Designing and using Project Management Simulator

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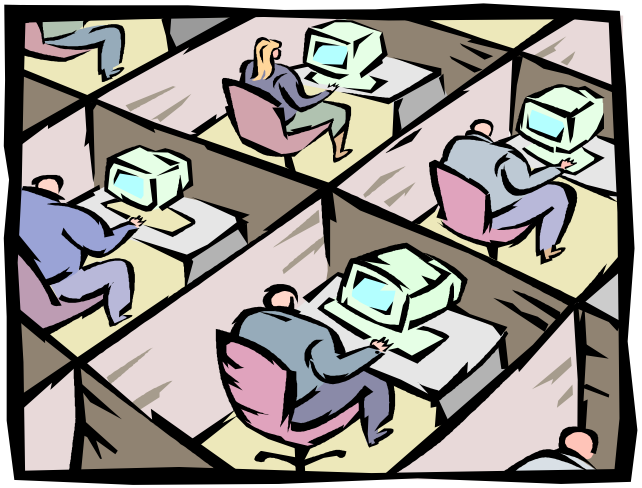

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Presentation Issues

- *Research goals*
- *Introduction*
- *The PM-Trainer*
- *Research methods*
- *Contribution and expected products*

Research goals

Motivation

- New methodologies for project management are developed at an accelerated rate.
- This fast development is not accompanied by similar progress in developing teaching and training tools.
- The need is fundamental guidelines of designing and using project management simulator.

Research goals (cont.)

- Research scope
  - Simulator design and implementation
  - Individual learning of project managers using history mechanism.
  - Team learning of project managers
  - Optimal training schedules.

Introduction

- Simulation = Imaging systems and processes using a variety of methodologies and tools.
- Similar environment to the “real world” using simulation, by running processes rapidly.
- Simulations - efficient and effective way of teaching and learning complex dynamic systems.
- Learning and forgetting curves
- Various simulator types

Introduction (cont.)

- New concept of built-in learning history recording and inquiry mechanism.
- Using history mechanism the trainee can examine his decisions, by comparing it to the previous actions.
- History mechanism can be done by two modes:
  - Undo: the ability to comeback to previous date.
  - Store Points: the ability to save the state of the scenario.
- The effectiveness and efficiency of the history recording and inquiry mechanism was tested in a controlled experiment (Parush, Hamm, Shtub 2001)
- The findings show a significantly better learning process, when using history.
- These results are in line with other studies (Caroll et al. 1996; Guzdial et al. 1996)
  - Reviewing past states can encourage meta-cognitive processes.
  - Encourage students to monitor their behavior.
  - Enables analysis of the decision-making process.

The impact of simulation on learning and forgetting

- Training – the act of teaching individuals the knowledge they need to function properly on the job.
- Learning and learning rate
- Forgetting – In case of breaks in the learning process, the individual may forget a certain amount of what he has been learned (Carlson et al. 1976).

History Mechanism

- History is possible by saving and recording user's actions and allowing access to them in various ways in order to recover and undo (Vargo et al. 1992, Witten 1988).
- Types of recovery mechanisms (Archer, 1984, Thimbeley, 1990, Holyer and Pehlivan, 2000).
- Influence the learning curves and the transfer abilities (Parush et al. 2002).
- Supply information about actions (Carrol et. al. 1996, Plaisant et. al. 1999).

Team learning

- Project managers in organization with shared resource constrained.
- Team Learning – Definition: relatively permanent change in the team's collective level of knowledge and skill produced by the shared experience of the team members.
- Shared Knowledge and skills (Stasser et al., 2000)
- Team's collective learning process (Hinsz et al., 1997)
- Learn from the experience of other team members (Weiss, 1990)

Optimal training schedules

- Activities that occur before training have an impact on how effective training turns out to be (Tannenbaum et al. 1993)
- The length of interval of not practicing relevant skills is a very good predictor of forgetting (Bailey 1989).
- Forgetting is affected by the kind of activities that people are engaged in during the intervening period (Healy 1995)

The Project Management Trainer

- Project management simulator
  - Simulation of project management is required due to the complexity of project management processes which is similar to flying an airplane (Collofello, 2000).
  - The need is for rapid simulation of the project in the time domain and acceptance of immediate information about the trainee performance.
  - Some kinds of simulators of project management are described in the literature (Pfahl et al. 2001, Martin 2000).
- The Project Management Trainer (PMT) is a teaching aid design to facilitate the teaching of project management in a dynamic, stochastic, multi-project environment.

The PMT principles

- A simulation approach
  - The trainer simulates one or more projects.
  - The simulation is controlled by a simple user interface.
  - No knowledge of simulation is required.
- A case study approach
  - The training is based on a simulation of case studies.
  - Each case study is a project or a collection of projects performed under schedule, budget and resource constraints, in a dynamic stochastic environment.
  - The details of these case studies are built into the simulation and all the data is easily accessed by the user interface.
  - A user friendly case study generator facilitates the development of new case studies as required.

The PMT principles (cont.)

- A dynamic approach
  - The situation of scenario changes over time.
  - A random effect is introduced to simulate the uncertainty in the environment.
- A model-based approach
  - A decision support system based on project management concepts is built into the trainer.
  - The model base contains well-known models for scheduling, budgeting, resource management and monitoring & control.
- A data-based approach
  - A data base is built into the trainer.
  - Data on the current state of the simulated system is readily available to the users

The PMT principles (cont.)

- An integrated approach
  - Several projects can be managed simultaneously on the PMT.
  - These projects share the same resources and a common cash flow.
- User friendliness and GUI
- Integration with commercial project management tools
  - The data can be exported to MS-Project.
  - The users can analyze the scenario using the MS-Project.

Research Hypotheses

- Support of the empirical data about learning and forgetting using simulators, in accordance to the learning curves models.
- Learners who use history mechanism will have better performance than those not using it.
- Learners who use manual history mechanism will have better performance than those using automatic history mechanism.
- Project managers teams with higher levels of general cognitive ability will evidence higher levels of team learning
- Using the simulator with accordance to the issues learned in class will evidence higher level of learning in comparison to without accordance

Research Method

Experiments

- Participants – graduate/undergraduate
- Various history mechanism
- Team Learning
- Optimal Scheduling

Contribution and expected products

- Definition of guidelines in designing and using training simulators using history mechanism both for individual learning and team learning.
- Methodology of efficient use of the gathered information.
- Investigation of learning and forgetting processes while using learning simulator.
- Additional value is a project management trainer that can be used as teaching tool.

The End

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