JPII 6 (1) (2017) 153-164

Jurnal Pendidikan IPA Indonesia

http://journal.unnes.ac.id/index.php/jpii

META-ANALYSIS OF JELAJAH ALAM SEKITAR (JAS) APPROACH IMPLEMENTATION IN LEARNING PROCESS

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DOI: 10.15294/jpii.v6i1.8490

Accepted: January 17th 2017. Approved: February 21th 2017. Published: 30th April 2017

ABSTRACT

The results of tracer studies on the approach of Jelajah Alam Sekitar (JAS) or environment exploring learning has been detected is used in eight provinces in Indonesia and studied in the learning begin primary school to college. Then, how the effectiveness of the implementation of the JAS approach in improving the learning process. This study uses meta-analysis-data in the form of descriptive exploratory qualitative. Data was taken from the various thesis, and research faculty in the last 10 years. Data analysis was performed by calculating the percentage of the same findings for similar problems. The results showed a wide range of studies using different methods and approach such as qualitative descriptive, quasi-experimental, PTK and R and D to produce evidence that the approach JAS effective when applied in teaching, especially teaching biology in a variety of teaching materials. Various studies have shown the approach JAS managed to increase learning outcomes, can differentiate learning outcomes between treatment and control groups in which the treatment group had a mean score higher. Models/strategies/methods centered learning students are very relevant to implementation approach JAS making it seem more real, like a model of cooperative learning, think pair share, strategy role-playing, the investigation group, learning cycle 5e, hands-on activity, and so on, making it possible to continuously assessed and developed in the paradigm of competency-based curriculum developed.

Keywords: JAS; environment exploring learning approach; learning process; meta-analyses

INTRODUCTION

Biology as a science is different with another science knowledge. The uniqueness of biology is that the objects are living creature. Thus, it can be concluded that biology has its characteristics. Biology as a part of science pointing in giving direct experience to develop the competence so the students can explore the nature scientifically, a kind of learning that combine science process experience and science product understanding.

Biology Department of FMIPA UNNES has developed Jelajah Alam Sekitar (JAS) Learning Approach since 2005. Ridlo (2005) have done tracer towards JAS implementation, which shows since 2006 to 2016, JAS has been spread in eight provinces in Indonesia although most of it are in Central Java especially in Semarang. JAS has been researched to be used in the learning process from elementary school to university. JAS approach also tracked as the most examined using quantitative research with pre and quasi-experiment design. After that, the tracer will be interesting if a meta-analysis is done to know the effectiveness of JAS usage in the learning process.

JAS learning approach can be defined as an approach that uses the student's nature environment, whether the physical, social, technology, or culture environment as the learning object in biology whose phenomena can be learned

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through scientific work (Marianti & Kartijono 2005). Learning by using JAS approach can use the environment to outdoor learning, and the effects of environment care behavior have been conducted by Amini (2015). The result of the research shows that classical completeness is getting better and the nature care behavior is in an excellent category.

The result of tracer study either documentary or online by Ridlo et al., (2016), JAS approach has been implemented in a few lessons in Indonesia. A brief description of the result of JAS implementation research from 2005 to 2016 will be explained below.

The research of JAS approach implementation in many subjects has been done. Riyanto, et al. (2005) have implementing JAS approach in Micro Teaching subject. The result shows that the increase of the variation of approaches, strategies, and learning methods that being chosen by the students in conducting Learning Plan. Micro Teaching practice also held in outdoor instead of indoor only by using the environment as the learning source.

JAS approach implementation combined with role playing method in ecosystem subject in Pondok Pesantren Modern Selamat Kendal (Ngabekti et.al., 2015). This research began with the problem of most students being sleepy in almost every subject. The activities in the Islamic boarding school that began from 04.00-21.00 is the main cause of this problem. With JAS approach implementation that combined with role playing method, there is no more sleepy student in class. The usage of the boarding school's environment as the learning source in JAS approach also increase the activity and learning result of the students.

JAS approach implementation in a Biostatic subject has been done by Budiyanto & Ngabekti (2007). The result of the research shows the increase of motivation and learning result. Around 78% of the students get their score in B, AB, and A category while the rest are C and BC. According to the researches above, it can be stated that JAS approach with its six characteristics affecting the activity, motivation, and the result positively.

Sugiyo, et al.,(2008). Team Game Tournament (TGT) learning model by using Jelajah Alam Sekitar (JAS) approach accompanied with Portfolio scoring in Koloid System main discussion can increase the study result of the eleventh-grade students in their second semester in MA Al-Asror Semarang with the percentage of completeness of 97,37%. The average score for the students psychomotor is taken from the demonstration score that has been done by the students, which is 71.58; while the average score of student's discussion is 76.20. The activity of the students increased because of the treatment (demonstration, discussion, and tournament). The percentage of the activity of the students in the first cycle is 70.13%, in the second cycle is 72.70% and in the third cycle is 75.20%. These means the students are getting more active and happy to learn chemistry.

Auliaty, (2015), in the research that uses a grass field as the learning source in living creature component and environment subject by implementing Group Investigation learning model and Jelajah Alam Sekitar (JAS) approach in SDN Pulogebang 08 Pagi, can increase the student's study completeness. Sari, et al. (2012) stated that the usage of education tour garden of UNNES as the learning source in living creature classification subject by implementing JAS approach could optimize the activity and the study result of the students of SMP Teuku Umar.

Widana (2014) reported that the implementation of JAS approach to the seventh-grade students in SMP Banyuglugur could increase the classical completeness from 78.78% to 100%. Fadllia (2012) get the result that study journal making in JAS approach affected the student's study result in Ecosystem material in SMA Negeri 1 Kaliwungu, whether in cognitive, affective, or psychomotor. The result of the analysis of t-test statistic achieved the sig score = 0.005 < 0.05. It means there is a difference in the cognitive score between the experiment and control class.

Wahyuni (2012) came to a conclusion that learning implementation in digestive system material with JAS approach affected positively towards mastering the science process skill of the students in SMAN 12 Semarang. The result of biserial correlation test analysis shows the coefficient of biserial correlation r_b as many as 0.31 and the determination coefficient as many as 10%. Significance test result of r_b calculated by t-test, resulting in t count > t table which is 4.68 > 1.993. The percentage of the study result in experiment class > study result of control class (100% > 57%). 97% of the students give very good responses and good toward the implementation of JAS approach in learning digestive system material towards mastering science process skill. The teacher gives a positive response towards the learning process.

The result of Student's Work Sheet with a Picture by (2012) shows that the study result of the students using Student's Work Sheet with a

picture with JAS approach is better than the students who used Student's Work Sheet with no picture without using JAS approach. Based on the recapitulation result of the activity of the students, it shows that the activity of the students in experiment class included in the very high category while the control class included in the middle category. Student's Work Sheet with a picture with JAS approach is suitable if implemented in environment organizing material.

The implementation of JAS approach in biotechnology material through the observation of soy sauce fermentation process in SMP Negeri 1 Blora has been done by Ristanti (2012). The result can optimize the activity and study result of the students. The average of student's activity along the learning process reached 92%. The classical completeness of the study result is 96%. From the observation of the soy sauce fermentation process, the students got the study experience so it can optimize the student's activity and study result.

JAS approach which accompanied by Problem Based Learning with The Environment as The Learning Source (Pramitasari, 2012) shows the study result of the students in experiment class is better than the control class. The analysis of student's activity observation result sheet shows the classical average score of experiment class is higher than control class.

The Effectiveness of Quantum Teaching Method Implementation in Conservation and Character Based JAS Approach also had been made by Sari (2012) in SMP N 1 Bae Kudus. The result of the student's activity analysis in experiment class is a higher classical average than the control class. The result of the character of the student's analysis which measured by behavior scale (Likert scale) is good. The result of the research can be concluded that the learning with Quantum Teaching Method in Conservation and Character Based JAS approach is effectively implemented towards the activity and study result and character building of the students.

The research of Indriasih (2013) resulted process skill in learning has a quite big impact towards the study result. Process skill towards the students in Science subject with JAS approach has a linear relation towards the student's study result. The amount of process skill in students in learning determination coefficient is 0.616. This result means the process skill affecting the study result as many as 61.6%; there are still outside effect as many as 38.4%. While Marianti et al. (2013) stated JAS approach with project-based learning can increase the student's score as many as 70% in Animal Physiology subject to A, AB, and B without any D or E score.

Ridlo & Alimah, (2013) stated that biology learning with student centering approach that specialized in JAS activity could be done using active and cooperative student learning system strategy. Those strategies are contextual learning, participative learning, and inquiry learning. Meanwhile, in the same year, Winarni (2015) stated that the study result of environment care behavior, process skill, and concept understanding aspect in the group of students that follow the science learning with JAS approach are better than the student group with expository learning. Sari et al. (2013) who combine Quantum Teaching learning with conservation and character based JAS approach is effective to be implemented to optimize the activity and study result of the students. Besides, it also is an effective way to build the student's character in the learning process.

Alimah et al. (2014), stated that Meksint Korefsi Model with JAS approach in Animal Body Structure Learning is developed into three phases which are planning, design and developing and three times of evaluation which are alpha test, beta test, and field test, deserve to be used as an alternative model choice in Animal Body Structure learning. Alimah (2014) Experiential Jelajah Alam Sekitar (EJAS) Model can use the designing learning process to increase the student's critical thinking ability strategy. The implementation of EJAS in designing the learning activity in class whether indoor or outdoor can increase the ability of student's critical, rational thinking in learning biology.

Erwan & Achyani (2014) who researched the JAS approach learning implementation with experiment method can increase the understanding of tenth-grade students in SMA Muhammadiyah 2 Metro in 2011/2012. Meanwhile, Yuanita, et al. (2014) stated that the implementation of Group Investigation method with Jas approach could optimize the activity and study result of the students in learning Life Continuance of Living Creature material in SMP Negeri 2 Brangsong. The contribution of JAS approach towards the students according to Hidayah (2014) is 41.3%.

Module development for digestive system material by Safarini (2014) shows that the scoring of module developing result pass the evaluation by the material expert, media expert, and JAS expert. Based on the trial of module usage shows that the study result of test class is higher than control class the test class is 90%, while the control class is 70%. The activity of the students shows that ≥80% of the students have the active

activity and very active level. The response of the students and the teacher towards the module are very good.

Fatimah (2015) has done the research on the class action to increase the critical thinking ability and creativity of the students in seventh grade through PBL implementation with JAS approach. The result shows that in the first cycle the learning with direct exploration caused the increase of the critical thinking ability by 74.35%. In the second cycle with indirect exploration, the creativity increased by 66.96%. This research concluded the PBL implementation with JAS approach is effective to fix the critical thinking ability and creativity of the students.

The result of a research by Pratama (2014) about the implementation JAS approach concluded: (1) development of JAS approach based module which integrated with Java culture in Earth and Moon Movement using 4D model which are definition, designing, development, and spreading, (2) the achievement of student's study result increased significantly in "Middle" category, (3) there are differences in the student's study result, before, and after the module being implemented, (4) the result of the teachers and students responses towards the learning module that being developed have a "Good" category. Meanwhile Palisoa & Wali (2010), tt. stated that JAS approach implementation resulting as many as 32 students (94,11%) had achieved their Minimum Passing Criteria.

Danis, et al. (2015), the result of their research conclude that the implementation of JAS approach resulting: 1) The average of absorption power in experiment class is 80% with good category while in control class is 74% with the good category. Based on the absorption power of the students it can be said the effectiveness of the learning in experiment class and control class are effective. 2) The study completeness of the students classically in experiment class is 84% while in control class is 62.5% stated incompletely. Classical completeness of process skill indicator in experiment class is 100% while the control class is 75%. Classical completeness of process skill indicator in experiment class is stated as complete while the control class is stated as incomplete.

The research of Ngabekti, et al. (2015) has implemented JAS approach in Animal Ecology subject. The result of the research concludes that by implementing JAS approach, the activity of exploration/discussion and the study result of the students in Animal Ecology subject are increased. The implementation of alternative assessment in JAS strategy in reproduction system material learning in senior high school which has been done by Widyastuti (2015) shows that the study result of the students in three scoring field have already fulfilled the criteria with ≥ 75% are above the determined Minimum Passing Criteria. Some students that pass the Minimum Passing Criteria in the cognitive field are 71 students, in the affective field are 68 students with good behavior while in the psychomotor field are 65 students.

Auliaty (2015) form her research conclude the study result of the students using JAS approach in ecosystem material learning in tenth grade giving a better study result in experiment class than the control class. Based on the result of recapitulation of the student's activity, it shows that the activity of the students in experiment class included in the very high category while the control class included in the middle category.

The result of the research conducted by Savitri & Sudarmin (2016) stated that the students in Integrated Science Department who attended Conservation and Local Wisdom in 2014/2015 could lead to a product from learning model with integrated JAS approach as an effort of accelerated visualization of the UNNES's vision and mission as a conservative university. Besides, the team of the lecturers in Conservation and Local Wisdom subject also capable of resulting an innovative conservation soft skill learning device with a valid JAS approach integrated with Conservation and Local Wisdom subject in Science Department in the form of learning device. The implementation of learning model with JAS approach integrated with Conservation and Local Wisdom subject in Science Department is effective in building the student's soft skill conservation behavior and action.

The result of the research of JAS approach implementation by Ardini, et al. (2016) stated, the average absorption power in experiment class is 78.4% with good category while in control class is 74.79% with the good category. Based on the absorption power of the students, it can be said that the learning in experiment and control class are effective. The study completeness of the students classically in experiment class is 88% stated as complete and in control class is 87.5% stated as complete. The completeness of competence achievement indicator in experiment class is 75%, and in control, class is 75%. Overall, the completeness of competence achievement indicator both in experiment and control class are stated as complete.

Implementation of JAS approach by Using

Biology Laboratory and UNNES's Educational Tour Garden as The Study Source of Biological Diversity Material had been done by Alvitasari (2016). Based on the psychomotor and affective aspect data analysis, experiment class gets a better result than the control class, which is 100% of the students included in A category. In the affective aspect in experiment class, 85.7% of the students are included in the very good category, and the rest are included in the good category. 98.9% of the learning process is well done. 98.3% of the responses of the students agrees with the JAS approach, while the teachers also give positive responses towards the learning process.

Based on the researches above, it is important to do a meta-analysis. Meta-analysis can be simply meant as the analysis of analysis (Merriyana, 2006). Meta-analysis is a study of some researches with a common problem and a way to make a summary of the result of a research quantitatively. Meta-analysis is used to organize and dig the information as many as possible from the given data. One of the requirements that are needed in doing meta-analysis is a study towards the results of a kind of researches. The result of the primer study analysis is used as a base to accept or support the hypothesis, reject/abort the hypothesis submitted by some researchers. Meta-analysis is used to look for the significance of treatment towards the students. For example, the effects of learning model toward student's study result and motivation. The meta-analysis also can be used for research designed not with an experiment design, like descriptive research.

METHODS

Problems or topics that will be researched have been determined to be known whether JAS approach implementation affected effectively towards student's study result. For that, the period of the research results that being used as the data source are the last 10 years from 2006 to 2016. The data gathering technique, including survey, documentation, and questionnaire. The survey was done in High School Library online. The report of the research that related to the research problems are in the form of essay, thesis, dissertation, or another report that can be collected from the library of UNNES, UPGRIS, and the internet. As many as 106 research titles have been analyzed for the suitability towards the problem that being researched. The research focused on the research methodology (type, place and time, method), and the result. The approach that been used is qualitative research in the form of descriptive explorative with critical analysis. The utilization of questionnaire through postal items and electronic were sent to the addresses of the working/domiciled alumni. All data that have been gathered through the survey, questionnaire or documentation are analyzed by using descriptive analysis technique. To know the conclusion of the qualitative research, the percentage calculation of the same findings was done for the same problem.

RESULT AND DISCUSSION

The result of Meta-analysis of JAS approach implementation

Below are the results of meta-analysis toward JAS approach implementation. The effective construct is coded into 6 indicators. The result of the meta-analysis towards the result of earlier research analysis is shown in Table 1.

Table 1. The result of Meta-analysis towards Effectiveness Construct of JAS Approach Implementation

Result of Implementation	Code	Number	Percentage (n=103)
Optimizing Activity	1	43	40,57
Optimizing study result	2	56	52,83
Optimizing skill (science process)	3	7	6,60
Effective to be used in learning	4	39	3679
Minimum Passing Criteria classically not achieved	5	1	0.94
Have not achieved base competence maximally	6	2	1.89

The effectiveness of JAS approach has been proved by 52.83% of researchers, with optimizing the study result indicator that been proved by the average result of group test achievement of the students with JAS approach are better, complete, or increased. JAS implementation also can optimize the study activity (40.57%). The meta-analysis result also shows effectiveness without detailing what is meant by effective as many as 36.79%. Overall, the meta-analysis result shows the effectiveness of JAS approach as many as 97%.

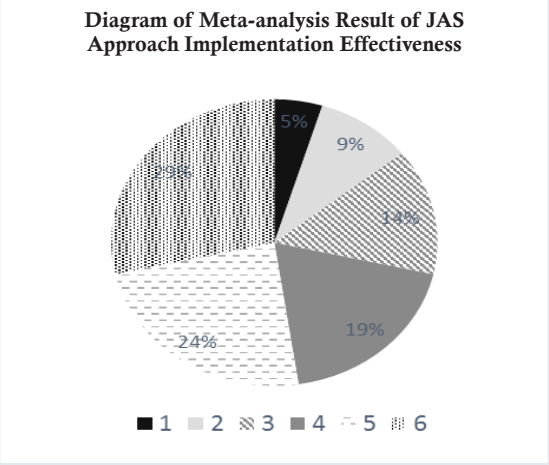

Figure 1. Shows a circle diagram of meta-analysis result of JAS approach effectiveness percentage.

The Result of JAS Approach Implementation in Learning Process Questionnaire Analysis.

Respondent's personal data can be seen in Table 2.

Table 2. Respondent's Personal Data

Question	Answer	Percentage
Gender	Male	23%
	Female	77%
Status	Married	69%
	Unmarried	23%
Last Education	S1	15%
	S2	31%
	S3	46%
	S3	46%

The meta-analysis result of JAS approach in learning questionnaire, the data were gotten are shown in Table 3.

Table 3 shows part of the JAS approach learning users sure that they have been using it, but the other part unsure whether they have used it properly or not. Most of JAS users stated that they had not done the alternative assessment when using JAS approach. Entertaining learning

Table 3. JAS Approach Implementation in Learning Process

Question	Answer	Percentage
JAS approach implementation correspond to the characteristic	Yes	54%
	Not Fully Yet	46%
The characteristic that can not be done yet is ...	(1) constructivism	38%
	(2) science process	31%
	(3) inquiry	31%
	(4) exploration of surrounding nature	38%
	(5) bioedutainment	46%
	(6) alternative assessment	54%
The reason of the undone characteristic	Hard to catch the means	8%
	Too much/too many characteristics	15%
	Not every characteristic must be done	54%
	No indicator in every characteristic	31%
	Other There is an unentertain material	8%
Repetition frequent of JAS approach implementation for research purposes	Yes 2/3 Times	31%
	Not Yet	38%
	There is a plan to do it again	46%
Aim of JAS approach implementation in learning process	Common Learning	77%
	Research	54%
	Thesis Conductance (S2)	0%
	Dissertation Conductance	8%

(edutainment) is still rarely happened. However, most of them reasoned that it is not that they do not understand about JAS but because not every characteristic of JAS should be in the learning process. But still, the research that includes Taufik et al., (2014) has done edutainment component by inserting puzzle game, crossword, and square word with Technology of Information and Communication basis. The result of the research shows a study result gain as many as 0.85 included in high category and environment care behavior as many as 93.75% included in the culture category.

To erase alL the doubts, JAS users stated their plan to do the research again. The thing that the Biology Department must appreciate is that JAS approach is not only used when there is research being conducted but also has been implemented in daily learning. JAS implementation is not free from problem and benefits, but the researcher also gives suggestions and benefits of JAS approach as shown in Table 4.

Based on Table 4 it is outlined the following things. JAS approach is effective to fix the learning process and study result and commonly stated as satisfying. The users of JAS approach are agreed that the main benefit of JAS approach is contextual and factual, fulfilling PAKEM learning requirements, and suited to learning models that have been recommended by Curriculum 2013 in elementary and middle schools. However, the users usually have some difficulties in allocating time and need more powers when applying this approach. The efforts that have been done to overcome the problems are asking the observer in exploration activity, increasing time allocation outside the determined hour, and applying self-assessment. Those findings should push Biology Department of UNNES to keep analyzing the benefits and weaknesses to conduct a guide of JAS approach implementation.

The push towards the department is not without reasons. First, some users who stated that the very high suitability of knowledge and skill would be achieved when JAS approach is being implemented. Second, information about JAS approach is still rare to be found in printed and electronic media. Third, the user's scoring toward the level of meaning that collected by implementing JAS studied from many aspects is not so high, only in a level of quite meaningful. Therefore, the users suggested that the academicians of Biology Department of UNNES committed to keep observing and publish the result in reputable journals.

Table 4. Effectiveness, Satisfaction, Benefits, Problem, Suggestion, and Benefit of JAS Approach Implementation in Learning Process

No	Question	Answer	Percentage
1	Effectiveness of JAS approach to fixing the learning process	Very Effective	31%
		Effective	54%
2	Effectiveness of JAS approach to fixing the study result	Very Effective	15%
		Effective	54%
3	Satisfaction level towards the implementation of JAS approach in learning process	Very Satisfied	15%
		Satisfied	62%
4	Satisfaction level towards the result of implementation of JAS approach in learning process	Very Satisfied	23%
		Satisfied	38%
5	Benefits from JAS approach	Very suitable with learning model which suggested by curriculum 13	54%
		Contextual and factual	100%
		Fitting the requirement of PAIKEM learning	62%
		Others	8%

6	Problem in implementing JAS approach	There is no big problem	15%
		The problem is the characteristics that have to be done	23%
		Evaluation problem	38%
		Time problem	77%
		Power problem	54%
		Others - there are no difference criteria from CTL - the need to prepare of tools, equipment, and money	31%
7	The effort to fix the problem in number 6?	Nothing can be done yet	15%
		Reducing JAS characteristic	23%
		Ask the observer in exploration activity	31%
		Increase the time allocation outside the determined hour	31%
		Implementing peer assessment	23%
		Implementing self-assessment	31%
		Others	15%
8	Data exposure of the respondent's suggestions to fix the JAS approach. JAS is an approach that still needs to be tested again about how to implement it in the learning process. Therefore, it needs some clear criteria about JAS approach that make it different from another approach so that JAS is not just the other name of CTL. For example, JAS learning characteristic in question number 2. There is an addition of inquiry and learning community. JAS approach can be well implemented if those 6 components (exploration, science process, constructivism, learning community, and authentic assessment) integrated into both indoor and outdoor learning. The academic paper about JAS needs to be perfected with the deeper scientific study including the results of research that have been done. Biology Department can provide the knowledge/special guidance that can help the teachers so they can apply JAS. Work from Biology Lecturer group of UNNES and support from FMIPA and LP2M are needed.		
9	Percentage of knowledge suitability and skill from JAS approach Implementation	> 86%	23%
		76 to 85%	38%
		61% to75%	31%
		51% to 59 %	0%
		≤ 50%	8%
10	First source of information about JAS approach	Major/Faculty	54%
		Lecturer	31%
		Electronic media	8%
		From JAS development team	15%

11	The need of English in implementing JAS approach	Highly needed	8%
		Needed	46%
		Fairly needed	15%
		Not so needed	8%
		Not needed	23%
12	The need of technology of information in JAS approach implementation	Highly needed	31%
		Needed	46%
		Not needed	15%
13	Knowledge and skill that have been gotten from JAS approach implementation follow the educational Science and Technology development	Yes	77%
		No	23%
14	The assessment about the beneficial level that you get from JAS approach implementation		
	Aspects of benefit	Beneficial level	Percentage
	The technical/practical ability in learning process	Very useful	38%
		Useful	23%
		Quite useful	31%
		Not so useful	8%
	Theoretical knowledge	Very useful	15%
		Useful	38%
		Quite useful	38%
		Not so useful	8%
		Not useful	0%
	High prestige	Very useful	38%
		Useful	15%
		Quite useful	38%
		Not so useful	8%
		Not useful	0%
	Self-esteem	Very useful	38%
		Useful	31%
		Quite useful	23%
		Not so useful	0%
		Not useful	0%
	Work achievement appraisal	Very useful	15%
		Useful	23%
		Quite useful	38%
		Not so useful	15%
		Not useful	0%

Fast career progress	Very useful	15%
	Useful	8%
	Quite useful	38%
	Not so useful	23%
	Not useful	8%
High cross field mobile ability	Very useful	15%
	Useful	15%
	Quite useful	38%
	Not so useful	23%
	Not useful	8%

15 Data exposure about the other things that the respondents have delivered related to JAS

In the last 4 years, JAS as an approach never to be touched again for getting fixed so it can be more applicative in the field. Therefore, it needs to create a deep study about the main characteristics of JAS that differentiate it from another approach, when to be applied, where, in what level, what kind of condition, what kind of students, outlined about the plus and minus of JAS approach. Do not let the kind of perception that whatever ideal is JAS. JAS should be capable of fixing the known weaknesses.

Biology Department of UNNES should be capable of bringing JAS to schools in the form of dedication towards the society. However, the Department needs to start from the inside where the lecturers and the students need to understand every lecture. We must be sure that JAS is suitable to be applied in lecturing. As a mother of JAS approach, Biology Department should strengthen the will to implement JAS approach in every lecture. The lecturers should be a role model for the students in implementing JAS approach in the class room.

The commitment of academician in the department to analyze the characteristics of JAS as written in the legal document are exploration, constructivism, science process, learning community, edutainment, authentic assessment. The department should push its academicians to publish the results of the researches more whether its journals or textbooks which related to JAS.

CONCLUSION

Many types of research using many methods and approaches like qualitative descriptive, quasi-experiment, PTK, and R and D resulting prove that JAS approach is effective when implemented in learning process especially in Biology in many materials.

The meta-analysis result shows the effectiveness of Jas implementation proved in 97% of researches about JAS. Many types of research proved JAS approach succeeded in increasing the study result, can differentiate the resulting study between experiment class and control class where the experiment class has a higher average score.

Learning model/strategy/method that centered in the students are very relevant in implementing JAS approach so it looks more real, like cooperative learning model, think pair share, role playing strategy, group investigation, learning cycle 5e, hands-on activity, and so on, so it make it possible to be kept studied and developed in curriculum paradigm that being developed with competence base. However, the users still got some difficulties in time and power allocation. Because of that, Biology Department is pushed to keep doing the study towards JAS approach implementation.

ACKNOWLEDGEMENT

Thank you for UNNES that has given the research fund through Daftar Isian Pelaksanaan Anggaran (DIPA) Universitas Negeri Semarang Number DIPA: DIPA-042.01.2.400899/2016 dated 7 December 2015 Correspond to the Surat Perjanjian Penugasan Pelaksanaan Program Penelitian Number: 1.25.4/UN37/PPK.3.1/2016, dated 25 April 2016.

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