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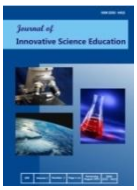

The Identification of Pisces at Ujungbatu Fish Auction in Jepara as a Source of Animalia Discovery-Based Handout

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Abstract

Jepara Regency has very large marine resources. Various species of fish including pelagic and demersal are a local potential that can be empowered as a source of science learning in the form of handout based on discovery learning. The use of discovery-based handout is expected to be able to improve cognitive learning outcomes and science process skills. This research is a development research specifically One Group Pretest-Posttest Design. As many as 18 species were obtained at the fish auction in Ujungbatu Jepara. The validation of subject-matter experts on the content of the handout was good and very good on language aspect. Assessment on language experts, media size, design and content was in a very good category. The effectiveness of handouts from N-Gain result was obtained an average score of 0.4 which was in the medium category. While science process skills gained an average score of 81% in the good category. The practicality of the handouts was derived from student responses. An aspect called significance was considered very good. Other aspects such as ease understanding, learning interes and presentation were good. While students' enthusiasm was in good enough category. The practicality of the handouts from teacher responses include some aspects in terms of ease understanding, students' enthusiasm, learning interest, presentation and the significance were in a very god category. It can be concluded that the use of discovery-based handout in learning Pisces material is effective and practical to improve students' cognitive learning outcomes and science process skills both individually and classical.

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INTRODUCTION

Jepara Regency has very large marine fish resources consisting of pelagic and demersal fish. The main species include Ariid Catfish, Yellow Tail, Mackerel, Pompano, Sardine, Anchovy, Indian Glassy Fish, Red Snapper, Mullet, Tuna, Long Jawed Mackerel, Barred, Coral Grouper, Coral Trout, Broiled Fish, Belt Fish, Swordfish, Milkfish, and Stingray. Capture fisheries production in 2012 was 6.991,6 tons (Kunarso et al., 2016). Fish caught by fishermen from Jepara are sold at Ujungbatu fish auction in Jepara Regency. Those biological resources are local potentials can be empowered as a source of information in the science learning process.

Biology learning in the application of curriculum 2013 requires the implementation of interactive, inspirational, fun and motivating learning for students. Minister of Education and Culture regulations No. 65 of 2013 concerning the Standard Process for Primary and Secondary Education has hinted at the need for a guided learning process with scientific approach. This is in line with the biology learning approach according to the Biological Sciences Curriculum Study (BSCS) which is characterized by the sharpening of science process skills which include observing, hypothesizing, questioning, experimenting, associating, and communicating using an inquiry approach (Bybee et al ., 2006; Wiyanto et al., 2017).

The findings of the preliminary study conducted in Senior High School in Jepara found that 95% of students did not have Animalia handouts. Learning resources used was in the form of textbook for specialization program and student worksheet for tenth grade which are limited so that the learning process of students is less effective. Based on the researcher's analysis on the learning material of Animalia, the picture of Pisces is still limited and has not led to the utilization of local potential. The learning process tends to be Teacher Centered Learning so that students' science process skills are less optimal.

Having direct observation of various species of Pisces at Ujungbatu fish auction in Jepara is not possible, so we need a tool to deliver information. A tool that can be used as a learning source is handout. Handout is a written learning source which contains various important concepts of a chapter or a complete learning material (Sanaky, 2011).

A research conducted by Agustina et al. (2013) found that giving handouts could improve students' learning outcomes. Furthermore, Wahyuni et al. (2012) also explained that the use of handouts designed with attractive content, colour, and image display can motivate students to learn.

Discovery learning model is applied to the learning of Animalia especially Pisces because it contains content that can be observed directly for a research. The discovery-based handout contains material that is not delivered in a closed question. Learners are encouraged to identify what they want to know and then continue to find the information, associating what they knew and finally understand the material. The benefits of discovery based handouts include: changing passive learning situations to be active and creative, conducting student-oriented learning instead of teacher-oriented, changing students expository mode which usually receives information as a whole from the teacher to discovery mode so as to improve students' science process skills.

The purpose of this study is to identify the Pisces at Ujungbatu fish auction in Jepara Regency and test the validity, effectiveness, and practicality of discovery-based handouts. Theoretically, the research can be used as a source to identify and describe Pisces at Ujungbatu fish auction in Jepara and provide learning source for Biology subjects. Practically, the results of this research can be used as a thoughtful contribution that is useful for schools in order to improve learning process of Biology and as input for teachers and other education personnel in order to develop handout that is in accordance with the learning material.

METHODS

Research on identifying Pisces was conducted at Ujungbatu fish auction in Jepara. The research findings are used as material for discovery-based handout development. Such development aims to produce products and test the validity, effectiveness and practicality of the product (Sugiyono, 2017).

Data collection methods were carried out using documentation, tests, observations, and questionnaires. Documentation was used to capture all pisces pictures at the fish auction and then bring them to the laboratory to be observed. Tests were used to obtain students' cognitive data. Observation was employed to obtain student science process skills data. The questionnaire was used to obtain practicality data for the handout.

Pisces analysis was carried out in UNNES Biology laboratory using some taxonomic books such as Handbook Trawled Fishes of Southern Indonesia and Northwestern Australia (Tarp & Kailola. 1992) and A Field Guide for Anglers and Divers Marine Fishes of South East Asia (1984). Handout validity analysis used five-scale quantitative descriptive analysis according to Azwar (2013: 163). Data on students' cognitive skills were analyzed by normalized gain test (N-gain). Data on science process skills was analyzed using quantitative descriptive analysis. Practical questionnaire data were analyzed using a modified Likert scale from the attitude scale category (Mardapi, 2008).

RESULTS AND DISCUSSION

Identification on capture fisheries at Ujungbatu fish auction in Jepara after an analysis in UNNES Biology Laboratory was found 18 spesies. Some of them were stingray, eel, sea dara, whipfin silver-biddy, kerik, injel fish, bagrid catfish, Nimrod, crimson jobfish, grouper, bagong kucir, bigeye scad, oxeye scad, selar boops, tuna, and purple-spotted bigeye. Data on species of Pisces at Ujungbatu fish auction in Jepara can be seen in Table 1.

Table 1. Spesies of Pisces at Ujungbatu Fish Auction Jepara

No	Class	Ordo	Family	Genus	Species
1.	Chondryct hyes	Myliobatifo rmes	Dasyatidae	Dasyatis	*Dasyatis kuhli* (Bluespotted Stingray)
2.	Osteichtye s	Anguiliform es	Ophichthidae	Phyllophich thus	*Phyllophichthus Xenodontus* (Flappy snake-eel)
		Perciformes	Priacanthidae	Priacanthus	*Priacanthus tayenus* (Purple-spotted Bigeye)
			Nemipteridae	Paascolopsi s	*P. eriomma* (Unarmed dwarf monocle bream)
				Nemipterus	*N. nematopus* (Yellow-tipped threadfin bream)
			Carangidae	Pantolobus	*P. radiates* (Whipfin Silver-biddy)
				Selaroides	*S. leptolepis* (Yellowstripe scad)
				Alectis	Alectis *ciliaris* (African pompano)
				Selar	*Selar boops* (Mackerel)
					Selar crumenophthalmus (Bigeye scad)
			Haemeilidae	Pomadasys	*P. kaakan* (Javelin grunter)
			Scombridae	Thunnus	*T. maccoyii* (Tuna)

		Euthynnus	*E. affinis* (Tuna)
	Pomacanthidae	Pomacanthus	*P. annularis* (Bluering Angelfish)
	Drepaneidae	Drepane	*D. punctate* (Bagrid catfish)
	Menidae	Mene	*M. Maculate* (Moonfish)
	Epinephelidae	Epinephelus	*E. bleekeri* (mud groper fish)
		Epinephelus	*Epinephelus aerolatus* (grouper fish)

Product assessment on discovery-based handout was done by several experts includes experts in subject-matter, media and language. The assessment of subject-matter experts includes aspects of content and language. Assessment of media experts and linguists includes aspects of size, cover design, and content layout. The findings of expert validation of discovery-based handout are found in Table 2.

Table 2. The Validation of the Expert towards Discovery-based Handout

No	Validator	Aspect	Average	Pecentage	Criteria
1	Subject-matter expert	Content	54,0	77,0	Good
		Language	24,0	96,0	Very good
2	Media experts and linguists	Size	10,0	100,0	Very good
		Cover design	43,0	95,6	Very good
		Content layout	61,5	94,6	Very good

The analysis of subject-matter experts showed that the content aspect was in average value of 54.0 with an ideal percentage of 77% which was in a good category. While for language aspect, the average value was 24.0 with an ideal percentage of 96% meaning in very good category. The subject-matter expert also provides written input for the improvement of the handout, the identification key is simplified again so that it is easier for students to understand.

Assessment of handouts by media experts and linguists showed that the handout size represents by the score of 10 with an ideal percentage of 100% meaning in a very good category. While the value of handout design was 43.0 with an ideal percentage of 95.6% or in the very good category. The design aspects of handout contents got an average score of 61.5 with an ideal percentage of 94.6% in very good category. Broadly speaking based on the findings of experts analysis and after being revised based on expert advice, handout discovery products can be used for research data collection.

Discovery-based handout was tested on 10 students of extracurricular on Science class at SMA N 1 Pecangaan. The findings on the first trial in a small scale aim to measure the effectiveness of the use of handouts developed, so that improvements can be made before it is implemented on a bigger scale for research data collection. The result of discovery-base handoutd trial is presented in Table 3.

The table showed that the readability of the handout was 23 or 91% which is very good. Furthermore, the content was also 23 at the percentage of 90% meaning that it is in the very good category. While the presentation was obtained 89% with average of 18 that was also in very good category. Based on the results of the trial analysis, discovery-based handout is eligible to be used for research data collection.

Table 3. Trial Results of Small-Scale Discovery-based Handout

No	Aspect	Average	Percentage	Category
1	Readability	23	91	Very good
2	Content	23	90	Very good
3	Presentation	18	89	Very good

The handout then was used for trial in class X MIA1 SMA N 1 Pecangaan Jepara with the number of students 34. It used discovery learning model. Steps for discovery learning according to to Syah (2004) in Syarif & Susilowati (2017) are: Stimulation, Problem statement, Data collection, Data processing, Verification and Generalization.

The effectiveness of using handout to improve students' cognitive skill is measured by comparing the results of the pre-test and post-test. The analysis used the normalized gain formula whose results can be seen in Table 4.

Table 4. The Measurement of Using Discovery-based Handout with Normarlized Gain Formula

	Pretest	Posttes	N-Gain	Criteria
Average	69,4	81,3	0,4	Enough
Max	85	95		
Min	45	60		

The results of normalized Gain analysis illustrate that the use of discovery-based handout in pisces material learning effectively improves the cognitive learning outcomes of both individual and classical. The results of the N-Gain classical average obtained a value of 0.4 in the medium category. This shows the use of handouts with discovery learning models can improve students' learning outcomes. It is in line with Permatasari & Suyoso (2013) stating that discovery-based handout can improve students' learning achievement. The improvement on students' learning outcomes was because the handout contains various fish images from students' region, namely Ujungbatu fish auction in Jepara so that the students' learning interest and motivation increase. This is also in line with the statement of Anyanwu and Alafiatayo (2015) and Rahmatih, et al. (2017) which states that the biological learning process is effective with the use of teaching materials obtained from the surrounding. Giving handouts during the learning process can also improve the efficiency of learning activities, this is in accordance with Marsh and Sink's (2010) research that giving handouts in learning activities can help students in learning. Handout can also improve student understanding, this is according to Hera et al. (2014) state that handout contains summary of important concepts that facilitate students in mastering, understanding and remembering important concepts learned so as to improve students' understanding. This is also in accordance with Kinchin's (2006) research that the development of power point handouts can improve understanding in learning activities.

Data showing that handout can improve science process skills are obtained through observation during the lesson. The results of the analysis of science process skill are shown in Table 5.

The effectiveness of using handouts on testing science process skills on pre-experiment aspects was obtained an average of 3.2 with a percentage of 81% or in a good category. While on observing aspect, it was obtained an average of 3.5 and percentages 87, meaning in a very good category. In measuring aspect, the average was 3.1 and the percentage was 76% showing it was in a good category. Furthermore, in grouping aspect, the average was 3.3 and the percentage was 82% or in a good category. The

inferencing aspect showed average of 3 and percentage of 74% lying in a good category. In communicating aspect, the average was 3.4 and the percentage was 85%, meaning in a very good category. The average for all of those aspects was 81% meaning it was in a good category. It indicates that the use of discovery-based handout can improve students' science process skills. This is because the handout contains images and discovery steps that direct students to identify pisces so that students are trained to do scientific work. According to Head and Eisenberg (2010) and Prastowo (2015), there are steps in handout used for guidance. This is consistent with the research of Sugiyanto et al. (2014) which states that science process skills can improve scientific work skills. According to Sasanti (2017) and Lestari et al. (2015), learning activities using inquiry discovery learning (IDL) models can improve students' scientific process skills. According to Suprihatin et al. (2014) and Lubis et al. (2016) the application of discovery learning influences student activities and learning outcomes. According to Lipinski et al. (2012) and Winarni et al. (2016) learning using discovery models can increase students' enthusiasm.

Table 5. Analysis of Science Process Skills during Learning Activities using Discovery-based Handout

	Pre-experiment	Observing	Measuring	Grouping	Inferencing	Communi cating
Average	3	3	3	3	3	3
Percentage	81	87	76	82	74	85
Category	B	SB	B	B	B	SB

The results of the practicality analysis were obtained from students' and teachers' responses. It was then analyzed using qualitative to 5 scale quantitative data analysis. The results of the practicality analysis of students are presented in Table 6.

Table 6. The Practicality Analysis of Using Discovery-based Handout from Students

No	Aspect	Average	Percentage	Category
1	Ease in understanding	15,5	77,4	Good
2	Enthusiasm in learning process	11,3	75	Good enough
3	Interest towards handout.	19,9	80	Good
4	Presentation of handout	15,6	78,2	Good
5	Significance of handout	16,1	80,6	Very good

Based on the findings and analysis of students responses, the use of handouts in learning can facilitate students' understanding of an average of 15.5 and percentage in 77.4 % or in a good category. It also increased students' enthusiasm on average 11.3 and percentage of 75% or in the category of good enough. Furthermore, it increased students' interest as many as 19.9 or 80%, meaning in a good category. Students assessment on the presentation of the handouts showed 15.6 or 78.2% which was in a good category. Significance of handouts got average of 16.1 and percentage of 80.6% or in a very good category. This shows that Pisces discovery-based handouts are very praktical to be used in learning activities. The results of the practicality of teachers are presented in Table 7.

Table 7. The Practicality Analysis Using Discovery-based Handout from Teachers

No	Aspect	Average	Precentage	Category
1	Ease in understanding	19	95	Very good
2	Enthusiasm in learning process	14	93	Very good
3	Interest towards handout	24	96	Very good
4	Presentation of handout	19	95	Very good
5	Significance of handout	20	100	Very good

The results of the analysis of the teacher's responses to the use of handouts were obtained in terms of ease and understanding on average 19 and percentage of 95%; increasing students enthusiasm on average 14 and percentage of 93%; increasing interest in learning on average of 24 and percentage of 96%; the assessment on the handout presentation on average 19 and percentage of 95%; and the significance of handouts on average 20 and percentage of 100%. All of those aspects were in very good category. This also shows that pisces discovery-based handouts are practically used in learning activities.

CONCLUSION

Discovery-based handouts based on the validation of several experts are declared valid. Based on the results of normalized gain analysis, it was found that the use of discovery-based handouts on pisces learning material effectively can improve learning outcomes of students cognitive aspects both individually and classically. The result of the practicality analysis of the handout from teachers' and students' responses obtained that the use of pisces discovery-based handout is practical to be used in animalia learning activities.

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