DESIGNING AND EVALUATING SIMULATION GAMES FOR PROFESSIONAL PROJECT MANAGEMENT EDUCATION

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Abstract

- Simulations and serious games are often considered to be efficient for professionals training.

- But the success of game based delivery depends on various factors such as the right blend of simulation and traditional theoretical lessons, concept and content of the simulation, link between the simulation and professional activities etc.

- Paper proposes a simple model representing links of the simulation with other relevant elements of professional training.

- The model has been tested in the specific case of project management education where the authors offered training to professionals having experience of 5 to 25 years.

- Identified three significant characteristics of simulation game, which are referred as 3R's (i.e. Reality, Relevance & Reliability) of simulation based pedagogical practice that trainers have to focus on while designing and delivering serious games.

Graphical Abstract
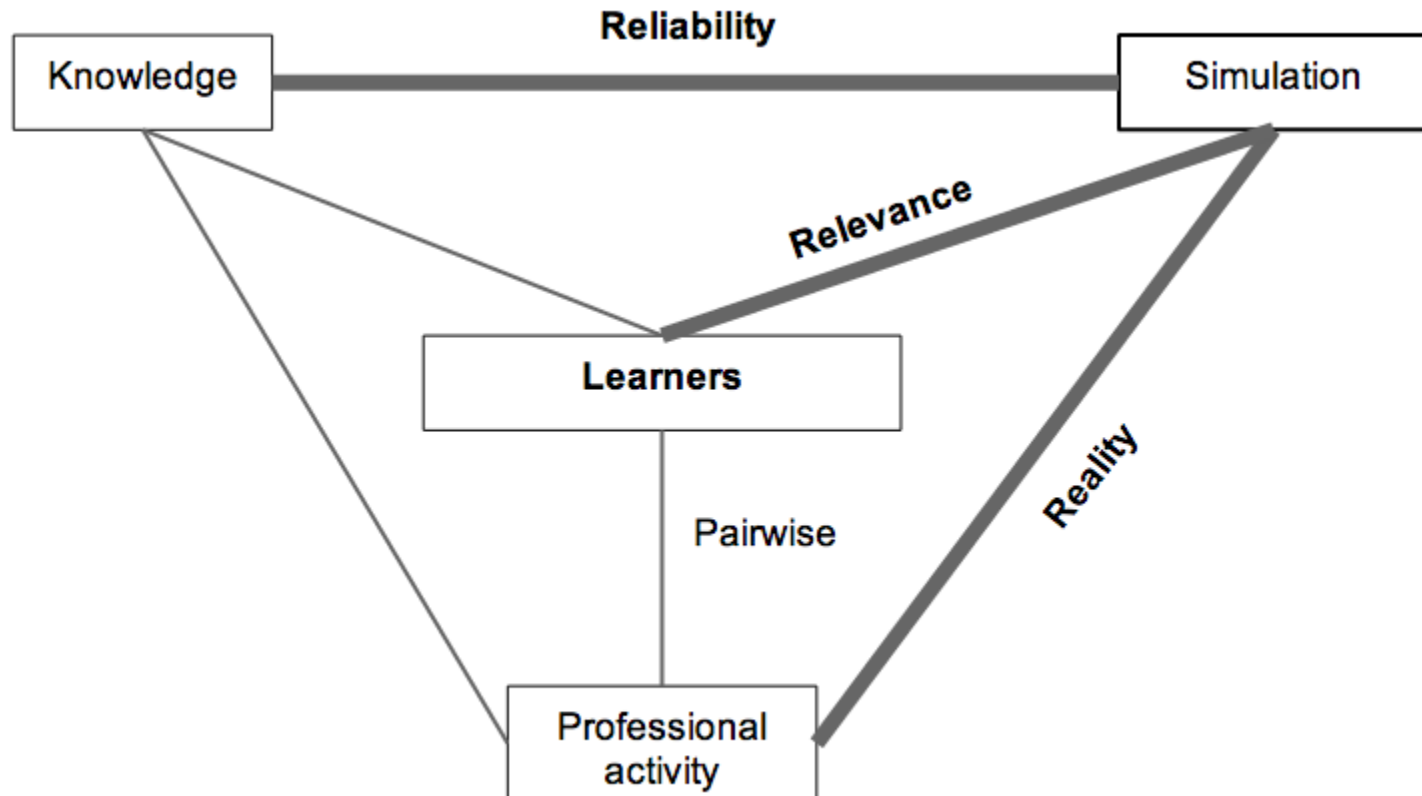
Objective

- To evaluate the effectiveness of simulation-based training for practicing project professionals

- To suggest a simple framework that can be of use to both designers & trainers of simulation games.

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Game, Case study, Simulation & Role Play

- Abt, (1968) explained the need for two basic characteristics, namely overt competition and rules in an exercise for it to qualify the context of "Game".

- For the exercise to fit into the definition of simulation it also needs to have a real situation and it must be on-going (Henry Ellington).

- A detailed examination of real –life or simulated situation can be seen as a case study. (Percival and Ellington, 1980)

- A role-play requires a design that allows participants to act out the parts of other persons (Ellington, Addinall and Percival, 1982).

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Professional training- A combination of soft and hard skills.

- Project management in practice requires a combination of a multitude of different skills,
  - *Soft skills* (leadership, negotiation, conflict management, stakeholder integration, communication, motivation, etc.)
  - *Hard skills* (planning, risk management, financial analysis, control, etc).
- Challenges with traditional education
  - Focuses on hard skills
  - Difficulty in integrating the learning
- Simulation-based training can be a way to include both soft and hard skills (for example by integrating role plays during the simulation) and be an effective tool to develop the systemic view needed for project management.

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PM GAME – IN CLASS ROOM.

- The training was conducted for three different groups.
  - Each group comprised of 18 participants who had experience in the range of 5 to 20 years.
- The game was introduced to the participants in a structured way and the participants were allowed to play in teams of two.
- At the end of the game participants were asked to fill a questionnaire and the responses were further analyzed for arriving at suitable simulation game design.

Test Measures

- When it comes to evaluation of a simulation design it was observed that direct measures are not possible as it becomes difficult to directly measure link between knowledge and simulation, simulation and reality or simulation and participants.

- It was therefore decided to get the indirect measures.

- Indirect measures are those that derive conclusions based on the perception of participants.
  - The concepts presented by early researchers were further reduced to three critical criteria namely Reality (closeness to reality), Relevance (Educational relevance) and Reliability (reliability of the results) and presented in the following section.

- A questionnaire has been developed in order to have questions linked with the criteria that covers 3R's of simulation based training

Response Analysis

- Out of 56 participants who were given the questionnaire 23 responded leading to a response rate of 41%.

- All the knowledge areas of PMBOK were presented to the participants in the questionnaire.

- Participant's responses to the questionnaire were analyzed.

- Saaty's Analytic Hierarchy Process used in evaluating responses on PM knowledge areas and their reflection in the simulation games as perceived by the participants.
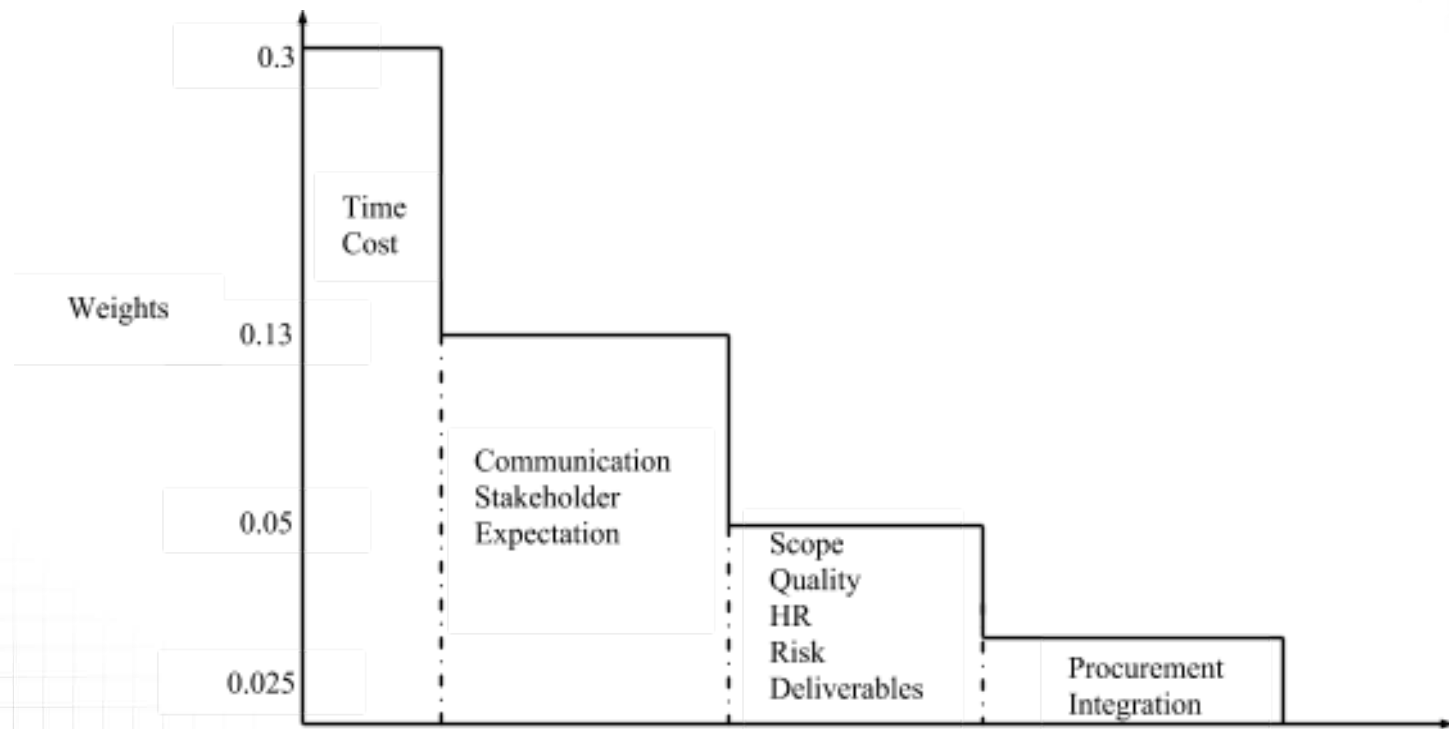
AHP Analysis Responses

	Scope	Time	Cost	Quality	HRM	Comm	Risk	Proc	Deliver	Stk Exp	Integ	G Mean	N Value
Scope	1	0.25	0.25	1	1	0.5	1	2	1	0.5	2	0.7579	0.053
Time	4	1	1	4	4	2	4	6	4	2	6	3.2875	0.229
Cost	4	1	1	4	4	2	4	6	4	2	6	3.2875	0.229
Quality	1	0.25	0.25	1	1	0.5	1	2	1	0.5	2	0.7579	0.053
HRM	1	0.25	0.25	1	1	0.5	1	2	1	0.5	2	0.7579	0.053
Comm	2	0.5	0.5	2	2	1	2	4	2	1	4	1.6245	0.113
Risk	1	0.25	0.25	1	1	0.5	1	2	1	0.5	2	0.7579	0.053
Procurement	0.50	0.17	0.17	0.50	0.50	0.25	0.50	1.00	0.50	0.25	1	0.3745	0.026
Deliverables	1.00	0.25	0.25	1.00	1.00	0.50	1.00	2.00	1.00	0.50	2	0.7579	0.053
Stake Exp	2.00	0.50	0.50	2.00	2.00	1.00	2.00	4.00	2.00	1.00	4	1.6245	0.113
Integration	0.50	0.17	0.17	0.50	0.50	0.25	0.50	1.00	0.50	0.25	1	0.3745	0.026

Results of AHP Analysis

- Few PM areas were found to be more prominent and often reflected in the game.

- Time and cost to a greater extent followed by communication and stakeholder's expectation.

- It is interesting to note that many of the project managers were not able to appreciate the reflection of attributes such as HR, scope and risk etc.

- The results of AHP analysis reveal that all knowledge areas of PMBOK are not reflected equally in the present simulation game that is used as case study. This difference can be attributed to the game structure, participant's perception and the way they played the game.

- While time & cost attributes are reflected at 30% level communication & meeting stake holder expectation was seen at 13%. Many of the other knowledge areas such as scope, quality, HR, Risk, Procurement and Integration were much below 5% as can be seen in *following bar chart*

Level of reflection of PM Knowledge area – in the Game

Point to note

- AHP analysis results reveal that project managers need more training in the area of functional and leadership roles before being presented with simulation based training.

- Participants found many challenges during execution phase (While playing the game) and the same was attributed to lack of integration of behavioral and functional based inputs in managing the projects.

What is a good simulation game?

- Sound theoretical concept orientation and discussion prior to simulation training

- Game should focus on covering all knowledge areas of PMBOK to the extent possible.

- Motivate and help project managers in understanding the knowledge and application requirements in a project and thereby connecting hard and soft skills.

- Both academic relevance and professional practice in terms of reliability embedded in a game shall allow the learner to connect the concepts well to their projects and make the game more motivating for the learners. *(Relevance and Reliability)*

- Games must have a provision to create more scenarios that suit their specific business environment of those undergoing training (*Reality*).

- Simulation game design therefore must reflect *3Rs of a project scenario. (Reality, Relevance and Reliability)*

Simulation Link with other training aspects
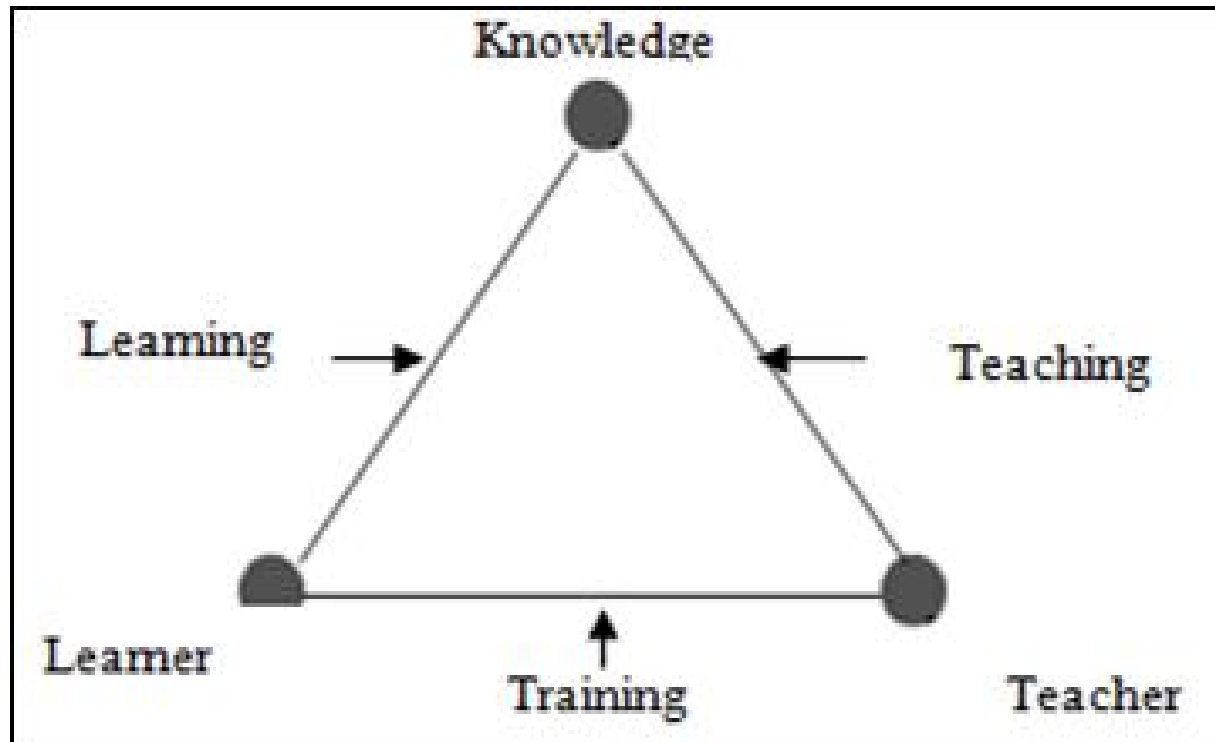
Recommended Framework
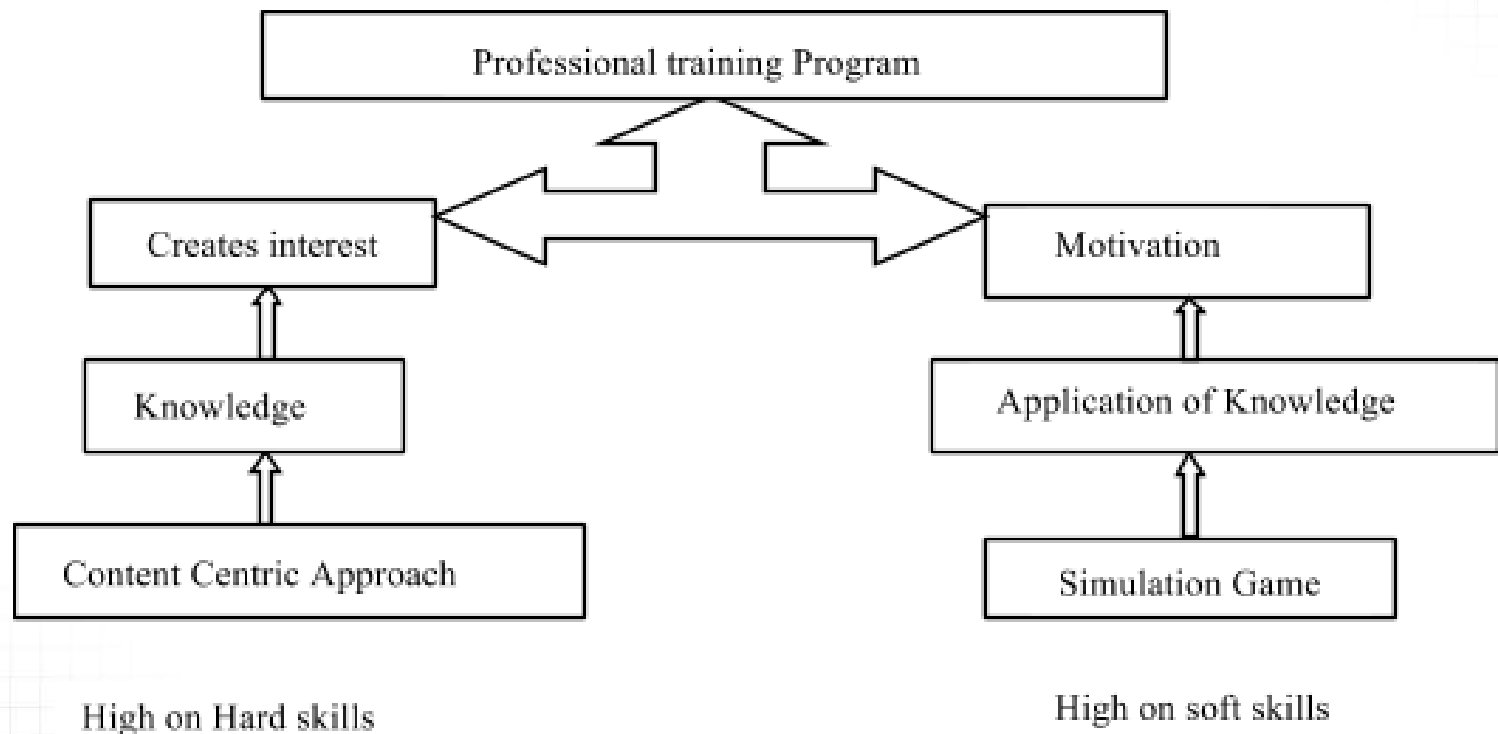
Conclusion

- A simulation is not good or bad in itself, but its effectiveness depends on the learning environment and how it is linked with the training context.

- The paper presents the learner's and instructor's perspective on effectiveness of the game as a training tool and suggests a framework that may be of interest to both trainers and professionals who are engaged in designing and developing the simulation games.

- The design of such framework should link the simulation with others elements of training.

- Based on the study it is concluded that professional training in project management requires theoretical inputs supported with simulation based learning.

- Structure of the game should cover all knowledge areas of PMBOK to the extent possible.

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