Vol. 8, No. 2, pp. 117-126, 2018 DOI: 10.23960/jpp.v8.i2.201813

Jurnal Pendidikan Progresif

e-ISSN: 2550-1313 | p-ISSN: 2087-9849

http://jurnal.fkip.unila.ac.id/index.php/jpp/

Improving Chemistry Learning Outcomes for Vocational Students Using ARIAS Learning Model

Sriwidya Hotmaria Panjaitan[1], Hartono[2,*], Eddy Dharmansyah[3]

[1,2]Educational Faculty of Universitas Sriwijaya, Jl. Ogan Bukit Lama, Ilir Barat 1, Palembang

[3]SMK Negeri 4 Palembang, Jl. Sersan sani No.1019, Kemuning, Palembang

**Corresponding author*: hartonosains@yahoo.co.id

Received: 16 August 2018 *Accepted: 21 October 2018* *Published: 31 November 2018*

Abstract: Improving chemistry learning outcomes for vocational students using ARIAS learning model. Objectives: This classroom action research was carried out to investigate students' chemistry learning outcomes at vocational level through ARIAS learning model. **Methods:** The study was conducted in two cycles, each cycle consisting of two meetings. **Findings:** The mean score before the treatment (T_0) was 66.89 with learning mastery percentage of 40.54%, then the mean score increased to 76.51 after teacher applied ARIAS learning model in cycle I (T_1) with learning mastery percentage of 62.16%. The improvement of the mean score of students' cognitive learning outcomes also occurred in the last cycle. The mean score of student cognitive test result was 84.09 with learning mastery percentage of 89.19%. Students also gave positive responses of learning process. **Conclusion:** It indicated that the ARIAS learning model was proven to be able to effectively improve student learning outcomes, especially in Chemistry subjects at the vocational level.

Keywords: *Classroom action research, ARIAS learning model, chemistry learning outcomes.*

Abstrak: Meningkatkan hasil belajar kimia siswa kejuruan melalui model pembelajaran ARIAS. Tujuan: ***Tujuan:*** *Menginvestigasi hasil belajar peserta didik pada bidang kejuruan dengan menerapkan model pembelajaran ARIAS.* ***Metode****: Penelitian ini dilakukan dengan dua siklus, masing-masing siklus terdiri dari 2 pertemuan.* ***Temuan****: Rata-rata hasil belajar sebelum diberikan perlakukan (T_0) adalah sebesar 66,89 dengan persentase ketuntasan belajar sebesar 40,54%, kemudian rata-rata skor hasil belajar meningkat menjadi 76,51 setelah guru menerapkan model pembelajaran ARIAS pada siklus pertama. Peningkatan rata-rata skor hasil belajar kognitif siswa juga terjadi pada siklus terakhir. Skor rata-rata hasil tes kognitif siswa adalah 84.09 dengan persentase ketuntasan belajar sebesar 89,19%. Siswa juga memberikan respon positif terhadap proses pembelajaran.* ***Kesimpulan:*** *Model pembelajaran ARIAS terbukti dapat secara efektif meningkatkan hasil belajar siswa, terutama dalam mata pelajaran Kimia di tingkat kejuruan.*

Kata kunci*: Penelitian tindakan kelas, model pembelajaran ARIAS, hasil belajar kimia.*

To cite this article:

Panjaitan, S. H., Hartono, & Dharmansyah, E. (2018). Improving chemistry learning outcomes for vocational students using ARIAS learning model. *Jurnal Pendidikan Progresif, 8*(2), pp. 117-126. doi:10.23960/jpp.v8.i2.201813

INTRODUCTION

The learning process was a determinant of the quality of education in schools. The learning process was carried out based on the curriculum, as a guideline in the implementation of learning activities in schools. The current curriculum in Indonesia required teacher-centered to be student-centered learning (Rayens & Ellis, 2018; Gribbins & Cook, 2017), passive learning become active learning (Gordy, Jones, & Bailey, 2018; Tharayil, Borrego, Prince, Nguyen, Shekhar, Finelli, & Waters, 2018; Nissim, Shahar, Elovici, Hripcsak, & Moskovitch, 2017; Streveler & Menekse, 2017), and self-learning patterns become collaborative learning (Cur°eu, Chappin, & Jansen, 2018; Strijbos & Wichmann, 2018; Sobocinski, Malmberg, & Järvelä, 2017). The learning process is the main part to make students active, creative and had a good capability, teachers only acted as facilitators in the learning process that will develop their potential and abilities optimally (Smith, 2017; Le Ha, 2014; Suparlan 2005). Effective and efficient learning processes required a process of planning, implementation, assessment and supervision in the implementation and follow-up. The application of the learning model was also very influential on the achievement of learning outcomes. Many studies had investigated the effect of applying learning models on student learning outcomes (Wolters, Won, & Hussain, 2017; Ba° & Beyhab, 2017; Arsyad, Rahman, & Ahmar, 2017). One of learning models that could be used in this study was the ARIAS learning model (Assurance, Relevance, Interest, Assessment, Satisfaction).

Research by applying the ARIAS learning model had been conducted (Kurniawati, Hartanto, & Zamzaili, 2017; Saminan, Risa, & Hamid, 2017). However, the application of the learning model at the vocational level had not been investigated especially in chemistry subjects. Empirical findings of preliminary research related to the chemistry learning process in the vocational field showed several facts as follows: a) students emphasize vocational learning compared to general fields of study such as chemistry; b) learning was still a lecture method or still teacher-centered, so students did not understand the concept of chemistry. The students activities in the class were also less active because students were less able to communicate. During the learning process students tend to prefer practical activities compared to theoretical learning activities. Chemistry learning at the vocational level of learning outcomes showed the fact that the number of students who achieve the minimum criteria completeness was only 60% compared to the learning criteria for learning should be more than 85%. This learning requireda an alternative solution that could increase students' curiosity and self-confidence in learning.

The purpose of this study is to improve student chemistry learning outcomes at the vocational level to improve student learning outcomes. The results of this study can be useful to tutors as information about planning and implementing experiential learning models on chemistry subjects to improve student learning outcomes. The application of the ARIAS learning model is expected to have a positive impact on students' chemistry learning outcomes, as a solution to overcome learning problems to improve learning quality and school quality. In addition, it can increase the knowledge and direct experience of researchers to carry out classroom action research; and research results can be used as input and reference to conduct research related to the ARIAS learning model.

METHOD

Sample and procedure

The research design carried out was a classroom action research (CAR). Recent studies related to the use of CAR design had been carried out (Sulimah, Sulitya, & Fitri, 2018; Anggaraeni, 2018; Bass, 2018; Aidinopoulou & Sampson,

2017; Jen, 2017). This research was conducted to 37 the elevent graders of a vocational class namely TKR in Palembang, Indonesia. CAR in this research was a teacher research (Cochran-Smith and lytle 1990, 1999; zeichner 2003), teacher resembling and applying ARIAS learning model of finding out what works best in an individual's specific context to improve student learning (Mettetal 2001). This research consisted of two cycles, each cycle consists of two meetings with the stage of activity namely concrete experience, observation and reflection, abstract conceptualization and active experimentation stages. Each cycle consists of four stages, namely planning, action, observation, and reflection like in the figure 1. The place of this research was Palembang State Vocational High School from April 11th 2018 - May 09th 2018. In this study, chemistry subject teachers collaborated with researchers to apply the ARIAS learning model.

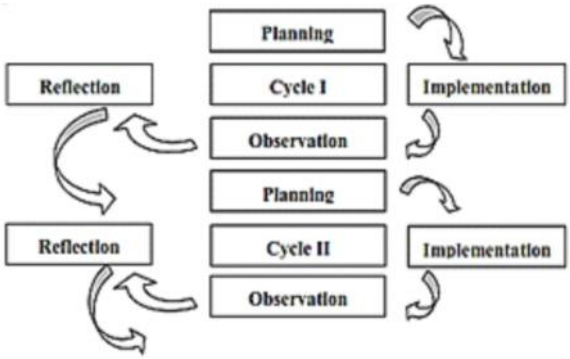

Figure 1. Modified *Cycle Design Class Action Research*

At the implementation stage in each cycle, the ARIAS learning model was applied. ARIAS learning model consisted of stages, they were 1) Self-confidence as the main capital for students before participating in learning activities, 2) Relevance as the results of learning activities, learning objectives that were relevant to the environment around make learning activities become more meaningful, 3) Interest was an important point because in learning activities with the interest of learning students will take part in learning activities as well as possible, 4) Assessment was a benchmark for teachers and students in measuring students' abilities and understanding of learning material, and 5) Satisfaction or reinforcement was feedback given from teacher to students related to students' performances, giving feedback and rewards to students who were active would give a positive influence on other students, besides that the attention given by the teacher in satisfaction makes students feel valued and have their own pride (Ku Rniawati, Hartanto, & Zamzaili, 2017). Achievement of mastery level was determined by Minimum Completion Criteria that was amounted to 75. There were two categories of learning completeness, namely individually and classically. Individual learning completeness was achieved when students obtained a minimum score of 75 and mastery learning classically it is achieved if the class is at least 85% of students get a minimum score of 75. Data of learning completeness percentage in classical and observational part were analyzed using descriptive analysis techniques. In the assessment of the test, the average value of learning outcomes is obtained by summing the values obtained by students, then divided by the number of students of the class so that the average value was obtained.

■ RESULT AND DISCUSSION

Analysis of student learning outcomes after the action was obtained from the acquisition of student learning outcomes tests given at the end of each cycle. The mean score of learning outcomes and completeness of learning was analyzed before ARIAS treatment, cycle I and cycle II. The cycle activity was held on April 12, 2018 in the eleventh graders of TKR 4 class by loading the phases of planning, implementation, observation, and reflection

1. Pre-Cycle Research

Pre-cycle activities are carried out to obtain daily test results from students on the previous topic, namely chemical equilibrium. The data obtained is the cognitive learning outcomes of students with learning completeness of 40.54% and the average cognitive learning outcomes of students is 66.89. The number of students who did not complete is 19, because in the learning process in the classroom is still teacher-centered, so there needs to be an increase in the learning process by using the ARIAS model (Assurance, Relevance, Interest, Assessment, and Satisfaction).

2. Cycle I Research

Improvement of cognitive learning outcomes of students were seen from the average learning outcomes and learning completeness of students. The results of learners' cognitive learning after the cycle 1 (T1) can be seen in Table 1.

Planning phase – The activities carried out before the implementation of the research actions are to determine cycle learning material 1. Topics of learning at the first meeting are Colloids and Colloidal Properties. The meeting of the two topics is Polymers. The next activity is to compile the RPP that is applied in the learning process in accordance with the ARIAS learning model, compile teaching materials, student worksheet, compile the observation sheet for students' activities, and compile the final evaluation test assessment instrument in cycle 1.

Tabel 1. Percentage of completeness of cognitive aspects of students in cycle 1 (T1)

Indicators of Competence Achievement	Cognitive Level	Learning Mastery Percentage	
		Complete (%)	Not complete (%)
Explain the meaning of solution, suspension, and colloid.	C1	78.38	21.62
Characterize solution, suspension, and colloid.	C2	75.68	24.32
Analyze colloidal systems.	C4	35.14	64.86
Analyze colloidal properties.	C4	62.16	37.84
Analyze the role of colloids in life based on their properties.	C4	59.46	40.54

Based on data analysis conducted on the results of observations of learning during the two meetings in cycle 1 it was found that the average student learning outcomes were 76.51. The concepts presented in cycle 1 are to explain the definition of solution, suspension, and colloid, characterizing between solution, suspension and colloid, analyzing colloidal systems, analyzing colloidal properties, and analyzing the role of colloids in life based on their properties. Students are able to analyze the properties of colloids and the role of colloids that are shown to be> 70% complete. However, students have not been able to analyze the colloidal system, which is indicated by the percentage of learning completeness in classical <50%. This is because students have difficulty distinguishing colloidal systems.

Treatment phase - The first meeting was held on April 19, 2018 studying the topic of colloids. The second meeting was held on April 26, 2018 studying the topic of the properties of colloids. The learning steps were carried out in accordance with the RPP that had been prepared. The observation phase carried out during the learning process takes place through the application of experiential learning models. At this stage the

observer observes the activities of the students during the learning process and records the results on the observation sheet. The following are observations made in the first cycle, namely 1) in the Assurance stage the teacher performs apperception and the students are involved in relating the colloidal system material about the difference in solution, colloid and suspension; 2) In the Relevance stage the students further understand the learning objectives to be achieved. the teacher gives student worksheet of learning materials; 3) In the Interest stage, students work on the student worksheet and discuss in groups. The teacher guides students in groups; 4) In the assessment phase, students do percentages between groups; 5) In the stage of satisfaction, students provide conclusions about the colloidal system and the properties of colloid then the teacher provides reinforcement related to the material that has been studied, students carry out evaluation tests as a final test cycle.

Reflection phase- At this stage an analysis of the achievement of learning outcomes and the self-confidence of the students is carried out, identifying the weaknesses of the actions given from the first cycle at the first and second meetings. Based on data analysis conducted on the results of observations of learning during the two meetings in cycle 1 it was found that the average student learning outcomes were 76.51. The percentage of learning completeness obtained is 62.16%, which means that the classical completeness has not been achieved, it is necessary to do corrective actions in the learning process in the next cycle. In the first cycle there were 13 students who achieved the learning standard because these students still did not follow the teacher's instructions in the learning process with the ARIAS model. Improved cognitive learning outcomes of students from before the treatment of learning model to cycle 1 was 15.47%. Learning completeness of students in the first cycle has not reached the classical completeness criteria of e"85%. The results of observations and reflections obtained learning weaknesses in the first cycle of which are some groups that do not discuss the stage of interest, so that students have difficulty communicating the results of their group discussions in front of the class. In addition, another weakness is that the teacher must appoint students to convey the results of the discussion at the assessment stage because no students raise their hands to communicate the concepts obtained. The weakness of learning in cycle 1 is used as a benchmark for preparing a follow-up plan for cycle 2. Follow-up planned for cycle 2 is that the teacher varies the learning process, the teacher instructs the students to discuss the interest stage, the teacher gives instructions to write the results of the discussion at the assessment stage in the column already available at the student worksheet then randomly selected students deliver it in front of the class.

2. Cycle II Research

Improved cognitive learning outcomes of students are seen from the average learning outcomes and learning completeness of students. The results of learners' cognitive learning after cycle 2 (T2) can be seen in Table 2.

Based on the data analysis conducted on the results of learning observations during the two meetings in cycle 1 it was known that the average student learning outcomes were 84.09. The concepts presented in cycle 1 were describing the classification of polymers based on their origin, describing the classification of polymers based on the monomer type, describing polymer classification based on the nature of heat, describes the type of polymer based on origin, monomer, and resistance to heat, able to determine the cause and effect of the use of plastic. Table 4 shows that the learning completeness of students in each indicator of competency achievement> 70%. Students have been able to analyze the reaction in sorting and determining the causes and consequences of plastic use in cycle 2 which showed students' mastery learning> 70%.

Tabel 2. Percentage of completeness of cognitive aspects of students in cycle 2 (T_2)

Indicators of Competence Achievement	Cognitive Level	Learning Mastery Percentage	
		Complete (%)	Not complete (%)
Decipher polymer classification based on origin.	C2	94.59	5.41
Decipher polymer classification based on the type of monomer.	C2	91.89	8.11
Describe polymer classification based on the nature of heat.	C2	83.78	16.22
Sort polymers based on their origin, monomers, and heat resistance.	C3	89.19	10.81
Determine the cause and effect of using plastic.	C3	86.49	13.51

Planning phase - The activities carried out before the implementation of the research actions are to determine cycle learning material 2. Topics of learning at the first meeting are polymers. The meeting of the two topics is various polymers and plastic waste handlers. The next activity is to compile the RPP that is applied in the learning process in accordance with the ARIAS learning model to compile teaching materials, student worksheet, compile the observation sheet for the activities of students, and compile the instrument for the final evaluation test on cycle 2.

Treatment phase - The first meeting was held on April 26th 2018 to study the topic of polymer principles. The second meeting was held on May 3th 2018 studying the topics of various polymers and handling of plastic waste. The learning steps were carried out in accordance with the lesson plan that had been prepared. The observation phase carried out during the learning process takes place through the application of experiential learning models. At this stage the observer observes the activities of the students during the learning process and records the results on the observation sheet. The following are the results of observations made in the second cycle, namely 1) In the assurance stage, students observe the picture given by the teacher showing a picture of the material which is an example of polymer; 2) In the Relevance stage students will then understand the learning objectives to be achieved. the teacher gives students student worksheets and teaching materials; 3) in the interest stage, students work on student worksheets and drawings for discussion in groups. The teacher guides students in groups; 4) In the assessment phase, students do percentages between groups. At this stage the students have mastered; 5) In the Satisfaction stage, students provide conclusions about the colloidal system and the properties of colloid then the teacher provides reinforcement related to the material that has been studied, students carry out evaluation tests as a final test cycle. In the final activity the students conclude the learning outcomes, then the teacher gives further action, namely learning about the types of polymers and handling plastic waste.

Reflection phase – Reflection activities in the second cycle are carried out based on the results of observations. After analyzing the data on the results of observations during learning, look for weaknesses and strengths after doing improvements in the previous cycle. Obtain learning outcomes data in cycle II learning. Learning outcomes in the second cycle obtained student learning outcomes with an average learning outcome of 84.09 with a percentage of

learning completeness of 89.19%, namely 33 students. The completeness of classical student learning outcomes in the second cycle has reached 85%. From the results of this reflection, it was concluded that this study was completed because students 'chemistry learning outcomes, namely the students' cognitive learning completeness had reached 89.19%, more than 85% had experienced a significant increase. The second cycle was carried out by implementing a learning implementation plan that had been prepared in accordance with corrective actions in cycle 1. The learning outcomes of students in the cycle had an average of 84.09 with learning completeness of 89.19%. Based on these data, it can be seen that students' learning progress from cycle 1 to cycle 2 was 14.21%. Learning completeness of students in this second cycle has achieved classical completeness criteria of e"85% so that the study was stopped. Based on observation data, the results showed that the improvement of action in cycle 1 was carried out well in cycle 2, as evidenced by the observation that students discussed the interest stage in the student worksheet and completed it before gathering. in addition, at the assessment stage each group has written the results of the discussion in the student worksheet. The weakness of the learning process in cycle 2 is that there are some students chatting outside the topic of learning so that the teacher admonishes and reminds students to return to their work so that learning is carried out properly.

2. Overall Cycle Research

The completeness of learning outcomes and the average value of learning outcomes of students in each cycle has increased. This shows an increase in student learning outcomes. The completeness of cognitive learning outcomes before action (T0) was 40.54%, increasing to 62.16% in cycle 1 (T1) and becoming 89.19% in cycle 2 (T2). Learning completeness in cycle 2 has achieved classical learning completeness, namely e"85% of students reach KKM. Increased completeness and average cognitive learning outcomes of students can be seen in Figure 1.

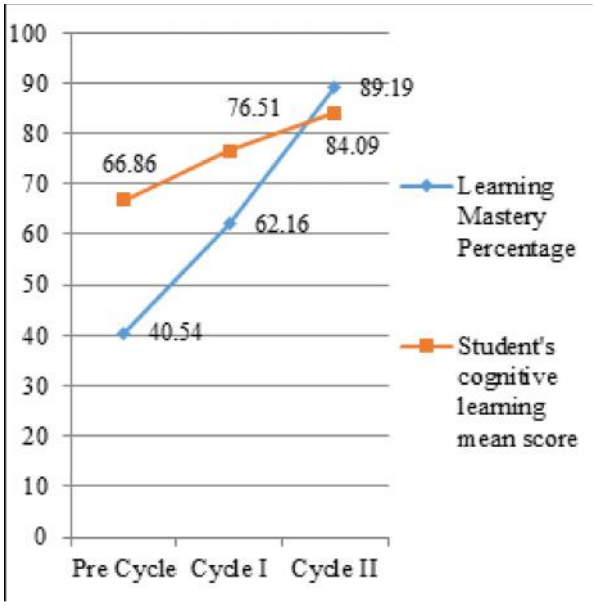

Figure 1. Cognitive Learning Outcomes

Figure 1 illustrated that through the application of the ARIAS learning model it can improve students' chemistry learning outcomes at the vocational level. These results are in line with the research by Nurhayati (2014) which leads to the conclusion that using the ARIAS model students' chemistry learning outcomes increase. Based on in-depth interviews with students, they suggested that their success in understanding a learning material was largely influenced by their self-confidence that they could certainly learn it. The results of Husna's (2011) research suggest ideas that are in line that increase students' cognitive learning outcomes in line with their self-confidence in students. ARIAS learning model can improve student learning outcomes, especially Chemistry because the teacher managed to build students' confidence in the assurance stage, the teacher managed to

build relationships and communication between teachers and students at the stage of relevance, students were successfully guided to discuss learning and present the results of stage interest discussions , and students can conclude learning shows good student response and satisfaction in students in the satisfaction stage. The activities shown by students are also positive, namely reading or seeking information, listening to teacher explanations, discussing or group collaboration, expressing opinions to teachers or friends, asking questions, and answering questions has increased and student responses to ARIAS learning models also show a positive response . This means that ARIAS Learning Model is effective in improving student learning outcomes in chemical material.

■ CONCLUSION

The research that has been carried out refers to the conclusion that the cognitive learning outcomes of students by applying the ARIAS learning model in the vocational field have increased between before and after the action. The score of pre-cycle learning outcomes (T0) was 66.89 with minimum completeness criteria (KKM) 75, and completeness of student learning outcomes 40.54%. After using the ARIAS learning model, the score of student learning outcomes in the first cycle (T1) increased to 76.51 with the completeness of student learning outcomes by 62.16%. The cognitive learning outcomes of students in the second cycle also experienced an increase with the application of the ARIAS learning model. The learning outcomes score in the second cycle (T2) became 84.09 with the completeness of student learning outcomes increased to 89.19%. Overall the results of the study indicate that the ARIAS learning model has the potential to improve student learning outcomes in the vocational field

■ REFERENCES

Aidinopoulou, V., & Sampson, D. G. (2017). An action research study from implementing the flipped classroom model in primary school history teaching and learning. *Journal of Educational Technology & Society*, *20*(1), 237.

Anggraeni, A. D. (2018). Metode Role Playing dalam Pembelajaran Profesi Kependidikan. *Jurnal Pendidikan Progresif*, *8*(1), 29-35.

Arsyad, N., Rahman, A., & Ahmar, A. S. (2017). Developing a self-learning model based on open-ended questions to increase the students' creativity in calculus. *Global Journal of Engineering Education*, *9*(2), 143-147.

Ba°, G., & Beyhab, Ö. (2017). Effects of multiple intelligences supported project-based learning on students € @ m achievement levels and attitudes towards English lesson. *International Electronic Journal of Elementary Education*, *2*(3), 365-386.

Bass, B. (2018). Action Research Study of Classical Teaching Methods vs. Active Learning Methods in the Middle School Social Studies Classroom. *Culminating Experience Action Research Projects, Volume 18, Part 2, Spring 2016*, 26.

Cochran-Smith, M., and S. l. lytle. (1990). "Research on Teaching and Teacher Research: The Issues That Divide." Educational Researcher 19 (2): 2–11.

Cochran-Smith, M., and S. l. lytle. (1999). "The Teacher Research Movement: A Decade later." Educational Researcher28 (7): 15–25.

Cur°eu, P. L., Chappin, M. M., & Jansen, R. J. (2018). Gender diversity and motivation in collaborative learning groups: the mediating role of group discussion quality.

Social Psychology of Education, *21*(2), 289-302.

Daryanto.2011. *Penelitian Tindakan Kelas dan Penelitian Tindakan Sekolah Beserta Contoh-Contohnya*. Yogyakarta: Gava Media

Gordy, X. Z., Jones, E. M., & Bailey, J. H. (2018). Technological Innovation or Educational Evolution? A Multi-disciplinary Qualitative Inquiry into Active Learning Classrooms. *Journal of the Scholarship of Teaching and Learning*, *18*(2), 1-23.

Gribbins, M., & Cook, V. (2017, May). Workshop: Emerging Technologies and Practices that Promote Student-Centered Learning. In *Proceedings of the Twelfth Midwest Association for Information Systems Conference (MWAIS), Springfield, Illinois*.

Husna. (2012). Pengaruh Penerapan Model Pembelajaran ARIAS disertai Tugas AwalTerhadap Belajar Fisika Siswa Kelas XI IPA SMAN 8 Padang. Jurnal Pelangi 3(2) : 1-14.

Jen, A. (2017). *Improving Eight Graders'integrated Students Reading-Speaking Skill Based On The 2013 Curriculum.(A Classroom Action Research Conducted at Second Grade of SMP N 1 Sedayu)* (Doctoral dissertation, Universitas Mercu Buana Yogyakarta).

Kunandar.2013. *Langkah Mudah Penelitian Tindakan Kelas Sebagai Pengembangan Profesi Guru.Jakarta: PT RajaGrafindo Persada.*

Kurniawati, E., Hartanto, H., & Zamzaili, Z. (2017). Pengaruh Model Pembelajaran Assurance, Relevance, Interest, Assesment, Satisfaction (Arias) Integratif dan Kemampuan awal Dalam Meningkatkan Pemahaman Konsep dan Pemecahan Masalah Matematika Siswa Sekolah Menengah Pertama di Kepahiang. *Jurnal Pendidikan Matematika Raflesia*, *2*(2).

Kusumah,Wijaya dan Dedi Dwitagama. 2012. *Mengenal Penelitian Tindakan Kelas*. Jakarta: *PT.Indeks.*

Le Ha, P. (2014). The politics of naming: Critiquing "learner-centred" and "teacher as facilitator" in English language and humanities classrooms. *Asia-Pacific Journal of Teacher Education*, *42*(4), 392-405.

Mettetal, G. (2001). "The What, Why and How of Classroom Action Research." Journal of Scholarship of Teaching and Learning, 2 (1): 6–13.

Nissim, N., Shahar, Y., Elovici, Y., Hripcsak, G., & Moskovitch, R. (2017). Inter-labeler and intra-labeler variability of condition severity classification models using active and passive learning methods. *Artificial intelligence in medicine*, *81*, 12-32.

Nurhayati.(2014). Pengaruh Strategi Genius Learning Melalui Model Pembelajaran ARIAS (Assurance, relevance, Interest, Assesmen, and Satisfaction) Terhadap Hasil Belajar Siswa. Jurnal Nalar Pendidikan 3(1) : 72-78.

Pangujuanto, Teguh., Trirahmidi.(2009). *KIMIA 3 Untuk kelas XII SMA/MA*. Jakarta: Pusat Perbukuan

Permendikbud.2013. *Materi Pelatihan Guru Implementasi Kurukulum 2013*. Jakarta: Badan Pengembangan Sumber Daya Manusia Pendidikan dan Kebudayaan dan Penjaminan Mutu Pendidikan.

Rayens, W., & Ellis, A. (2018). Creating a Student-Centered Learning Environment Online. *Journal of Statistics Education*, *26*(2), 92-102.

Saminan, S., Risa, N., & Hamid, T. (2017). Implementation of ARIAS Learning Model Integrated With Constructivist Theory to Improve Student Learning Outcomes. *Jurnal Ilmiah Peuradeun*, *5*(2), 213-224.

Smith, K. (2017). The Facilitator Perspective: The Decisions and Actions That Strategise Teacher Self-Directed Learning. In *Teachers as Self-directed Learners* (pp. 119-126). Springer, Singapore.

Sobocinski, M., Malmberg, J., & Järvelä, S. (2017). Exploring temporal sequences of regulatory phases and associated interactions in low- and high-challenge collaborative learning sessions. *Metacognition and Learning*, *12*(2), 275-294.

Streveler, R. A., & Menekse, M. (2017). Taking a closer look at active learning. *Journal of Engineering Education*, *106*(2), 186-190.

Strijbos, J. W., & Wichmann, A. (2018). Promoting learning by leveraging the collaborative nature of formative peer assessment with instructional scaffolds. *European Journal of Psychology of Education*, *33*(1), 1-9.

Sulimah, S., Sulitya, D., & Fitri, S. (2018). Improving Students' Learning Achievement Through Think, Talk, and Write (TTW) Learning Mode. *Jurnal Pendidikan Progresif*, *8*(1), 10-17.

Suparlan. 2004. *Guru Efektif*. Yogyakarta: Hikayat Publishing.

Tharayil, S., Borrego, M., Prince, M., Nguyen, K. A., Shekhar, P., Finelli, C. J., & Waters, C. (2018). Strategies to mitigate student resistance to active learning. *International Journal of STEM Education*, *5*(1), 7.

Wolters, C. A., Won, S., & Hussain, M. (2017). Examining the relations of time management and procrastination within a model of self-regulated learning. *Metacognition and Learning*, *12*(3), 381-399.