

The Analysis of Ecological Awareness of Students of SMK Migas Cepu

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Abstract

The history of petroleum in Cepu, which has not been explored and taught to students, makes students' knowledge of the environment low. This study aims to analyze the extent to which students' knowledge of the environment and ecological awareness possessed by students of SMK Migas Cepu. By using the case study method, the principles of ecological literacy outlined by the researcher in the form of a questionnaire become the basis for knowing students' understanding and awareness of their environment. To provide students with an understanding of the negative impact of oil refineries in relation to fostering attitudes and knowledge of ecology, researchers provide learning the history of petroleum through the guided inquiry method with the aim of helping students to bring up character values, namely a caring attitude towards the environment. The result that the significance of $0.000 < 0.05$, it can be concluded that H_0 is rejected and H_1 is accepted that There is a mean difference between the control and experimental classes. So that dapat disimreport that the questionnaire developed was effective in increasing students' ecological awareness.

Keywords

petroleum history;
guided inquiry;
students' ecological
awareness



I. Introduction

Preserving ecology is very important for natural and human life. But in reality human ecological awareness is still very low. Lualhati, Catibog, Holgado, & Liwanag (2018) define ecological awareness as a way of thinking about the world in terms of natural and human interdependent systems, including consideration of the consequences of human actions and interactions in a natural context. Furthermore, to make people ecologically literate, there are three components, namely cognitive (knowledge), affective (caring), and behavior (practical competence).

According to The responsibility for cultivating ecological awareness is carried out by making every student want to be friends with nature, which separates waste, conserves water and energy, and follows the idea of a balanced development throughout their life. According to ecological awareness can be grown in schools by implementing the Adiwiyata program, with the aim to create schools that care about the environment and are able to participate in and implement efforts to preserve a sustainable environment. The Adiwiyata program helps introduce students to environmental education.

Ecological awareness at SMK Migas Cepu is low. This can be seen from the habits of students who really like littering, such as under desks, in the back corner of the classroom, the toilet has changed its function to a place to dispose of tissue and others. Ideally, in

accordance with one of the school's vision and mission, which is to form human resources with environmental culture, students of SMK Migas Cepu have a good ecological awareness.

Moreover, the environmental impact in Cepu from Cepu refinery waste comes from mining activities carried out by PT. Pertamina EP Java Region Cepu Field from the Kawengan, Ledok and Nglobo fields which only got attention in 1985. The existence of oil in Cepu began by 1886 Andrian Stoop. Andrian Stoop started the company since 1887 which was named De Dordtsche Petroleum Maatschappij (DPM). Then in 1911 the dordtsche company was taken over by Bataafsche Petroleum Maatschappij (BPM) or Shell from the Dutch royal skin and made the group's marketing company throughout the Dutch East Indies.. 1962 Shell was nationalized, which actually experienced a decrease in production due to a shortage of experts. In 1966, after going through negotiations on the Cepu oil mine, which experienced a decline in production, it was agreed to be handed over to Lemigas to become a center for education and training for oil and gas. After that the Oil and Gas Academy (Akamigas) was established in 1966. To organize the management of Akamigas in Cepu, the Oil and Gas Field Education and Training Center (Pusdiklat Migas) was formed. The existing oil field is then used as a means of educational demonstration.. In addition to being established Akamigas, SMK Migas was also established starting in 1961 and only had an oil department in 2005.

The establishment of the Cepu oil refinery in 1928, there was no obligation regarding an AMDAL (Environmental Impact Analysis), so that attention to environmental management was not so serious. Environmental management, especially waste management, only received serious attention starting in 1985 before the enactment of Government Regulation no. 29 of 1986 regarding AMDAL (Environmental Impact Analysis). The waste management is carried out by completing the waste oil treatment facilities and facilities using the oil catcher method. Based on PP No. 18 of 1999 jo. PP no. 85 of 1999 concerning the management of B3 waste (Hazardous and Toxic Materials), oil spills in the refinery area are included in the category of B3 waste code D 221, because their nature and concentration can endanger human health and the environment.tif, poisonous, infectious, corrosive and is carcinogenic (causes cancer).

The ecological conditions in Cepu are very dangerous for the life around them, students of SMK Migas Cepu are very important to get knowledge about the history of oil because it is closely related to their vocational skills which can be used as a provision for the future, regardless of the history of petroleum has positive and negative impacts, especially with regard to issues. environment that has never been taught and explored and low awareness of ecology in schools is very helpful to build students' knowledge of the importance of protecting the environment. As with the opinion of Fattah (2020) that vocational schools in the practical dimensions of historical learning must be included in the vision of links and facts where learning in schools and the needs of workforce in the industrial world are appropriate. Learning local history is the study of the life of a particular community or community in the dynamic development of human life (Rosmiati, 2020).

This study aims to analyze the ecological awareness of the students of SMK Migas Cepu. Analysis of ecological awareness is important because of the widespread damage to the environment due to human interests and the uncontrollable development of science and technology, as well as students' low knowledge of the surrounding environment. With this research, is expected to build the character of students who are aware of their environment. reverence for nature and gross abuse of nature in order to honor nature Culture and the ecological belief that human beings and culture have a harmonious connection (Basirizadeh, 2020).

II. Review of Literatures

2.1 Ecological Awareness

Refers to theory (Lualhati, Catibog, Holgado, & Liwanag, 2018b) about ecological consciousness which depends on how people think about the world. For that then, Bruyere (2008) to make people ecologically literate, there are three components, namely cognitive (knowledge), affective (caring), and behavior (practical competence). Caring measures the level of a person's affection for environmental protection and social justice. Caring people, in this context, feel a desire and are responsible for reducing their personal and communal impacts on the ecological system. This section reflects a person's thoughts, not actions. Knowledge represents an understanding of ecological principles and human interactions with their natural and artificial environments.

Through these experiences, it is possible that such people will be able to better connect the three areas of ecological literacy. For example, giving students the opportunity to work on a farm and eat the food they harvest gives students a space to learn about agriculture; connect students to work because they are in the field, not at the table; and give students the opportunity to take action and emulate that action. Programs that combine care, knowledge, and action have the potential to greatly enhance students' ecological literacy and the ecological literacy of those around them.(McGinn, 2014)

In addition, according to Cherrett, as cited by McGinn (2014), one needs to be aware of the environment, as this is the basis and starting point of literacy. Today, knowledge is no longer limited to the extent of memorizing concepts, but raising awareness is a prerequisite for successful learning. Ecologically conscious people will have an understanding of important ecological concepts such as ecosystem succession, energy flow, cycling of materials, ecological adaptation, food webs, carrying capacity, and species diversity.

Ecological literacy is also supported by several ecological principles to create a sustainable society. According to A Sonny Keraf (2013) in Capra, there are five principles of ecological literacy or ecoliteracy, namely as follows:(Keraf, 2013)

1. The principle of independence that is between nature and humans has an interrelated relationship. Life in nature depends on other life. In other words, the existence, wholeness, life and development of each member determine the existence, wholeness, life and development of each other member, and on the other hand, also determine the existence, integrity, life and development of the entire ecological community. But on the contrary, the existence, wholeness, life and development of the ecological community all determine the existence, integrity, life and development of each member.
2. The principle of recycling, which is a life process like the food chain, in other words, the remaining products of the life process as waste are not wasted, but all of them are reabsorbed as energy and food for life processes in a non-linear cyclic relationship.
3. The Principle of Partnership, namely in life on earth is interrelated, mutually supporting, mutually supporting, participate actively, voluntarily to live and support each other and cooperate.
4. The principle of flexibility (easy to adapt), namely the human community must be open to change and without being carried away by it. The human community must develop by maintaining its identity and identity while still adapting to change and absorbing changes and progress that occur around it.
5. The principle of diversity is that humans are diverse in ethnicity, culture, language.

So that human principles which are not like the five principles above will damage our ecology. To restore the ecological damage that is around us, we must use these five principles for a sustainable life for humans and nature.

According to (Suwandi & Yunus, 2016) The components covered by ecological intelligence include:

1. Identify the components of the ecosystem, both abiotic and biotic
2. Understand the functions and uses of ecosystem components, both abiotic and biotic
3. Understand natural and environmental management systems, both abiotic and biotic
4. Understand environmental values, which include local wisdom values, religious values, and normative values
5. Shows concern over environmental damage or environmental pollution, both abiotic and biotic
6. Adapt behavior to the environment, both abiotic and biotic
7. Solve problems arising from environmental impacts (abiotic and biotic), both individually and collectively
8. Manage / conserve natural resources (abiotic and biotic), both individually and collectively
9. Make positive use of the environment (abiotic and biotic), both individually and collectively

Supporting this, the center for ecoliteracy (Center for Ecoliteracy) is available in <https://www.ecoliteracy.org/publications/fritjof> has developed a set of “core competencies” to help young people develop and live in sustainable societies. This competency is related to knowledge (learning to know), attitudes (learning to be), action (learning to do) and relationships with humans and nature (learning to live together). These competencies include:

Table 1. Core Competencies of Ecological Awareness

The core competencies of the Center for Ecoliteracy	The sub-competencies of the Center for Ecoliteracy's core competencies
Knowledge aspect	<ul style="list-style-type: none"> • Understand environmental issues and problems from the perspective of ecological balance and sustainability. • Understand the principles of ecology • Think critically, solve problems creatively and apply knowledge to new situations • Assess the impact or effect of human action and apply technology to the environment • Taking into account the long-term consequences of making a decision and taking into account the long-term consequences of a decision
Attitude aspect	<ul style="list-style-type: none"> • Give attention, empathy, and respect to others and other living things • Respect for differences in background, motivation, intention to interact in accordance with the perspective of mutual

	respect for the value of cooperation <ul style="list-style-type: none"> • Committed to equality, fairness, inclusiveness and respect for all people
Aspects of skills	<ul style="list-style-type: none"> • Create and use the tools, objects, and producers needed by a sustainable society • Put into practice practical action and be effective in applying a caring understanding of ecological balance • Assess and utilize energy and resources according to their use

To find out how far the principle of ecological literacy has succeeded, it is not only tested in the fields of politics, industry but also in education. In the world of education, it is very important to provide students with an understanding of the environmental conditions around them, because it will help change wrong ecological principles with correct ones. One school that can be used as a reference in this case is SMK Migas Cepu. Students at SMK Migas Cepu have low ecological awareness. Therefore, referring to the principles of ecology, the core competencies of ecology can be tested with the following indicators of research success and questionnaires:

Table 2. Indicators of Success in Ecological Awareness Research

The core competencies of the Center for Ecoliteracy	The sub-competencies of the Center for Ecoliteracy's core competencies	Research Success Indicators
Knowledge aspect	<ul style="list-style-type: none"> • Understand environmental issues and problems from the perspective of ecological balance and sustainability. • Understand the principles of ecology • Think critically, solve problems creatively and apply knowledge to new situations • Assess the impact or effect of human action and apply technology to the environment • Taking into account the long-term consequences of making a decision and taking into account the long-term consequences of a decision 	<ul style="list-style-type: none"> • Students can understand the issues and problems around them • Students understand that between nature and human life are interrelated • Students understand the importance of recycling products • Students always support environmental activities • Students understand the process of the formation of petroleum

		<ul style="list-style-type: none"> • Students understand the positive impact of using technology on the environment • Students understand the negative impact of using technology on the environment • Learners understand the long term effects of oil drilling • Students understand that there are foreign companies holding oil companies in their environment
Attitude aspect	<ul style="list-style-type: none"> • Give attention, empathy, and respect to others and other living things • Respect for differences in background, motivation, intention to interact in accordance with the perspective of mutual respect for the value of cooperation • Committed to equality, fairness, inclusiveness and respect for all people 	<ul style="list-style-type: none"> • Students understand the effectiveness of using oil • Students have a cooperative attitude to deal with environmental crises • Students have a sense of respect for the environment around them
Aspects of skills	<ul style="list-style-type: none"> • Create and use the tools, objects, and producers needed by a sustainable society • Put into practice practical action and be effective in applying a caring understanding of ecological balance • Assess and utilize energy and resources according to 	<ul style="list-style-type: none"> • Students think of innovations to prevent environmental damage • Students make recycled materials from the trash around them • Students socialize the impact of oil

	their use	drilling to friends in other departments <ul style="list-style-type: none"> • Students plant trees to protect their environment • Students bury leaf and animal litter around them
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III. Research Methods

3.1 Research Design

This study uses a case study method to formulate an analysis of the ecological awareness of the students of SMK Migas Cepu. (Yin, 2017)formulating 6 steps in conducting a case study, namely: (1) Plan (early knowing what and when to use a case study), (2) Design (identifying the case studied and forming the case study to make sense), (3) Prepare (prepare, collect what cases are needed before starting case study data), (4) Collect (collect basic case study evidence from at least 6 sources in the form of: documentation, archival notes, interviews, direct observation, participant observation, physical artifacts) (5) Analyze (analyze case studies), (6) share (report and compile the results of the case studies). The results and findings of this paper are the results of the ecological awareness questionnaire and the analysis of the results of the questionnaire is why the ecological awareness of the students of SMK Migas Cepu is low.

3.2 Research Respondents

Research respondents include students who have almost the same characteristics and abilities. In this case, the students of class X SMK Migas Cepu majoring in Oil and Petrochemical Processing (T.PMP) class A, amounting to (27) and B (27).

3.3 Research Instruments

The research instrument used students' ecological awareness questionnaires. This questionnaire uses a Likert scale with 4 answer options, namely:

- Never: 1
- Rarely: 2
- Often: 3
- Always: 4

Table 3. Students' Ecological Awareness Questionnaires

No.	Question	Answer			
		1	2	3	4
1.	I understand the dangers of wastewater pollution to human health				
2.	I studied the process of the formation of petroleum				
3.	I learned that oil processing will be faster using a machine				
4.	I understand the negative impacts of oil drilling				
5.	I understand that if a pipe leak occurs, it will kill				

	the biota in Solo				
6.	I understand the danger that an oil spill will block sunlight from entering the water				
7.	I understand that exploitation will lead to global warming				
8.	I understand exploitation leads to smog				
9.	I am innovating how to use petroleum effectively				
10.	My friends and I work together to deal with the environmental crisis				
11.	I use plastic waste to make crafts				
12.	I water the flowers in front of my class				
13.	I throw the trash in its place				
14.	I took my friend's trash and put it in the trash				
15.	I think of innovations to reduce environmental damage				
16.	I follow school rules not to use plastic wrap on food				
17.	I socialize the impact of drilling to my friends in other departments				
18.	I participated in planting 1000 trees				
19.	I help bury the plants that have been cut down				
20.	I help bury dead animals / bones around me				

IV. Discussion

4.1 Petroleum History Learning with Guided Inquiry

Learning activities using hendout that conducted in two meetings. The first meeting served as an introduction through a zoom meeting and giving a pretest both in the form of an ecological awareness questionnaire. And the second meeting was delivering material through zoom meetings through power points and hendouts and giving posttests. The learning process is carried out using the Learning Implementation Plan (RPP) which has been discussed with the Indonesian history subject teacher. Giving pretest and posttest questionnaires through word files sent via WA.

The following are the steps of the learning process using the guided inquiry learning model:

Table 4. Learning Steps

Learning Steps	Details of activities	Time Allocation
preliminary	<ul style="list-style-type: none"> ➤ Educators say greetings, make presence, prepare learning devices. ➤ Educators do apperception to motivate students about the importance of learning the material to be delivered ➤ Educators convey learning objectives 	5 minutes

Core activities	<ul style="list-style-type: none"> ➤ Educators explain the historical material of Dutch oil exploration in Cepu through power points and hendouts. ➤ Each student identifies the problem of mining activities ➤ Each student follows a hypothetical step ➤ Each student collects data from teaching materials ➤ Each student tests the hypothesis that is made ➤ Each student interprets the data obtained ➤ Each student concludes the results by writing them in the assignment book 	30 minutes
Closing	<ul style="list-style-type: none"> ➤ Educators provide conclusions and benefits of today's learning. ➤ Educators ask students to fill out an ecological awareness questionnaire ➤ The educator ends the meeting and says hello. 	10 minutes

4.2 Ecological Awareness in SMK Migas Cepu Students

To write down the results of the research, the researcher adopted the research design of Robert K. Yin, there were 6 steps, namely: Plan, Design, Prepare, Collect, Analyze and Share, which will be explained in more detail below:

Table 5. Research Steps

No.	Steps	Information
1.	<i>Plan</i>	Planning research on ecological awareness.
2.	<i>Design</i>	Identifying the ecological awareness of students of SMK Migas Cepu.
3.	<i>Prepare</i>	Prepare and collect cases in the form of (students' ecological awareness, knowledge of the environmental impact of students).
4.	<i>Collect</i>	Collecting participant observation evidence in the form of an ecological awareness questionnaire.
5.	<i>Analyze</i>	Analyze students' ecological awareness obtained from the questionnaire.
6.	<i>Share</i>	Writing down the results of the ecological awareness analysis of the students of SMK Migas Cepu

Based on the six steps above, the analysis of ecological awareness in SMK Migas Cepu students using an ecological awareness questionnaire in the form of pretest and posttest data in class X PMP A and X PMP B are as follows:

Table 6. Pretest Results of Ecological Awareness Attitudes of Experiment and Control Classes

No .	Control Class		Experiment Class	
	Name	Pretest	Name	Pretest
1	Abdul Wafi	52	Ade Maula Yahya	57
2	Afif Aminudin	69	Ardian Farid	53
3	Alifah Firdhausyah	44	Ariel Dwi Ramadhani	57
4	Alziqhra January	69	Aulia Mutiara Arseti	44
5	Amanda Putri Rizqiya	41	Choirun Nisa`	56
6	Andhika Cahya	50	Peaceful Kayla Rezka	71
7	Andika Eka Pratama	52	Dinda Ayu Trihapsari	41
8	Chelsea Widya Santoso	50	Hammam Sholihin	53
9	Dailly Drasta House	41	Ilham Afbel Karaka	44
10	Dannel Susriatmanto	46	Java Bagus Maylana	46
11	Davit Mustika	53	Julinka Nareswari	58
12	Devinta Aprillia	38	M. Zaidan Dzaki Kansa	70
13	Elsa Eliyanti Hutabarat	70	Margareta Videllia Chika	60
14	Fajri Andinikhlas	63	Monika Ulim	45
15	Holizah	60	Muhammad Ilham Mufaddil	55
16	Izaki Surya Abdullah	55	Muhammad Rafi	64
17	Jaka Afriza Nurchosim	55	Niken Zhulia Ayu Astutik	58
18	Kayana Amoretta	53	Pritia Dwi Yulianti	55
19	Luthfiah Adelya	55	Purnomo Hadi Saputro	50
20	Moh. Anwar Rudin	40	Radiq Bima Alditya	57
21	Muhammad Ilham	59	Rahadian Rizqy Irawan	50
22	Muhammad Rendy	38	Renovaldy Arya	70
23	Muhammad Ridlo	69	Rifaul Ihsan	40
24	Naufal Hisyam	53	Selvia Yulira Pratama	55
25	Patricia Aurha De Priza	44	Sophie Nayla Fattima	56
26	Sandrina Widyatma	68	Yuniar Andini Ainahaq	53
27	Vira Salsabila Syah Fitri	71	Zaetin Anggi Sasmita	67

After obtaining the pretest value of the students' ecological awareness, the next step is to do the Prerequisite test. The prerequisite test is carried out to determine the level of equality or similarity in the level of ecological awareness of students before receiving treatment, some of the Prerequisite test results are as follows:

1) Normality Test

Table 7. Affective Prerequisite Normality Test

	Kolmogoro v-Smirnova	Shapiro-Wilk					
		Statistics	df	Sig.	Statistics	df	Sig.

Control Class Pretest	.129	27	.200 *	.930	27	.071
Pretest Experiment Class	.140	27	.184	.953	27	.251

a. Lilliefors Significance Correction

* This is a lower bound of the true significance.

Based on the data above, it is known the significance normality shapiro-wilk for The pretest of the control and experimental classes were 0.071 and 0.251, respectively. So that the normality value of shapiro-wilk > 0.05 , then disimshow that the pretest data is normally distributed.

2) Homogeneity Test

Table 8. Affective Inscription Homogeneity Test

Ecological

Levene Statistics	df1	df2	Sig.
1,848	1	52	.180

Based on the data above, it is known the significance equal to $0.180 > 0.05$, then disimreturn that the control class and Experiments come from the same variant or are homogeneous.

3) Independent Sample t-test

Table 9. Independent Samples Affective Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
									95% Confidence Interval of the Difference	
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference		Lower	Upper
Ecological Intelligence Pretest Value	Equal variances assumed	1,848	.180	-382	52	.704	-1,000	2,617	-6,252	4,252
	Equal variances not assumed			-382	49,760	.704	-1,000	2,617	-6,257	4,257

Based on the test The Independent Samples t Test shows that the significance is $0.704 > 0.05$, so it can be concluded that the two classes have equality and there is no mean

difference in terms of the level of ecological awareness. So that the two classes meet the requirements to be sampled. After the conditions have been stated fulfill then the test is carried out in the control class and experiment with the posttest results of ecological awareness as follows:

Table 10. Posttest Results Attitude of Ecological Awareness of Experiment and Control Class

No .	Control Class		Experiment Class	
	Name	Posttest	Name	Posttest
1	Abdul Wafi	64	Ade Maula Yahya	74
2	Afif Aminudin	72	Ardian Farid	80
3	Alifah Firdhausyah	68	Ariel Dwi Ramadhani	67
4	Alziqhra January	72	Aulia Mutiara Arseti	76
5	Amanda Putri Rizqiya	64	Choirun Nisa`	78
6	Andhika Cahya	69	Peaceful Kayla Rezka	78
7	Andika Eka Pratama	60	Dinda Ayu Trihapsari	73
8	Chelsea Widya Santoso	69	Hamam Sholihin	70
9	Dailly Drasta House	64	Ilham Afbel Karaka	76
10	Dannel Susriatmanto	68	Java Bagus Maylana	64
11	Davit Mustika	68	Julinka Nareswari	73
12	Devinta Aprillia	71	M. Zaidan Dzaki Kansa	78
13	Elsa Eliyanti Hutabarat	70	Margareta Videllia Chika	71
14	Fajri Andinikhlas	70	Monika Ulim	62
15	Holizah	69	Muhammad Ilham Mufaddil	73
16	Izaki Surya Abdullah	69	Muhammad Rafi	70
17	Jaka Afriza Nurchosim	60	Niken Zhulia Ayu Astutik	76
18	Kayana Amoretta	65	Pritia Dwi Yulianti	76
19	Luthfiah Adelya	73	Purnomo Hadi Saputro	72
20	Moh. Anwar Rudin	62	Radiq Bima Alditya	67
21	Muhammad Ilham	65	Rahadian Rizqy Irawan	80
22	Muhammad Rendy	73	Renovaldy Arya	76
23	Muhammad Ridlo	59	Rifaul Ihsan	74
24	Naufal Hisyam	65	Selvia Yulira Pratama	76
25	Patricia Aurha De Priza	73	Sophie Nayla Fattima	74
26	Sandrina Widyatma	71	Yuniar Andini Ainahaq	72
27	Vira Salsabila Syah Fitri	76	Zaetin Anggi Sasmita	80

After getting the value of the attitude of ecological awareness, then the effectiveness test is carried out to analyze aIf the questionnaire is made effective in increasing students' ecological awareness attitudes, an independent sample t test will be carried out on the posttets results of the control and experimental classes, with the following hypothesis:

H0: There is no mean difference between the control and experimental classes

H1: There is a mean difference between the control and experimental classes

Test Decision:

H0: accepted, if t count with a significance level (2-tailed)> 0.005

H1: rejected, if t count with a significance level (2-tailed) <0.005

The test results are as follows:

1) Normality Test

Table 11. Affective Normality Test

	Kolmogoro v-Smirnova	Shapiro-Wilk					
		Statistics	df	Sig.	Statistics	df	Sig.
Posttest Control Class		.153	27	.107	.958	27	.335
Posttest Experiment Class		.144	27	.160	.937	27	.101

a. Lilliefors Significance Correction

Based on the data above, it is known the significance normality shapiro-wilk for Posttest for the Control and Experimental Classes were 0.335 and 0.101, respectively. So that the normality value of shapiro-wilk > 0.05 , then disimshow that the posttest data is normally distributed.

2) Homogeneity Test

Table 12. Affective Homogeneity Test

The Posttest Value of Ecological Awareness

Levene Statistics	df1	df2	Sig.
.193	1	52	.662

Based on the data above, it is known the significance equal to $0.662 > 0.05$, then disimrestore that data Posttest control class and Experiments come from the same variant or are homogeneous.

3) Independent Sample t-test

The requirements for the t test have been stated fulfill the normality and homogeneity, then the independent sample t-test is then carried out with the results as follows:

Table 13. Independent Samples Affective Test

	Levene's Test for Equality of Variances	t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference
									Lower Upper

The Posttest Value of Ecological Intelligence	Equal variances assumed	.193	.662	4,339	52	.000	-5,481	1,263	-8,017	-2,946
	Equal variances not assumed			4,339	51,988	.000	-5,481	1,263	-8,017	-2,946

Based on the test Independent Samples t Test, it is known that the significance is $0.000 < 0.05$, it can be concluded that H_0 is rejected and H_1 is accepted that There is a mean difference between the control and experimental classes. So that dapat disimpulkan that the questionnaire developed was effective in increasing students' ecological awareness.

V. Conclusion

Based on the results of the above research, it can be concluded that the development of a questionnaire to measure the level of students' ecological awareness is proven effective because the measurement is not only based on one aspect, namely the attitude aspect, but is based on measuring three aspects, namely knowledge, attitudes and skills. Giving questionnaire tests to students who were given twice before and after learning about the history of oil in Cepu, the impact of oil refineries and ecological awareness proved to be significant and effective in measuring the ecological awareness of students of SMK Migas Cepu. However, this research is limited to students who are majoring in petroleum because it provides knowledge and attitudes for petroleum students who will later work in the world of petroleum, so that the analysis of students' ecological awareness needs to be further developed.

References

- Abidin, N. F. (2020). Pembelajaran Sejarah Lokal di Sekolah. 3(1), 88–99.
- Basirzadeh, F. S., et. al. (2020). A Study of Wuthering Heights from the Perspective of Eco-Criticism. Budapest International Research and Critics in Linguistics and Education (BirLE) Journal Vol 3 (4): 1623-1633.
- Bruyere, B. L. (2008). The effect of environmental education on the ecological literacy of first-year college students. Journal of Natural Resources and Life Sciences Education, 37(1), 20–26.
- Cepu, smk migas. (n.d.). Selamat Datang di SMK Migas Cepu.
- Keraf, S. (2013). Fritjof Capra Tentang Melek Ekologi. [https://jo\(11\)](https://jo(11)), 54–81.
- Landriany, E. (2014). Implementasi kebijakan adiwiyata dalam upaya mewujudkan pendidikan lingkungan hidup di SMA Kota Malang. Jurnal Kebijakan Dan Pengembangan Pendidikan, 2(1).
- Lualhati, G P., Catibog, F. J. A., Holgado, R. A. L., & Liwanag, J. M. A. (2018a). Discovering Ecological Awareness of Filipino Education Students. International Journal of Applied Science, 1(2), p37. <https://doi.org/10.30560/ijas.v1n2p37>
- Lualhati, G P., Catibog, F. J. A., Holgado, R. A. L., & Liwanag, J. M. A. (2018b). Discovering Ecological Awareness of Filipino Education Students. International Journal of Applied Science, 1(2), p37–p37.

- Mccabe, R. G. (1931). *Petroleum Refineris*.pdf. Washington.
- Mcginn, A. E. (2014). Quantifying and Understanding Ecological Literacy: A Study of First Year Students at Liberal Arts Institutions. Retrieved from http://scholar.dickinson.edu/student_honors
- Prastiwi, L., Sigit, D. V., & Ristanto, R. H. (2019). Relationship Between Academic Ability and Environmental Problem-Solving Skill: A Case Study at Adiwiyata Schools in Tangerang City, Indonesia. *Üniversitepark Bülten*, 8(1), 76.
- Pytel, K., Piaskowska, M., & Migo, P. (2016). Teaching bioscience in primary and middle school and children's ecological awareness. *Proceedings of the International Scientific Conference. Volume II*, 298, 308.
- Rosmiati, Wahyuni, A., and Syarifuddin, A. (2020). Ombilin Coal Mine Site: History and Potential as a Learning Source for the History of the Economy Based on Outdoor Learning. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal Vol 3 (3)*: 1343-1352.
- Siti Nur Fatimah, Wasino, B. (2016). Nasionalisasi Tambang Minyak di Cepu dan Pengelolaannya Tahun 1950-1966. *Journal of Indonesian History*, 5(1), 52–61.
- Sulistiyono, S., Suntoro, S., & Masykuri, M. (2011). Kajian dampak tumpahan minyak dari kegiatan operasi kilang minyak terhadap kualitas air dan tanah (Studi Kasus Kilang Minyak Pusdiklat Migas Cepu). *Jurnal Ekosains*, 4(2), 23–34. Retrieved from <http://jurnal.pasca.uns.ac.id/index.php/ekosains/article/view/267/252>
- Suwandi, S., & Yunus, A. (2016). Kecerdasan Ekologis dalam Buku Sekolah Elektronik Mata Pelajaran Bahasa Indonesia SMP. *Litera*, 15(1).
- Yin, R. K. (2017). Designing Case Studies. In *Case Study Research and Applications: Design and Methods*.