

## REFERENCES

- Akdeniz, A.R., Töman, U., Çimer, S.O., Gürbüz, F. (2013). Extended worksheet developed according to 5E model based on constructivist learning approach. *International Journal on New Trends in Education and Their Implications*. 4(4), 16.
- Anderson, L.W. & Karthwohl, D.R. (2001). A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. Boston: Addison Wesley Longmam Inc.
- Andrews, E., Bufford, A., Banks, D., Curry, A. and Curry, M. (2014). STEM Modules: Developing Innovative Approaches to Enhance Student Learning. *Proceedings of the 2014 ASEE Gulf-Southwest Conference*.
- Arikunto, S. (2006). *Prosedur Penelitian Suatu Pendekatan Praktek Edisi Revisi VI*. Jakarta : Rineka Cipta.
- Arikunto, S. (2010). *Dasar-dasar Evaluasi Pendidikan (Edisi Revisi)*. Jakarta: Bumi Aksara.
- Atman, C. J., Adams, R. S., Cardella, M. E., Turns, J., Mosborg, S., & Saleem, J. (2007). Engineering design processes: A comparison of students and expert practitioners. *Journal of Engineering Education*, 96(4), 359-379.
- Australian Government: Department of Education, Employment, and Workplace Relation.
- Bagiati, A., Yoon, S.Y., Evangelou, D., Magana, A., Kaloustian, G, Zhu, J. (2015). The landscape of pre K-12 engineering online resources for teachers: *Global Trends. International Journal of STEM Education (2015) 2:1*.
- Bement, A. (2013). *Educate to innovate: factors that influence innovation*. Washington D.C: The National Academic Press.
- Becker, S.B. (2010). Why don't young people want to become engineers? Rational reasons for disappointing decisions. *European Journal of Engineering Education*, 35(4), 349–366.
- BSNP, (2006). *Panduan Penyusunan Kurikulum Tingkat Satuan Pendidikan Jenjang Pendidikan Dasar dan Menengah*. Jakarta: Badan Standar Nasional Pendidikan.

- Bybee, R.W. (2010). Advancing STEM education: A 2020 vision. *Journal of Technology and Engineering Teacher*, 70(1), 30-35.
- Bybee, R.W. (2013). *The Case from STEM Education: Challenges and Opportunities*. Arlington: NSTA Press.
- Carnevale, A.P., Smith, N, Melton M. (2015). *STEM Executive Summary*. Georgetown University: Center on Education and the Workforce.
- Carr, R.L. and Strobel, J. (2011). *Integrating Engineering Design Challenges into Secondary STEM Education*. National Center for Engineering and Technology Education: [www.ncete.org](http://www.ncete.org) (Accessed; 18<sup>th</sup> July 2016)
- Carroll, M. (2015). Stretch, Dream, and Do - A 21st Century Design Thinking & STEM Journey. *Journal of Research in STEM Education: Vol 1, No 1, July 2015, PP 59-70.*
- Chiu, A., Price C.A., & Ovrahim, E., (2015). Supporting elementary and middle school stem education at the whole school level: a review of the literature. *Paper presented at NARST 2015 Annual Conference April 11-14 2015, Chicago, IL.*
- Crebert, G., Patrick, C.-J., Cragnolini, V., Smith, C., Worsfold, K., Webb, F. (2011). *Problem Solving Skills Toolkit 2<sup>nd</sup> Edition*. Queensland: Griffith University.
- Creswell, John W. (2013). Research design: qualitative, quantitative, and mixed methods approaches, 4th edition. *SAGE Publication Inc.*
- Dahar (1996). *Model-model Mengajar*, Bandung : CV. Diponegoro
- Departemen Pendidikan Nasional. (2007). *Naskah Akademik Kajian Kebijakan Kurikulum SMP*. Jakarta: Pusat Kurikulum Depdiknas.
- Dimopoulos, C, Katzis, K, & Hawwash, K. (2011). *Attracting Students to Engineering Education Studies: A Survey of Practices*. Lisbon, Portugal: European Society for Engineering Education (SEFI).
- Djamarah, Syaiful Bahri. (1994). *Prestasi Belajar dan Kompetensi Guru*. Surabaya: Usaha Nasional.
- Duschl, R.A. & Bybee, R.W. (2014). Planning and carrying out investigations: an entry to learning and to teacher professional development around ngss science and engineering practices. *International Journal of STEM Education 1:12 Licensee Springer.*

- Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D., & Leifer, L. J. (2005). Engineering design thinking, teaching, and learning. *Journal of Engineering Education*, 94(1), 104-120.
- English, L.D., King, D.T. (2015). STEM learning through engineering design: Fourth-grade students' investigations in aerospace. *International Journal of STEM Education* 2:14
- Fan, S.C. and Ritz, J. M. (2014). International Views of STEM Education. *Retrieved from www.iteea.org/Conference/PATT/PATT28/Fan%20Ritz.pdf*
- Fensham, P.J. (2009). The link between policy and practice in science education: The role of research. *Wiley Online Library Vol. 93, Issue 6, pages 1076 – 1095*
- Firman, H. (2015). Pendidikan sains berbasis stem: konsep, pengembangan, dan peranan riset pascasarjana. *Paper presented on Seminar Nasional Pendidikan IPA dan PKLH Postgraduate Study Universitas Pakuan*
- Gero, J. S., & McNeill, T. (1997). An approach to the analysis of design protocols. *Design Studies*, 19, 21-61.
- Goldman, S., Carroll, M.P., Kabayadondo, Z., Cavagnaro, L.B., Royalty, A.W., Roth, B., Kwek, S.H., Kim, J. (2012). Assessing design learning: Capturing the journey of becoming a design thinker. *Springer Online Vol. 78, Issue 8, pages 304*
- Greenfield, S., Peters, J., Lane, N., Rees, T. & Samuels, G. (2002) A report on women in science, engineering and technology for the Secretary of State for Trade and Industry. Available online at: [http://extra.shu.ac.uk/nrc/section\\_2/publications/reports/R1182\\_SET\\_Fair\\_Report.pdf](http://extra.shu.ac.uk/nrc/section_2/publications/reports/R1182_SET_Fair_Report.pdf) (Accessed March 2015).
- Grinbaum, A., Groves, C., 2013. What is “responsible” about responsible innovation? Understanding the ethical issues. *Wiley, London, pp. 119–142.*
- Gunarso, A. (1993). *Interaksi Dan Motivasi Belajar-Mengajar*. Jakarta; PT. Raja Grafindo pg. 77
- Hake, R. (1999). *Analyzing Change/Gain Scores*. [On Line]. Available: <http://lists.asu.edu>. (Accessed: 3<sup>rd</sup> April 2015)
- Han, S. (2014). How science, technology, engineering, and mathematics (STEM) project-based learning (PBL) affects high, middle, and low achievers differently:

- The impact of student factors on achievement. *International Journal of Science and Mathematics Education 2014*
- Harahap, Nasrun. (1982). *Teknik Penilaian Hasil Belajar*. Jakarta: Bulan Bintang
- Plattner, H., (2012). Design Thinking Process. *Stanford: Hasso Plattner Institute of Design*
- Hynes, M., Portsmore, M., Dare, E., Milto, E., Rogers, C., & Hammer, D. (2011). Infusing engineering design into high school STEM courses. Retrieved from the National Center for Engineering and Technology Education website: <http://ncete.org/flash/pdfs/Infusing%20Engineering%20Hynes.pdf>
- IBSA (2009). Developing Innovation Skills: A guide for trainers and assessors to foster the innovation skills of learners through professional practice.
- Indonesia Perlu Masukkan Aspek STEM dalam Pendidikan (2015, 8<sup>th</sup> March). Republika Online.
- International Technology Education Association (ITEA). (2000). Standards for technological literacy: content for the study of technology (1st ed.). Reston, VA: ITEA.
- Jain, V. K., & Sobek II, D. K. (2006). Linking design process to customer satisfaction through virtual design of experiments. *Research in Engineering Design, 17(2)*, 59-71.
- Kelley, E.L. et.al. (2010). Problem-solving paradigm. *Taylor & Francis Vol. 48, Issue 1, 2000, pages 24-27*
- Kelley, T. (2011). Engineer's notebooks: A design assessment tool. *Technology and Engineering Teacher, 70(7)*, 30-35.
- Kemendikbud (2013). Lampiran peraturan mentri pendidikan dan kebudayaan No. 68 tahun 2013 tentang Kerangka dasar dan struktur kurikulum sekolah menengah pertama/ madrasah tsanawiyah. Jakarta: Kemendikbud.
- Khandani, S. (2005). Engineering Design Processes: Education Transfer Plan. Available online: <http://www.iisme.org/ETPExemplary.cfm> (Accessed 23rd July 2016)
- Koentjaraningrat. (1990). *Metode Penelitian Kemasyarakatan*. Jakarta: Gramedia.

- Konstantopoulos, S. (2009). Effects of teachers on minority and disadvantaged students' achievement in the early grades. *The Elementary School Journal*, 110(1), 92–113.
- Kown, C. & Weinstein, R. S. (2008). Teacher expectations, classroom context, and the achievement gap. *Journal of School Psychology*, 46(3), 235–261
- Krathwohl, D.R., Bloom,B.S. and Masia, B. B. (1964).*Taxonomy of educational objectives, Book II. Affective domain*. New York, NY. David McKay Company, Inc.
- Krulik S. and Rudnick J.A. (1996). *New Sourcebook for Teaching Reasoning and Problem Solving in Junior and Senior High School*. Boston: Allyn & Bacon
- Kuenzi, JJ. (2008). CRS report for congress: science, technology, engineering, and mathematics (STEM) education: Background, federal policy, and legislative action. *Congressional Research Service, Library of Congress, RL33434, Washington, DC. Retrieved on December 30<sup>th</sup> 2014*
- Kwan, L.P. et.al. (2007). *Discover Biology G.C.E. 'O' Level Science Practical Work*. Marshall Cavenish Education
- Lachapelle, CP, & Cunningham, CM. (2014). Engineering in elementary schools. In S Purzer, J Strobel, & M Cardella (Eds.), *Engineering in pre-college settings: research in synthesizing research, policy, and practices* (pp. 61–88). Lafayette, IN: Purdue University Press.
- Lederman, N.G. and Lederman, J.S. (2013). *Is it STEM or ‘‘S & M’’ that We Truly Love?* The Association for Science Teacher Education: USA 2013
- Litchfield, R. (2008). Brainstorming reconsidered: A goal-based view. *Academy of Management Review*, 33(3), 649-668.
- Lou, S. J., Shih, R.C., Diez, C.R.,& Tseng, K.H., (2011). The impact of problem-based learning strategies on stem knowledge integration and attitudes: An exploratory study among female Taiwanese senior high school students. *Springer: International Journal of Technology Design Education* (DOI 10.1007/s10798-010-9114-8)
- Lou, S. J., Shih, R.C., Liu, Y.H., (2010). The senior high school students' learning behavioral model of STEM in PBL. *Springer: International Journal of Technology Design Education* (DOI 10.1007/s10798-010-9112-x)

- Lubienski, S. T. (2002). A closer look at black-white mathematics gaps: Intersections of race and SES in NAEP achievement and instructional practice data. *The Journal of Negro Education*, 71(4), 269–287.
- Ma, X. & Klinger, D. A. (2000). Hierarchical linear modeling of student and school effects on academic achievement. *Canadian Journal of Education*, 25(1), 41–55.
- Marieb, E. N., Mitchell, S. J. (2009). *Human Anatomy & Physiology Laboratory Manual 9th (Ninth) edition*. San Francisco: Benjamin Cummings; 9th edition
- Massachusetts Department of Education. (2006). Massachusetts science and technology/engineering curriculum framework. Malden, MA: Author. Retrieved from <http://www.doe.mass.edu/frameworks/scitech/1006.pdf>
- McGraw, Hill. (2007). *Chapter 9: The Musculoskeletal System and Levers*. Focus on Life Science Grade 7: Glencoe National Geographic
- Michaelis, J.U. & Garcia, J. (1996). *Social Studies for Children, Eleventh Edition*, Boston: Allyn Bacon.
- Next Generation Science Standards Release, (2013). *A Framework for K-12 Science Education*
- Nurkencana. (2005). *Evaluasi Hasil Belajar Mengajar*. Surabaya: Usaha Nasional.
- OECD PISA 2003.
- Osborn, A. F. (1953). *Applied imagination: Principles and procedures of creative thinking*. New York: Scribner.
- Pellegrino, J.W. (2013). *Developing Assessments for the Next Generation Science Standards*. The National Academies Press: National Academy of Sciences.
- Pidgeon, N., Parkhill, K., Corner, A., Vaughan, N., 2013. Deliberating stratospheric aerosols for climate geoengineering and the SPICE project. *Nature Climate Change* 3 (5), 451–457.
- Plattner, H. et.al. (2012). Design Thinking Research, Understanding Innovation. *Springer-Verlag Berlin Heidelberg 2012*
- Punie, Y. (2012). Preface. In joint research centre of the european commission innovating learning: Key elements for developing creative classroom in Europe (p. 1). Luxemburg: Publications Office of the European Union.

Permendikbud No. 81a Year 2013 about Kurikulum 2013

- Piaget, J.(1963). *Psychology of Intelligence*. Paterson, New Jersey: Little-field, Adams & Co.
- Richardson, V. & Fallona, C. (2010). Classroom management as method and manner. *Journal of Curriculum Studies*, 33(6), 705–728.
- Riley, D.P. (2011). *Cambridge Checkpoint Science 2*. UK: Hodder Education
- Roberts, A. (2012). A justification for STEM education. *Technology and Engineering Teacher*, 74(8), 1-5
- Sadler, P. M., Coyle, H. P., & Schwartz, M. (2000). Engineering competitions in the middle school classroom: Key elements in developing effective design challenges. *Journal of the Learning Sciences*, 9(3), 299 - 327.
- Sanders, M. (2009). STEM, STEM education, STEMmania. *The Technology Teacher*, 20, 20–26.
- Sardiman, A.M. (2005). *Interaksi dan Motivasi Belajar Mengajar*. Jakarta: Rajawali Press
- Stanford University: Taking Design Thinking to Schools (2011)
- Sham, T. (2002). *AutoCAD' 2002 A Problem Solving Approach*. Autodesk Official Press: Books on AutoCAD
- Shores, M. L., Shannon, D. M. & Smith, T. G. (2010). Individual learner variables and their effect on mathematics achievement as students advance from fifth to sixth grade. *Journal of Research in Childhood Education*, 24(3), 187–194.
- Stilgoe, J. et.al. (2013). Developing a framework for responsible innovation. *Elsevier B.V.*
- Structure, Function, and Physical Principles in Living Systems accessed on: [msmillersra.weebly.com/uploads/3/7/2/4/37242969/chap09.pdf](http://msmillersra.weebly.com/uploads/3/7/2/4/37242969/chap09.pdf)
- Suyantiningsih (2013). *Pengembangan Buku Kerja Siswa pada Mata Pelajaran PKN untuk Meningkatkan Kemandirian Belajar Siswa Sekolah Dasar di Propinsi Daerah Istimewa Yogyakarta*. LPPM UNY
- Slameto. (2003). *Belajar dan Faktor-Faktor yang Mempengaruhinya*. Jakarta: Rineka Cipta.

- Toman, U, Arkendiz, A.R., Cimen, S.O., Gurbuz, F. (2013) Extended worksheet developed according to 5E model based on constructivist learning approach. *Journal on New Trends In Education And Their Implications: Volume: 4 Issue: 4 Article: 16 Issn 1309-6249*
- Toon, T.Y., (2007). *G.C.E. 'O' Level Chemistry Matter Workbook*. Marshall Cavenish Education.
- TPSR Toolbox: Resources for Research, Evaluation, and Assessment: University of Memphis.
- Widowati, Sri. (2013). Pengembangan buku kerja materi eksponen bercirikan rme untuk siswa SMK teknik. *Jurnal Pendidikan Sains, Vol. 1 No. Page 265-273ew Trends in Education and Their Implications*
- Wilson , S. M. (2013). Recent Developments in STEM Education Relevant to the Qualities of Teacher Preparation. *Paper presented at a workshop in Washington, DC, February 25, 2013*
- Wilson, L.O. (2006). *Beyond Bloom - A new Version of the Cognitive Taxonomy*. [Online]. Available: <http://www4.uwsp.edu/education/lwilson/curric/> [3rd July 2016]
- Winkel (1996). *Oxford Advanced Learner's Dictionary of Current English*. Oxford University Press.
- Wright, P.M. (2009). TPSR Rubric for Assessing Responsible Behavior.