Chapter 6

Useful Resourses for Teachers and Students

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In this final chapter some useful resources on educational robotics including books, articles and web recourses are recommended for teachers and students to support them in using robotics or designing activities for educational purposes.

6.1 TERECoP Publications (in chronological order)

1. Alimisis, D., Moro, M., Arlegui, J., Pina, A., Frangou, S., Papanikolaou, K. (2007). *Robotics & Constructivism in Education: the TERECoP project, Eurologo 2007,* EuroLogo 2007,40 Years of Infuence on Education,Ivan Kalas (ed.),Proceedings of the 11th European Logo Conference, 19-24 August 2007,Bratislava,Slovakia, Faculty of Mathematics, Physics and Informatics, Comenius University, Bratislava, ISBN pp. 978-80-8918.

2. Papanikolaou, K. Frangou, S., Alimisis, D. (2007). *On the development of a framework for the design and implementation of robotic-enhanced activities: the TERECoP project*, In Proceedings of the 4th National Teacher Conference on ICT in Education, Island of Syros, May 2007 (in Greek language).

3. Frangou, S., Papanikolaou, K., Alimisis, D. (2007). *Using RoboLab of Lego Dacta to support programmable robotic constructions*, In Proceedings of the 4th National Teacher Conference on ICT in Education, Island of Syros, May 2007 (in Greek language).

4. Ionita, S., (2007). *Robotics between «object» and «educational tool». Steps towards a constructionist methodological approach.* In Proceedings of Eco-Media International Conference, 23-24 Nov. 2007, Pitesti, Romania, pp.119-125, ISBN978-973-690-701-2.

5. Tocháček D. (2008). *Course TERECoP at KITTV PedF UK – the preparation of future teachers of technical and information education on the use of robotics in the wider of constructructivist education.* In proceedings of the Modern technology in education conference, Faculty of Education of Masaryk University, Brno, Czech Republic; Available at; http:/ /boss.ped .muni.cz/hrbacek/ktivkonf2008/; ISBN: 978-80-7392-091-3 (in Czech language)

6. Arlegui, J., Menegatti, E., Moro, M., Pina, A. (2008). *Robotics, Computer Science curricula and Interdisciplinary activities.* In proceedings of the TERECoP Workshop "Teaching with robotics: didactic approaches and experiences" or-

ganised in the context of SIMPAR 2008 conference, University of Padova, 2008. Available at http://www.simpar-conference.org/

7. Frangou, S., Papanikolaou, K., Aravecchia, L., Montel, L., Ionita, S., Arlegui, J., Pina,A., Menegatti, E., Moro, M., Fava, N., Monfalcon, S., Pagello, I. (2008). *Representative examples of implementing educational robotics in school based on the constructivist approach*. In proceedings of the TERECoP Workshop "Teaching with robotics: didactic approaches and experiences" organised in the context of SIMPAR 2008 conference, University of Padova, 2008. Available at http://www.simpar-conference.org/

8. Papanikolaou, K.m Frangou, S., Alimisis, D. (2008). *Teachers as designers of robotics-enhanced projects: the TERECoP course in Greece,* In proceedings of the TERECoP Workshop "Teaching with robotics: didactic approaches and experiences" organised in the context of SIMPAR 2008 conference, University of Padova, 2008. Available at http://www.simpar-conference.org/

9. Alimisis, D. (2008). *Designing Robotics-enhanced constructivist training for science & technology teachers: the TERECoP project*. In proceedings of ED-MEDIA 2008-World Conference on Educational Multimedia, Hypermedia & Telecommunications, Vienna, Austria. Published by Association for the Advancement of Computing in Education (AACE), USA, p. 288-293.

10. Alimisis, D., Frangou, S., Papanikolaou, K. (2009). *A Constructivist Methodology for Teacher Training in Educational Robotics: the TERECoP Course in Greece through Trainees' Eyes*. In proceedings of the 9th IEEE International Conference on Advanced Learning Technologies, Latvia, July 2009.

11. Frangou, S., Papanikolaou, K. Alimisis, D., Kynigos. Ch. (2009). *Teachers in the role of designers of robotic-enhanced learning activities: the case of the TERECoP training course in Greece*. In Proceedings of the 5th National Teacher Conference on ICT in Education, Island of Syros, May 2009 (in Greek language).

12. Fava, N., Monfalcon, S., Moro, M., Menegatti, E., Arlegui, J., Pina, A. (2009). *Teacher Training In The Scientific Field Through Robotics Activities: Some Experiences From Italy & Spain*. In proceedings of the INTED2009 Conference, Valencia, Spain, March 9-11, 2009.

13. Comite, M., Moro, M. (2009). *How introducing artificial intelligent behaviours in educational robotics.* In proceedings of the INTED2009 Conference, Valencia, Spain, March 9-11, 2009.

14. Moro, M., Alimisis D. (2009). From the Logo Turtle to the Tiny Robot Turtle: practical and pedagogical issues. In *Proceedings of the 5th National Teacher Conference on ICT in Education,* Island of Syros, Greece, May 2009.

15. Alimisis, D. (2009). Robotic technologies as vehicles of new ways of thinking about constructivist teaching and learning: The TERECoP Project in : Robotics & Automation Magazine, IEEE, Sept. 2009, Volume:16, Issue: 3, On page(s): 21-21,23

6.2 Proposed Literature

6.2.1 Books

1. Brooks, J. and Brooks M. (1993). *The case for constructivist classrooms.* Alexandria, Virginia: Association for Supervision and Curriculum Development.

2. Druin, A., & Hendler, J. (2000). *Robots for kids: Exploring new technologies for learning*. San Diego, CA: Academic Press.

3. Harel, I. and Papert S. (1991). *Constructionism.* Norwood, New Jersey: Ablex Publishing Corporation.

4. Maeda, J. (2000). *Maeda@Media*. Rizzoli Publications. New York.

5. Martin, F., Mikhak, B., Resnick, M., Silverman, B., and Berg, R. 2000. To Mindstorms and beyond: Evolution of a construction kit for magical machines. *Robots for kids: Exploring new technologies for learning.* Morgan Kaufmann.

6. Papert S. (1980) Mindstorms – Children, Computers and Powerful Ideas, New York , Basic Books 1980

7. Papert, S. (1991) *Situating Constructionism*. In S.Papert and I.Harel (eds.) Constructionism, Norwood, NJ, Ablex Publishing Corporation.

8. Perkins, D. 1986. *Knowledge as design.* Hillsdale, New Jersey: Lawrence Erlbaum Associates.

9. Resnick, M. 1995. New paradigms for computing, new paradigms for thinking. *Computers and Exploratory Learning.* New York, New York: Springer-Verlag.

10. Thomas, J. W., Mergendoller, J.R., & Michaelson, A. (1999). *Project-based learning: A handbook for middle and high school teachers*. Novato, CA: The Buck Institute for Education.

6.2.2 Papers

1. Ackermann E., (2001) Piaget's constructivism, Papert's constructionism: What's the difference? Future of Learning Group Publication, Available at http://learning.media.mit.edu/content/publications/EA.Piaget%20_%20Papert.pdf

2. Alimisis, D., Karatrantou, A., Tachos, N. (2005), Technical school students design and develop robotic gear-based constructions for the transmission of motion, Eurologo 2005, *Digital Tools for Lifelong Learning*, Proceedings, Warsaw, Poland, 76-86.

3. Carbonaro, M., Rex, M., Chambers, J. (2004), Using LEGO Robotics in a Project-Based Learning Environment. The Interactive Multimedia Electronic *Journal of Computer-Enhanced Learning*, Vol. 6, No 1. Available at http://imej.wfu.edu/articles/2004/1/02/printver.asp Cerezo, E., Baldassarri, S., Pina, A. and Huizi, L. (2005), Learning robotics via web: remote experiment systems for distance training, IADAT-e2005 *2nd IADAT International Conference on Education*, Biarritz, France

5. Denis, B. & Hubert, S. (1999), A conceptual framework of educational robotics, In 9th International conference on Artificial Intelligence in Education, AI-ED 99, Workshop on Educational Robotics, Le Mans, 45 – 54

6. Denis, B. & Hubert, S. (2001), Collaborative learning in an educational robotics environment\, Computers in Human Behaviour, 17, 465 – 480

7. Dimitriou A. and Xatzikraniotis E (2003) Educational robotics as a tool for skills development, In Proceedings of the 2nd national teachers' conference on "ICT in Education", Syros, May 2003, pp. 146-157 (in Greek).

8. Erstad, O. (2002), Norwegian students using digital artifacts in project-based learning, Journal of Computer Assisted Learning 18, 427-437.

9. Han, S. & Bhattacharya, K. (2001). Constructionism, Learning by Design, and Project-based Learning. In M. Orey (Ed.), Emerging perspectives on learning, teaching, and technology. Available Website: http://www.coe.uga.edu/epltt/LearningbyDesign.htm

10. Järvinen Esa-Matti (1998), The Lego/Logo Learning Environment in Technology Education: An Experiment in a Finnish Context; Spring; Journal of Technology Education; Vol. 9, No.2. Available at http://scholar.lib.vt.edu/ejournals/JTE/v9n2/jrvinen.html

11. Kagkani K., Dagdilelis V., Satratzemi M., Evangelidis G., (2005) A case study of teaching programming in secondary education with Lego Mindstorms. In on-line Proceedings of the 3d National Conference "Teaching Computer Science", University of Peloponnese, Korinthos, 7-9 October 2005, http://www.etpe.gr/uploads1/paper_s53.pdf (in Greek).

12. Karatrantou A, Panagiotakopoulos X., Pierri E. (2006) Robotic constructions of Lego Mindstorms and science understanding in primary education: a case study. In Proceedings of the 5th National Conference on ICT in Education, University of Thessaloniki, 5-8 October 2006, pp. 310-317 (in Greek).

13. Karatrantou A, Tachos N., Alimisis D., (2005), Introduction in basic principles and programming structures using the robotic constructions LEGO Mindstorms. In on- line Proceedings of the 3d National Conference "Teaching Computer Science", University of Peloponnese, Korinthos, 7-9 October 2005 http://www.etpe.gr/uploads1/paper_s81 (in Greek).

14. Kynigos C. and Frangou S. (2000), Aspects of pedagogical use of control technology in school class, In Proceedings of the 2nd national conference on "ICT in education", University of Patras, pp. 83-91 (in Greek).

15. Martin, F. (1996), Kids Learning Engineering Science Using LEGO and the Programmable Brick, presented at the American Educational Research Association Annual Meeting

16. Martin, F., Butler, D., and Gleason, W. (2000), Design, story-telling, and robots in Irish primary education, Proceedings of the 2000 IEEE International Conference on Systems, Man, and Cybernetics, Nashville, TN. IEEE Systems, Man, and Cybernetics Society; http://www.cs.uml.edu/~fredm/papers/martin-smc2000.pdf

17. Mataric´, M.J. (2004), Robotics Education for All Ages, Accessible Hands-on AI and Robotics Education. In Proceedings of 2004 AAAI Spring Symposium "Accessible Hands-on AI and Robotics Education". Available at http://www.aaai.org/Library/Symposia/Spring/ss04-01.php

18. McCartney, R. (1996), Introduction to robotics in computer science and engineering education, Computer Science Education, 7(2), 135 – 137

19. Parsons, S. and Sklar. E. (2004). Teaching AI using LEGO Mindstorms. In Proceedings of 2004 AAAI Spring Symposium "Accessible Hands-on AI and Robotics Education". Available at http://www.aaai.org/Library/Symposia/Spring/ss04-01.php

20. Portsmore, M. (1999), RoboLab: Intuitive robotic programming software to support lifelong learning, *Learning Technology Review*, Spring/Summer, 26-39

21. Resnick, M. (1993), Behavior Construction Kits, Communications of the ACM, 36(7), 64 – 71

22. Resnick, M. and Silverman, B. (2005), Some Reflections on Designing Construction Kits for Kids. Proceedings of Interaction Design and Children conference, Boulder, CO. Available at http://llk.media.mit.edu/papers.php

23. Resnick, M., Martin, F., Berg, R., Borovoy, R., Colella, V., Kramer, K. & Silverman, B. (1998), Digital manipulatives: new toys to think with, In Karat, C., Lund, A., Coutaz, J. & Karat, J. (eds.), Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, ACM Press/Addison-Wesley Publishing Co., New York, NY, 281 – 287

24. Resnick, M., Martin, F., Sargent, R., and Silverman, B. (1996). 'Programmable Bricks: Toys to Think With' IBM Systems Journal, vol. 35, no. 3-4, pp.443-452

25. Resnick, M. & Silverman, B. (2005), Some reflections on designing construction kits for kids, In Proceeding of the 2005 conference on Interaction design and children, Boulder, Colorado, 117 – 122

26. Rusk, Z. N., Resnick, M., Berg, R. & Pezalla-Granlund, M. (2008), New Pathways into Robotics: Strategies for Broadening Participation, Journal of Science Education Technology, 17, 59 – 69

27. Turbak, F. & Berg, R. (2002), Robotic Design Studio: Exploring the big ideas of engineering, Liberal Arts Enviroment, Journal of Science Education and Technology, 11(3), 237 – 253.

6.2.3 Web Recourses

1. Educational Robotics Repository: A shared space for collecting curricular materials on the use of educational robotics, currently in undergraduate classes http://www.sci.brooklyn.cuny.edu/~sklar/er/er.html

2. LEGO Engineering – Mindstorms education. http://www.legoengineering.com Site dedicated to providing educators with resources for teaching through engineering with LEGO materials.

3. Lifelong Kindergarten http://llk.media.mit.edu/mission.php The Lifelong Kindergarten group is located within the MIT Media Lab, a hotbed of creative activity.

4. Houghton Mifflin's Project Based Learning Space: A site that supports course instructors, novice teachers, practicing teachers to a) do sustained inquiry on extended problems and projects b) get background knowledge on its theory and use in classrooms, and c) revisit generic teaching concepts. http://www.college.hmco.com/education/pbl/background.html

5. Why do project-based learning? http://pblmm.k12.ca.us/PBLGuide/WhyPBL.html

6. LCSI http://www.microworlds.com/. The site of LCSI where you can find information about the logo like environment for controlling NXT.

Software

7. Lego Mindstorms Web site http://www.legomindstorms.com

8. Robolab   http://www.ceeo.tufts.edu/

9. NXT-G iconic language http://www.ni.com/academic/mindstorms/

10. NBC language http://bricxcc.sourceforge.net/nbc/

11. Microsoft Robotic Studio http://msdn.microsoft.com/robotics

12. LCSI Microworlds EX Robotics http://www.microworlds.com/

13. Lego Digital Designer http://ldd.lego.com/

Ideas for robotic-enhanced projects

14. Lego Mindstrorms Projects http://mindstorms.lego.com/nxtlog/ProjectList.aspx

15. The Bee-bot robot http://www.bee-bot.co.uk

16. The Scribbler robot http://www.parallax.com/html_pages/robotics

17. The Pico Cricket robot http://www.picocricket.com

18. Robotis humanoid http://www.robotis.com

Projects on robotics

19. TERECoP project www.terecop.eu

20. IRRE Piemonte http://robotica.irrepiemonte.it/robotica/index.htm

21. Robot@Scuola http://www.scuoladirobotica.it/retemiur/

22. Amico Robot http://www.amicorobot.net /

23. Robotics in Spain http://www.robocity2030.org/
    http://complubot.educa.madrid.org/

24. Robot competitions in Spain http://www.roboteca.org

25. Logo in Spain http://roble.cnice.mecd.es/~apantoja

26. RESS project http://www.cnice.mec.es/pamc/pamc_2003/2003_proyecto_ress/

27. Koldo Olaskoaga http://www.euskalnet.net/kolaskoaga/es/