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# Empirical evaluation of an educational game on software measurement

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#### ↑ ABSTRACT

Software measurement is considered important in improving the software process. However, teaching software measurement remains a challenging issue. Although, games and simulations are regarded powerful tools for learning, their learning effectiveness is not rigorously established. This paper describes the results of an explorative study to investigate the learning effectiveness of a game prototype on software measurement in order to make an initial judgment about its potential as an educational tool as well as to analyze its appropriateness, engagement and strengths & weaknesses as guidance for further evolution. Within the study, a series of experiments was conducted in parallel in three master courses in Brazil. Results of the study reveal that the participants consider the content and structure of the game appropriate, but no indication for a significant difference on learning effectiveness could be shown.

### REFERENCES

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10/22/2010 2:33 PM 1 of 4

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- 1 Abt CC (2002) Serious games. University Press of America, Lanham, MD
- 2 Akili GK (2007) Games and Simulations: A new approach in education. In: Gibson D, Aldrich C, Prensky M (eds) Games and simulations in online learning: research and development frameworks. Information Science Publishing, Hershey/PA, pp. 1-20



- Vicki L. Almstrum, Nell Dale, Anders Berglund, Mary Granger, Joyce Currie Little, Diane M. Miller, Marian Petre, Paul Schragger, Fred Springsteel, Evaluation: turning technology from toy to tool: report of the working group on evaluation, Proceedings of the 1st conference on Integrating technology into computer science education, p.201-217, June 02-06, 1996, Barcelona, Spain [doi>10.1145/237466.237648]
- 4 Anderson LW, Krathwohl DR (eds) (2001) A taxonomy for learning, teaching, and assessing: a revision of bloom's taxonomy of educational objectives. Longman, New York
- Alex Baker, Emily Oh Navarro, André van der Hoek, Problems and Programmers: an educational software engineering card game, Proceedings of the 25th International Conference on Software Engineering, May 03-10, 2003, Portland, Oregon
- Basili VR, Caldiera G, Rombach HD (1994) Goal/question/metric approach. In: Marciniak J (ed) Encyclopedia of software engineering, vol. 1. John Wiley & Sons, New York, pp. 528-532
- 7 Bastien JMC, Scapin D (1993) Ergonomic criteria for the evaluation of humancomputer interfaces. Technical report no. 156. Institut National de Recherche en Informatique et en Automatique, France
- 8 Bruns B, Gajewski P (1999) Multimediales Lernen im Netz: Leitfaden für Entscheider und Planer. Springer, Berlin (in German)
- 9 Buglione L (2007) Project-o-poly. Giocare per Apprendere. Il gioco come opportunità nelle Learning Organizations. Persone & Conoscenze, Jan/Feb 2007, No.26/27, ESTE, pp 43-47 (in Italian)
- 10 Choi J, Hannafin M (1995) Situated cognition and learning environments: roles, structures and implications for design. Educ Technol Res Dev 43(2):53-69 doi:10.1007/BF02300472
- 11 CMMI Product Team (2006) CMMI for development, version 1.2. Technical report CMU/SEI-2006-TR-008. Software Engineering Institute/Carnegie Mellon University, Pittsburgh, Pennsylvania
- 12 James S. Collofello, University/Industry Collaboration in Developing A Simulation Based Software Project Management Training Course, Proceedings of the 13th Conference on Software Engineering Education & Training, p.161, March 06-08, 2000
- Dantas A, Barros M, Werner C (2004) A simulation-based game for project management experiential learning. Proceedings of the 16th International Conference on Software Engineering & Knowledge Engineering (SEKE'2004), Banff, Canada, pp 19-24
- 14 Carol A. Dekkers, Patricia A. McQuaid, The Dangers of Using Software Metrics to (Mis) Manage, IT Professional, v.4 n.2, p.24-30, March 2002 [doi>10.1109/MITP.2002.1000457]

2 of 4 10/22/2010 2:33 PM



- Anke Drappa, Jochen Ludewig, Simulation in software engineering training, Proceedings of the 22nd international conference on Software engineering, p.199-208, June 04-11, 2000, Limerick, Ireland [doi>10.1145/337180.337203]
- 16 Ellington H, Addinall E, Percival F (1982) A handbook of game design. Kogan Page, London



- 17 Frank L. Greitzer, Olga Anna Kuchar, Kristy Huston, Cognitive science implications for enhancing training effectiveness in a serious gaming context, Journal on Educational Resources in Computing (JERIC), v.7 n.3, p.2-es, November 2007 [doi>10.1145/1281320.1281322]
- 18 Hock GT, Hui GLS (2004) A study of the problems and challenges of applying software metrics in software development industry. Proceedings of the M2USIC-MMU International Symposium on Information and Communication Technologies, Putrajaya, Malaysia
- 19 ISO 9241-151 (2008) Ergonomics of human-system interaction--part 151: guidance on world wide web user interfaces. International Organization for Standardization, Geneva
- 20 Apurva Jain , Barry Boehm, SimVBSE: Developing a Game for Value-Based Software Engineering, Proceedings of the 19th Conference on Software Engineering Education & Training, p.103-114, April 19-21, 2006 [doi>10.1109/CSEET.2006.31]
- 21 David S. Janzen , Clark S. Turner , Hossein Saiedian, Empirical Software Engineering in Industry Short Courses, Proceedings of the 20th Conference on Software Engineering Education & Training, p.89-96, July 03-05, 2007 [doi>10.1109/CSEET.2007.20]
- 22 Kafai YB (2001) The educational potential of electronic games: from games-to-teach to games-to-learn. Conference on playing by the rules: the cultural policy challenges of video games. Chicago, Illinois
- 23 Kasunic M (2006) The state of software measurement practice: results of 2006 survey. Technical report CMU/SEI-2006-TR-009, Carnegie Mellon University/Software Engineering Institute, Pittsburgh, Pennsylvania
- 24 Kirkpatrick DL, Kirkpatrick JD (2006) Evaluating training programs: the four levels, 3rd edn. Berrett-Koehler Publishers, San Francisco, 379 pp
- 25 Levin J, Fox J (2006) Elementary statistics in social research. Allyn & Bacon, Boston, 384 pp
- 26 Lino JI (2007) Proposal of an educational game for software measurement and analysis. Project Thesis, Undergraduate Course on Information System, Federal University of Santa Catarina, Brazil (in Brazilian Portuguese)
- 27 Lipsey M (1990) Design sensitivity. Sage, California
- 28 Löper S, Zehle M (2003) Evaluation of software metrics in the design phase and their implication on CASE tools. Master Thesis, Blekinge Institute of Technology, Sweden



- 29 Thomas W. Malone, Heuristics for designing enjoyable user interfaces: Lessons from computer games, Proceedings of the 1982 conference on Human factors in computing systems, p.63-68, March 15-17, 1982, Gaithersburg, Maryland, United States [doi>10.1145/800049.801756]
- 30 McGarry J, Card D, Jones C, Layman B, Clark E, Dean J et al (2001) Practical software measurement: objective information for decision makers. Addison-Wesley Professional, Reading

3 of 4 10/22/2010 2:33 PM

- 31 McNabb M, Hawkes M, Rouk U (1999) Critical issues in evaluating the effectiveness of technology conference summary. National Conference on Educational Technology, Washington, D.C.
- 32 David R. Michael , Sandra L. Chen, Serious Games: Games That Educate, Train, and Inform, Muska & Lipman/Premier-Trade, 2005
- 33 Molenda M, Pershing JA, Reigeluth CM (1996) Designing instructional systems. In: Craig RL (ed) The ASTD training and development handbook. 4th edn. McGraw-Hill, New York, pp 266-293
- Emily Oh Navarro, Andre van der Hoek, Comprehensive Evaluation of an Educational Software Engineering Simulation Environment, Proceedings of the 20th Conference on Software Engineering Education & Training, p.195-202, July 03-05, 2007 [doi>10.1109/CSEET.2007.14]
- 35 Ott LM (2005) Developing healthy skepticism not disbelief-problems in teaching software metrics. Proceedings of the 1st Workshop on Methods for Learning Metrics at the 11th IEEE Software Metrics Symposium. Como, Italy
- 36 Percival F, Ellington H, Race P (1993) Handbook of educational technology, 3rd edn. Kogan Page, London
- 37 <u>Dietmar Pfahl</u>, <u>Oliver Laitenberger</u>, <u>Jörg Dorsch</u>, <u>Günther Ruhe</u>, <u>An Externally</u> Replicated Experiment for Evaluating the Learning Effectiveness of Using Simulations in Software Project Management Education, Empirical Software Engineering, v.8 n.4, p.367-395, December 2003 [doi>10.1023/A:1025320418915]
- 38 Marc Prensky, Digital Game-Based Learning, McGraw-Hill Pub. Co., 2004



- Helen Sharp, Pat Hall, An interactive multimedia software house simulation for postgraduate software engineers, Proceedings of the 22nd international conference on Software engineering, p.688-691, June 04-11, 2000, Limerick, Ireland [doi>10.1145/337180.337528]
- Takona JP (2002) Educational research: principles and practice. Writers Club Press, New York, 604 pp
- 41 R. Thomas, A practical experiment in teaching software engineering metrics, Proceedings of the 1996 International Conference on Software Engineering: Education and Practice (SE:EP '96), p.226, January 24-27, 1996
- 42 Claes Wohlin, Per Runeson, Martin Höst, Magnus C. Ohlsson, Bjöorn Regnell, Anders Wesslén, Experimentation in software engineering: an introduction, Kluwer Academic Publishers, Norwell, MA, 2000

# **↑ INDEX TERMS**

## **Keywords:**

Educational game, Experiment, Measurement, Project management

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10/22/2010 2:33 PM 4 of 4