

## DAFTAR PUSTAKA

- American Association of Colleges of Teacher Education. (2010). *21<sup>st</sup> Century knowledge and skills an educator preparation*. The American Association of Colleges of Teacher Education (AACTE) and the Partnership for 21<sup>st</sup> Century Skills (P21). [http://www.p21.org/storage/documents/aacte\\_p21\\_whitepaper2010.pdf](http://www.p21.org/storage/documents/aacte_p21_whitepaper2010.pdf) diakses tanggal 11 Desember 2014
- Abdullah, M., & Osman, K. (2010). 21<sup>st</sup> century inventive thinking skills among primary students in Malaysia and Brunei. *Procedia Social and Behavioral Sciences*, 1646–165. DOI: 10.1016/j.sbspro.2010.12.380
- Abrami, et al. (2008). Instructional interventions affecting critical thinking skills and dispositions: A stage 1 meta-analysis. *Review of educational research*, 1102–1134. DOI: 10.3102/0034654308326084
- Adey, P., & Shayer, M. (1994). *Really raising standards*. London: Routledge
- (2002). *Learning intelligence: Cognitive acceleration across the curriculum from 5 years*. Buckingham: Open University Press
- Adler, M. (2000). *How to think about the great ideas: From the great books of Western civilization*. New York, NY: Open Court.
- Adey, P., Robertson, A., & Venville, G. (2002). Effects of a cognitive acceleration programme on year 1 pupils. *British Journal of Educational Psychology*, 72, 1–25. DOI: 10.1348/000709902158748
- Afandi, Sajidan, Akhar, M., & Suryani, N. (2014). Stimulasi keterampilan argumentasi mahasiswa calon guru biologi menggunakan variasi pertanyaan dalam grup diskusi facebook. *Teknodika*, 1(1), 165–176. DOI: 10.13140/RG.2.1.1026.3285
- (2018a). Pre-service science teachers perception about high order thinking skills (HOTS) in 21<sup>st</sup> century. *International Journal of Pedagogy and Teacher Education*, 2(1): 301–308. DOI: 10.20961/ijpte.v2i1.18254
- (2018b). *Exploring digital-age literacy among prospective science teachers' in West Kalimantan (Indonesia)*. Dipresentasikan pada International Conference on Mathematics and Science Education, Bali 8-9 Oktober 2018.

- \_\_\_\_\_ (2018c). A framework of integrating environmental science courses based to 21st century skills standards for prospective science teachers. *AIP Conference Proceedings*, 2014(1): 020032. DOI: 10.1063/1.5054436
- \_\_\_\_\_ (2019). Development frameworks of Indonesian partnership 21<sup>st</sup> century skills standards: A Delphi study. *Jurnal Pendidikan IPA Indonesia*, 8(1): 91-102. DOI: 10.15294/jpii.v8i1.11647
- Akcay, H. (2017). Learning from dealing with real world problems. *Education*, 137(4): 413-417. <https://www.projectinnovation.com/education.html>. Diakses tanggal 4 Januari 2019.
- Anazifa, R. D., & Dzukri. (2017). Project-based learning and problem-based learning: Are they effective to improve student's thinking skills?, *Jurnal Pendidikan IPA Indonesia*, 6(2), 346-355. DOI: 10.15294/jpii.v6i2.11100
- Anderson, W. L & Krathwohl, R. D. (2001). *A taxonomy for learning, teaching and assesing: A revision of Bloom's taxonomy of educational objectives*. New York: Addison Wesley Longman, Inc
- Arends, R. I. (2012). *Learning to teach (ninth edition)*. New York: McGraw-Hill.
- Arsyad, N., Osman, K., & Soh, T. (2011). Instrument development for 21<sup>st</sup> century skills in Biology. *Procedia Social and Behavioral Sciences* 15, 1470–1474. DOI: 10.1016/j.sbspro.2011.03.312
- Association of College and Research Libraries (2000). *Information literacy competency standards for higher education*. Illinois: American Library Association. <http://www.ala.org/acrl/standards/informationliteracycompetency>. Diakses tanggal 4 Januari 2019.
- Aswandi. (2015). *Revitalisasi pendidikan guru*. <https://www.pontianakpost.co.id/revitalisasi-pendidikan-guru-0>. Diakses tanggal 10 Januari 2019
- Azwar, S. (2012). *Metode penelitian*: Yogyakarta: Pustaka pelajar.
- Ball, A. L., & Garton, B. L. (2005). Modeling higher order thinking: The alignment between objectives, classroom discourse, and assessments. *Journal of Agricultural Education*, 46 (2), 58-69. DOI: 10.5032/jae.2005.02058
- Basham, G., Irwin, W., Nardone, H., & Wallace, W. J. (2011). *Critical thinking: A student's introduction (4<sup>nd</sup> edition)*. New York: McGraw-Hill Companies, Inc

- Berkowitz, W. M., & Simmons, P. (2003). *Integrating science education and character education*. In L. D. Zeidler. (Ed). The role of moral reasoning on socioscientific issues and discourse in science education. Netherlands: Kluwer Academic Publishers
- Bloom, S. B., Engelhart, D. M., Furst, J. E., Hill, H. W., & Krathwohl, R. D. (1956). *Taxonomy of educational objectives, book I: Cognitive domain*. New York: David McKay Company, Inc
- Badan Nasional Standar Pendidikan. (2010). *Paradigma pendidikan nasional abad XXI. Badan Standar Nasional Pendidikan Versi 1.0*. [www.bsnp-indonesia.org/id/wp-content/Laporan BNSP2010.pdf](http://www.bsnp-indonesia.org/id/wp-content/Laporan%20BNSP2010.pdf). diakses 10 Februari 2015
- Boden, M. (2001). *Creativity and knowledge*. In A. Craft., B. Jeffrey., & M. Leibling (Eds.), *Creativity in education*. London: Continuum Publishing.
- Boersma, J. J. (2009). Environmental sciences, sustainability, and quality. In J. J, Boersma., & L. Reijnders. (Eds.), *Principles of environmental sciences*. Aldershot: Springer Science + Business Media B.V
- Borg, R. W., & Gall, D. M. (1989). *Educational research: An introduction (4<sup>nd</sup> Edition)*. Boston: Pearson Education, Inc.
- Bok, D. (2006). *Our underachieving colleges. A candid look at how much students learn and why they should be learning more*. Princeton, NJ: Princeton University Press.
- Brierton, S. B. 2011. *Higher order thinking skills as demonstrated in synchronous and asynchronous online college discussion posts*. Dissertation: North Carolina State University (Published). <http://www.repository.lib.ncsu.edu/> diakses tanggal 05 januari 2015.
- Briggs, L. J., & Wager, W. (1981). *Handbook for procedures for the design of instruction*. Englewood Cliffs, NJ: Educational Technology Publications.
- Broadbent, D. (1958). *Perception and communication*. London: Pergamon Press.
- Brookhart, S. M. (2010). *Assess high order thinking skills in your classroom*. Virginia: ASCD
- Bruner, J. S. (1960). *The process of education*. Cambridge, MA: Harvard University Press.
- Budiyono. 2009. *Statistika untuk penelitian (2<sup>nd</sup> Edition)*. Surakarta: Sebelas Maret University Press. *commit to user*

- Budsankom, P., Sawangboon, T., Damrongpanit, S., & Chuensirimongkol, J. (2015). Factors affecting higher order thinking skills of students: a meta-analytic structural equation modeling study. *Educational Research and Reviews*, 2639-2652. DOI: 10.5897/ERR2015.
- Butterfield, J. (2010). *Problem solving and decision making*. Boston, MA: Course Technology, Cengage Learning
- Butterworth, J., & Thwaites, G. (2013). *Thinking skills: Critical thinking and problem solving (2<sup>nd</sup> Edition)*. Cambridge: Cambridge University Press
- Bybee, J., et al. (2006). *The BSCS 5E instructional model: Origins, effectiveness, and applications*. Colorado, Spring: BSCS. [http://www.bscs.org/BSCS\\_5E\\_Instructional\\_Model-Executive\\_Summary\\_0.pdf](http://www.bscs.org/BSCS_5E_Instructional_Model-Executive_Summary_0.pdf) diakses 13 Oktober 2015
- Cahyarini, A., Rahayu, S., & Yahmin. (2016). The effect of 5E learning cycle instructional model using socioscientific issues (SSI) learning context on students' critical thinking. *Jurnal Pendidikan IPA Indonesia*, 5(2), 222-229. DOI: 10.15294/jpii.v5i2.7683
- Carpenter, T., Franke, M., & Levi, L. (2003). *Thinking mathematically: Integrating arithmetic and algebra in elementary school*. Portsmouth: Heinemann
- Chang, C. Y., & Barufaldi, J. P. (1999). The use of a problem-solving-based instructional model in initiating change in students' achievement and alternative frameworks. *International Journal of Science Education*, 21, 373-388. DOI: 10.1080/095006999290606
- Chia, W. L., & Goh, C. (2016). Teachers' perceptions, experience, and learning, *Asia Pacific Journal of Education*, 36(S1), 1-4. DOI: 10.1080/02188791.2016.1141464
- Chien, S. P., Wu, H. K., & Hsu, Y. S. (2014). An investigation of teachers' beliefs and their use of technology based assessments. *Computers in Human Behavior*, 31, 198-210. DOI: 10.1016/j.chb.2013.10.037
- Chowdhury, M. (2016). Emphasizing morals, values, ethics, and character education in science education and science teaching, *The Malaysian Online Journal of Educational Science*, 4(2), 1-16.
- Chowning, J. T., Griswold, J. C., Kovarik, D. N., & Colling, L. J. (2012). Fostering critical thinking, reasoning, and argumentation skills through bioethics education. *PLoS One*, 7(5), e36791. DOI: 10.1371/journal.pone.0036791



- Ciardiello, A. V. (1998). Did you ask a good question today? Alternative cognitive and metacognitive strategies. *J Adolesc Adult Lit*, 42(3), 210-219. DOI: 10.2307/40014681
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum
- Collings, J. N. (1994). Some fundamental questions about scientific thinking. *Research in Science and Technological Education*, 12, 161–173. DOI: 10.1080/0263514940120205
- Costa, L. A. (2008). Describing the habits of mind. In L. A. Costa., & B. Kallick. (Eds.), *Learning and leading with habits of mind; 16 essential characteristics for success* (pp. 15-41). USA: Association for Supervision and Curriculum Development (ASCD)
- Costa, L. A., & Kallick, B. (2008). *Learning and leading with habits of mind: 16 characteristics for success*. Alexandria CA: Association for Supervision and Curriculum Development
- Cresswell, J. W. (2009). *Qualitative, quantitative, and mixed method approach* (3<sup>th</sup> Edition). California: Sage Publication
- Cunningham, P. W., & Cunningham, A. M. (2007). *Environmental science: A global concern* (8<sup>th</sup> Edition). New York: The McGraw-Hill Companies, Inc
- Dahar, R. D. (1989). *Teori-teori belajar*. Bandung: Alfabeta.
- De Bono, E. (1978). *Teaching thinking*. New Zealand: Penguin Books
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Boston: D. C. Heath and Company.
- \_\_\_\_\_. (1980). *Art as experience*. New York: Perigee Books
- Demirel, J., Derman, I., & Karagedik, E. (2015). A study on the relationship between reflective thinking skills towards problem solving and attitudes towards mathematics. *Procedia - Social and Behavioral Sciences*. 197, 2086 – 2096. DOI: 10.1016/j.sbspro.2015.07.326
- Diamond, A. (2006). *The early development of executive functions*. In F. I. M. Craik (Ed.), *Lifespan cognition: Mechanisms of change*. New York: Oxford University Press.

- Dick, W., Carey, L., & Carey, O. J. (2009). *The systematic design of instruction* (7<sup>th</sup> Edition). New Jersey: Pearson Education, Inc
- Dixon-Krauss. (2002). *The virtual faculty's* [Online]. <http://www.massey.ac.nz>. diakses 08 Oktober 2014
- Duncan, S., McNieven, D., & Savory, C. (2004). *Thinking skills through science*. Cambridge: Chris Kington
- Elder, L & Paul, R. (1998). The role of socratic questioning in thinking, teaching, and learning, *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 71(5), 297-301. DOI: 10.1080/00098659809602729
- Engle, R. A., & Conant, F. R. (2002). Guiding principles for fostering productive disciplinary engagement: Explaining an emergent argument in a community of learner's classroom. *Cognition and Instruction*, 20 (4), 399-483. DOI: 10.1207/S1532690XCI2004\_1
- \_\_\_\_\_. (1996). *Critical thinking*. New Jersey: Prentice-Hall, Inc
- Everitt, N., & Fisher, A. (1995). *Modern epistemology: A new introduction*. New York: McGraw-Hill.
- Fadzil, H. M. (2017). Exploring early childhood preservice teachers' problem-solving skills through socioscientific inquiry approach. *Asia-Pacific Forum on Science Learning and Teaching*, 18(1), 1-19
- Fauziah, L. (2017). *Perubahan Iklim Bisa Berdampak Pada Pasokan Pangan Dunia*. Diakses di <http://nationalgeographic.grid.id/read/13307419/perubahan-iklim-dapat-berdampak-pada-pasokan-pangan-dunia>
- Fisher, A. (2009). *Berfikir kritis: Sebuah pengantar*. Jakarta: Erlangga
- Florida, R., Mellander, C., & King, K. (2015). *The Global Creativity Index 2015*. London: Rottman Publisher
- Frederiksen, N. (1984). Implications of cognitive theory for instruction in problem solving. *Review of Educational Research*, 54(3), 363–407. DOI: 10.3102/00346543054003363
- Friedman, T. L. (2007). *The world is flat 3.0: A brief history of the twenty first century*. New York: Picador
- Gall, D. M., Gall, J. P., & Borg, R. W. (2003). *Educational research: An introduction* (7<sup>nd</sup> Edition). Boston: Pearson Education, Inc.

- Gagné, R. M. (1985). *The conditions of learning (4<sup>nd</sup> Edition)*. New York: Holt, Rinehart and Winston, Inc.
- Ghozali, I., & Fuad. (2014). *Structural equation modelling: Teori, konsep, dan aplikasi dengan program LISREL 9.10*. Semarang: Badan Penerbit Universitas Diponegoro.
- Gokhale, A. A. (1995). Collaborative learning enhances critical thinking [Online]. *Journal of Technology Education*, 7 (1). <http://scholar.lib.vt.edu/sci-hub.org/ejournals/JTE/v7n1/gokhale.jte-v7n1.html?ref=Sawos.Org> diakses tanggal 1 Januari 2015
- Gredler, M. B. (1991). *Belajar dan membelajarkan*. Seri Pustaka Teknologi Pendidikan No.11. Jakarta: Rajawali Pers
- Griffin, P., & Care, E. (2015). *The ATC21S method*. In P. Griffin., & E. Care. (Eds). *Assessment and teaching of 21st century skills: method and approach*. Dordrecht: Springer
- Grissom, R. J., & Kim, J. J. (2012). *Effect sizes for research: Univariate and multivariate applications (2<sup>nd</sup> ed.)*. New York: Routledge/Taylor & Francis Group.
- Grosser, M., & Nel, M. (2013). The relationship between the critical thinking skills and the academic language proficiency of prospective teachers, *South African Journal of Education*, 33(2), 1-17. DOI: 10.15700/saje.v33n2a639
- Hake R (1998) Interactive-engagement vs. traditional methods: a six-thousandstudent survey of mechanics test data for introductory physics courses. *American Journal of Physics*, 66(1), 64–74. DOI: 10.1119/1.18809
- Halpern, D. F. (2003). *Thought and knowledge: An introduction to critical thinking (4<sup>nd</sup> Edition)*. New Jersey: Lawrence Erlbaum Associates Publisher
- Harmin, M., & Toth, M. (2006). *Inspiring active learning: a complete book for today's teachers*. USA: Association for Supervision and Curriculum Development
- Hart Research Associates. (2013). *It takes more than a major: Employer priorities for college learning and student success*. [https://www.aacu.org/publications-research/periodicals/it-takes-more-major-employer-priorities-college-learning-and](https://www.aacu.org/publications-research/periodicals/it-takes-more-major-employer-priorities-college-learning-and-commit-to-user)  
*commit to user*

- Hartley, J. (1998). *Learning and studying: A research perspective*. London: Routledge.
- Hasan Alwi. (2010). *Kamus besar bahasa Indonesia (Edisi Ketiga)*. Jakarta: Balai Pustaka
- Hattie, J., Biggs, J., & Purdie, N. (1996). The effect of learning skills intervention on student learning: a meta-analysis. *Review of educational research*, 66 (2), 99-136. DOI: 10.3102/00346543066002099
- Hattie, J. (2017). Hattie's 2017 Updated List of Factors Influencing Student Achievement. <https://www.visiblelearningplus.com/>
- Harvey, M. (2014). The food-energy-climate change trilemma: Toward a socio-economic analysis. *Theory, Culture & Society*, 31(5), 155–182. DOI: 10.1177/0263276414537317
- Hawes-Neisbitt, P. (2005). *Higher order thinking skills in a science classroom computer simulation*. Thesis. Brisbane: Queensland University of Technology
- Heong, Y., et.al. (2012). The needs analysis of learning higher order thinking skills for generating ideas. *Procedia - Social and Behavioral Sciences* 5, 197 – 203. DOI: 10.1016/j.sbspro.2012.09.265
- Higgins, S., Hall, E., Baumfield, V., & Moseley, D. (2005). *A meta-analysis of the impact of the implementation of thinking skills approaches on pupils*. London: The EPPI-Centre is part of the Social Science Research Unit, Institute of Education, University of London. <http://eppi.ioe.ac.uk/> diakses 10 januari 2014
- Holyoak, J. K & Morrison, G. R. (2005). *The cambridge handbook of thinking and reasoning*. New York: Cambridge Univeristy Press
- Huberty, C.J. & Olejnik, S. (2006) *Applied MANOVA and discriminant analysis. 2nd Edition*, John Wiley & Sons Inc, New York.
- IBM (2014). *What is big data?* <https://www01.ibm.com/software/sg/data/bigdata/>. Diakses 10 januari 2015
- Indah, R. N., & Kusuma, A. W. (2016). Factors affecting the development of critical thinking of indonesian learners of english language. *IOSR Journal of Humanities and Social Science*, 21(6), 86-94. DOI: 10.9790/0837-2106088694
- Januszewski, A. (2001). *Educational technology the development of a concept*. Colorado: Libraries Unlimited, Inc.



- Jejen, M. (2015). *Jalan Terjal Kurikulum KKNl*. Koran SINDO, sabtu, 31 Oktober 2015.
- Johnson, E. B. (2007). *Contextual teaching and learning (menjadikan kegiatan belajar-mengajar mengasyikan dan bermakna)*. Bandung: MLC.
- Joyce, B. R., & Weil, M. (2000). Models of Teaching and Learning; Where Do They Come From and How Are They Used? In *Models of Teaching* (6 ed). Allyn and Bacon.
- Joyce, B., Weil, M., & Calhoun, E. (2009). Models of teaching (8<sup>nd</sup> Edition). diterjemahkan oleh A. Fawaid dan A. Mirza. *Model-Model Pengajaran*. Yogyakarta: Pustaka Pelajar
- Kantar, D. L. (2014). Assessment and instruction to promote higher order thinking in nursing students. *Nurse Education Today*. 34, 789–794. DOI: 10.1016/j.nedt.2013.08.013
- Kauchak, D. P., & Eggen, P. D. (1998). *Learning and teaching: Research based method (3<sup>nd</sup> Ed)*. Boston: Allyn and Bacon
- King, F. J., Goodson, L., & Rohani, F. (2006). *Higher order thinking skills*. Center for Advancement of Learning and Assessment. [http://www.cala.fsu.edu/files/higher\\_order\\_thinking\\_skills.pdf](http://www.cala.fsu.edu/files/higher_order_thinking_skills.pdf)
- Kementerian Pendidikan Malaysia. (2013). *Malaysia Education Blueprint 2013-2025*. Ministry of Education Malaysia: Putrajaya
- Kimura, D., & Tatsuno, M. (2017). *Advancing 21st century competencies in japan*. asia society, centre for global education [Online]. Tersedia: <http://asiasociety.org/files/21st-century-competencies-japan.pdf>
- Knowles, M. S. (1984). *Andragogy in action*. San Francisco, CA: Jossey Bass.
- Lau, J. Y. F. (2011). *An introduction to critical thinking and creativity: Think more think better*. New Jersey: John Wiley & Sons, Inc
- Law, W. W. (2013). Understanding China's curriculum reform for the 21st century, *Journal of Curriculum Studies*, 46(3), 332-360. DOI: 10.1080/00220272.2014.883431
- Lawrence-Lightfoot, S. (2003). *The essential conversation: What parents and teachers can learn from each other*. New York: Ballantine Books.
- Lewis, A., & Smith, D. (1993). Defining high order thinking. *Theory into Practice*, 32 (3), 131-137

- Levy, F., & Murnane, J. R. (2004). *The new division of labor: How computers are creating the next job market*. Princeton: Princeton University Press
- Levy, F. (2010). How technology changes demands for human skills. *OECD Education Working Paper No. 45*. <http://www.oecd.org/edu/skills-beyond-school/45052661.pdf>. diakses tanggal 02 Januari 2015
- Loon, J. E., & Lai, H. L. (2014). Information literacy skills as a critical thinking framework in the undergraduate engineering curriculum. *Library Scholarly Publications: Wayne State University*, Paper 80, 1-8
- Loveless, A. (2002). *A Literature Review in Creativity, New Technologies and Learning: A Report for Futurelab*. Bristol: Futurelab.
- Lun, V. M. (2010). Examining the Influence of Culture on Critical Thinking in Higher Education. University of Wellington: Victoria [Dissertation].
- Mainali, B. P. (2012). Higher order thinking in education. *Academic Voices a Multidisciplinary Journal*, 2 (1), pp 5-10
- Manurung, S. R., & Rustaman, N. (2012). *Identifikasi keterampilan argumentasi melalui analisis "Toulmin Argumenation Pattern (TAP)" pada topik kinematik bagi mahasiswa calon guru*. Seminar & Rapat Tahunan BKS-PTN B
- Markowitsch, J., & Messerer, K. (2007). *Practice-oriented methods in teaching and learning in higher education*. In P. Tynjälä, J. Välimaa, & G. Boulton-Lewis (Eds.), *Higher education and working life: Collaborations, confrontations and challenges*. Oxford: Elsevier.
- Martin Prosperity Institute. (2015). *The global creativity index 2015*. <http://martinprosperity.org/content/the-global-creativity-index-2015/>. Diakses 10 Juli 2015
- Marzano, R. J., & Pickering, D. J. (1997). *Dimensions of learning*. Colorado: Association for Supervision and Curriculum Development.
- Marzano, R. J., Brandt, R. S., Hughes, C. S., Jones, B. F., Presseisen, C. S., Rankin, S. C., & Suhor, C. (1998). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R. J., Pickering, D. J., & Pollock, J. (2001). *Classroom instruction that works: research-based strategies for increasing student achievement*. Alexandria VA: Association for Supervision and Curriculum Development

- Mayer, R. E. (1989). Cognitive views of creativity: Creative teaching for creative learning. *Contemporary Educational Psychology*, 14(3), 203-211. DOI: 10.1016/0361-476X(89)90010-6
- McCormick, D. F., & Whittington, M. S. (2000). Assessing academic challenges for their contribution to cognitive development. *Journal of Agricultural Education*, 41(3), 114-122
- McGregor, D. (2007). *Developing thinking; developing learning: A Guide to developing thinking in education*. New York: Open University Press
- Meichenbaum, D. (1977). *Cognitive behavioral modification: An integrative approach*. New York, NY: Plenum Press.
- Mewborn, D. S. (1999). Reflective Thinking among Preservice Elementary Mathematics Teachers. *Journal for Research in Mathematics Education*, 30(3), 316-341. DOI: 10.2307/749838
- MIT. (2011). *The third revolution: the convergence of the life science, physical science and engineering*. MIT Washington office. <http://news.mit.edu/2011/convergence-0104>, diakses tanggal 10 Juni 2015
- Miller, T. G., & Spoolman, S. (2010). *Environmental science (13<sup>nd</sup> Edition)*. Belmon, CA: Brooks/Cole, Cengage Learning
- Miri, B., Ben-Chaim, D & Zoller, U. (2007). Purposely teaching for the promotion of higher-order thinking skills: A case of critical thinking. *Res Sci Educ* 37, 353–369. DOI: 10.1007/s11165-006-9029-2
- Moseley, D., Baumfield, V., Elliot, J., Gregson, M., Higgins, S., Miller, J., & Newton, D. (2005). *Frameworks for thinking: A handbook for teaching and learning*. New York: Cambridge University Press
- Muhibbin Syah. (1995). *Psikologi pendidikan: Suatu pendekatan baru*. Bandung: Rosdakarya Offset
- Myers, B. E., & Dyer, J. E. (2006). The influence of student learning style on critical thinking skill. *Journal of Agricultural Education*, 47(1), 43-52. DOI: 10.5032/jae.2006.01043
- NCREL & Metiri Group. (2003). *enGauge 21st century skills: digital literacy for the digital age*. Napierville, IL and Los Angeles, CA: NCREL and Metiri.

- Nesbit, J., Belfer, K., & Leacock, T. (2009). *Learning object review instrument (LORI)*. Version 1.5, E-Learning Research and Assessment Network.
- Newton, P. M., & Miah, M. (2017). Evidence-based higher education – is the learning styles ‘myth’ important?. *Frontiers in Psychology*, 8, 444. DOI: 10.3389/fpsyg.2017.00444
- Ngah, N., Ismail, Z., Tasir, Z., & Haruzuan, M. N. (2017). Students’ higher order thinking skills and their relationships with problem posing ability. *Journal of Computational and Theoretical Nanoscience*, 23(4), 2876-2879. DOI: 10.1166/asl.2017.7589
- Nieveen, N., McKenney, S., & van den Akker, J. (2007). *Educational design research: The value of variety*. In J. N. D. Akker., K. Gravemeijer., S. McKenney, & N. Nieveen (Eds.), *Educational design research*. London: Routledge.
- Nuangchalermp, P., & Kwuanthong, B. (2014). Teaching “global warming” through socioscientific issues-based instruction, *Asian Social Science*, 6(8), 42-47. DOI: 10.5539/ass.v6n8p42
- Osman, K., Hamid, S., & Hasan, A. (2009). Standard setting: Inserting domain of the 21<sup>st</sup> century thinking skills into the existing science curriculum in Malaysia. *Procedia Social and Behavioral Sciences* 1, 2573–2577. DOI: 10.1016/j.sbspro.2009.01.454
- Omrod, J. E. (2012). *Human learning*. (7<sup>nd</sup> Edition). USA: Pearson Education, Inc.
- Ongardwich, N., Kanjanawasee, S., & Tuipae, C. (2015). Development of 21<sup>st</sup> century skill scales as perceived by students. *Procedia-Social and Behavioral Sciences*, 737 – 741. DOI: 10.1016/j.sbspro.2015.04.716
- Partnership for 21<sup>st</sup> Century Skills. (2008). *21<sup>st</sup> century skills, education & competitiveness*. [www.p21.org/storage](http://www.p21.org/storage). diakses 20 Desember 2015
- Paul, R., & Elder, L. (2002). *Critical thinking: Tools for taking charge of your professional*. New Jersey: Prentice-Hall, Inc
- Paul, R., Binker, A., Martin, D., Vetrano, C., & Kreklau, H. (1989). *Critical thinking handbook: 6<sup>th</sup>-9<sup>th</sup> grades*. Rohnet Park CA: Center for Critical Thinking and Moral Critique Sonoma State University
- Pellegrino, W. J., & Hilton, L. M. (2012). *Education for life and work: developing transferable knowledge and skills in the 21st century*. Washington, D.C: National Academic Press



Peraturan Menteri Pendidikan Nasional Nomor 6 Tahun 2007 *tentang Standar Kompetensi Lulusan Untuk Satuan Pendidikan Dasar dan Menengah*. <http://disdik.jabarprov.go.id/download/product/11/peraturan-menteri-pendidikan-nasional-nomor-6-tahun-2007>

Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia nomor 49 Tahun 2014 *tentang Standar Nasional Pendidikan Tinggi*. <http://www.kopertis12.or.id/2014/06/11/pemendikbud-no-49-tahun-2014-tentang-standar-nasional-pendidikan-tinggi.html>. diakses 10 juli 2015

Peraturan Menteri Pendidikan dan Kebudayaan Republik Indonesia Nomor 20 Tahun 2016 *Tentang Standar Kompetensi Lulusan Pendidikan Dasar dan Menengah*. Retrieved from <http://peraturan.go.id/inc/view/11e714327136c69496db313034373333.html>

Peraturan Menteri Pendidikan dan Kebudayaan Nomor 21 Tahun 2016 *Tentang Standar Isi Pendidikan Dasar dan Menengah*. Retrieved from [https://edunamika.com/wpcontent/uploads/2017/09/Permendikbud\\_21\\_Tahun\\_2016\\_Standar\\_Isi\\_Pend\\_Dasar\\_dan\\_Menengah.pdf](https://edunamika.com/wpcontent/uploads/2017/09/Permendikbud_21_Tahun_2016_Standar_Isi_Pend_Dasar_dan_Menengah.pdf)

Peraturan Menteri Pendidikan dan Kebudayaan Nomor 22 Tahun 2016 *Tentang Standar Proses Pendidikan Dasar dan Menengah*. Retrieved from <http://peraturan.go.id/inc/view/11e74a5f922968ee9b23303932363339.html>

Peraturan Menteri Pendidikan dan Kebudayaan Nomor 24 Tahun 2016 *Tentang Kompetensi Inti dan Kompetensi Dasar Pelajaran Pada Kurikulum 2013*. Retrieved from <http://peraturan.go.id/permen/kemendikbud-nomor-24-tahun-2016-tahun-2016.html>

Piaget, J. (1963). *The origins of intelligence in children*. New York, NY: Norton.

PISA. (2015). *PISA 2015 Assessment and Analytical Framework; Science, Reading, Mathematic, Financial Literacy and Collaborative Problem Solving*. Paris: OECD Publishing

Polit, D.F., & Beck, C.T. (2006). The content validity index: are you sure you know what's being reported? : Critique and recommendations. *Research in Nursing & Health*, 29, 489–497. DOI: 10.1002/nur.20147

Polya, G (1973). *How to solve it: A new aspect of mathematical method* (2<sup>nd</sup> Edition). Princeton, New Jersey: Princeton University Press.

- Rahmawati, D., Sajidan., & Ashadi. (2018). Analysis of problem solving skill in learning biology at senior high school of Surakarta. *IOP Conf. Series: Journal of Physics: Conf. Series* 1006, 012014. DOI: 10.1088/1742-6596/1006/1/012014
- Ramirez, R. P., & Ganaden, M. S. (2008). Creative activities and students' higher order thinking skills. *Education Quarterly*, 66 (1), 22-33
- Ramoz, L. J., Dolipas, B. B., Villamor, B. B. (2013). Higher order thinking skills and academic performance in physics of college students: A regression analysis. *International Journal of Innovative Interdisciplinary Research*, 1 (4), 48-60
- Revell, L., & Arthur, J. (2007). Character education in schools and the education of teachers, *Journal of Moral Education*, 36(1), 79-92. DOI: 10.1080/03057240701194738
- Resnick, B. L. (1989). *Education and learning to think*. Washington. D.C: National Academic Press
- Richardson, J. T. E. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational Research Review*, 6(2), 135-147. DOI: 10.1016/j.edurev.2010.12.001
- Riding, R. J., & Powell, S. D (1987). The effect on reasoning, reading and number performance of computer presented critical thinking activities in five-year-old children. *Educational Psychology*, 7, 55-65. DOI: 10.1080/0144341870070107
- Rudinow, J., & Barry, V. (2008). *Invitation to critical thinking* (6<sup>nd</sup> Edition). USA: Thomson Wadsworth
- Saad, I. M., Baharom, S., Mokshien, S. E., & Setambah, A.B.M. (2017). the study of used socio-scientific issues (SSI) in Biology. *International Journal of Academic Research in Business and Social Sciences*, 7(3), 348-355. DOI: 10.6007/IJARBS/v7-i3/2740
- Sadler, T. D. & Zeidler, D. L. 2004. The morality of socioscientific issues: construal and resolution of genetic engineering dilemmas. *Science Education*. 88(1), 4-27. DOI: 10.1002/sce.10101
- Sajidan & Afandi. (2017). *Nature of science (NOS) sebagai dasar pembentukan karakter dan keterampilan berpikir tingkat tinggi menuju pendidikan abad 21*. disampaikan pada Seminar Nasional SALINGDIDIK, Tarakan 9 November 2017.

- Sajidan & Afandi (2018). Menjembatani keterampilan berpikir tingkat tinggi siswa usia sekolah dasar melalui pembelajaran inovatif, disampaikan pada Seminar Nasional Pendidikan Dasar, Surakarta 25 Agustus 2018
- Santos, P. D., & Luiz, W. (2014). Debate on global warming as a socio-scientific issue: science teaching towards political literacy. *Cultural Studies of Science Education*, 9(3), 663-674. DOI: 10.1007/s11422-014-9596-x
- Santrock, W. J. 2011. *Educational psychology (5<sup>nd</sup> Edition)*. New York: McGraw-Hill Companies, Inc
- Schultz, G. V., & Li, Y. (2016). Student development of information literacy skills during problem-based organic chemistry laboratory experiments, *J. Chem. Educ.*, 93(3), 413–422. DOI: 10.1021/acs.jchemed.5b00523
- Scott, G., Leritz, L. E., & Mumford, M. D. (2004). The effectiveness of creativity training: A quantitative review. *Creativity Research Journal*, 16(4), 361-388. DOI: 10.1080/10400410409534549
- Searle, M. (2017). *Causes and cures in the classroom*. USA: ASCD
- Sembiring, M. G. (2014). Modeling factors affecting the 21st century skills viewed by indonesian teachers. *ASEAN Journal of Open Distance Learning*, 6 (1), 21-31. <http://ajodl.oum.edu.my/sites/default/files/document/vol6-no1/Vol6-02.pdf>
- Sidi. I. D, & Setiadi. B. N. (2013). *Manusia Indonesia abad 21 yang berkualitas tinggi di tinjau dari sudut psikologi*. <http://himpsi.or.id/publikasi/makalah>. diakses 15 agustus.2016
- Sigelman, K. C., & Rider, A. E. (2012). *Life-span human development (7<sup>nd</sup> Edition)*. USA: WADSWORTH Cengage Learning
- Simmoneaux, L. (2014). *Questions socialement vives and socioscientific issues: new trends of research to meet the training needs of post-modern society*. In Bruguière, C., Tiberghien, A., & Clément, P (Ed). Topics and trends in current science education, Springer Science+Business Media: Dordrech, p. 37-54
- Slavin, E. R. (2006). *Educational psychology: Theory and practice (8<sup>nd</sup> Edition)*. USA: Pearson Education, Inc
- Smith, G. (2002). Are There Domain-Specific Thinking Skills?, *Journal of Philosophy of Education*, 36, 207-227. DOI: 10.1111/1467-9752.00270

- Soh, T., Asyad, N., & Osman, K. (2010). The relationship of 21<sup>st</sup> century skills on students' attitude and perception towards physics. *Procedia Social and Behavioral Sciences* 7(C), 546–554. DOI: 10.1016/j.sbspro.2010.10.073
- Sugiyono. 2010. *Metode penelitian pendidikan: Pendekatan kuantitatif, kualitatif dan R&D*. Bandung: Alfabeta.
- Suhaenah Suparno. (2001). *Membangun kompetensi belajar*. Jakarta: Dirjen Dikti Depdiknas
- Stephens, M. A. (1992). *Introduction to Kolmogorov (1933) On the Empirical Determination of a Distribution*, dalam Kotz, S., & Johnson, N. L. (Eds) *Breakthroughs in Statistics*. Springer Series in Statistics (Perspectives in Statistics). New York: Springer
- Sutrisno, L. (2015). *FKIP UNTAN mencari model pembelajaran di abad ke-21*. <http://fkip.untan.ac.id/p-fkip-untan-mencari-model-pembelajaran-di-abad-ke21.html>, diakses 10 Desember 2015
- Syaifudin Azwar. (2013). *Reliabilitas dan validitas (4<sup>nd</sup> Edition)*. Yogyakarta: Pustaka Pelajar
- Tan, O. S., Liu, W.C., Low, E. L. (2017). *Teacher education futures: Innovating policy, curriculum and practices*. In Tan, O. S., Liu, W.C., Low, E. L. (Eds). *Teacher education in the 21st century*. Singapore: Springer Nature Singapore Pte Ltd
- Taggart, G., Ridley, K., Rudd, P., & Benefield, P. (2005). *Thinking skills in the early years: a literature review*. London: NFER/Nelson.
- Tal, T., & Kedmi, Y. (2006). Teaching socioscientific issues: Classroom culture and students' performances. *Cultural Studies of Science Education*, 1(4), 615-644. DOI: 10.1007/s11422-006-9026-9
- Tashakkori, A., & Teddlie, C. (2010). *Mixed Methodologi (Mengkombinasikan Pendekatan Kualitas dan Kuantitas)*. Pustaka Pelajar, Yogyakarta. 2010
- Teare, B. (2005). *Effective resources for able & talented children*. New York: Continuum International Publishing Group
- (2006). *Problem-solving and thinking skills resources for able and talented children*. London: Continuum International Publishing Group
- Tearle, P., Dillon, P., & Davis, N. (1999). Use of information technology by English university teacher: Development and trends at the time of the  
*commit to user*



national inquiry into higher education. *Journal of Futher and Higher Education*, 23 (1), 5-15. DOI: 10.1080/0309877990230101

The Learning Curve. (2014). *Index - Which countries have the best schools?* <http://thelearningcurve.pearson.com/index/index-ranking>. diakses 5 januari 2016

Tim Pengampu Mata Kuliah Biologi Umum FKIP UNTAN. (2007). *Silabus Biologi Umum*. Pontianak: FKIP UNTAN. Tidak Diterbitkan

TIMSS. 2011. *TIMSS 2011 International results in science*. Boston: TIMSS & PIRLS International Study Center, Lynch School of Education

Tofade, T., Elsner, J., & Haines, T. S. (2013). Best practice strategies for effective use of questions as a teaching tool. *American Journal of Pharmaceutical Education*, 77(7), 1-9. DOI: 10.5688/ajpe777155

Trilling, B., & Fadel, C. (2009). *21st Century skills: learning for life in our times*. San Fransisco: Josey-Bass

Tsui, L. (2001). Faculty attitudes and the development of students' critical thinking. *The Journal of General Education*, 50(1), 1-28. DOI: 10.2307/27797860

Tsaparlis G., & Zoller U., (2003). Evaluation of higher-versus lower-order cognitive skills-type examinations in chemistry: Implications for university in-class assessment and examinations. *University Chemistry Education*. 7, 50-57. DOI: 10.1007/BF02463036

Undang-Undang Republik Indonesia No 20 Tahun 2003 Tentang Sistem Pendidikan Nasional. Bab 1 Pasal 1 Ayat 20 [Online]. [www.inherent-dikti.net/files/sisdiknas.pdf](http://www.inherent-dikti.net/files/sisdiknas.pdf). diakses 10 Maret 2014

Undang-Undang Republik Indonesia Tentang Perlindungan dan Pengelolaan Lingkungan Hidup. [www.dpr.go.id/dokjdi/document/uu/UU\\_2009\\_32.pdf](http://www.dpr.go.id/dokjdi/document/uu/UU_2009_32.pdf). diakses 11 November 2015

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

Vyjayaratnam, P. (2012). Developing higher order thinking skills and team commitment via group problem solving: A bridge to the real world. *Procedia - Social and Behavioral Sciences*, 66, 53-63. DOI: 10.1016/j.sbspro.2012.11.247

- Wahyudi. (2014). Catatan akhir tahun Indonesia, negara biodiversity yang rentan kehilangan satwa dilindungi. <http://www.mongabay.co.id>
- Ward, T., Smith, S., & Finke, R. (1999). *Creative cognition*. In R. Sternberg (Ed.), *Handbook of creativity*. New York: Cambridge University Press.
- Warner, R. M. (2012). *Applied statistics: From bivariate through multivariate techniques* (2<sup>nd</sup> edition). Washington DC: Sage Publications
- Wasserman, S. (2010). *Effective Classroom Discussions*. <http://www.ascd.org/publications/educational-leadership.aspx> diakses 9 september 2015
- Whiteley, T. R. (2006). Using the socratic method and bloom's taxonomy of the cognitive domain to enhance online discussion, critical thinking, and student learning, *Developments in Business Simulation and Experiential Learning*, 33, 65-70. <https://journals.tdl.org/absel/index.php/absel/article/viewFile/499/468>
- Whittington, M. S. (1995). Higher order thinking opportunities provided by professors in college of agriculture classrooms. *Journal of Agricultural Education*, 36 (4), 32-38. DOI: 10.5032/jae.1995.04032
- Whittington, M. S., & McCormick, D. F. (1998). *Cognitive level of academic challenges provided to college students*. Paper presented at the Annual Meeting of the American Vocational Education Research Association.
- Woolfolk, A. (2009). *Educational psychology: Active learning edition* (10<sup>th</sup> Edition). diterjemahkan oleh Helly P Soetjipto dan Sri M Soetjipto. *Psikologi pendidikan: Pembelajaran aktif*. Yogyakarta: Pustaka Pelajar
- Yang, Y. F. (2005). Student views concerning evidence and the expert in reasoning a socio-scientific issue and personal epistemology. *Educational Studies*, 31(1), 65–84. DOI: 10.1080/0305569042000310976
- Yee, M., et al. (2015). Disparity of learning styles and higher order thinking skills among technical students. *Procedia-Social and Behavioral Sciences*. 204, 143 – 152. DOI: 10.1016/j.sbspro.2015.08.127
- Zeidler, D.L., & Nichols, B. H. (2009). Socioscientific issues: Theory and practice. *Journal of Elementary Science Education*, 21(2), 49-58. DOI: 10.1007/bf03173684
- Zeidler, D. L., Sadler, T. D., Applebaum, S., & Callahan, B. E. (2009). Advancing reflective judgment through socioscientific issues. *Journal of Research in Science Teaching*, 46(1), 74-101. DOI: 10.1002/tea.20281

- Zohar, A., Degani, A., & Vaaknin, E. (2001). Teachers' beliefs about low-achieving students and higher order thinking. *Teaching and Teacher Education*, 17, 469-485. DOI: 10.1016/s0742-051x(01)00007-5
- Zohar, A. (2004). *Higher order thinking in science classroom: Students' learning and teachers' professional development*. UK: Springer-Science + Business Media B.V
- Zohar, A., & Nemet, F. (2002). Fostering students' knowledge and argumentation skills through dilemmas in human genetics. *Journal of Research in Science Teaching*, 39(1), 35-62. DOI: 10.1002/tea.10008
- (2013). Challenges in wide scale implementation efforts to foster higher order thinking (HOT) in science education across a whole school system. *Thinking Skills and Creativity*, 10, 233-249. DOI: 10.1016/j.tsc.2013.06.002
- Zoller, U., & Pushkin, D. (2007). Matching higher-order cognitive skills (HOCS) promotion goals with problem-based laboratory practice in a freshman organic chemistry course. *Chemistry Education Research and Practice*, 8 (2), 153-171. DOI: 10.1039/B6RP90028C