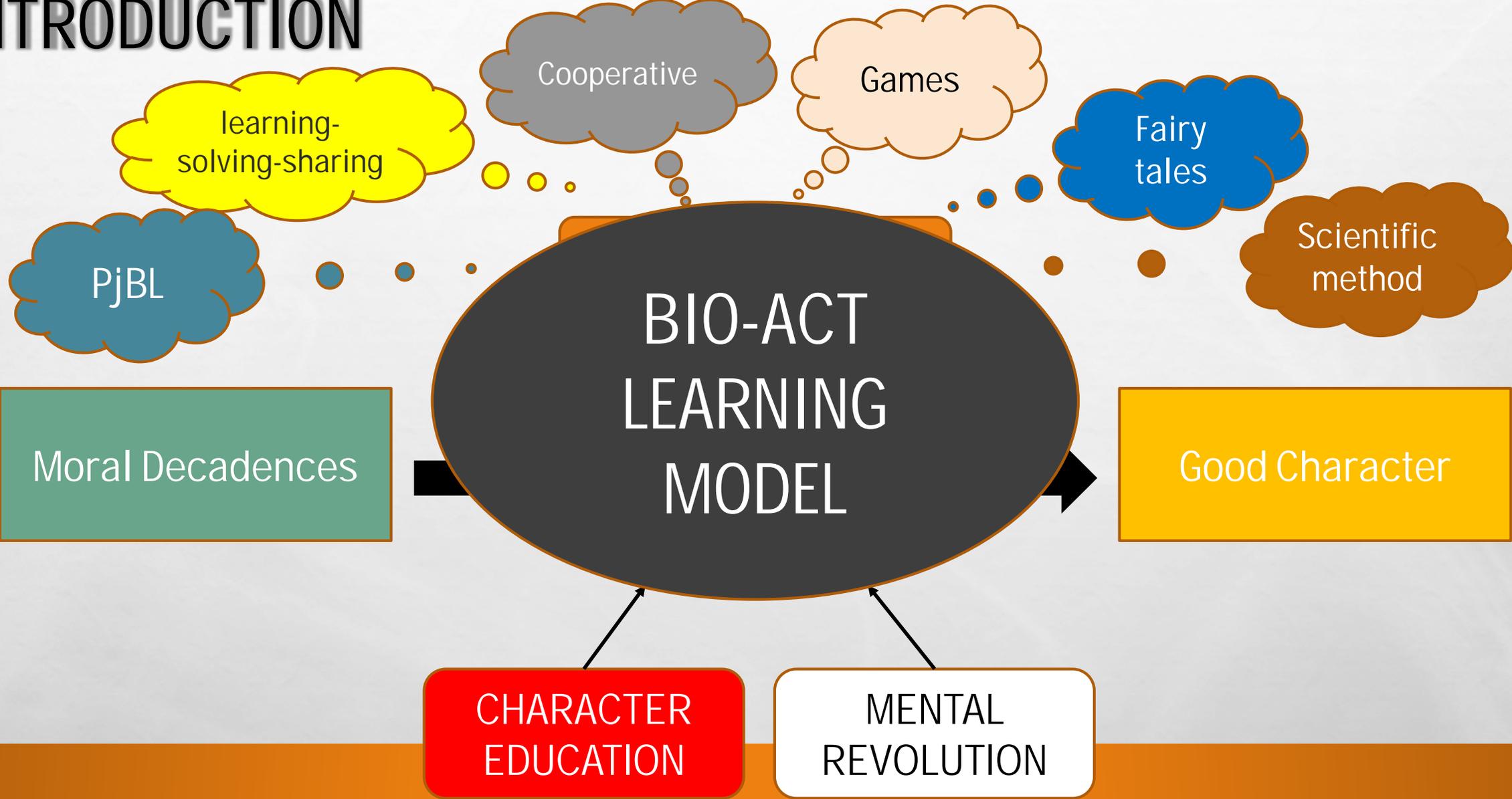


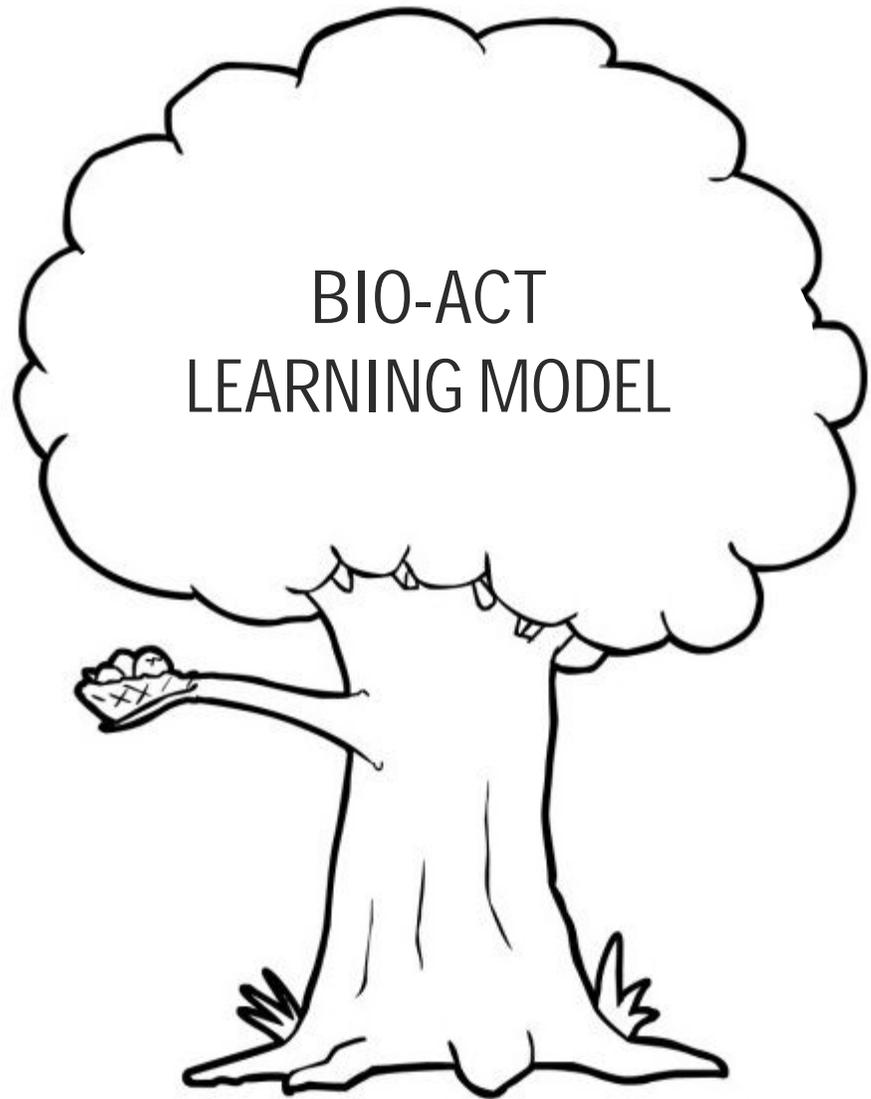
# Development of Bio-act Learning Model: Character Education Model in Biology Learning in Higher Education

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# INTRODUCTION





Service-Learning

**Service-learning** is a learning model that combines learning in the classroom with service activities to the community (Warren, 2012)

Rooted in the theory of experiential learning which focuses on giving experience to students to implement learning theories in service activities to the community (Jacoby, 2015)

The basic principle is "**Service, combined with learning, adds value to each and transform both**" (Jacoby, 2015)

The concept of developing service-learning as experiential learning is described as a cycle involving experience, reflection, and implementation

Through service-learning, students can learn and develop themselves through active participation in an organized service activity based on problems that exist in society.

# The Service-Learning Model has Many Opportunities in Developing Student Character

No.	Service-learning stage	Character Values
1	Investigation	Curiosity, communicative, social care, honest
2	Planning and Prepare	Creative, hard work, communicative, responsibility
3	Action	Hard work, discipline, responsibility, communicative, social care
4	Reflection	Honest
5	Demonstration	Honest, communicative

(Handoyo, 2014)

The aims of this study is :

- to develop the Bio-Act learning model as a character education model, which consist of the syntax, the principle of reaction, the social system, the support system, the instructional impact and the accompanying impact of the Bio-Act learning model.
- Explained how the implementation in learning process
- Explain the findings during the implementation of the model
- Analysis the effectiveness of the Bio-Act model in developing student character, especially the character of social care and responsibility

# RESEARCH METHODOLOGY

## Preliminary Research

- 1) Analysis of curriculum of Biology Education Study Program in the Yogyakarta Stated University and the Sanata Dharma University
- 2) Course analysis, related to lesson plans and learning materials;
- 3) Analysis the context of the community around Yogyakarta that can be used as learning materials; and
- 4) Studies of various libraries, especially research journals on service-learning implementation, to develop the design of learning models in accordance with the context of society.

The initial data collection phase be conducted through literature studies and interviews with lecturers in courses in biology education study programs, Yogyakarta State University and Sanata Dharma University.

## Prototyping Stage

- 1) **Design** : developed syntax, reaction principle, social system, support system, instructional impact and accompaniment impact; Determination of courses used as samples for testing and determining target communities where service learning is implemented; Develop learning tools (lesson plans, student diaries, and mastery test); and Develop a quisionaire character
- 2) **Formative evaluation**: including self evaluation, followed by validation of learning tools and evaluation tools by experts and field trial
- 3) **Revision**: The revisions are carried out in stages starting from the self evaluation, expert validation, and field trial

## Assessment Stage

At this stage the effectiveness of the prototype was explored and evaluated using summative evaluation.

This assessment phase is carried out at the end of the model development in each cycle.

The effectiveness of the Bio-Act learning model in developing the character of social care and student responsibility is measured quantitatively and qualitatively.

Quantitatively, character development is measured through the character questionnaire instrument, while qualitatively using student reflection in a student's diary.

# FINDING AND DISCUSSION

## *PRELIMINARY ANALYSIS*

- Subjects related to hygiene and environmental sanitation
- The courses used in the development of the bio-act learning model are the environmental health practicum which is held at the Yogyakarta State University (YSU) and the human health sciences course held at the biology education study program in Sanata Dharma University (SDU)

### **Environmental Health Practicum (EHP) course**

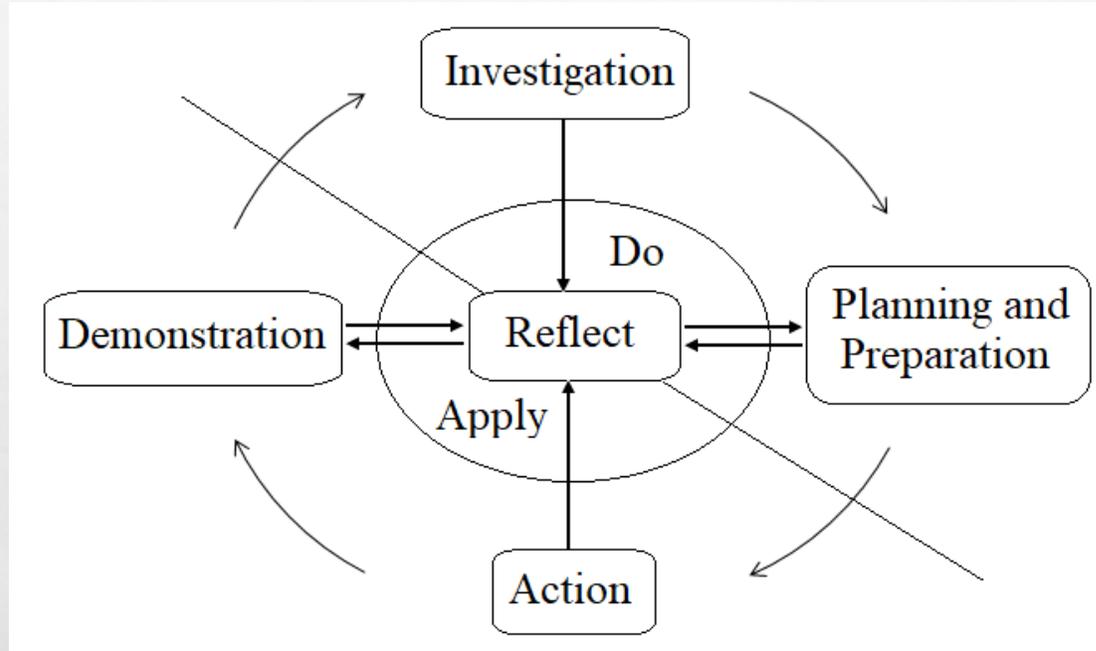
- an elective course
- 1 SKS/2JP
- The subject focuses on problem solving skills in overcoming environmental sanitation problems.
- The usual lecture methods are lectures, discussions, observations, and presentations.
- Environmental health practicum courses have implemented a group project for students. Students are assigned to carry out observations related to sanitation problems that exist in the environment around the campus, conduct analysis and the results are presented in class. Never doing service-learning before

### **Human Health Sciences (HHS) course**

- Regular course with 5 SKS/5 JP
- Focuses on various things related to humans and health, one of the lecture material discussed is about personal hygiene and environmental sanitation.
- This course is delivered with lecture, discussion, presentation, observation, and practicum methods.
- In the subject of human health science, students are invited to make observations to the community related to environmental hygiene and sanitation, the results of these observations are set out in the form of community service activities proposals. The proposal is submitted to the university or submitted in the community creativity program for community service. If funded then the activity is carried out, and vice versa.

# THE PROTOTYPE OF THE BIO-ACT LEARNING MODEL

Experiential learning  
"do, reflect and apply"



Steps of service learning  
IPARD

Syntax Of Bio-act Learning Model

# ELEMENTS OF THE BIO-ACT LEARNING MODEL

No.	Elements	Description
1	Syntax	The main syntax consists of 5 stages, namely Investigation, Planning and prepare, Action, Reflection, and Demonstration (IPARD)
2	Principle of Reaction	The duties of lecturers as facilitators who: <ul style="list-style-type: none"><li>• Receive student observations</li><li>• Helping students explore the problem situations that exist in society from various sides</li><li>• Provide input / alternatives for action activities that will be carried out by students</li><li>• Give emphasis that there are many alternatives in solving a problem</li><li>• Observing action activities carried out by students</li><li>• Increase student awareness about feelings and what students learn through reflection</li></ul>
3	Social System	Lecturers have responsibility at the beginning of the activity, especially in introducing the Bio-Act learning model to students, starting stages and guiding students through activities at each stage. Lecturers must be able to create students' imagination and creativity in formulating ideas for activities that can be done. The action activities that will be carried out by students are determined jointly by the student group with input from the lecturer (cooperative).
4	Supporting System	Lesson plan, student diary, tools and materials for action activities, assessment instruments, activity observation sheets
5	Instructional Impact	Understanding of learning material
6	Companion Impact	Student character development, especially social care and responsibility

# IMPLEMENTATION OF THE BIO-ACT MODEL

No.	Learning Stage	Learning Activities
1	Preliminary	<ul style="list-style-type: none"><li>• Preliminary lecture with material what is service learning, what are the benefits for students and how the learning steps</li></ul>
2	Investigation stage	<ul style="list-style-type: none"><li>• Group discussions to determine the focus of problems in the community that will be observed</li><li>• Compile the observation sheet, discuss it with the lecturer</li><li>• Provision of observation assignments in accordance with the topics agreed to by the group with the guidance of the observation sheet, carried out outside the lecture hours</li><li>• Presentation of observations</li><li>• Students do personal reflection on investigation stage</li></ul>
3	Planning and prepare stage	<ul style="list-style-type: none"><li>• Student groups discuss plans for Bio-Act action activities to be carried out</li><li>• Students do personal reflection on planning and prepare stage</li></ul>
4	Action Stage	<ul style="list-style-type: none"><li>• Student groups carry out action activities in the community, namely counseling related to the topic of each group</li></ul>
5	Reflection stage	<ul style="list-style-type: none"><li>• Students do personal reflection</li></ul>
6	Demonstration Stage	<ul style="list-style-type: none"><li>• Student groups present the results of the Bio-Act activities</li></ul>
7	Closing activities	<ul style="list-style-type: none"><li>• Strengthening of lecturer and prepare final report</li></ul>

# ANALYSIS OF BIO-ACT MODEL IMPLEMENTATION

The implementation of the bio-act learning model in EHP course encountered several obstacles in terms of the time of each stage of activity.

- Preparation of observation sheets that exceed the specified time
- Observation of the field beyond the set time causes the time for presentation to be backwards
- The action activities in the community which were originally planned for 2 weeks, declined to 3 weeks.

**These constraints are caused partly because:**

- the bio-act model was first applied to students so students need to adapt to new learning models;
- limited learning time (1 sks / 2 hour);
- the bio-act learning model involves many people and requires time outside the lecture hours, especially in the investigation stage and action stage; and
- other tasks that students must complete.
- The evaluation of the technical constraints on the implementation of the bio-act learning model in the environmental health practicum course is an improvement material for the implementation of the model in the next cycle.

# ANALYSIS OF BIO-ACT MODEL IMPLEMENTATION

- The implementation of the bio-act learning model in the HHS course runs better and more freely. Students can complete all assignments given on time. This is due to the large amount of credit (5 credits). A free time allows lecturers and students to discuss better and students have time to manage all their activities.

# THE EFFECTIVENESS OF THE BIO-ACT LEARNING MODEL IN DEVELOPING STUDENT CHARACTER

Analysis of Character Questionnaires in the Environmental Health Practicum Course

No.	Aspects		Social care	Respon sibility
			Score	
1	Normality Test (Shapiro-Wilk)	Sig. (Before)	0,536	0,073
		Sig. (After)	0,675	0,135
2	Mean	Initial Character	29,1765	29,2941
		Final Character	31,3529	30,00
3	Correlation	Before-After	0,946	0,964
4	T-Paired score	Sig. (2-tailed)	0,000	0,001
5	Level of confidence		95%	95%

Analysis of Character Questionnaires in the Subject of Human Health Sciences

No.	Aspects		Social care	Respon sibility
			Score	
1	Normality Test (Shapiro-Wilk)	Sig. (Before)	0,798	0,461
		Sig. (After)	0,257	0,546
2	Mean	Initial Character	27,8333	29,8333
		Final Character	37,9167	38,375
3	Correlation	Before-After	0,659	0,435
4	T-Paired score	Sig. (2-tailed)	0,000	0,013
5	Level of confidence		95%	95%

# Qualitative analysis

Qualitative analysis of student character development is measured through student reflection written in a student's diary

*"My social care character has developed, as in service-learning activities, I can share information with the public about waste management. This service-learning activity requires collaboration between group members and students with the community. Collaboration between group members such as in terms of coordination, task completion, assignment, etc. In carrying out service-learning responsibilities are also needed such as when I am given responsibility in the division of tasks. My sense of responsibility is even greater because this activity interacts directly with the community"* (SMSP, HHS4)

*"With this activity I became more concerned with others and the surrounding environment. The task of service-learning activities is a responsibility for us to solve problems in life, especially about personal hygiene and requires us to be able to cooperate well with groups"* (IAD, HHS3)

*"... What I like about activities with the community is being happy to find a solution that can ultimately benefit others"* (IR, EHP3)

*"What can be learned is that we must cooperate with each other, deliberate consensus, respect each other's opinions, do not force the will and must be responsible for the tasks that have been carried out"* (HAPP, EHP1)

# FINAL REVIEW OF THE BIO-ACT LEARNING MODEL

- Implementation of the bio-act learning model is not easy
- Time management
- The amount of the credit for the course
- Creativity
- Doing observation
- Linking the theory to the activity

Huge effort

vs

The benefit in  
developing  
character

WHY NOT?

THANK  
YOU