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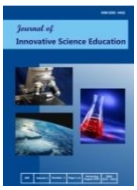

Development of Natural Plant Module Approach Around as a Learning Resource in UIN Walisongo Semarang

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Abstract

The management of natural resources (medicinal plants) is a material taught in the UIN Walisongo biology education department. Based on preliminary observations students experience saturation of learning in the classroom. Therefore, it is necessary to attempt to overcome this by using JAS approaching learning module. This study aims to: (1) identify the types of medicinal plants grown in Taman Jamu Nyonya Meneer (TJNM) and TOGA Park Patemon Tengaran Village; (2) developing JAS medicinal plant modules; (3) test the validity, practicality and effectiveness of the module. Characteristics of the module consist of concept maps, indicators, materials, tasks, quizzes, experiments and essay tests. This research is a research and development (R & D) which is designed consists of stages: (1) analysis of potentials and problems; (2) data collection; (3) product design of learning module; (4) module characteristics; (5) validation of product design; (6) revision of phase I module; (7) small scale module test; (8) revision of module stage 2; (9) final module revision. A limited-scale trial was conducted at UIN Walisongo. Data collection was done by observation method, interview, questionnaire, documentation and test. Trials were conducted to test the practicality and effectiveness of the module on students' cognitive, affective and psychomotor learning outcomes. The result of identification of medicinal plants in TJNM and TOGA Park Patemon Village was found by the number of medicinal plants in TJNM that is 49 species and in Patemon Tengaran Village that is 23 species. Validation results are valid by media experts and valid by material experts. The cognitive learning result of 84.67% of students reach completeness. Students and lecturers responded very well to the developed learning modules.

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INTRODUCTION

Processing of natural resources in the form of medicinal plants is one of the materials in the subject of natural resources conservation (KSDA). KSDA courses in biology education still rely on discussions with sources of material coming from the internet and the lack of modules for students from local potential. Assessment of lecturers on medicinal plant material is still limited to cognitive ability, need for affective and psychomotor assessment. The importance of affective and psychomotor assessment is that students experience the learning process directly. It is also proposed by Rosa (2015) is not only mastering the material knowledge but must be aligned with the skills in order to utilize the knowledge it has in daily life.

Java Island has a variety of medicinal plant species. Commodities of medicinal plant species are mostly ginger and turmeric. In 2015 Central Java produces 12.85% ginger production and 25.22% turmeric (BPS, 2016). One of the villages in Central Java has a potential source of learning about medicinal plants, because the community uses medicinal plants in daily life.

The importance of students studying medicinal plants is to preserve the culture of consuming herbal medicine. Medicinal plants from Patemon Village and Nyonya Meneer Jamu Garden (TJNM) have not been used as a learning resource for UIN Walisongo Semarang students. Effective learning should be supported by lessons that emphasize the provision of experience directly to students to understand the actual symptoms. Another factor for the effective learning of the need for a module that can support students to learn independently.

The results of initial observation in the field proves that TJNM and TOGA Park Patemon Village District of Tengaran deserve to be a source of learning. Location TJNM is a collection of herbal plants owned by private parties, because of concern for the preservation of herbal plants to not extinct then the owner of the park set up. The second location is the park TOGA Village Patemon District Tengaran Semarang. Patemon Village people still believe traditional medicine which is a declining trust. Community awareness in the care of medicinal plants is still maintained, it is proven in 2014 won the TOGA national park race champion 3 national level.

The results of initial observation in UIN Walisongo Semarang lack of knowledge of biology education students about medicinal plants. The reason is due to lack of enthusiasm to recognize more closely the names and benefits of medicinal plants and prestige to consume herbal medicine.

The approach of learning through Nature Exploration (JAS) provides an opportunity for students to explore in-depth knowledge in accordance with the material. JAS approach will provide real experience to the students so that the results obtained are not just the value of a number, but a science that can be useful for life later in the community.

The development of modules originating from research in Patemon and TJNM villages is expected to improve learning outcomes in the form of knowledge of medicinal plants, skilled in identifying potentially herbal plants, skills in processing plants into herbs to students as agents of change that are responsible for preserving medicinal plants and culture consuming herbs to avoid extinction.

METHODS

This research is a research and development (R & D) designed using research procedure. Development procedure consists of: (1) an analysis of the potential in TJNM and Taman Desa Patemon Tengaran TOGA potential as a source of learning and the problems found are not tersediannya berpendekatan module JAS in UIN Walisongo Semarang; (2) The data collection consists of the identity of medicinal plants, namely practicality questionnaire responses of students and faculty, assessment questionnaire (affective and psychomotor), cognitive value berpendekatan modules use JAS, and interviews of lecturers; (3) product design of learning module; (4) module characteristics in terms of language and module

contents; (5) validation of product design; (6) revision of phase I module; (7) small scale module test; (8) revision of module stage 2; and (9) final module revision. The product developed in the form of learning module. The study was conducted by identifying medicinal plants in TJNM and TOGA Park Patemon Village, Tengaran District. Identification results are used as a source of learning module development. The learning module is tested for validity by media experts and material experts. Module practicality is tested in learning activities on natural resource management materials. The effectiveness of the use of learning modules is tested against students' cognitive, affective and psychomotor learning outcomes.

RESULTS AND DISCUSSION

Results of Plant Medicinal Identification In TJNM

The identification of medicinal plants in TJNM was conducted in 4 collection sites based on common functions of strength, femininity, chronic illness and minor illness. The results of the identification of the collection in TJNM consists of 49 species, parts of plants that are often used to be processed into traditional medicine is the leaves and rhizomes. The number of collection types for minor illnesses is the most widely compared to other sites (Figure 1).

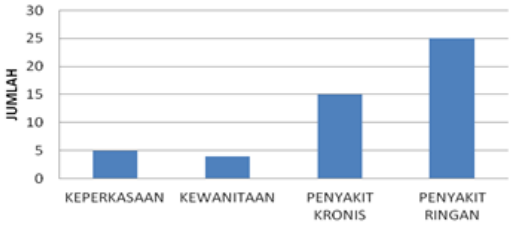

Figure 1. Number of Function of Medicinal Plants in General

Leaf is a part that is often used to be processed into medicinal plants. Leaves contain compounds of flavonoids. The compound content of the Javanese compound (Talinum paniculatum) consists of flavonoids, tannins, saponins, alkaloids and quinones (Setyani et al., 2016). It is also proved in the results of the study of Zuhra (2008) states that the compound content of katuk leaf (Sauropus androgynus) is an apaverin, protein, fat, vitamin, mineral, saponin, flavonoid and tannin which have strong antioxidant ability. Damarini et al. (2013) states that extra red betel leaves contain flavonoid compounds, alkaloids, tannins and essential oils that have antibacterial properties against Staphylococcus aureus and Escheria coli.

Table 1. Result of identity based on general function can be seen in table 1

No	Local name	Plant parts	General Function	Benefit
1.	Purwoceng *(Pimpinella alpine)*	Roots and leaves	Power	Increase male vitality
2.	Kola (*Cola acuminate)*	Seed		Strong medicine
3.	Pronojiwo (*Euchresta horsfieldii)*	Seed		Triggers sexual arousal
4.	Som jawa (*Talinum paniculatum)*	Leaves, roots and stems		Vitality of the body
5.	Cabe jawa putih (*Piper retrofractum)*	Fruit		Overcoming sperm infertility
6.	Katuk *(Sauropus androgynus)*	Leaf	Womanhood	Leaf
7	Kayu rapet *(Parameria laevigata)*	Tree bark		Tree bark
8	Kepuh / kayu wedok	Fruit		Fruit

	(Sterculia foetida)			
9	Sirih (*Piper betle)*	Leaf		Leaf
10	Sereh wangi	Stem	Chronic Illness	Cancer and diabetes
11	Nusa indah (*Mussaenda frondosa)*	Flower		Cancer
12	Kayu manis *Cinnamomum burmannii*	Tree bark		Diabetes
13	Mahkota dewa *Phaleria macrocarpa*	Fruit		Cancer
14	Kumis kucing *Orthosiphon stamineus*	Leaf		Uric acid
15	Pandan *Pandanus amaryllifolius*	Leaf		Antibacterial and diabetes
16	Kompri *Shymphytum officinale*	Leaf		Inflammation of the intestines, diarrhea, and diabetes.
17	Seligi *Phyllanthus buxifolius*	Leaf		Diabetes
18	Sambiloto *Andrographis paniculate*	Leaf		Diabetes
19	Cendana *Santalum album*	Tree bark		Aromatherapy, Skin cancer and diuretic
20	Jati belanda *Guazuma ulmifolia*	Leaf		Cholesterol
21	Tempuyung *Sonchus arvensis*	Leaf		Uric acid
22	Tapak liman *Elephantopus scaber*	Root		Cancer
23	Kedondong laut *Nothopanax fruticosum*	Leaf		Rheumatism and diuretics
24	Kelor *Moringa oleifera*	Leaf		liver, rheumatism and anemia.
25	Tapak dara *Catharanthus roseus*	Leaf	Mild illness	Burns
26	Pipermint *Mentha cordifolia*	Leaf		Flu and aromatherapy
27	Stevia *Stevia rebaudiana*	Leaf		Anti-inflammatory
28	Echinacea *Echinbacea purpurea*	Flowers and leaves		Influenza, and immune system.
29	Pecut kuda *Stachytarpheta mutabilis*	Leaf		Inflammation, tonsillitis, cough.
30	Temu hitam *Curcuma aeruginosa*	Rhizome		Increase appetite
31	Jahe *Zingiber officinale*	Rhizome		Antibody

32	Kunyit *Curcuma domestica*	Rhizome	Anti-inflammatory
33	Pegagan *Centella asiatica*	Leaf	Intelligence
34	Lempuyang *Zingiber aromaticum*	Rhizome	Fever and appetite
35	Adas *Foeniculum vulgare*	Seed	Constipation
36	Gandarusa *Justicia gendarussa*	Leaf	Rheumatism and fever
37	Daun encok/daun sendok *Plantago major*	Leaf	Cough
38	Beluntas *Pluhea india*	Leaf	Overcoming body odor, mouthwash, antiseptic and diarrhea
39	Mangkokan *Nothopanax scutellarium*	Leaf	Hair loss, inflammation and repel mosquito repellent.
40	Kapulaga sabrang *Amomum compactum*	Rhizome	Anti bacterial
41.	Kucai *Allium odorum*	Leaf	Food flavoring
42.	Lavender *Lavandula angustifolia*	Flower	Powerful overcome insomnia, and reduce mosquito larvae
43.	Jintan hitam *Nigella sativa*	Seed	Asthma and anti allergies
44.	Kopsia *Kopsia fruticosa*	Roots and leaves	Overcoming hemorrhoids
45.	Rosmery *Rosmarinus officinalis*	Leaf	Dental treatment, improve memory and aromatherapy
46.	Sri gading *Nyctanthes arbor-tristis*	Flowers and leaves	Anti-inflammatory
47.	Melati putih *Jasminum sambac*	Flower	Aroma therapy
48.	Akar wangi *Vetiveria zizanioides*	Roots and essential oils	Basic ingredients of cosmetics, perfumes and soaps.
49.	Lidah Buaya *Aloe vera*	Sap	Treating wounds and fertilizing hair

Moringa leaf (Moringa oleifera) contains higher iron than other vegetables of 17.2 mg / 100 g (Yameogo et al., 2011). Moringa leaves also contain amino acids. The results of Verma et al. (2009) that the Moringa leaf contains phenol in large quantities known as an antidote to free radical compounds. Tomato leaf extract (Catharanthus roseus) has benefits as wound healing because it contains alkaloids, flavonoids, tannins, polyphenols and steroids (Putri, 2017).

The number of Patemon Village of Tengaran District is 2,940 people. Patemon

village has an area of 372,380 hectares consisting of 233,000 ha of land, 139,380 hectares of yard and 1 Ha tomb. The village of Patemon Tengaran is known as a village that hereditary still preserve the culture of utilizing medicinal plants. Patemon Tengaran villagers have knowledge about the use of medicinal plants and apply them in daily life. Although the community has advanced, but still believe in traditional medicine in life. Patemon Village community utilize the home page, roadside and fields as a media planting. Research conducted Arum (2012) states that the identification of medicinal plants Keseneng villagers conducted in forests, yard houses, roadsides, rice fields and riverside.

One of the villagers Patemon Dusun Losari District Tengaran Mrs. Ngatemi and Mr Margono process medicinal plants in the form of powder. The concoction is usually consumed by itself even sold to the surrounding community, outside the city and even outside Java. Ngatemi's mother obtained raw materials from the yard or middleman. Ngetemi's mother is the chairman of the Kelompok Wanita Tani (KWT) who initiated the preparation of traditional medicine into powder. The packaging of traditional medicine is modern and interesting. Drawings of medicinal plant products can be seen in Figure 2.

Figure 2. Preparations of Medicinal Plants Patemon Village

Patemon Village customs consume traditional medicinal preparations empowered by the village government to create a village of Family Medicinal Plants (TOGA). This is evidenced by the Patemon Village District Tengaran get the national champion 3. Community visits to Patemon Village from various regions both from Java island and outside Java island. The results of the identification of medicinal plants in Patemon Village contained 23 species can be seen in Table 2.

Tabel 2. Results of Identification of Medicinal Plants at TOGA Park in Patemon Village, District of Tengaran, Semarang Regency

No	Local name	Plant parts	Benefith
1	Lempuyang (*Zingiber zerumbet*)	Rhizome	Increase appetite
2	Jahe (*Zingiber officinale*)	Rhizome	Body warmers.
3	Laos (*Alpinia galangal*)	Rhizome	Food flavoring
4	Sereh (*Cymbopogon citratus*)	Rhizome	Spices and anti-inflammatory
5	Temulawak (*Curcuma xanthorrhiza*)	Rhizome	Appetite enhancer
6	Sirsak (*Annona muricata*)	Leaf	Uric acid
7	Manggis (*Garcinia mangostana*)	Leaf and fruit skin	Prevent cancer
8	Pandan (*Pandanus amaryllifolius*)	Parts of the plant	Function
9	Jeruk Nipis (*Citrus aurantifolia*)	Leaf	Aroma cuisine
10	Jambu Biji (*Psidium guajava*)	Leaf and fruit	Facial skin and cooking spices
11	Lidah buaya (*Aloe vera*)	Leaf	Diarrhea
12	Brotowali (*Tinospora crispa*)	Sap	Drug wound
13	Kunyit (*Curcuma longa*)	Leaves and stems	Appetite and diabetes

14	Sambiloto (*Andrographis paniculata*)	Rhizome	Stomach ulcers, diarrhea
15	Purwoceng (*Pimpinella pruatjan*)	Leaf	Hot fever
16	Keji beling (*Strobilanthes crispa*)	Leaves and roots	Strong medicine
17	Binahong (*Anredera cordifolia*)	Leaf	Urinary stones and gout
18	Kayu manis (*Cinnamomum burmannii*)	Leaf	Diabetes
19	Temu ireng (*Curcuma aeruginosa*)	Stem bark	Herbs and spices
20	Seligi (*Phyllanthus buxifolius*)	Rhizome	Increase appetite
21	Adas (*Foeniculum vulgare*)	Leaf	Sprain
22	Sirih (*Piper betle*)	Leaf	Constipation
23	Gandarusa (*Justicia gendarussa*)	Leaf	Whitish

Part of the plants that are often used by the people of Patemon Village are the leaves and rhizomes. Rimpang lempuyang (Zingiber zerumbet) is believed Patemon Society can increase appetite. Rimpang lempuyang also used maternal breast milk (ASI) by the Village Keseneng (Arum, 2012). Jahe (Zingiber officinale) is used by the Patemon Village community as a body-warming drink and a cold medicine. Ginger also has benefits as an antimicrobial and antioxidant, because ginger contains a compound of gingerone and gingerol that can inhibit the growth of E. coli (Harahap, 2016). Rimpang Lengkuas (galangal galangal) or laos is often used Patemon Village community as a spice cooking. Other benefits of galangal as antifungal and antibacterial (Handajani, 2008). Patemon Village community uses the most medicinal plants as an appetite enhancing drug. Lempuyang (Zingiber zerumbet), temulawak (Curcuma xanthorrhiza) and temuireng (Curcuma aeruginosa). How to medicinal plants in the village of Patemon by boiling and processed into powder.

The result of identification that was done later became the basis in the development of learning module JAS approaches on the material processing of natural resources in the form of medicinal plants in TJNM and TOGA Park Patemon Village, Tengaran District.

Characteristics of JAS approach module

The format of learning module JAS approach with systematic module framework consists of concept maps, indicators of competence achievement, materials, independent tasks, quizzes, experiments processed medicinal plants and essay tests. Learning module has characteristic that is development of this module based on identification of medicinal plants directly at TJNM location and TOGA Park Patemon Village of Tengaran District. Parmin & Peniati (2012) stated that learning bermodul developed through the utilization of research results effectively will be able to change the conception of students to the scientific concept.

Validity of Learning Module JAS Approach

Modules are said to be worthy of use once they have passed the validation stage. According Ridho (2014) the quality of a module can be obtained from expert validation. The development of JAS approaching learning module through the process of validation by media experts and material experts. The purpose of validation for measuring modules developed can provide results that match the learning objectives. Expert material validation results obtained valid criteria and highly valid media experts. The learning module has been said to be valid, but it needs to be revised. The revision of the module is done to make the product better viewed from both media and material aspects. Revisions made on inputs and suggestions obtained from validator media criterion experts are very valid (95%) and material criterion valid (89%). Components that need to be revised is the design of learning modules, learning materials are still ambiguous, the module has not been able to generate student motivation, the language used is not yet standard, the concept of

learning is not clear, the material is not in accordance with the learning objectives, the material description has not been in accordance with the level of student development, consistency of images and typeface.

Practicality of Learning Module JAS Approach

The response of students and lecturers aims to know the legibility and implementation of learning activities using JAS learning module approach. Results of student and lecturers' responses show that JAS approaching learning modules developed have met the level of legibility with very good criteria that is 100%. Lecturers also provide a very good response to learning modules developed.

The existence of learning modules JAS approach, students respond very well that is 93% in learning activities. Students are excited and interested to observe the types of medicinal plants in TJNM and TOGA Park Patemon Village, Tengaran District. The learning module JAS approach has good quality. The practicality of the developed learning module also gives convenience to the students in learning the learning materials. The results of the research carried out the material contained in the module using language that is easy to understand. The types of medicinal plants shown in the module are medicinal plants that can be found in TJNM and TOGA Park Patemon Village, Tengaran District. Indirectly learning using this module gives a positive impact to the students to be more interested in learning the material of medicinal plants.

Effectiveness of JAS Approach of Learning Module

Effectiveness of Learning Module on Student Cognitive Learning Outcomes

Students cognitive learning outcomes using learning modules at TJNM and TOGA Park Patemon Village District Tengaran show mastery of 84.67%. The value of student activity on activities 1 and 2 meets criterion A (value 80-84) and B + (74-77). High value achievement is supported by the use of JAS approach module. Sari (2016) states high cognitive learning outcomes with the support of a mutual-based module that allows students to learn thoroughly.

Obtaining the value of student learning outcomes shows a high response in learning. The results of Samitra's (2016) study showed that experimental class given JAS approach was more effective than control class. Outdoor learning activities make learning fun, so that will have an impact on student learning outcomes.

In the final evaluation, there are still students who get unfinished value that is with the score 58 and 59 because the essay only filled in several numbers. Suwardi (2012), expressed the desire of students to master the material can help students in improving their achievement.

Effectiveness of Learning Module on Student Affective Learning Outcomes

Student affective learning result using JAS learning module in TJNM and TOGA Park Patemon Village of Tengaran District showed 84% mastery with good criteria. The factors of student success in reaching completeness of affective value is student interest in learning process. Darmaji (2014) expressed interest in encouraging one to gain understanding and skills for the purpose of attention.

The learning process is done outside the classroom so that students have an interest in the learning process. Students can interact with nature in TJNM and TOGA Park Patemon Village, Tengaran District. Students also communicate with the Patemon Village community about the benefits of medicinal plants. The results of Widiyaningrum et al. (2013) states that the average affective aspect in each meeting has increased, as many students are actively involved in learning. Aspects of assessment get a good criterion on the sincerity of students to learn to know and cultivate medicinal plants into traditional medicine.

Effectiveness of Learning Module on Student Psychomotor Learning Outcomes

Learning outcomes show that all aspects assessed achieve very good criteria of 90%. However, there are some aspects have not reached the criteria very well namely aspects of

students' skills in preparing tools and materials. Some student groups did not carry cameras during observation and identification of medicinal plants, making it difficult to report documentary observations.

Another psychomotor assessment is gained from the experience of students working on medicinal plants. Students practice the making of traditional medicinal products in powder form. Students cultivate medicinal plants from the environment around Patemon Village. The traditional process of processing and packaging that has been done in a modern way to attract students. According to Widiana (2016), project-based learning provides students with learning to foster aspects of learning interests and opportunities to solve concrete problems in order to make learning more meaningful.

Rahayu (2011) states that learning involving physical actions can develop activities and physical movements that are transferred into ideas so as to enhance psychomotor development. Another factor is the diverse student background. Suharti & Sirine (2011) stated the importance of family role in encouraging the interest of children in entrepreneurship. Interest in developing a business in treating medicinal plants needs support from student psychomotor family environment.

CONCLUSION

Results of identification of medicinal plants were obtained by 49 species in TJNM and 23 species in TOGA Park Patemon Village, Tengaran District. Further identification results were used as the basis for the development of JAS medicinal material learning modules.

Characteristics of JAS-modified medicinal modules contain directly identifed MFIs in TJNM and TOGA Park, quizzes to find the names of medicinal plants, experiments to treat medicinal plants, plant medicinal modules of JAS syntax, essays and clear drawings and facts.

JAS learning module JAS approach in Taman Nyonya Meneer Jamu declared very valid by media expert and declared valid by expert material. Learning modules developed eligible for use in learning activities of natural resources processing materials in the form of medicinal plants.

JAS medicinal plant modules are practically used in learning based on student and lecturer responses.

The medicinal plant learning module is effective for improving students' mastery. The result of student learning using learning module JAS approach shows 84,67% student reach completeness.

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