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## Using Service-Learning in Urban Areas in Semarang Regency to Address Local Knowledge System

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### Abstract

Service-learning has gained substantial recognition as an effective type of pedagogy and has enhanced civic education across the disciplines, however remains a lack of understanding of this type of learning in Indonesia. The goals of the study were (1) to explore the forms of local knowledge systems practiced in Semarang Regency and how they are used in resources conservation using service-learning method, (2) to foster student engagement with the community, and (3) to promote student awareness of community resources that are directly relevant to local knowledge system issues. The success of the service-learning projects in meeting these goals was assessed via qualitative analysis of student reflective papers and classroom presentations. The results indicated there were local knowledges that were still successfully in use, but often only very locally. Furthermore, the results also indicated that the service-learning projects promoted students' valuable academic skills, including communication, team-building, and critical thinking, built their self-esteem, their awareness of community needs and resources, and demonstrated the relevance of course content to real life.

**Keywords:** *Service-learning, environmental management, local knowledge, agriculture, Indonesia.*

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## Introduction

At its most basic, service-learning offers exciting opportunities for pedagogy that can enhance student classroom experiences and community engagement through targeted service that meets community-identified needs and reflection activities that integrate that service back into the academic framework of the course [1]. Personal reflection is a process occurring when learners actively reflect on what is learned throughout the service-learning experience [2]. Service-learning, like undergraduate research, is one of ten high-impact practices known to increase student retention and engagement [3]. It has been credited with making arcane disciplinary knowledge relevant to students.

Service-learning has been applied in a wide variety of disciplines and courses, including writing and composition [4], financial [5], engineering [6], psychology [7], science and mathematics [8], accounting [9], nursing [10], geography [11], political science [12], liberal education [13], public relations [14], and teacher education [15] courses. Although service-learning has become very widespread in undergraduate education, applications in the natural sciences in Indonesia are rare. This may seem surprising since numerous studies have documented benefits in discipline-based learning for student engaged in service-learning experiences as reviewed by [16], as well as development of personal and professional skills and increased civic-mindedness [3]. Service-learning has been shown to give students the tools necessary for critical reflection and thinking [17]. This reflective space fulfills both academic and civic learning outcomes for students encouraging them to understand the applicability of their service-learning experiences to their lives and communities [18].

For these reasons, a service-learning project was incorporated into the curriculum of an undergraduate course entitled Environmental Management on the topic of local knowledge systems. Through participating in this project, students learned about local knowledge systems use in agriculture since local knowledge is increasingly seen as a critical information source for environmental management and restoration [19]-[22]. Taylor and de Loë [23] stated that local knowledge is an important value in supporting technical investigations, developing policies, and effective use in the environmental decision-making process. It is the basic for decision-making in rural communities with respect to food security, human and animal health, education and natural resources management [24].

Local knowledge has been developed outside the formal educational system and is embedded in culture and steeped in tradition. However, in many places in world, local knowledge systems are eroding or losing their relevance due to rapid changes in their biophysical and socio-economic environment [25]. Some of these changes are driven by process of globalization, outrun their evolutionary adaptive capacity [26].

The goals of the study were (1) to explore the forms of local knowledge systems practiced in Semarang Regency and how they are used in resources conservation using service-learning method, (2) to foster student engagement with the community, and (3) to promote student awareness of community resources that are directly relevant to local knowledge system issues.

## Research Method

### Participant

Participants in the study were 42 undergraduate students enrolled in the Environmental Management course in the year 2014-2015. Participants included 14 males (33%) and 28 females (67%). The students in the class were divided into 4 teams of 10-11 students each. Community partners included dryland farmers on the slope of Mt. Merbabu, paddy farmers on the edge of Rawa Pening Lake, local fishers in Rawa Pening Lake, and local inhabitants of the Senjoyo spring.

### Procedures

Environmental Management course is offered in a lecture format. The course is designed to provide students with a thorough understanding of how ecological principles can be applied to the environmental and natural resources management. The class meets once a week as a group in 100-minute lecture sessions. Four of twelve course sections were designated as “service-learning” sections, in which students would be assigned to engage in approximately 30 hours of service throughout the semester, which included about 20 hours of actual service performed together at dryland farm on the slope of Mt. Merbabu, wetland farm on the edge of Rawa Pening Lake, other agricultural endeavors in Rawa Pening Lake, and the Senjoyo spring as well as about 2 hours of reflection. The lecturer facilitated guided in-class reflection before live-in and at the end of semester to encourage students to connect the content and course goals they were learning to the service-learning experience. Near the end of the semester, students in groups in the service sections also wrote short papers and presented brief

oral reports based on their experiences. Students were guided to integrate their experience through service-learning with the theories discussed in class.

In order to gain insight on local agricultural systems and to learn the life of farming families, the students lived with farmers for 3 days. They provided direct services via working with various farmers and their responsibilities included assisting with farming (clearing weeds, harvesting crops, fishing), collecting water hyacinth (*Eichhornia crassipes*) petioles, spring cleanup or other support as necessary. To allow for documentation of local agricultural knowledge, this study used informant interviews and participant observation and involvement to collect information.

## Results and Analysis

The results of this study describe a service-learning assignment integrated into Environmental Management course. Data were collected on students' experiences engaging in the assignment in order to explore the forms of local knowledge systems practiced in Semarang Regency and how they are used in resources conservation. The experience was designed through the subject on local knowledge systems and service-learning as an empirically based approach to help students connect their coursework to real world settings [27].

After the concept of service-learning was explained to them, the reflective comments showed that majority of students enrolled in this course said they would like to participate in it. Most of students felt that they would benefit from engaging in community service-learning. Most students believed that through service-learning they would develop problem solving skills.

While living with various farmers for 3 days, the student found and used some local knowledge that has been practiced in the management of land and agriculture for generations. For examples, some farmers on the slope of Mt. Merbabu still used *pranata mangsa*, a traditional agriculture calendar system found in Java. It is a source of guidance for the management and conservation of land and water environments [28]. Some farmers also used freshwater crabs (*Parathelphusa convexa*) and hydrilla (*Hydrilla verticillata*) as attractant for insect (*Leptocorisa oratorius*) in paddy fields on the edge of Rawa Pening Lake. After killing, these crabs were tied with bamboo sticks and placed randomly in the field. Insects are attracted with the smell of crabs and they sit over the body to suck the sap. Thus, the crop is saved from insects. Farmers in the slope of Mt. Merbabu used fennel (*Foeniculum vulgare*) in farm field as insect repellent. Farmers in paddy fields on the edge of Rawa Pening Lake also used traditional bird-scaring methods at the time of maturity of rice crop to dissuade birds from eating rice. These methods included vocalizations and hang lots of flags or rattling cans that attached to lines or cord stretching from the central location throughout the field. Some fishermen in Rawa Pening Lake used spears to catch fish and red claw crayfish (*Cherax quadricarinatus*) that seems to be environmentally friendly form of fishing due to highly selective causing no habitat damage. In addition, students also found that banyan (*Ficus benjamina*) trees near to the Senjoyo spring were sacred as local residents have a belief that holy spirits reside in the trees and ensure the availability of clean water. Thus, there are local knowledges that are still successfully in use, but often only very locally and those that are still in use but no longer meet the increased pressure of changing land use and other socio-economic changes.

As discovered by students, local knowledge mostly stored in people's memories and embedded in their practices and experiences, and its transmission is usually based on oral as well as direct training of youth by elders rather than in written means. This makes local knowledge gradually extinct as its system goes out of use [29]. It is also at risk of becoming extinct because of rapidly changing natural environments and fast pacing economic, political, and cultural changes on a global scale [30]. In agriculture, for example, new technologies adopted by farmers are easier and convenient to use hence making indigenous knowledge to disappear. Students also found that awareness of and compliance with local knowledge practices are associated more with older village residents than with younger generations. This phenomenon also happened in rural communities in northern Ghana [31].

Overall, the students were very positive about their service-learning experiences. Feedback from reflective comments suggested that most of students agreed that service-learning experiences enhanced classroom studies. Most students also noted that they learned to work within a group. They indicated that service-learning helped to strengthen their collaboration skills, work as a team member, and work with community partners. For example, once students have worked on farms or lake in the hot sun for a few hours, pulling weeds, moving compost, bringing the harvest from the farm, cutting water hyacinth petioles (stalk stem) for handicraft raw materials, or catching fish at night, they are more respectful on the difficulty of farming as an occupation. Student participants developed empathy for the communities they were serving as well as their fellow students. Service-learning enables students to understand their respective roles in improving the environment and resources. An example of these

roles was demonstrated by a group of students educated young residents on Senjoyo spring about sanitation, spring water quality, and how to maintain the water quality. Previous studies also suggested there is an improvement when service-learning methodology is used [32], [33].

## Conclusion

There were local knowledges that were still successfully in use, but often only very locally. The service-learning projects have promoted students' valuable academic skills, including communication, team-building, and critical thinking, built their self-esteem, their awareness of community needs and resources, and demonstrated the relevance of course content to real life.

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