DAFTAR PUSTAKA

Abdurahman. (2010). *The role of quantum physics multiple representations to enhance concept matter of generic science skills, and critical thinking disposition for pre-service physics teacher students.* Disertasi Doktor Pada FPS Universitas Pendidikan Indonesia: Tidak diterbitkan.

American Association for the Advance of Science. (2011). AAAS *Project 2061 Science Assessment*. tersedia di http://assessment.aaas.org/

Adadan, E. (2009).Impact of multi-representational instruction on high school students' conceptual understandings of the particulate nature of matter. *Journal of Research in Science Teaching. 31(13) 1743-1775.*

Anderson, T.R., & Rogan, J.M. (2010). Bridging the educational research-teaching practice gap: Tools for evaluating the quality of assessment instrumental. *Biochemistry and Molecular Biology Education, 38(1), 51-57.*

Anderson. & Schonborn. (2013). Identifying and developing students` ability to reason with concepts and representations in biology. In D.F. Treagust and Tsui, (Eds.), *Multiple Representations in Biological Education, Models and Modelling in Science Education* 7, DOI 10.1007/978-94-007-4192-8_2 @ Springer Science + Business media B.V.

Ainsworth, S. (1999).The Function of multi representations *Computer & Education. 33(2/3*). 131-152.

Azevedo., Johnson., Chauncey., & Burkett. (2010). Self-regulated learning with Meta tutor: Advancing the sciences of learning with metacognitive tools. In M.S. Khine and Saleh (Eds), *New sciences of learning*: *Cognition, Computers and collaboration in education* (pp. 225-247), New York: Springer.

Beichner. (1994). Testing student interpretation of kinematics graphs. *American Journal of Physics*, 62 (8), 750-762.

Buckley. & Boulter. (2000). Investigating the role of representations and expressed models in building mental model. In J.K. Gilbert &Boulter (Eds), *Developing Models in Science Education* (pp. 105-122). Dodrecht, the Netherlands: Kluwer.

Campbell, N., and Reece, J. (2008). *Biology.* (8th eds). San Francisco: Pearson.

Capra. (1996). *The Web of life: A new scientific understanding of living systems*. New York: Anchor Books.

Chi, M.T.H., Siler, S.A., Jeong.H., Yamauchi,T., & Hausmann,R.G.(2001). Learning from human tutoring. *Cognitive Science, 25, 471-533.*

Chiu., & Wu., & Duit. (2009). Globalization: Science from an international perspective. *Journal of Research in Science Teaching, 48(6), 553-566.*

Clark. and Paivio. (1996). Dual coding theory and education. *Educational Pschology Review, Vol 3, No 3. pp. 149-210.*

Cuoco. (2001). *The roles of representation in school mathematics*. 2001 year book of the national council of teachers in mathematics). Reston, VA: National Council of Teachers in Mathematics.

De Jong. & van der Meij. (1998). The effect of directive self-explanation prompts to support active processing of multiple representations in a simulation-based learning Environment. *Journal of Computer Assisted learning, 411-423.*

diSessa. (2004). Meta representation: native competence and targets for instruction. *Cognition and Instruction, 22(3), 293-331*. DOI: 10.127/s1532690xci2203_2.

Dochy., Rijdt., & Dyck. (2002). Cognitive prerequisites and learning: how far have we progresses since bloom? Implications for educational practice and teaching. *Active Learning in Higher Education. Vol 3(3): 265-284. ISSN: 1469-7874. on line ISSN: 1741-2625*.

Eilam, B. & Yael, Poyas. (2010). "External representations in biochemistry". *International Journal of Science Education. 31, (2)*.

Facione dan Facione. (1994). Critical thinking disposition as a measure of competent clinical judgement: The development of the CCTDI. *Journal of Nursing Education, 33, 345-350.*

Feltovich., Spiro., & Coulson. (1989). Multiple analogies for complex concepts: Antidotes for analogy-induced misconception in advanced knowledge acquisition. In S. Vosniadou & A. Ortony (Eds), *Similarity and analogical reasoning*. Cambridge, UK: Cambridge University Press.

Galit, B. & Miriam, R. (2005).*Visualization in science education*. Dodrecht, The Nederland: Springer.

Gibb, J. (Eds) & Curtin, P. (2004). *Overview in generic skills in vocational and training.* Adelaide: National Centre for Education Research.

Gillbert. (2005). Visualization: A Metacognitif skill in science and science education. In J.K. Gilbert (Eds). *Visualization in Science Education. (*pp. 9-27*).* Dodrecht, The Nederland: Springer.

Gilbert, J. & Treagust, D. (2009). Towards a coherent model for macro, submicro and symbolic representations in chemical education. In J. K. Gilbert & Treagust (Eds.), *Models ad Modelling in Science Education: Multiple Reprsentations in Chemical Education*. Dordrecht.The Netherlands: Springer.

Gobert, J.D. (2005). A model of molecular visualization. In J.K. Gilbert (Ed.), *Visualization in science education*. Dordrecht, The Netherlands: Springer.

Griffard. (2010). Decoding of visual narratives used in university biology. Paper presented at the *National Assosiation for Researchs in Science Teaching (NARST) Annual Conference*, Philadelphia, PA.

Griffard. (2013). Deconstructing and decoding complex process diagrams in university Biology. In Treagust and Tsui (Eds). *Multiple Representations in Biological Education.* Vol.7. Dodrecht. The Netherlands:Springer.

Guyton. & Hall. (2014). Textbook of medical physiology 12th Edition. *e-book*. Elsevier.

Halverston, K.L., Pires, J.C., &Abell, S.K. (2011). Exploring the complexity of tree thinking expertise in undergraduate plant systematic course. *Science Education, 95, 794-823.*

Hegarty. (2004). Diagram in the mind and in the world: Relations between internal and external visualization. *Diagrammatic representation and inferences: Lecture notes in artificial intelligence. Vol. 2980, pp. 88-102*. Berlin, Germany: Springer.

Hegarty. (2010). Effect of knowledge and display design on comprehension of complex grapics. *Learning and Instruction, 20, (pp. 155-166).*

Hill, W.F. (2011). *Theories of Learning. Learning: A Survey of Pscychological Interpretations.* Diterjemahkan oleh M. Khozim. Bandung: Nusa Media.

Hmelo-Silver. & Pfefer. (2004). Comparing expert and novice understanding of a complex system from the perspective of structures, behaviour, and functions. *Cognitive Science, 28, 127-138.*

Hoffler. & Leutner. (2010). The influence of visual cognitive style when learning from instructional animations and static pictures. *Learning and individual Differences, 20, 479-483.* Journal homepage: www.elsvier.com/locate/lindif.

Hopper. (2011). Comparison of student engagement and in a variety of physiology courses. *How we Teach: Classroom and laboratory Research Projects*. Tersedia on line: 12 Februari 2016// https://: doi.org/10.1152/advan.00129.2015.

Hubber,P., Tytler, R., & Haslam, F. (2010). Teaching and learning about force with a representational focus: pedagogy and teacher change. *Research in Science Education, 40(1), pp.5-28.*

Hull, K. Wilson, S. Hopp, R., Schaefer, A., Jackson, J.A. (2016). Determinant of student` success in anatomy and physiology: Do Prerequisite Courses Matter? *Journal of the Human Anatomy and Physiology Society, 20(2), pp. 38-45.*

Kalyuga. (2011). Cognitive load theory: how many types of load does it really need? *Educational Psychology Review, 23, 1-19.* doi:10.1007/s10648-010-9150-7. Google Scholar, Crossref, ISI.

Kamsah, M.Z. (2004). Developing generic skills in classroom environment: engineering student's perspective.*Journal of Research in Science Teaching 20, (2).*

Kozma, R.B.& Russell, J.(1997). Multimedia and understanding: expert and novice responses to different representations of chemical phenomena. *Journal of Research in Science Teaching. 34 (9).*

Kozma, R. & Russell, J. (2005). Students becoming chemists: Developing representational competence, In J. K. Gilbert (Ed), *Visualization in science education (pp. 121-146).* Dodrecht, the Netherlands: Springer.

Krajicik. (1991). Representational competence in chemistry: A comparison between students with different levels of understanding of basic chemical concepts and chemical representations. In J. Hiong Sim & Sarojin Daniel. (Eds.). *Cogent Education,* 1 (99). Tersedia di http://dx.doi.org/10.1080/2331186x.2014.991180.

Large. (1996). Computer animation in an instructional environment. *Library and Information Science Research, 18(1), 3-23.*

Lengkana. (2015). Peran kemampuan representasi dalam meningkatkan keterampilan generik sains. Makalah disajikan pada *Seminar Nasional Pendidikan MIPA* Universitas Lampung, Lampung 2015.

Lengkana. (2017). The preference of multiple representation on biological concept : Identification and quality constructed representation**.** Paper presented in *SHIELD 2nd seminar,* Lampung University, Lampung, Indonesia.

Liliasari. (2007). Scientific concept and generic science skill relationship in the 21th century science education. Makalah Kunci pada *Seminar Internasional Pendidikan IPA ke-1 SPs UPI,* Bandung 27 Oktober 2007.

Lohse, G., Walker, N., Biolsi, K., & Rureter, H.(1991). Classifying graphical information. *Behaviour & Information Technology.* 10(5), helm. 419-436.

Maheady, L., Michielli-Pendl., Harper, G. F., & Mallete, B. (2006). The effects of numbered heads together with and without an incentive package on the science test performance of a diverse group of sixth graders. *Journal of Behavioural Education. 15: 24.* Di akses dari: *https://link.springer.com/article/.*

Marzano, R.J. & Kendall, J.S. (2008). *Designing & assessing educational objectives*. Thousand Oaks California: Corwin Press.

Mayer, R.E. & Galtini, J.K. (1990). When is an ilustration worth ten thousand words? *Journal of Educational Psychology, 82*, 715-726.

Mayer, R.E. (2003). The promise of multimedia learning: Using the same instructional design methods across different media. *Journal of Learning and instruction, 13 (2)*.

Mayer, R.E. & Massa, J.L.(2003). Three facets of visual and verbal learners: Cognitive ability, cognitive style and learning preference. *Journal of Educational Psychology, 95(4), hal. 833-846.*

Michael, J. & Modell, H.I. (2003). Active learning in the interactive classroom: A working model of helping to learn. *Advance Physiology Education. 17(5).*

Michael, J. (2006). Where's the evidence that active learning works? *Advance Physiology Education. 30, 159-167.*

Nitz., Sandra., & Ainsworth. (2014). Do student perceptions teaching predict the development of representational competence and biological knowledge? *Learning and Instruction*, 31. (pp.13-22). ISSN 0959-4752.

NRC, (1996).*A new biology for the 21st century*. Washington, DC: National Academic Press.

Paley,W. (2008). Sophisticated visual techniques for ease and clarity. In G. Stapleton, J. Howse, & J. Lee (Eds.) *Diagrammatic representations and interference* (Vol. 5223, pp. (2-3). Berlin, Germany: Springer.

Perrin. (1969). Handbook of research for educational communications and technology: A theory of multiple-image communications. In Jonassen, D. and Driscoll, M. (Eds.) *AV Communication Review*. 17(4), 368-382.

Pozzer. & Roth. (2003). Prevalence, structure, and functions of photographs in high school biology texbooks. *Journal of Research in Science Teaching*, *40(10*). 1089-1114.

Pozzer-Ardenghi, L. & Roth.(2005). Photograph in lectures: Gestures as meaning-making resources. .*Linguistics and Education*, 15, 275-293.

Prain,V., & Waldrip.(2006). An exploratory study of teachers' and students' use of multi-modal representations of concepts in primary science. *International Journal of Science Education.* 28 (15).

Rahman, T. (2008). Program pembelajaran praktikum yang meningkatkan keterampilan generik dan pemahaman konsep Fisiologi Tumbuhan. *Disertasi*. FPS UPI Bandung: tidak diterbitkan.

Rapp. & Kurby. (2008). The "ins" and "outs" of learning: Internal representations and internal visualizations. In J. K. Gilbert, M. Reiner, & Nakhlekh (Eds.). *Visualization: Theory and Practice in Science Education* (pp. 29-52). Dordrecht, The Netherlands: Springer.

Roth. & Ardenghi. (2003). Prevalence, function, and structure of photographs in high school biology textbooks. *Journal of Research in Science Teaching, 40(2), pp. 39-53*.

Roth. & Ardenghi. (2005). Photographs in lectures: Gestures as meaning-making resources. *Linguistics and Education 15, pp. 275-293. doi: 10.1016/j.linged.2005.01.001*

Rybarczyk. (2011). Visual literacy in biology: A comparison of visual representations in textbooks and journal articles. *Journal of College Science Teaching, 41 (1), 106-114*.

Rutherford, F. J. & Alghren A. (1990). *Science for all Americans*. Oxford: Oxford University Press, Inc.

Sadoski., Paivio., & Goetz. (1991). A dual coding view of vocabulary learning. *Reading and Writing Quarterly 21(3), 221-238*.

Salomon. & Perkins. (1989). Rocky roads to transfer: Rethinking mechanism of a neglegted phenomenon. *Educational Psychologist, 24(2), 113-142*.

Schonborn. & Anderson. (2008). Identifying and developing students ability to reason with concepts and representation in biology. In Tregust, D.F; Tsui, C.Y , (Eds.) *Multiple Representations in Biological Education*. 2013. 8, 390 p.

Schornborn, K.J. & Anderson, T.R. (2009). A Model of factors determining students' ability to interpret external representations in Biochemistry. *International Journal of Science Education.31, (2), 193-232*.

Schornborn, K.J. & Anderson. (2010). Bridging the educational research teaching practice gap: Foundations for assessing and developing biochemistry students` visual liteacy. *Biochemistry and Molecular Biology Education, 38(5*), 347-354.

Schornborn, K.J. & Bogeholtz, S. (2009). Knowledge transfer in biology and translation across external representations: Expert`s view and challenges for learning. *International Journal of Science and Mathematics Education, 7,931-955*.

Scheiter., Wiefe., & Holsanova.(2008). Theoritical and instructional aspects of learning with visualizations. In R Zheng (Eds.). *Cognitive Effects of Multimedia Learning* (pp.67-88). Hershey, PA: IGI Global.

Seufert,T. (2003). Supporting coherence formation in learning from multiple representation *Learning and Instruction*, 13(2), 227-237.

Sherwood. (2016).Human physiology: From cells to systems. 9th (Ed). ISBN-13: 978-1285866932, ISBN-10:1285866932.

Solso, R.L., Otto, H., Maclin., & Kimberly, Maclin. (2008). *Psikologi Kognitif.* Jakarta: Penerbit Erlangga.

Stieff, M. , Hegarty, M., & Deslongchamps, G. (2011). Identifying representational competence with multi-representational displays. *Cognition andInstruction, 29*(1), 123-145.

Sudarmin. (2007). Pengembangan model pembelajaran kimia organik dan keterampilan generik (MPKOG)) bagi calon guru kimia. *Disertasi* Doktor pada FPS UPI Bandung: tidak diterbitkan.

Sugiyono. (2007). Metode penelitian pendidikan kuantitatif, kualitatif dan R&D. Bandung: Alfabeta.

Sweller. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science, 12,* 257-285.

Tortora. (2016). *Principles of Anatomy and Physiology, 14th Edition*. Free Download-Foxe-Book. tersedia di http://sco.it/7fYJTF.

Treagust, D.F. (2000). A typology of school science models. *International Journal of Science Education*, 22(9), 1011-1026.

Treagust, D.F. (2008). The role of multiple representations in learning science: Enhancing students' conceptual understanding and motivation. *Lee, J. & A.L Tan (Eds), Science Education at the Nexus of Theory and Practices*.

Treagust, D.F. & Chitleborough. (2007).The modelling ability of non-major chemistry students and their understanding of the submicroscopic level. *Chemistry Education Research and Practice.* 8.

Tsui, C.Y. & Treagust, D.F. (2003). Genetics reasoning with multiple external representations. *Reasearch in science Education. 21*.

Tsui, C.Y. & Treagust, D.F. (2013). A theoretical model for interpreting learning with MERs in Biology. J.K Gilbert (Eds) *Multiple Representations in Biological Education*. Dodrecht:Springer.

Tufte. (1997). *Visual Explanations*. Chesire, CT: Graphic Press.

Tversky. (2002). Animation: Can it facilitate? *International Journal of Human Computer Studies*, 57, 247-262.

Tversky., Zacks, Lee., & Heisser. (2000). Lines, blobs, crosses and arrows: diagrammatic communication with schematic figures. *Theory and Application of Diagrams Proceedings*, 1889, 221-230.

Van Heuvelen. & Zou. (2000). The effect of multiple internal representations on context-rich instruction. *American Journal of Physics*. Di akses dari http://doi.org/10.1119/1.1286662 69(2), 184-194.

Waldrip, B.G. & Prain. (2006). Learning junior secondary science through multi-modal representations". *Electronic Journal of Science Education.52, (1).*

Waldrip., Prain., dan Carolan. (2010). Using multi-modal representations to improve learning in junior secondary science. *Research in Science Education, 40(1), 65-80*.

Waldrip, B., Hubber, P., Prain, V., Tytler, R. (Eds.) (2013). *Constructing representations to learn in Science*. Netherland : Sense Publishers.

Wahono, W. (2006). Tinjauan tentang keterampilan generik.[online]. Di akses dari :www.scribd.com/doc/74648874/Tinjauan-Tentang-Keterampilan_Generik-Sains

Weiss. & Parsley. (2004). What is high-quality instruction? *Educational Leadership, 61(5), 24-28.*

Wileman. (1993). Visual literacy in teaching and learning: A literature perspective. in stokes S. (Eds.) *Electronic Journal for the Integration of Technology in Education, 1(1), pp. 10-19.*

Winston. (2010). Prediction and prevention of failure: An early intervention to assist at-risk medical students. *Medical Teacher. 36, pp. 25-31.ISSN 0142-159X prints /ISSN 1466-187X online/14/10025-7. DOI: 10.3109/0142159X2013.835270.*

Woolgar, (1990). Scientific representation and science learning. In Corrado Matta, (Eds.) *Open Review of Educational Research, 1:1, 211-231. DOI: 10.1080/23265507.2014.989900.*

Yarden. & Yarden. (2011). Learning using dynamic and static visualizations: Students` comprehension, prior knowledge and conceptual status of a biotechnological method. *Research in Science Education*. 40, 375-402.

Yohanes Surya (2007). Sederhana dan Kompleks. Di akses dari: www.yohanessurya.com›AsyikFisika_07.