

## Research Article

## Metacognitive awareness of commuter and resident students of Islamic high school in biology learning

Afifah Putri Sari <sup>a,1</sup>, Puguh Karyanto <sup>a,2,\*</sup>, A. Ashadi <sup>a,3</sup><sup>a</sup> Magister of Science Education, Faculty of Teacher Training and Education, Universitas Negeri Sebelas Maret, Jl. Ir. Sutami 36 A, Surakarta, Central Java, 57727, Indonesia<sup>1</sup> afifahputrisari30@gmail.com; <sup>2</sup> puguhkaryanto@staff.uns.ac.id \*; <sup>3</sup> ashadiuns2014@gmail.com

\* Corresponding author

## ARTICLE INFO

## ABSTRACT

## Article history

Received April 18, 2019  
Revised November 20, 2019  
Accepted February 24, 2020  
Published March 31, 2020

## Keywords

Commuter students  
Islamic high school  
Metacognitive awareness  
Resident students

There have been several studies which focus on metacognitive awareness (MA) of senior high school students done. However, the factors influence MA have not been widely revealed. Thus, this research aimed at distinguishing the MA between the commuter and resident students' of Islamic High School in biology learning. The subject of this quantitative research was divided into two groups (commuter and resident students). The sample unit in this study consisted of three boarding schools i.e. Al-Abidin Bilingual Resident School, Al-Islam 1 Senior High School, and Majelis Taqlim Al-Quran Senior High School that were selected by purposive sampling. The participants in this study were 88 students of grade X (40 commuters and 48 residents) which were taught in the same class. The data were collected using the survey method. Metacognitive Awareness Inventory (MAI) was used to obtain the data of the students' MA. The data were analyzed using independent samples t-test. The results indicated that there was a significant difference between commuter and resident students' MA ( $p = 0.027$ ). In addition, the commuter students performed better MA on biology learning than resident students.



Copyright © 2020, Sari et al

This is an open access article under the CC-BY-SA license



*How to cite:* Sari, A. P., Karyanto, P., & Ashadi, A. (2020). Metacognitive awareness of commuter and resident students of Islamic High School in biology learning. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 6(1), 25-30. doi: <https://doi.org/10.22219/jpbi.v6i1.8257>

## INTRODUCTION

The development of 21<sup>st</sup>-century learning emphasizes the importance of the correlation between learning innovation and the attainment of the skills that modern students must possess (Glaze, 2018; Reeve, 2016; Scott, 2015). The research focus of the educational experts always leads to the achievement of these essential skills (Miharja, Hindun, & Fauzi, 2019; Siswati & Corebima, 2017a; Veenman, Hesselink, Sleenwaegen, Liem, & Van Haaren, 2014). Metacognition, one of the essential skills of the 21<sup>st</sup>-century, has been widely studied in various countries, both in developed and developing countries (Akyol, Sungur, & Tekkaya, 2010; McComas et al., 2018). Moreover, metacognitive research is also carried out at various levels of education, i.e. primary (Tzohar-Rozen & Kramarski, 2014), secondary (Naimnule & Corebima, 2018), and higher education (Panchu, Bahuleyan, Seethalakshmi, & Thomas, 2016). Researchers believe that metacognition is the essential factors responsible for learning success (Adnan & Bahri, 2018; Ayazgök & Aslan, 2014; Dwyer, Hogan, & Stewart, 2014). Thus, the identification and development of metacognitive skills need to be continuously developed.

The development of metacognitive skills is based on various factors (Arslan, 2015; Goh & Hu, 2014; Jagals & Walt, 2016). These factors are indicated to be closely related to the development of students' metacognition skills such as self-awareness (Kallio, Virta, & Kallio, 2018; Okoza, Aluede, & Owens-Sogolo, 2013), learning that activates thinking skills (Bensley & Spero, 2014; Dwyer et al., 2014; Miharja et al., 2019), to a conducive learning environment (Tzohar-Rozen & Kramarski, 2014). Metacognition that is constantly sharpened through activities carried out routinely has a significant impact on improving metacognitive skills (Jagals & Walt, 2016). The routine gradually strengthens the students' self-regulation so that they are able to control the activities they do (Kruit, Oostdam, Berg, & Schuitema, 2018; Panchu et al., 2016).

The environment, according to some experts, plays a significant role in the development of students' metacognition skills (Aurah, 2013; Gul & Shehzad, 2012; Lee et al., 2011). Students who grow up in a conducive environment have a psychological environment that is adaptive to the development of metacognition (Kisa & Stein, 2015; Muwonge, Schiefele, & Ssenyonga, 2017). Interestingly, the student learning environment is not limited to where students get knowledge but also to where students live. According to the concept of lifelong learning, wherever students are in a learning environment due to interactions between them. Interestingly, in Indonesia, the student's living environment is not only at home but also in a dormitory for students studying at an Islamic boarding school.

Research on developing skills and metacognitive awareness (MA) focuses a lot on the work that can be done in classroom learning (Aurah, 2013; Bensley & Spero, 2014; Goh & Hu, 2014; Okoza et al., 2013). Earlier studies showed that modern Islamic school has gained the interest of many researchers around the world to uncover history and the student's activity and outcomes, such as modern Islamic school in Singapore & Britain (Tan, 2011), Victoria (Hassen, 2013), Bangladesh (Asadullah, 2016), and North America (Memon, 2011). However, it does not explicitly distinguish how MA develops based on different learning environments. This research aimed at distinguishing the MA between the commuter and resident students' of Islamic High School in biology learning.

## METHOD

This research was quantitative research. The focus of this research is the students' MA. The research was conducted at a modern Islamic school in Surakarta. The commuter and resident students in each school taught in the same classroom. The unit samples were Al Abidin Bilingual Boarding School, Senior High School of Al Islam 1, and Senior High School of Majelis Taqlim Al Quran. Purposive random sampling was used to select the participants. The sample units are schools that have dormitories, and students learn in heterogeneous classes. Samples of this research were X-6 of Al-Abidin Bilingual Boarding School, X-4 of Senior High School of Al-Islam 1, and X-5 of Senior High School of Majelis Taqlim Al Quran.

The data were collected using the Metacognitive Awareness Inventory (MAI) questionnaire developed by Schraw and Dennison (1994). The MAI instrument, consist of 52 questions, was tested to 88 students of grade X (40 commuter students; 48 resident students). The questionnaire is divided into four classification, i.e 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). The MAI is divided into two aspects namely knowledge and regulation of cognition. Knowledge of cognition aspect has three indicators such as declarative knowledge, procedural knowledge, and conditional knowledge. Regulation of cognition aspect has six indicators such as planning, information management strategies, monitoring, debugging strategies, and evaluation.

The Cronbach's alpha at the 0.05 level was used for the MAI instrument. The coefficient of Cronbach's alpha is the measurement for reliability test. The normality data was checked by using Kolmogorov-Smirnov for adequate assumption in conducting independent sample t-test to analyze the students' MA.

## RESULTS AND DISCUSSION

The results of Cronbach-alpha analysis were shown in Table 2. The obtained alpha ( $\alpha$ ) value was 0.935. It showed that the instrument was reliable and can be used in research.

Table 2. The results of reliability test of the MAI

Cronbach's Alpha	N of Items
.935	52

The significant scores for the commuter students were 0.697, and for the resident students was 0.463. It showed the data were normally distributed. After the normality test was examined, the descriptive statistic of the data was shown in Table 3. It shows that most of the students, both commuter and resident, conducted

high MA on biology learning. Moreover, the results of the independent sample t-test (Table 4) show that there were any differences in MA in both students (sig. value <0.05).

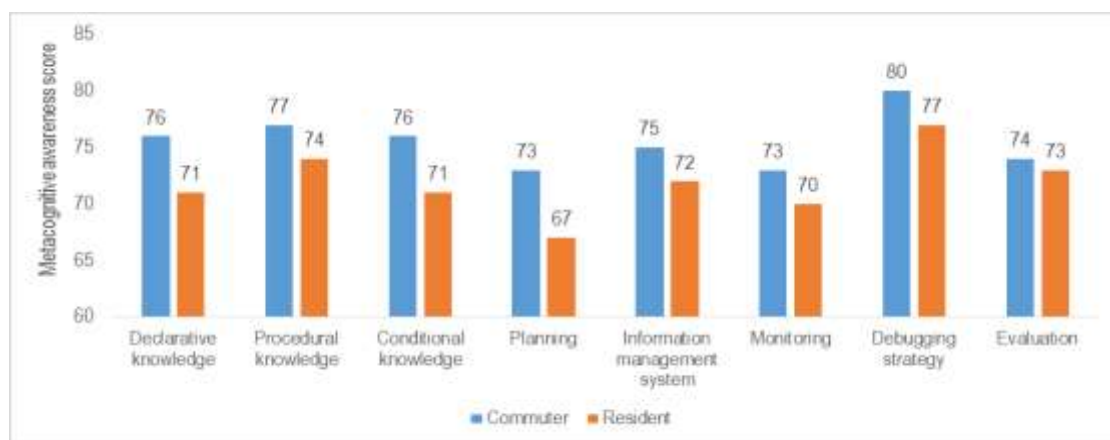
**Table 3.** Descriptive statistic of commuter and resident students

Students	M	SE	Low (%)	Moderate (%)	High (%)
Commuter	75	1.527	37.5	12.5	50.0
Resident	71	0.932	43.8	10.4	45.8

**Table 4.** The results of independent sample t-test

Statistic	F	Sig.
Values	5.064	0.027

The results in Figure 1 show that commuter students show higher MA. These results indicate the influence of different living environments on the growth of MA. On the other hand, MA of resident students was less than commuter students. This result is contrary to research (Martin et al, 2014; Ogechukwu & Chika, 2018) which says that the MA of resident students is higher.



**Figure 1.** Metacognitive awareness of the commuter and resident students

MA of resident students was less than commuter students in this research that can be explained by the different experiences of them. Students who entered the boarding for the first time face the challenge of adapting to the new environment. Resident students must overcome the challenges of independent living and adapt to new rules in the boarding. The observation in the first year of resident students achieved fewer outcomes than the commuter students (Behaghel, Chaisemartin, & Gurgand, 2017). The resident students have to overcome many challenges to adapt to the strict rules and situations which are exclusive for boarding programs. Students who are mature or experienced are predicted to be able to adapt quickly. This indicates that MA is closely related to biological age and experience (Fisher, 1998).

The results of this study contradict some researchers who claim boarding students achieve better than commuter students because boarding students are under the control of their studies (Martin et al., 2014; Ogechukwu & Chika, 2018). Resident students who can adapt and accept new environments can find effective ways of learning Living together leads the positive effect to boarding students so they can learn how to manage their studies in the under control environment of boarding. Besides, factors that affect the MA include not only learning environment as external factors (Gul & Shehzad, 2012) but also age, gender, personality, and intelligence as the internal factors (Martin et al., 2014; Siswati & Corebima, 2017b). However, the experience of commuter and boarding students varies depending on what is in each individual as a learner (Laiser & Makewa, 2016).

Besides, metacognition plays an essential role in managing the cognitive process. It means that high MA students might have a high cognitive learning outcome (Aurah, 2013). The commuter students performed a better MA than boarding students in this research might perform a better learning outcome. It can be because of their parent's support. Parent participation may be a factor that should be given attention because it affects the student's outcome (Mahuro & Hungi, 2016). The excellent family parenting conducts good motivation for children, so it affects the learning achievement (Ambarwati, 2018; Aulia & Khafid, 2018; Kaukab, 2016; Thoha & Wulandari, 2016). In addition, age maturity is also an important factor that has an impact on MA (Song & Bonk, 2016). The sample of this study is in the age range of 16-17 years, which is psychologically in a period

that requires assistance from parents or competent figures (Catalano, Hawkins, & Toumbourou, 2008). Resident students, during this period, usually require a considerable amount of time and tend to vary among individuals (Logan, Lundberg, Roth, & Walsh, 2017).

According to this result, MA's result that related the learning environment such as boarding school needs further investigation to limit other factors so the better result can be achieved. Overall, this research was conducted to reveal the MA that is needed in learning biology. Teachers, parents, and students themselves must actively participate to form an adaptive learning environment in fostering MA (Ambarwati, 2018; Pang, Lau, Seah, Cheong, & Low, 2018). Another way to get a clearer result about the difference between MA of commuter and boarding students is by conducting the observation. Observation of students verbalized in biology learning is one of the ways to conceptualize MA. This point of view leads to the common features of what really happens in students when they face such a different situation and how MA becomes an important process in daily life students (Al-Hilawani, 2018).

MA can be elaborated as a students' tool to be better understanding biology. Students with good MA perform consciously to manage their knowledge. Then, find the difficulties in learning, and it can be overcome through an effective strategy. The experience plays an important role in leading the MA of students to become ready to plan, monitor, and evaluate for high achievement in biology learning (Ben-David & Orion, 2013; Fisher, 1998; Muwonge et al., 2017).

## CONCLUSION

The finding of the study shows that the commuter students performed better MA than resident students on biology learning in Islamic modern school Surakarta. This finding contributes to the topic of MA. However, further investigations are needed to ascertain the importance of MA in the role and learning.

## REFERENCES

- Adnan, A., & Bahri, A. (2018). Beyond effective teaching: Enhancing students' metacognitive skill through guided inquiry. In *Journal of Physics: Conference Series* (Vol. 954, p. 12022). doi: <https://doi.org/10.1088/1742-6596/954/1/012022>
- Akyol, G., Sungur, S., & Tekkaya, C. (2010). The contribution of cognitive and metacognitive strategy use to students' science achievement. *Educational Research and Evaluation*, 16(1), 1–21. doi: <https://doi.org/10.1080/13803611003672348>
- Al-Hilawani, Y. A. (2018). Reflection on metacognition in real life situations: The truth is out there. *Reflective Practice*, 19(1), 135–144. doi: <https://doi.org/10.1080/14623943.2017.1379982>
- Ambarwati, W. (2018). Influence of parents attention, emotional intelligence, and learning motivation to learning outcomes. *Journal of Education, Teaching and Learning*, 3(1), 72–81. doi: <https://doi.org/10.26737/jetl.v3i1.467>
- Arslan, S. (2015). Investigating predictive role of critical thinking on metacognition with structural equation modeling. *The Malaysian Online Journal of Educational Science*, 3(2), 1–10. Retrieved from <http://ije.um.edu.my/index.php/MOJES/article/view/12690>
- Asadullah, M. N. (2016). Trust, trustworthiness, and traditional Islamic education. *Oxford Development Studies*, 44(2), 152–166. doi: <https://doi.org/10.1080/13600818.2015.1104294>
- Aulia, D. W., & Khafid, M. (2018). Role of learning discipline in mediating the influence of parent's parenting towards student's learning achievement. *Journal of Primary Education*, 7(2), 155–162. doi: <https://doi.org/10.15294/jpe.v7i2.23131>
- Aurah, C. (2013). The effects of self-efficacy beliefs and metacognition on academic performance: A mixed method study. *American Journal of Educational Research*, 1(8), 334–343. doi: <https://doi.org/10.12691/education-1-8-11>
- Ayazgök, B., & Aslan, H. (2014). The review of academic perception, level of metacognitive awareness, and reflective thinking skills of science and mathematic university students. *Procedia - Social and Behavioral Sciences*, 141, 781–790. doi: <https://doi.org/10.1016/j.sbspro.2014.05.137>
- Behaghel, L., Chaisemartin, C. de, & Gurgand, M. (2017). Ready for boarding? The effects of a boarding school for disadvantaged students. *American Economic Journal: Applied Economics*, 9(1), 140–164. doi: <https://doi.org/10.1257/app.20150090>

- Ben-David, A., & Orion, N. (2013). Teachers' voices on integrating metacognition into science education. *International Journal of Science Education*, 35(18), 3161–3193. doi: <https://doi.org/10.1080/09500693.2012.697208>
- Bensley, D. A., & Spero, R. A. (2014). Improving critical thinking skills and metacognitive monitoring through direct infusion. *Thinking Skills and Creativity*, 12, 55–68. doi: <https://doi.org/10.1016/j.tsc.2014.02.001>
- Catalano, R. F., Hawkins, D. J., & Toumbourou, J. W. (2008). Positive youth development in the united states: History, efficacy, and links to moral and character education. In *Handbook of moral and character education* (pp. 459–483). New York: Routledge. Retrieved from <http://dro.deakin.edu.au/view/DU>
- Dwyer, C. P., Hogan, M. J., & Stewart, I. (2014). An integrated critical thinking framework for the 21st century. *Thinking Skills and Creativity*, 12, 43–52. doi: <https://doi.org/10.1016/j.tsc.2013.12.004>
- Fisher, R. (1998). Thinking about thinking: Developing metacognition in children. *Early Child Development and Care*, 141(1), 1–15. doi: <https://doi.org/10.1080/0300443981410101>
- Glaze, A. (2018). Teaching and learning science in the 21st century: Challenging critical assumptions in post-secondary science. *Education Sciences*, 8(1), 12. doi: <https://doi.org/10.3390/educsci8010012>
- Goh, C. C. M., & Hu, G. (2014). Exploring the relationship between metacognitive awareness and listening performance with questionnaire data. *Language Awareness*, 23(3), 255–274. doi: <https://doi.org/10.1080/09658416.2013.769558>
- Gul, F., & Shehzad, S. (2012). Relationship between metacognition, goal orientation and academic achievement. *Procedia - Social and Behavioral Sciences*, 47, 1864–1868. doi: <https://doi.org/10.1016/j.sbspro.2012.06.914>
- Hassen, Y. (2013). Making muslims: The politics of religious identity construction and Victoria's Islamic Schools. *Islam and Christian-Muslim Relations*, 24(4), 501–517. doi: <https://doi.org/10.1080/09596410.2013.813120>
- Jagals, D., & Walt, M. Van Der. (2016). Enabling metacognitive skills for mathematics problem solving: a collective case study of metacognitive reflection and awareness. *African Journal of Research in Mathematics, Science and Technology Education*, 20(2), 154–164. doi: <https://doi.org/10.1080/18117295.2016.1192239>
- Kallio, H., Virta, K., & Kallio, M. (2018). Modelling the components of metacognitive awareness. *International Journal of Educational Psychology*, 7(2), 94–122. doi: <https://doi.org/10.17583/ijep.2018.2789>
- Kaukab, S. R. (2016). The impact of parent/family involment on student' learning outcome. *International Journal of Research Granthaalayah*, 4(10), 72–81. doi: <https://doi.org/10.5281/zenodo.164925>
- Kisa, M. T., & Stein, M. K. (2015). Learning to see teaching in new ways: *American Educational Research Journal*, 52(1), 105–136. doi: <https://doi.org/10.3102/0002831214549452>
- Kruit, P.M., Oostdam, R.J., Berg, E.V.D., & Schuitema, J. A. (2018). Assessing students' ability in performing scientific inquiry: Instruments for measuring science skills in primary education. *Research in Science & Technological Education*, 36(4), 413–439. doi: <https://doi.org/10.1080/02635143.2017.1421530>
- Laiser, S., & Makewa, L. N. (2016). The influence of boarding school to young children: A case of two boarding schools in Hai District in Kilimanjaro, Tanzania. *International Journal of Education and Research*, 4(6), 73–84. Retrieved from <https://www.ijern.com/journal/2016/June-2016/07.pdf>
- Lee, S. W. Y., Tsai, C., Wu, Y., Tsai, M., Liu, T., Hwang, F., ... Chang, C. (2011). Internet-based science learning: A review of journal publications. *International Journal of Science Education*, 33(14), 1893–1925. doi: <https://doi.org/10.1080/09500693.2010.536998>
- Logan, J. W., Lundberg, O. H., Roth, L., & Walsh, K. R. (2017). The effect of individual motivation and cognitive ability on student performance outcomes in a distance education environment. *Journal of Learning in Higher Education*, 13(1), 83. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1139727.pdf>
- Mahuro, G. M., & Hungi, N. (2016). Parental participation improves student academic achievement : A case of Iganga and Mayuge districts in Uganda. *Cogent Education*, 4, 1–12. doi: <https://doi.org/10.1080/2331186X.2016.1264170>
- Martin, A. J., Papworth, B., Ginns, P., & Liem, G. A. D. (2014). Boarding school, academic motivation and engagement, and psychological well-being. *American Educational Research Journal*, 51(5), 1007–1049. doi: <https://doi.org/10.3102/0002831214532164>
- McComas, W. F., Reiss, M. J., Dempster, E., Lee, Y. C., Olander, C., Clément, P., ... Waarlo, A. J. (2018). Considering grand challenges in biology education: Rationales and proposals for future investigations to guide instruction and enhance student understanding in the life sciences. *The American Biology Teacher*, 80(7), 483–492. doi: <https://doi.org/10.1525/abt.2018.80.7.483>

- Memon, N. (2011). What islamic school teachers want: Towards developing an islamic teacher education programme. *British Journal of Religious Education*, 33(3), 285–298. doi: <https://doi.org/10.1080/01416200.2011.595912>
- Miharja, F. J., Hindun, I., & Fauzi, A. (2019). Critical thinking, metacognitive skills, and cognitive learning outcomes: A correlation study in genetic studies. *Biosfer*, 12(2), 135–143. doi: <https://doi.org/10.21009/biosferjpb.v12n2.135-143>
- Muwonge, C. M., Schiefele, U., & Ssenyonga, J. (2017). Self-regulated learning among teacher education students: Motivational beliefs influence on the use of metacognition. *Journal of Psychology in Africa*, 27(6), 515–521. doi: <https://doi.org/10.1080/14330237.2017.1399973>
- Naimnule, L., & Corebima, A. D. (2018). The correlation between metacognitive skills and critical thinking skills toward students' process skills in biology learning. *Journal of Pedagogical Research*, 2(2), 122–134. Retrieved from <http://ijopr.com/index.php/ijopr/article/view/50/24>
- Ogechukwu, D. O. F., & Chika, N. P. (2018). Extent of academic achievement of day and boarding secondary schools students in Anambra State, Nigeria. *International Journal of Scientific Research and Management*, 6(1), 20–26. doi: <https://doi.org/10.18535/ijorm/v6i1.e103>
- Okoza, J., Aluede, O., & Owens-Sogolo, O. (2013). Assessing students' metacognitive awareness of learning strategies among secondary school students in Edo State, Nigeria. *Research in Education*, (90), 83–97. doi: <https://doi.org/10.7227/RIE.90.1.6>
- Oz, H. (2016). The importance of personality traits in students' perceptions of metacognitive awareness. In *Procedia-Social and Behavioral Sciences* (Vol. 232, pp. 655–667). doi: <https://doi.org/10.1016/j.sbspro.2016.10.090>
- Panchu, P., Bahuleyan, B., Seethalakshmi, K., & Thomas, T. (2016). Metacognitive knowledge: A tool for academic success. *International Journal of Medical Research Professionals*, 2(5), 3–6. doi: <https://doi.org/10.21276/ijmrp.2016.2.5.026>
- Pang, C., Lau, J., Seah, C. P., Cheong, L., & Low, A. (2018). Socially challenged collaborative learning of secondary school students in Singapore. *Education Sciences*, 8(24), 1–10. doi: <https://doi.org/10.3390/educsci8010024>
- Reeve, E. M. (2016). 21st century skills needed by students in technical and vocational education and training. *Asian International Journal of Social Sciences*, 16(4), 62–74. doi: <https://doi.org/10.29139/aijss.20160404>
- Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Education Psychology*, 19(4), 460–475. doi: <https://doi.org/10.1006/ceps.1994.1033>
- Scott, C. L. (2015). *The futures of learning 2: What kind of learning for the 21st century?* Retrieved from <https://unesdoc.unesco.org/ark:/48223/pf0000242996>
- Siswati, B. H., & Corebima, A. D. (2017a). Study on the correlation between metacognitive skills and concept gaining of biology at several learning models. *Asia-Pacific Forum on Science Learning and Teaching*, 18, 1–14. Retrieved from <https://eric.ed.gov/?id=EJ1160094>.
- Siswati, B. H., & Corebima, A. D. (2017b). The effect of education level and gender on students' metacognitive skills in Malang, Indonesia. *Advances in Social Sciences Research Journal*, 4(4), 163–168. doi: <https://doi.org/10.14738/assrj.44.2813>
- Song, D., & Bonk, C. J. (2016). Motivational factors in self-directed informal learning from online learning resources. *Cogent Education*, 3(1), 1–11. doi: <https://doi.org/10.1080/2331186X.2016.1205838>
- Tan, C. (2011). Where tradition and “modern” knowledge meet: Exploring two islamic schools in Singapore and Britain. *Intercultural Education*, 22(1), 55–68. doi: <https://doi.org/10.1080/14675986.2011.549645>
- Toha, I., & Wulandari, D. (2016). The effect of parents attention and learning discipline on economics learning outcomes. *Journal of Research & Method in Education*, 6(2), 100–104. doi: <https://doi.org/10.9790/7388-060201100104>
- Tzohar-Rozen, M., & Kramarski, B. (2014). Metacognition, motivation, and emotions: contribution of self-regulated learning to solving mathematical problems. *Global Education Review*, 1(4), 76–95. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1055263.pdf>
- Veenman, M. V. J., Hesselink, R. D., Smeets, S., Liem, S. I. E., & Van Haaren, M. G. P. (2014). Assessing developmental differences in metacognitive skills with computer logfiles: Gender by age interactions. *Psihologiske Teme*, 23(1), 99–113. Retrieved from <https://hrcak.srce.hr/index.php?>