Time-to-Proficiency in Acquiring Complex Skills Preliminary findings of Doctorate Research



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Complex skills to be Acquired by **Employees as learners** toward **Proficiency** in Shorter time using **E-Learning strategies** At or for Workplace

- You are in-charge of professional skill development and technical learning on learning technologies for your faculty members.
- A new technology has come up in the market and learners (students/professionals) now demand all-mobile-based-courses which requires deployment of new highly complex platform (or technology).
- Your faculties would need to acquire new technical and course design knowledge / skills on this platform from scratch.
- If your faculty members do not become <u>fully proficient</u> in the skills required to use this new platform within a stipulated time, you risk losing next academic year's enrollments to other institutions.
- Due to faculty geographical locations only option you have is using e-learning.
- How would you make them fully proficient on new skills n shorter time?

Why this research?



Shortened Time-to-market of new technologies and services puts pressure on organizations to gain competitive advantage quickly and to develop skills of their employees at the pace of the business

"empirical fact about expertise (i.e., that it takes a long time) sets the stage for an effort at demonstrating the acceleration of the achievement of proficiency......Our vision is that methods for accelerating the achievement of proficiency, and even extraordinary expertise, might be taken to new levels such that one can accelerate the achievement of proficiency across the journeyman-to-expert span post-hiring."

(Hoffman, Andrews & Feltovich ,2012, p. 9)



Research Question: What and how specific training strategies (methods, techniques, mechanisms, systems, processes, instructional design, methodologies, interventions, etc.) have been used by training experts in various contexts in leading organizations to successfully accelerate acquisition of complex job skills?

- Recruited training experts worldwide with specific project experience
- Reached out to 366 potential training experts
- 84 participants participated in research
- Conducted 71 in-depth interviews
- Collected 100 project cases
- Covering 13 sectors and 42 industries (classified as per S&P)
- Qualitative research Grounded Theory Approach
- Constant comparison and Case based data analysis
- Theory development driven by theoretical sampling



Cognitive Complex Skills @ Workplace

Complex technical and personal interactions, higher order decision making, problem solving, troubleshooting and critical thinking central part of today's jobs

Changing nature of workplace requires nonroutine cognitive skills (Karoly & Panis, 2004)

Novice to Expert Skill Acquisition Model

(Dreyfus & Dreyfus, 1980, 1986, 1986a, 2008)

Practical Wisdom Master / Mastery Expert / **Expertise Proficient** / Proficiency Competent / Competency Advanced Beginner Novice

Proficient

A 'proficient' level individual exhibit a consistent superior performance characterized by **reliability**, **repeatability**, **reproducibility** and **consistency** of his skills regardless of the situation, problem and challenge (Dreyfus & Dreyfus, 1980, 1986, 1986a, 2008)

Proficiency

A stage when employee is independently productive, fully functioning and up to speed (Williams & Rosenbaum, 2004 in Learning Paths)



"E-learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning." (Sangrà, Vlachopoulos & Cabrera, 2012)

> information and communication technology in education learning technology technology-enhanced learning computer managed instruction computer-assisted instruction internet-based training web-based training online learning virtual learning environments

educational technology multimedia learning computer-based instruction computer-based training computer-aided instruction flexible learning online education virtual education m-learning

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Focus of this Paper

Proven E-learning Strategies which hold potential to accelerate proficiency of learners within a training program and at the workplace

E-learning in Complex Skill Acquisition

- Computer based simulation (Lesgold, Lajoie, Bunzo & Egan (1988)
- Scenario based simulation (Gott and Lesgold, 2000)
- Blended learning (Sims, Burke, Metcalf & Salas, 2008)
- Technology Enhanced Learning (Dror, Schmidt and O'Connor, 2011)
- Active Processing e-learning strategies (Clark and Mayer, 2011)
- Gaming (Dror, Schmidt, O'Connor, 2011)
- Problem based 'digital laboratory' (Hinterberger, 2011)
- Scenario Based e-learning (Clark and Meyer, 2013)
- Case based expert system (Arnold et al., 2013)
- Computer based simulation games (Sitzmann, 2011)

* Evidences supporting accelerating proficiency using e-learning

Preliminary Findings: E-learning Strategies To Accelerate Time-to-Proficiency



E-Learning Path Sequence

Strategy:

- Eliminate redundant, irrelevant or wasteful activities in learning path. Select most essential and relevant learning activities (e-learning or otherwise) required for a stated proficiency goal
- Sequence those through readily available resources and avenues in natural settings to achieve that goal in shortest possible time.



SOME GUIDEPOINTS

- E.g. Activity on learning path to selflearn informational content in an elearning module
- Approach from business goals not like individualized or personalized learning path
- Map the learning activities vs. available opportunities and focus is on the optimal order

Strategy:

- Profile learners on their prior learning, current skill assessment and other experience.
- Design a learning path which allows different 'adaptive' entry and
- Act
- exit points based on learner's profile which gives head-start to learners.
- Conduct continuous assessment of learning outcomes and dynamically select activities or modules in the learning path to collectively shorten journey to proficiency.

Confident Mastery of Concepts Thoroughly remediating misinformation and knowledge gaps

Knowledge Retention After 12 Months Versus industry standard of 5% after 12 months

Reduction in Study Times
Maximizing study time and making learning more efficient

Increase in Top Quintile Scoring

Dramatic improvement in student test scores and up to a 50% decrease in bottom quintile scoring Use smart technologies to systematic profile learner's current knowledge, skill and experience during the journey in a learning path

With learning objectives

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Pre

Blended e-Learning

Strategy: Convert traditional ILT content into a) self-guided pre-work, b) intensive homework c) virtual instructor-led sessions based on complexity and sequence the sessions strategically to prepare learners for ILT sessions and better outcomes from ILT sessions. It cuts down the wait time and speeds up the learning.

- **Skill profiling**: Complexity and difficulty.
- **Pre-ILT modules**: Low complexity skills including informational content
- **Bridging Modules**: Medium complexity skills dispersed between consecutive ILT sessions
- **ILT sessions**: Highly complex skills delivered over time through technologyenabled instructor-led virtual or remote classrooms
- Self-guided homework assignments: Highly complex skills requiring deeper thinking – allows space, time and opportunity for reflection before next day's ILT session
- E-learning Path: Sequence all elements of pre-work, ILT sessions, homework etc. as e-learning path.



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- Scenarios
- Problems
- Cases
- Virtual reality
- Simulation
- Games

CONTEXT

Contextualized Scenario-Based E-learning

Philosophy: Time-to-proficiency gets accelerated if learning happens in context of the actual job or learning is contextualized. **Strategy:** Design e-learning by contextualizing i.e. linking the task at hand to the realist job environment and realistic challenges (Clark & Mayer, 2013).



Highly supported by literature to accelerate proficiency

- Use variations of scenario-based e-learning including problems, cases, games, virtual reality, simulation etc.
- Several different ways to incorporate context
 - To analyze a real-life scenario
 - to solve the stated problem
 - to describe the root cause
 - to provide recommendation on a solutions
 - to make decision
 - To chose between available options,
 - to explore or extend an option

Philosophy: Higher order complex cognitive skills are typically nonlinear in nature i.e. the problem space and approaches could be fuzzy and structured rules may not be applicable all the time.

Strategy: Actively involve the learners into learning in a way to trigger non-linear thinking by driving them to create deliverables or through thinking based assessment or solving job-relevant scenarios.

Active participation: incorporate interactivity and encourages learning by doing

- Generate some deliverables
- Compute something
- Process information actively
- Transform content



Thinking based assessment: questions that require some kind of research, active involvement and deeper thinking

Trigger non-linear thinking process in learners: higher order scenarios, reallife cases and job relevant assessment

Active Involvement and Non-Linear Thinking

More than just learner's engagement

Let's recollect



Rapid Failure Cycles in Compressed Time Frame

- Set performance threshold for the learning outcome
- Assign milestones to deliverables for each outcome
- Add desirable errors in the activities or cases
- Speed up failure cycles or errors

Philosophy & Strategy: Build several rapid failure cycles or desirable errors within a 'compressed timeframe' with realistic time pressures to accelerate time-to-proficiency.

Emotional involvement and stakes

PHILOSOPHY: Workplace challenges and consequences drive emotions in each task assigned to an individual (e.g. aggressive timelines within complex interactional spaces) which impacts speed-to-proficiency. Far transfer & time-to-proficiency appears to have some link with emotional involvement and stakes during learning.

STRATEGY

- Drive learning with stakes and high degree of emotional involvement rather than always design for 'safe place to learn'
- Promote learners' emotional involvement, emotional reactions to stakes in learning and sense of 'what is on the line'.

- Building peer-to-peer communication and collaboration which promote peer recognition;
- Driving learning goals or outcomes closely or directly linked to on-the-job success or failure;
- Allowing tangible sense of achievements while completing e-learning modules (like credits, points, scores);
- introducing pressure of quality and timeline with peer review of the deliverables;
- putting stakes in learning like consequences, etc.

Anytime anywhere learning

Nano-Coaching / Nano-Mentoring



SOME GUIDEPOINTS

- Very short burst support
- Supported by mobile technology
- Enables frequent, short, targeted, asynchronous coaching interactions
- Makes it easy for managers (or peers, or network of coaches or experts) to give timely feedback
- that support employees job performance

(Elliott Masie)

Philosophy and Strategy: Provide coaching in timely fashion from a 'network of coaches' at the '**moment of need**' eliminating need for learners to browse through the piles of information.

Social Interconnectivity and interactions

Philosophy: Acquisition of complex skills and knowledge gets accelerated by learning by 'purposeful' doing with each other, discussions, conversations with peers and asking questions from experts (and even from peers).



STRATEGY

- Allows learners to connect and interact with anyone and everyone instantly (preferred) at the 'moment of need'.
- Focus on 'learning by socializing and connecting' though may use 'social networking' platforms
 - Drive interactions and connectivity by learning outcomes



Let's put it together

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Training Mode nceptual 0



Discussion: Orchestrating 10 E-learning Strategies Together



- Niche area no such comprehensive study or a conceptual model on elearning strategies in relationship to shortening time-to-proficiency.
- If <u>orchestrated strategically</u> in an existing training program or a new design, 10 suggested strategies may accelerate time-to-proficiency and shorten their time-to-readiness of learners
- Different mix of suggested strategies may work <u>in conjunction with</u> <u>each other</u> depending on the context and complexity of the job.
- Validating each strategy for its effectiveness in shortening time-toproficiency and appropriate mix could be topic for future research

Interested to read more?



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Manager's scenario - Lucidway E-learning Group Cleanroom protocol- Digitech Interactive Virtual Hospital – Designing Digitally Virtual Telephonic conversation - CommLab India Navy encounter - US Army, Sgt. Steven L. Phillips @ WikiMedia Social Networking - Endless entertainment Context - Loyality and retention Thinking girl-idiva nano-coaching: Cognitive Advisors Microlearning blocks -IDreflections Blogspot Blog Clock – Synthesis Maze – Blue republican.com Adaptive Learning - Dionne Vermeulen @ anewspring Adaptive learning results - Pearson Education @MyITlab Learning Path - SecurityCompass Learning Path Sequence - Learning Masters Blog Racing executives - Personal Resonance E-learning banner -JobsAmerica Main cover running main - Robust Pro.com E-learning technologies - Framedia Inc. Rlended Learning - Bottom-line Performance