

**PEMETAAN KONSEP dan *THINKING ALOUD PAIR PROBLEM SOLVING*
(TAPPS) HIDROLISIS GARAM UNTUK MENINGKATKAN
KETERAMPILAN BERPIKIR KRITIS PESERTA DIDIK SMA**

TESIS

Diajukan untuk memenuhi sebagian syarat untuk memperoleh
gelar Magister Pendidikan Kimia



OLEH :

DILLA MULYA PRATIWI

NIM. 1603147

PROGRAM STUDI PENDIDIKAN KIMIA
SEKOLAH PASCASARJANA
UNIVERSITAS PENDIDIKAN INDONESIA

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Oleh
Dilla Mulya Pratiwi

S.Pd Universitas Sebelas Maret, 2015

Sebuah Tesis yang diajukan untuk memenuhi salah satu syarat memperoleh gelar
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Dilla Mulya Pratwi

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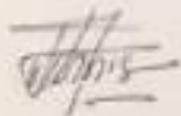
Pembimbing I,



Dr. Hernani, M.Si.

NIP. 196711091991012001

Pembimbing II,

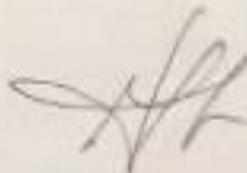


Dr. FM. Titin Supriyanti, M.Si.

NIP. 195810141986012001

Mengetahui,

Ketua Program Studi Magister Pendidikan Kimia



Dr. Hendrawan, M.Si.

NIP. 196309111989011001

ABSTRAK

Penelitian ini bertujuan untuk mengembangkan keterampilan berpikir kritis siswa pada materi hidrolisis garam melalui penerapan pembelajaran *Thinking Aloud Pair Problem Solving* (TAPPS) dan Pemetaan Konsep. Metode penelitian ini adalah *quasi experiment*, dengan desain *pretest-posttest nonequivalent control group*. Subjek penelitian adalah 52 siswa dari salah satu SMA di kota Tasikmalaya Jawa Barat, terdiri atas 28 siswa di kelas eksperimen I yang menggunakan model pembelajaran TAPPS dan 24 siswa di kelas eksperimen II yang menggunakan model pembelajaran pemetaan konsep. Instrumen penelitian ini terdiri atas soal tes uraian, serta lembar observasi. Hasil penelitian menunjukkan bahwa keterlaksanaan keseluruhan tahapan model pembelajaran TAPPS dan model pemetaan konsep dikategorikan baik. Model pembelajaran TAPPS dan pemetaan konsep mampu meningkatkan penguasaan materi peserta didik pada kelas TAPPS yaitu $\langle g \rangle 0,71$ sedangkan pada kelas pemetaan konsep $\langle g \rangle 0,38$. Subkonsep yang sangat dikuasai peserta didik ialah hidrolisis anion ($\langle g \rangle 0,88$) pada kelas TAPPS, sedangkan subkonsep yang kurang dikuasai peserta didik ialah hidrolisis total ($\langle g \rangle 0,08$) pada kelas pemetaan konsep. Penerapan model pembelajaran TAPPS dan model pembelajaran pemetaan konsep meningkatkan KBK peserta didik ($\langle g \rangle 0,62$) pada kedua kelas eksperimen, namun dengan peningkatan indikator yang berbeda, yaitu bertanya dan menjawab ($\langle g \rangle 0,97$), menganalisis argumen $0,87$ ($\langle g \rangle 0,97$), pada kelas TAPPS sedangkan pada kelas pemetaan konsep indikator menganalisis argument ($\langle g \rangle 0,54$). Terdapat hubungan yang kuat antara penguasaan materi dan KBK siswa setelah pembelajaran TAPPS dan pemetaan konsep ($r=0,703$).

Kata Kunci : keterampilan berpikir kritis, TAAPS, pemetaan konsep, hidrolisis garam.

ABSTRACT

This study aims to develop students' critical thinking skills on salt hydrolysis material through the application of Thinking Aloud Pair Problem Solving (TAPPS) learning and Concept Mapping. This research method is a quasi experiment, with a pretest-posttest nonequivalent control group design. The research subjects were 52 students from one of the high schools in the city of Tasikmalaya, West Java, consisting of 28 students in the experimental class I who used the TAPPS learning model and 24 students in the experimental class II who used the concept mapping learning model. The instrument of this study consisted of a test item description, as well as an observation sheet. The results showed that the overall implementation of the stages of the TAPPS learning model and the concept mapping model were categorized as good. The TAPPS learning model and concept mapping are able to increase students' mastery of the material in the TAPPS class that is $<g> 0,71$ while in the concept mapping class $<g> 0,38$. The sub concept that is highly controlled by students is hydrolysis of anions ($<g> 0,88$) in the TAPPS class, while the subconcept that is less controlled by students is total hydrolysis ($<g> 0,08$) in the concept mapping class. The application of the TAPPS learning model and the concept mapping learning model increased the critical thinking skills of students ($<g>0,62$) in the two experimental classes, but with an increase in different indicators, namely asking questions and answering ($<g>0,97$), analyzing the arguments ($<g>0,8$) in the TAPPS class while in class mapping concept indicators analyze the argument ($<g> 0,54$). There is a strong relationship between mastery of the material and CBC students after TAPPS learning and concept mapping ($r = 0,703$).

Keywords: critical thinking skills, TAPPS, mapping concept, salt hidrolisis matter.

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DAFTAR PUSTAKA

- Aguiar, J. G., & Correia, P. R. M. (2016). *Using concept maps as instructional materials to foster the understanding of the atomic model and matter–energy interaction. Chemistry Education Research and Practice*, 17(4), 756–765. <https://doi.org/10.1039/c6rp00069j>
- Bassham, G., Irwin, W., Nardone, H., & Wallace, J.M. (2011). *Critical Thinking A Student's Introduction*. Fourth Edition. New York: McGraw-Hill.
- Cottrell, S. (2005). *Critical Thinking Skills: Developing Effective Analysis and Argument*. New York: Palgrave MacMillan.
- Croasdell DT, Freeman LA, Urbaczewski A. *Concept Maps for Teaching and Assessment. Commun Assoc Inf Syst.* 2003;12:396-405. doi:10.17705/1cais.01224
- Croasdell. (2003). *Concept maps for Teaching and Assesment*.
- Egbo JJ. *Effect of Concept Mapping Method of Instruction and Expository Method on Students' Academic Achievement in Chemistry. Mediterr J Soc Sci.* 2014;5(26):80-84. doi:10.5901/mjss.2014.v5n26p80
- Ennis, R. (2000). *An Outline of Goals for Critical Thinking Thinking Curriculum and Its Assesment*. [Online]. Tersedia. www.criticalthinking.net
- Ennis, R.,(1985). *Goal for Critical Thinking Curriculum, Developing Minds; A Resource Book for Teaching Thinking*, Virginia : ASDC.
- Ennis, R.,(1993),*Critical Thinking Assessment; Theory into Practice*, Harvard.
- Felder RM, Brent R. (1994). *Cooperative Learning in Technical Courses: Procedures, Pitfalls and Payoffs. Reproduction.* 1994;377038(2):1-26.
- Gilbert, J. K., & Treagust, D. F. (2009). *Models and Modeling in Science Education: Multiple Representations in Chemical Education (Volume 4)*. Scotland: Springer. <https://doi.org/10.1007/978-1-4020-8872-8> Library
- Halliday, D. Dan Resnick, R., (1986). *Fisika Jilid 2. Edisi Ketiga*. Jakarta: Penerbit Erlangga.
- Halpern, D. F. (1998). *Teaching Critical Thinking for Transfer Across Domains Dispositions, Skills, Structure Training, and Metacognitive Monitoring. American Psychologist.* 53(10), 449-455.

- Johnstone, A H. (1991). Why is science difficult to learn? Things are seldom what they seem. *Journal of Computer Assisted Learning*, 7, 75–83.
- Kani, N. H. A., & Shahrill, M. (2015). Applying the thinking aloud pair problem solving strategy in mathematics lessons. *Asian Journal of Management Sciences and Education*, 4(2), 20–28.
- Kani, Nekmahtul H A& Masitah S., (2015), Applying the thinking aloud pair problem solving strategy in mathematics lessons asian, 4(2), p. 20-28.
- Kettler, T. (2014). Critical Thinking Skills Among School Students: Comparing Identified Gifted and General Education Student Performance. *National Association for Gifted Children*, 58(2), hlm. 127-136.
- King, F.J., Goodson, L., & Rohani, F. (1998). *Higher Order Thinking Skills: Definition, Teaching Strategies, Assessment*. [Online]. Diakses dari http://www.cala.fsu.edu/files/higher_order_thinking_skills.pdf.
- Larkin, J. H. (1977). What kind of knowledge transfers? In L. B. Resnick (Ed.), *Knowing, learning, and instruction: Essays in honor of Robert Glaser* (pp. 283-305). Hillsdale, NJ: Erlbaum.
- Larkin, J. H. (1977) “Skilled Problem Solving in Physics: A Hierarchical Planning Model.” Berkeley: University of California SESAME Technical Report.
- Liliasari. (2002). *Kimia 3 untuk Sekolah Menengah Umum Kelas 3*. Jakarta: Balai Pustaka.
- Liliasari. (2005). *Membangun Keterampilan Berpikir Kritis Manusia Indonesia Melalui Pendidikan Sains. Pidato Pengukuhan Guru Besar Tetap Dalam Ilmu Pendidikan IPA*. Universitas Pendidikan Indonesia.
- McClure, B. Sonak & H.K. Suen.(1999). Concept map assessment of classroom learning: reliability, validity, and logistical Practicality.*Journal OfResearch In Science Teaching*, 36(4), p.475-492.
- McMillan, J.H. (1996). *Educational Research Fundamental for the Consumer*. USA: HarperCollins College Publishers.
- Minium, E.W., King, B.M., & Bear, G. (1993).*Statistical Reasoning in Psychology amd Education*. Canada: John Wiley & Sons.
- Mistades, V. (2009).Concept mapping in introductory physics.*Journal OfEducation and Human Development*, 3(1), p.1-6.

- Moore, D.E., Goode, D.R., Seney, C.S., & Boatwright, J.M. (2016). Isothermal Titration Calorimetry Can Provide Critical Thinking Opportunities. *Journal of Chemical Education*, 93(2), hlm. 304-310.
- Murni, Susilowati. *Analisis Keterampilan Berpikir Kritis Pada Siswa MA Magetan. Seminar Pendidikan Nasional Sains*. 2017
- Nakagawa, J.J. (2003). *Spencer Kagan's Cooperative Learning Structures*.
- National Education Association. (2002). *Preparing 21st Century Students for a Global Society*. [Online]. Diakses dari <http://www.nea.org/assets/docs/A-Guide-to-Four-Cs.pdf>
- National Research Council. (2006). *America's Lab Report: Investigations in High School Science*. Committee on High School Science Laboratories: Role and Vision, S.R. Singer, M.L. Hilton, and H.A. Schweingruber, Editors. Board on Science Education, Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.
- Noh, T., Jeon, K., & Huffman, D. (2005). The Effects of Thinking Aloud Pair Problem Solving on High School Students' Chemistry Problem-Solving Performance and Verbal Interactions. *Journal of Chemical Education*, 82(10), 1558. <https://doi.org/10.1021/ed082p1558>
- Noh, T., Jeon, K., & Huffman, D. (2005). The Effects of Thinking Aloud Pair Problem Solving on High School Students' Chemistry Problem-Solving Performance and Verbal Interactions. *Journal of Chemical Education*, 82(10), 1558. <https://doi.org/10.1021/ed082p1558>
- Noh, T.; Jeon, K. *J. Kor. Assoc. Res. Sci. Educ.* (in Korean) 2005,17, 75–83.
- Novak and Gowin. 1985. *Learning how to learn*. Cambridge; Cambridge University Press
- Novak, J. D. & Gowin, D. B. (1984). *Learning how to learn*. New York: Cambridge University Press.
- Novak, J. D. (2010). *Learning, Creating, and Using Knowledge: Concept Maps as Facilitative Tools in Schools and Corporations*: Routledge.
- Novak, J.D & Gowin, D.B. (1984). *Learning How to Learn*. London : Cambridge University Press.

- OECD. (2013). PISA 2012 Result: What Student Know and Can Do Student Performance in Mathematics, Reading, and Science (Volume I). PISA, OECD Publishing.
- Ozdemir, A.S. (2005). Analyzing concept maps as an assessment (evaluation) tool in teaching mathematics. *Journal of Social Sciences*, 1(3), p. 141-149.
- Pate, M., & Miller, G. (2011). Effects of Think–Aloud Pair Problem Solving on Secondary–Level Students’ Performance in Career and Technical Education Courses. *Journal of Agricultural Education*, 52(1), 120–131. <https://doi.org/10.5032/jae.2011.01120>
- Paul, R. & Elder, L. (2008). The Miniature Guide to Critical Thinking Concept and Tools. [Online]. Diakses dari <http://www.criticalthinking.org>
- Peraturan Menteri Pendidikan dan Kebudayaan.(2016). *Implementasi Kurikulum*. Jakarta: Depdikbud.
- Permendikbud. (2013). *Implementasi Kurikulum*. Jakarta: Depdikbud.
- Peterson, R. F., Treagust, D. F., and Garnett, P. (1989). "Development and application of adiagnostic instrument to evaluate grade-11 and -12 students' concepts of covalentbonding and structure following a course of instruction." *J. Res. Sci. Teach.*, 26(4), 301-314
- Petrucci, R.H., Herring, F.G., Madura, J.D., & Bissonnette, C. (2010). *General Chemistry Principles and Modern Applications 10 Ed*. Toronto: Pearson Canada.
- Qing, Z., Jing, G., & Yan, W. (2011). Promoting Preservice Teachers’ Critical Thinking Skills by Inquiry-Based Chemical Experiment. *Procedia Social and Behavioral Sciences*, 2, hlm. 4597-4603.
- Riduwan. (2010). *Skala Pengukuran Variabel–Variabel Penelitian*. Bandung : Alfabeta.
- Rumansyah. Yudha Irhasyuarna, (2001) Penerapan Metode Latihan Berstruktur dalam Meningkatkan Pemahaman Siswa terhadap Konsep Persamaan Kimia. *Jurnal Pendidikan dan Kebudayaan*,35.hlm. 172.
- Sanjaya, W. (2006). *Strategi Pembelajaran*. Jakarta: Kencana Prenada Media Group.

- Schafersman, S.D. (1991). An Introduction to Critical Thinking. [Online]. Diakses dari <http://www.freeinquiry.com/critical-thinking.html>.
- Shaarawy, H.Y. (2014). The Effect of Journal Writing on Students' Cognitive Critical Thinking Skills A Quasi-Experimental Research on an English as a Foreign Language (EFL) Undergraduate Classroom in Egypt. *International Journal of Higher Education*, 3(4), hlm. 120-128.
- Silberberg, M.S. (2007). *Principles of General Chemistry*. New York: McGraw-Hill.
- Stensvold, M. S., & Wilson, J. T. (1990). The Interaction of Verbal Ability with Concept Mapping in Learning from a Chemistry Laboratory Activity. *Science Education*, 74(1983), 473–480.
- Subhani, Armin. (2011). *Pengertian Thinking Aloud Pair Problem Solving, Keuntungan & Karakteristik*. Gramedia.
- Sudijono, Anas. 2005. *Pengantar Evaluasi Pendidikan*. Jakarta: Paja Grafindo Persada.
- Sulistyowati, T, Utomo, B.S., & Yamtinah, S. (2014). Implementasi Learning Cycle 5e Dilengkapi Worksheet untuk Meningkatkan Kreativitas dan Prestasi
- Sunarya, Yayan. (2009). *Mudah dan Aktif Belajar Kimia 2*. Bandung: Departemen Pendidikan Nasional.
- Taber, K. (2002). *Chemical Misconception: Prevention, Diagnosis, and Cure* (Volume 1). London: Royal Society of Chemistry.
- Temel, Senar. (2014). The effects of problem-based learning on pre-service teachers' critical thinking dispositions and perceptions of problem-solving ability. *South African Journal of Education*, 34(1), p. 1-20.
- Valdes, A.V., Lomoljo, A., Dumrang, S.P., & Didatar, M.M. (2015). Developing Critical Thinking through Activity-Based and Cooperative Learning Approach in Teaching High School Chemistry. *International Journal of Social Science and Humanity*, 5(1), hlm. 139-141.
- Widuri, S. Y. S., Almash, L., & Zuzano, F. (2018). Application of Learning Engineering Techniques Thinking Aloud Pair Problem Solving in Learning Mathematics Students Class VII SMPN 15 Padang. *IOP Conference Series*:

Materials Science and Engineering, 335(1). <https://doi.org/10.1088/1757-899X/335/1/012126>

Widuri, S. Y. S., Almash, L., & Zuzano, F. (2018). Application of Learning Engineering Techniques Thinking Aloud Pair Problem Solving in Learning Mathematics Students Class VII SMPN 15 Padang. *IOP Conference Series: Materials Science and Engineering*, 335(1). <https://doi.org/10.1088/1757-899X/335/1/012126>

Wiersma, W., & Jurs, S.G. (2009). *Research Methods in Education*. United State of America: Pearson.

Zhou, Q., Huang, Q., & Tian, H. (2013). Developing Students' Critical Thinking Skills by Task-Based Learning in Chemistry Experiment Teaching. *Scientific Research*, 12(4), hlm. 40-45.

Zielinski, T.J. (2004). Critical Thinking in Chemistry Using Symbolic Math Documents. *Journal of Chemical Education*, 81(10), hlm. 1533-1534