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A Guide on How to Run an In Situ One Health Problem Based Learning

A guide on how to run an *in situ* one health problem based learning

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A Guide on How to Run an In Situ One Health Problem Based Learning

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CONTENTS

APPENDICES

ABBREVIATIONS

Brucella sp.	*Brucella species*
CK	Creatinine kinase
DNA	Deoxyribonucleic acid
DOT	Directly Observed Therapy
DVS	Department of Veterinary Services
E. coli	*Escherichia coli*
ELISA	Enzyme linked immunosorbent assay
FILA	Facts, Ideas, Learning outcomes, Actions
FBC	Full blood count
IFAT	Immunofluorescence antibody test
JKORC	Jerome Kaino Orangutan Rehabilitation Centre
GERD	Gastro-esophageal reflux
LCD	Liquid crystal display
MRI	Magnetic resonance imaging
MDR-TB	Multi-drug-resistant
M. tuberculosis	*Mycobacterium tuberculosis*.
Mycobacterium sp.	*Mycobacterium species*
Nocardia sp.	*Nocardia species*
OH	One Health
PBL	Problem Based Learning
PCR	Polymerase chain reaction
PERHILITAN	Department of Wildlife and National Parks Peninsular Malaysia
PTH	Pusat Ternakan Haiwan
RNA	Ribonucleic acid
rRNA	Ribosomal RNA
SWOT	Strengths, Weaknesses, Opportunities, Threats
TOR	Term of reference
WHO	World Health Organization
XDR-TB	Extensive-drug resistant tuberculosis

FOREWORD BY CHAIRMAN, MALAYSIA ONE HEALTH UNIVERSITY NETWORK (MyOHUN)

I wish to congratulate the multisectoral and multidisciplinary team members from the government agencies and universities working under the Malaysia One Health University Network (MyOHUN) for initiating and successfully completing this novel Guidelines Book.

This Guidelines Book is a much-needed addition to the existing books, publications, and guidelines on problem-based learning (PBL) in our country and the Southeast Asia region. I believe that this is the first local Guidelines Book that outlines detailed SOPs/guidelines on how to conduct the *in situ* PBL program. While the general concept of PBL is now widely known and implemented in the classroom, adopting and integrating the idea in the *in situ* PBL program is quite challenging.

MyOHUN has successfully organized the *in situ* PBL program over the years as part of the One Health Experiential Learning, providing an opportunity for university students to learn relevant One Health competencies through PBL cases adapted to be used outside the classroom.

It is hoped that this Guidelines Book will address, to some extent, the numerous issues and barriers related to the implementation of the *in situ* PBL program, thereby, bridging the gap between classroom theories and field investigations using the One Health concept. Novel as it is, the book also emphasizes the importance of ecosystem and wildlife balance in maintaining a healthy tropical ecosystem to prevent zoonosis transmission.

I sincerely hope our future One Health Workforce will benefit from this Guidelines Book. I am humbled and extremely grateful to the contributors of this book, led by Assoc. Prof. Dr. Hasliza Abu Hassim and team members from the ministries and universities for their time, determination, efforts, and commitment leading towards its completion. It is high time that a Guidelines Book like this is developed as a reference to conduct the *in situ* PBL program.

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PREFACE

As part of One Health experiential learning for students from various disciplines, this *in situ* Problem Based Learning (PBL) provides an opportunity for university students to learn One Health competencies through MyOHUN OH-PBL cases adapted to be used outside the classroom. The objective of the activity is to expose the students to the application of theories learned in class to the investigation of a problem using the One Health concept in the field.

Following the success of conducting this *in situ* PBL activity, this module is developed to ensure its sustainability and used as an addition of teaching-assisted materials, especially on *in situ* problem-based learning. This module provides details SOP/guidelines on how to conduct this *in situ* PBL, which involves networking and cooperation from different agencies (e.g. Department of Veterinary Services).

The module uses an example of PBL case studies that were used during an *in situ* PBL activity, with an application of One Health core competencies covering medical, biomedical, veterinary, animal and ecosystem health. The module also includes the awareness of possible pathways for zoonosis in a tropical forest ecosystem amongst the wildlife workforce and emphasizes the importance of maintaining a healthy tropical ecosystem to prevent zoonosis transmission.

This module was prepared in two series of workshops which involved 20 editors and 2 facilitators with experienced in developing modules. All suggestions for improvement by the facilitators and editors were noted and incorporated into the final version of the book. The *how-to* in this guide can be tailored and adapted as needed to scale the activity up or down depending on the resources available to the organizer. We hope this module will benefit everyone from other regions of the world who wish to conduct the *in situ* PBL.

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CHAPTER 1:
INTRODUCTION TO AN *IN SITU* PROBLEM BASED LEARNING

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Table 1.0 Overview on the introduction of an *in situ* PBL

Person in charge	Items	Description	Pages
-	**1.0 Definition of an *in situ* PBL**	1.0 Definition and description of an *in situ* PBL and comparison with a classroom PBL	15
-	**1.1 Definition and terms of reference (TOR) for *in situ* PBL team**	1.1 Definition and TOR for *in situ* PBL team: (a) Organizing committee (b) Coordinator (c) Facilitator • Characteristics of a good facilitator. (Do's and Don'ts) (d) Participants • Roles of participants. (e) Collaborator (f) Sponsor (g) Case writer	16
-	**1.2 Definition of learning outcomes**	1.2 Definition of learning outcomes. How to develop learning outcomes. Refer to Chapter 2 (Pre-activity)	23
-	**1.3 Activities of an *in situ* PBL**	1.3 Activities of an *in situ* PBL: a) Pre-activity • guideline on preparation and planning of the *in situ* PBL. b) Activity • guidelines on conducting the *in situ* PBL. c) Post-activity • guidelines on assessment of the *in situ* PBL.	23

Activity 1.0: Definition of an *in situ* PBL

Description

Definition of an *in situ*

- *In situ* is defined in the Oxford Languages dictionary as 'in the original place'.
- In the context of Problem based learning (PBL), *in situ* refers to the concept of implementing the student-centered pedagogical approach at a location in which the learning issues can be directly related (Weiss, 2018).

The difference between an *in situ* PBL and a classroom PBL

- The main difference between an *in situ* PBL as compared to the commonly practiced counterpart lies in the location where the learning sessions are conducted.
- A classroom PBL is usually conducted in dedicated classrooms or other venues within the university campus.

Description of an *in situ* PBL

- As well as relying on readily available information, resources and tools in the problem-solving process, participants are also exposed to on-site learning cues.
- The problem (usually termed in PBL as 'triggers') to spark off the PBL sessions should be specifically designed to suit the environmental factors (location, surroundings, specific features etc.).
- Because of this, preparations for an *in situ* PBL requires more effort compared to classroom PBL.
- The manager for any *in situ* PBL must be familiar with the site and resources available at the location before the session could be designed.
- Partnership with the site host should also be forged beforehand.
- Experienced facilitators with a huge time commitment are required to deliver an effective *in situ* PBL program.

Advantages of an *in situ* PBL

- The *in situ* PBL technique in a real-life setting would make it a more relevant and interesting learning experience for participants.
- The ability to relate the triggers with real-life and real-time experience in the *in situ* PBL would allow the participants to solve the problems more efficiently. This is because the hands-on approach would render a better knowledge delivery, hence foster a better understanding of the situation.
- The implementation of *in situ* PBL is a highly effective way of fostering information literacy in participants, as it engages higher-order skills and requires a great deal of critical thinking, questioning and judgement based on direct first-hand observation and experience.
- Participants will have the opportunity to directly investigate the scenarios in understanding the triggers while going through the PBL process.

- If the *in situ* PBL is conducted on a site with limited accessibility to the internet or other conventional information source, the participants will have to utilize other means of information gathering in order to help them work the problem.
- This will prompt a great amount of discussion and critical thinking that will ultimately equip the participants with life-long learning skills useful for their future.
- The participants will be exposed to the relevant core competencies required to solve complex problems, such as teamwork and collaboration, leadership, communication, management, values and ethics, culture and beliefs and systems thinking.
- These competencies are required for efficient and effective problem solving processes in future real-life situations.

Reference:

1. Weiss, D. M. (2018). In-Situ Educational Research from Concept to Classroom Implementation: A Multiple Paper Dissertation. ProQuest LLC. Retrieved from https://proxy.lib.umich.edu/login?url=https://search.proquest.com/docview/2101886354?accountid=14667%0Ahttp://mgetit.lib.umich.edu/?ctx_ver=Z39.88-2004&ctx_enc=info:ofi/enc:UTF-8&rfr_id=info:sid/ERIC&rft_val_fmt=info:ofi/fmt:kev:mtx:dissertation&rft.genre

Activity 1.1: Definition and terms of reference (TOR) for an *in situ* PBL team

Description

Definition and terms of reference (TOR) for an *in situ* PBL team

a) Organizing committee

The organizing committee shall be involved in the following aspects:

- Preparation of the tentative program.
- Seeking for potential sponsors.
- Identification of the case writers.
- Selection of facilitators.
- Selection of participants.
- Formation of the organizing committee/team (lecturers, supporting staff, volunteers).
- Preparation of the registration form and additional documents, health declaration, food allergy, etc.
- Planning of health and safety protection of all participants.
- Identification of the venue, location, facilities, infrastructures, accessibility, health and safety protocols.
- Planning of logistic arrangements (accommodation, transportation, meals, first aid kit, additional tools and equipment, etc).

- Branding (including but not limited to logo of sponsors/institutions, banner, t-shirt, slides, publicity, social media, etc).

b) Coordinator

- A coordinator for the program can be from any One Health field or those with interest in One Health.
- Roles of an *in situ* PBL organizer/coordinator:
  - Identify the title, theme and learning outcomes of the *in situ* One Health PBL.
  - Appoint organizing committee members for the program.
  - Conduct meetings with the committee/collaborator to update and propose solutions to any arising problems.
  - Conduct a site visit to the potential venue/location and assess the suitability of the venue for the planned activities which includes excursion, distance, travelling time, seasonal variation, infrastructure, accessibility, facilities, health and safety features (tracking area, life-jacket, qualified guide), food/meal options, time for check in and out, accommodation rooms, cost).
  - Monitor the work progress of the subcommittee before, during and after the PBL program.
  - Scrutinize a detailed work plan including tentative program and budget for the *in situ* PBL program.
  - Present the proposed budget and work plan to potential sponsors.
  - Apply for approval from institutional ethic committee for research involving human (questionnaire, respondent consent form), if applicable.
  - Identify and appoint case writers according to the title/theme of the *in situ* PBL.
  - Coordinate the work plan for *in situ* PBL with the university academic calendar to ensure the availability of multidisciplinary participants.
  - Identify and appoint facilitators for the *in situ* PBL program.
  - Conduct a briefing session for facilitators (virtually or face-to-face) to clarify on any matters pertaining to the activities, roles and responsibilities of the facilitators.
  - Identify and initiate invitation to the participants i.e. student and staff through their respective faculty representative.
  - Develop a registry database of all participants, with the relevant information (contact details, emergency contact, health/allergy declaration, t-shirt size if applicable, etc).
  - Coordinate the dissemination of guidelines, instructions and logistic notes to all participants (both facilitators and participants).
  - Prepare a contingency plan or standard operating procedure should an emergency/unexpected event occurs during the duration of the program.

(For example; injury to participants during an excursion or while outdoors, food poisoning, medical emergencies, adverse weather conditions, road accident, traffic jam, and others). This would include health and safety insurance coverage for all participants.

- Ensure the program is aligned with the appropriate learning objectives (instructor's aims) and learning outcomes (participants to achieve).
- Develop an evaluation tool to obtain feedbacks on the *in situ* PBL program from the participants and facilitators (program evaluation, survey, questionnaire, comments).
- Prepare a report at the end of the program and submit to sponsors and faculties.
- Compile and finalize marks/grade of the participants at the end of the course (if applicable).

c) Facilitator

- Facilitators are appointed from the relevant background related to the theme/title of the *in situ* PBL. The facilitators can be from any faculty, institute/university, ministry or governmental department/agency.
- The organizer/coordinator will send a formal invitation to the appointed facilitator.
- The facilitator shall commit to the following roles and responsibilities:
  - Attend all meetings and briefing sessions regarding the program.
  - Register the program through the platform provided by the organizer (Google form, other online registration methods).
  - Ensure that the physical and health status meet the requirement of the activities including the excursion.
  - Attend a pre-activity workshop/training of trainer session for the case study flow.
  - Study the case, facilitator notes and other documents (rubric, participant assessment guidelines, case evaluation feedback form, and others) in the facilitator's file provided by the organizer.
  - Clarify with the coordinator or case writers during the briefing session or before the program on any matters arising (comprehension of the case, flow of trigger or activities, and others).
  - Keep all information on the case confidential and never release any content to the participants before and during the *in situ* PBL program.
  - Attend the *in situ* PBL program (under subtopic during *in situ* PBL).
  - Facilitate the assigned group. Brief the participants on the PBL flow and offer guidance during the group discussion.
  - Identify dominant, passive and irregular behavior that may affect the progress and dynamic of the discussion among the group members.

Moderate the session but avoid taking the role of a lecturer as the participants are supposed to lead and critically discuss the case.

- Complete the assessment form for the participants and case evaluation feedback form. Refer Chapter 4 (Post-activity).
- Return the completed forms, triggers and facilitator notes (all included in the facilitator's file) to the coordinator.
- Attend the case presentation by the participants (after the program, on campus).

CHARACTERISTICS OF A GOOD FACILITATOR (DO'S AND DON'TS)
(Olivia Hanifan, 2020)

1. **Impartial**
   A good facilitator is always unbiased and does not have any prejudice towards a particular participant or topic being discussed.

2. **Non-dominant**
   It may be a hurdle for some facilitators to adapt to the 'student-centered learning' approach as they may be used to being the resource person during lecture or the topic discussed during the case may be the field of which the facilitators are experts. However, a good facilitator shall not be dominant and therefore are not supposed to be the resource person nor the lead voice of the group during discussion. This is to allow the students to navigate the discussion amongst themselves rather than relying or seeking approval from the facilitator.

3. **Empathic**
   Facilitators who are sensitive to the feelings of the participants during the discussion will be able to positively influence the session by encouraging shy or students with low confidence to participate without feeling judged as well as to mediate between dominant and passive participants.

4. **Respectful**
   It is very important for the facilitator to remain courteous and respectful to the participants at all times. Avoid making remarks that would make the participants feel ashamed or wronged as this may trigger discomfort and negatively affect the flow of the discussion.

5. **Attentive**
   Paying close attention to the opinions and ideas will allow the facilitator to guide better. For instance, if the discussion begins to digress beyond the actual topic or theme, then the facilitator should be able to respond subtly by probing with questions to justify why the group thinks a certain way, and continue to probe until the group begins to be back on track.

6. **Motivator**

   When the ambiance becomes monotonous or the discussion becomes non-progressive, a good facilitator should be able to transmit positive energy by encouraging the students to think outside of the box or take short breaks in between with casual conversation to allow the participants to be more comfortable particularly for introverts or other types of personalities with social anxiety/difficulty to communicate with strangers.

7. **Creative**

   When giving guidance to the group to drive their discussion, a facilitator who can think creatively will be able to stir the discussion from alternative views that may not seem apparent to the student but is still relevant to the topic. This will lead to the students to continue thinking critically, rather than the facilitator giving away the direction or answers.

8. **Observant**

   Facilitators must be able to sense should the participants begin to feel exhausted or lose interest and allow for a short break before the discussion resumes. This is because some participants may be easily drained during the session and may affect the performance and motivation to participate.

9. **Keeps to the schedule and instructions of the case writer and coordinator/organizer**

   Upon appointment, the organizer will usually brief on the responsibilities of the facilitators before, during and after the PBL session. Similarly, the instructions to the facilitators from the case writer(s) will be provided before the PBL session to allow the facilitators to familiarize and understand the case so they are able to confidently facilitate. Therefore, full commitment is required from facilitators at all phases of the PBL (before, during and after) from attending briefing, meeting, recording marks, completion of evaluation forms, keeping confidential files protected from participants and last but not least, keeping to time not only for the session with the participants, but also for all required tasks and forms to be submitted to the coordinator.

Reference:

1. https://www.mentimeter.com/blog/great-leadership/the-7-key-traits-of-an-excellent-facilitator

d) Participants

- Participants will be identified by the coordinator or lecturers from fields relevant to the theme/title of the *in situ* PBL and should embody the PBL concept (e.g. for One Health concept, the participants are selected from medical, veterinary, environmental/ecosystem, other relevant courses).
- The organizer/coordinator will send a formal invitation to the participants through the respective faculty/institute where the participants belong to.
- The participants shall commit to the following roles and responsibilities:
  - Attend all briefing sessions conducted by the coordinator/organizer.
  - Ensure that their physical and health status meets the requirement of the activities to be participated during the *in situ* program, including the excursion.
  - Be well prepared with notes, books and other reference materials deemed relevant to the theme of the *in situ* PBL program.
  - Attend the *in situ* PBL program.
  - Appoint a chairperson, scribe and secretary within the group members.
  - Participate in the group discussion.
  - Complete the peer assessment form.
  - Return the completed forms, triggers and supplementary materials (in the case file) to the group's facilitator.
  - Attend the case presentation by the participants (after the program, on campus).

e) Collaborator

- Problem based learning (PBL) presents an opportunity for other agencies/organization to collaborate on conducting PBL and share the knowledge or resources that could be beneficial for participants to experience the *in situ* PBL.
- Involvement of interdisciplinary collaborators may help to increase participant engagement, skills development and problem-solving techniques.
- For example:
  - In One Health *in situ* PBL, the collaborators from ministry or governmental agencies that involve in environmental, health and veterinary field.
  - List of potential collaborators for One Health *in situ* PBL:
    - Ministry of Health
    - Department of Veterinary Services (DVS)
    - Department of Wildlife and National Parks Peninsular Malaysia (PERHILITAN)

f) Sponsor

- Coordinator and committee to prepare a detailed budget allocation based on the work plan of the *in situ* PBL program.
- Identify potential sponsors to fund the program. Once identified, sponsors should be informed on the institutional guidelines on funding such teaching activities to avoid any conflict of interest between the funder and the institution.
- Ensure to be abide by all legal requirements (terms of reference, agreement, documentation, others) from both sides (institution and sponsor).

g) Case writer

- Case writers are responsible for the development of the *in situ* PBL cases to be used during the *in situ* PBL activity.
- Case writers should have the relevant expertise/ or content expert comprises of different backgrounds to reflect the *in situ* PBL theme/concept.
- For example:
  - In *in situ* One Health PBL, the 'One Health' collaborative effort and could be a combination from the following (non-exhaustive list): medical, veterinary, environment, ecosystem health, wildlife ecology, wildlife conservation, communication, anthropology, and others.
- Detailed instructions and guidelines for case writers can be found in the Chapter 3 (Activity) of this manual.

Group discussion among the case writers

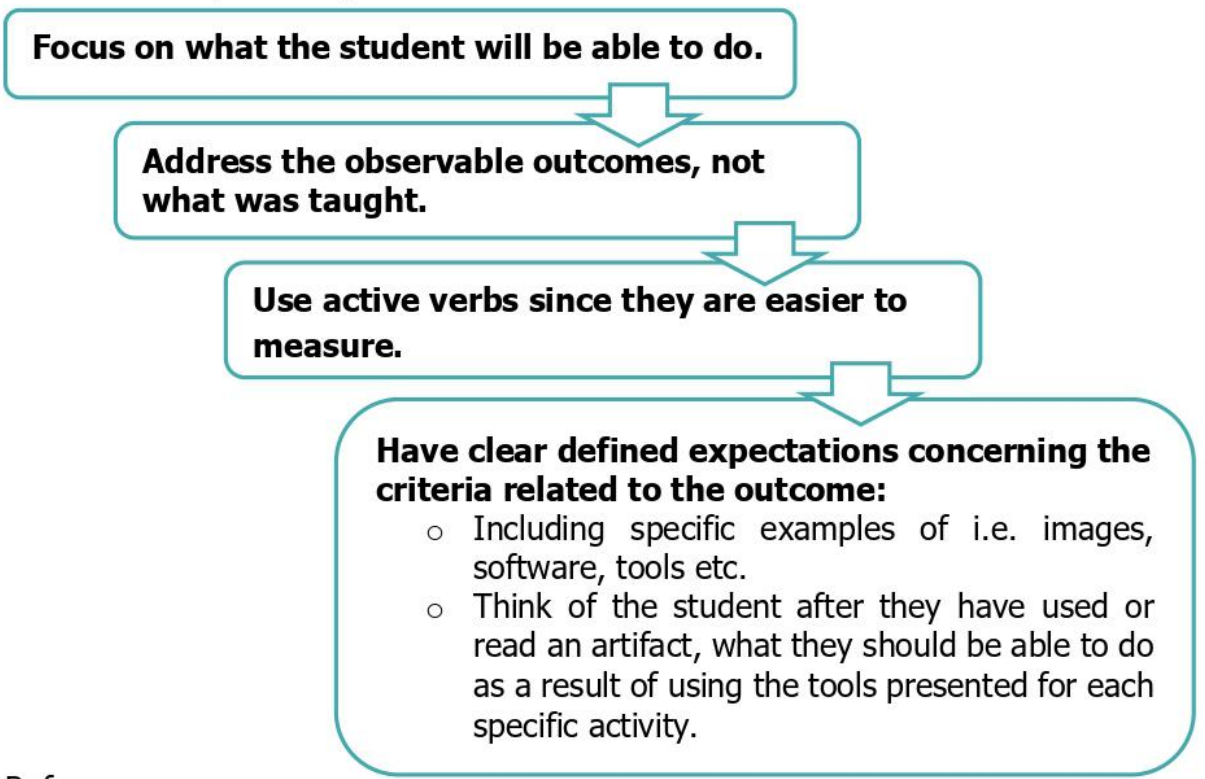
Activity 1.2: Definition of learning outcomes

Description

Student Learning Outcomes (SLO) are statements that specify what students will achieve from the activities. This includes the ability of the participants *to know, to be able to do* or *to be able to demonstrate* when they have completed or participated in a Course or Program. SLO's specify an action by the student that must be observable, measurable and able to be demonstrated.

Supplementary

How to develop learning outcomes:



Reference:

1. https://champlain.instructure.com/courses/200147/pages/developing-learning-outcomes

Activity 1.3: Activities of an *in situ* PBL

Description

Phases of activities during an in situ PBL:

- Pre-activity

Guidelines on preparation and planning of the in situ PBL.

- Activity

Guidelines on conducting the in situ PBL.

CHAPTER 2:
PRE-ACTIVITY OF AN *IN SITU* PROBLEM BASED LEARNING

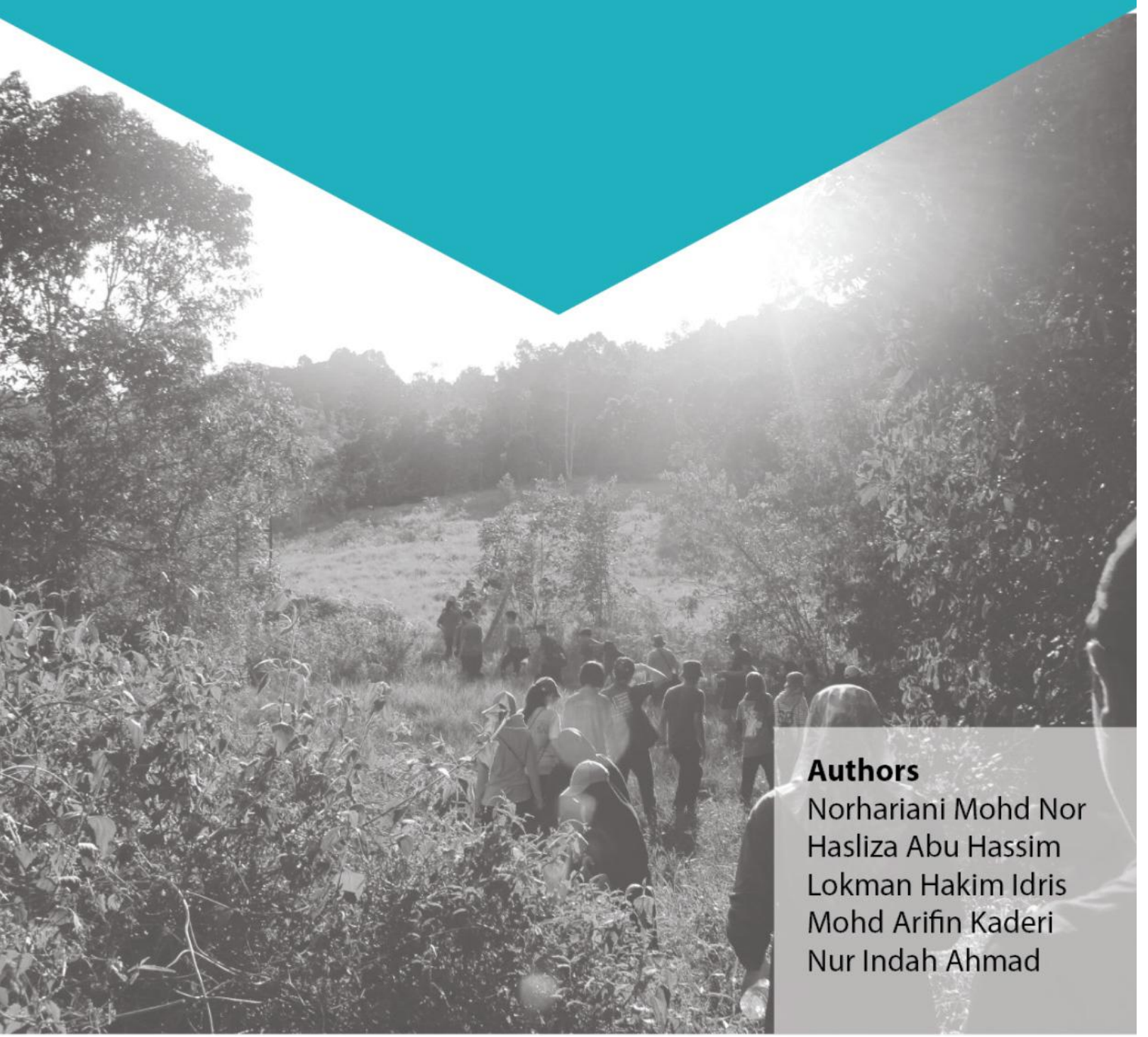


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Table 2.0 Overview on the pre-activity while conducting the *in situ* One Health PBL.

Person in charge	Items	Description	Pages
-	**2.0 Overview of pre-activity**	2.0 Description and overview of Chapter 2	26
-		2.1 Definition of One Health.	26
▪ Organizing committee ▪ Coordinator ▪ Case writer ▪ Facilitator ▪ Participants ▪ Collaborators ▪ Secretariat	**2.1 Definition of One Health** **2.2 General guidelines on how to organize an *in situ* One Health PBL**	2.2 General guidelines on how to organize an *in situ* One Health PBL: **a) Case writer** • Selection of case writer. • Selection PBL case based on objectives. • Refer to Chapter (Activity) **b) Select location** • Selection of location based on objectives of the program, budget, safety of the location, availability of facility. • Site visit. **c) Logistic requirement** • Transportation, accommodation, equipment, attire, amenities, safety and security, food. **d) Tentative program** • Determination of duration of program and activity. • Extra activities besides PBL (ice-breaking, culture night). **e) Appoint facilitator** • Recruiting facilitator and their criteria (need detailed). • Pre-activity workshop for facilitator Training of Trainer. • Development of flow summary for facilitator during briefing session via in-person and/or virtual meeting. **f) Select participant** • Selection based on various disciplines for *in situ* One Health PBL participants. • Checklist of roles. • Health screening.	27

Activity 2.0: Overview of pre-activity

Description

Pre-activity is an early planning of action that should be done as it is one of the most crucial phase before organizing any event. Objective of a pre-activity is to ensure all activities or programs that has been planned run seamlessly throughout the event and follow up by a post-activity. It is very important to appoint the right person that can be relied on to carry out the program. A detailed plan of action is essential in order to achieve the event purpose. Nevertheless, every eventuality should be considered thoroughly and the person in charge is responsible to combat any circumstance that may exist. Therefore, having back-up plan on standby is a must for all areas of the event.

In this guideline of an *in situ* PBL, the pre-activity will be described according to the *in situ* One Health PBL. Thus, the general guideline on how to organize an *in situ* One Health PBL is described below in Activity 2.1

Activity 2.1: Definition of One Health

One Health is an integrated, collaborative and transdisciplinary approach to address potential or existing risks of health problems involving humans, animals and the rapidly changing environments. The One Health concept clearly focusses on consequences, responses, and actions at the animal–human–ecosystems interfaces. One Health issues include zoonotic diseases, antimicrobial resistance, food safety and food security, vector-borne diseases, environmental contamination, and other health threats shared by people, animals, and the environment. Thus, the One Health approach usually involve experts in human, animal, environmental health, and other relevant disciplines and sectors in monitoring and controlling public health threats and to learn about how diseases spread among people, animals and the environment (Arshad et al., 2017; Putra et al., 2016).

References:

1. Arshad, S. S., Selvarajah, G. T., Mastura, W. A. N., Mohamed, S., Kamal, F. M., Amuguni, J. H., Omar, M. A., Abdullah, R. (2017). *A Problem Based Learning Approach to One Health Cases*.

2. Putra, T. A. T. R., Hezmee, M. N. M., Farhana, N. B., Hassim, H. A., Intan-Shameha, A. R., Lokman, I. H., Hamali, A. Yusof, Salisi, M. S., Ghani, A. A.A., Shahudin, M. S., Qayyum, M. A.L., Hafandi, A., Speare, R., Fenwick, S. G. (2016). The application of One Health concept to an outdoor problem-based learning activity for veterinary students. *Veterinary World*, 9 (9), 955–959. https://doi.org/10.14202/vetworld.2016.955-959.

Activity 2.2: General guidelines on how to organize an *in situ* One Health PBL

Person in charge

- Organizers/Coordinators
- Case writers
- Facilitators
- Participants
- Collaborators
- Secretariat

Description

a) Case writer

- Case writers should have the expertise or are content experts comprising of different backgrounds to reflect "One Health" collaborative effort and could be a combination from the following (non-exhaustive list): medical, veterinary, environment, ecosystem health, wildlife ecology, wildlife conservation, communication, anthropology, and others.
- Selection PBL case based on objectives: the coordinator will appoint the leader for the case writer whom will suggest the case title, compile the case summary, introduction, triggers and the facilitator's note. Refer to the example in Chapter 3 (Activity).

b) Location

- The location will be selected primarily based on the objective/learning issues of the *in situ* PBL, either in ruminant or wildlife PBL aspect.
- The selection of location is based on the availability of facility and the suitability of location will be identified by the coordinator and collaborator. To secure the facility, partnership with the site host should also be forged beforehand.
- The other criteria for location selection as below:
  - Meet the budget allocated to conduct the *in situ* PBL at selected location, considering the logistics components (e.g. distance, accommodation, transportation, rental facilities, excursion etc.).
  - The safety and convenience of selected location should also be considered.
  - The availability of facilities to conduct activity for *in situ* PBL (e.g. discussion room, audio visual equipment, etc.)
  - If the *in situ* PBL is conducted on a site with limited internet accessibility, the manager will need to advice participants on other means of information gathering in order to help participants to work on given tasks.
- The coordinator will schedule a site visit to the selected location to ensure all criteria as mentioned above are met.

- Site visit enable the manager for in-situ PBL to be familiar with the site and resources available at the site before the session is planned.

This location was selected primarily based on the objective/learning issues of the *in situ* PBL – to study the ecology system under mangrove area.

c) Logistic requirement

- The coordinator will identify and discuss about the requirements and logistics to conduct the *in situ* PBL at selected location.
- The logistics arrangement will be done by the Secretariat.
- The booking for accommodation, transportation and other facilities used in *in situ* PBL will be done by the Secretariat three weeks before the program.
- Below is the list of logistics items to be considered for an *in situ* PBL:
  - Accommodation - facilities available, booking date and fee, check-in and check-out time, etc.
  - Transportation - cost of transportation, type of transportation suitable to accommodate the number of participants, facilitators and coordinators team.
  - Food and beverages (F&B) - cost of F&B considering the number of meals provided per day.
  - Equipment/materials - type and quantity of equipment/materials required to conduct activities for the *in situ* PBL. For excursion activity, normally participants are required to wear a proper attire considering their safety and security.

- The logistic note will be prepared by the Secretariat and email to all participants of the *in situ* PBL a week before the program.

In situ PBL discussion among students and facilitators.

d) Tentative program

- The determination of duration of program and activity will be based on the objectives of the program and the location.
- The tentative program can be planned for one day to maximum of 3 days and 2 nights and includes travelling time (refer appendix for example of tentative program).
- The activities can be held at enables in-situ program with nearby accommodation.
- The program will include briefing the participants, in-situ training activities and extra activity.
- The amount of time for each trigger could be between 45 minutes to 1 hour, with the maximum of three triggers per day.
- Extra activities besides PBL will encourage better teamwork for example ice-breaking, night walk, demonstration and culture night.

e) Appoint facilitator

- Recruiting facilitator and their criteria (need detailed).
- Pre-activity workshop for facilitator Training of Trainers.
- Development of flow summary for facilitator during briefing session by physicals and/or virtual meeting.
- Facilitators with a lot of experiences and a huge time commitment are required to deliver an effective *in situ* PBL program.

f) Select participant

- Selection of participants will be based on various discipline for an *in situ* One Health PBL.
- Various methods could be employed to gather information by giving consent, health declaration, indemnity and feedback forms to participants.
- Coordinators are expected to gather the information before the program.
- Coordinator will develop a health screening survey form to evaluate the participants health status in addition to other information during the initiation of invitation to faculty representative and to ensure that physical and health status meets the requirement of the activities to be participated during the *in situ* program, including the excursion. An example of the survey form is in the appendix.
- The consent form is a document that is meant to obtain and record the agreement of the participants to the activity and to ensure the participants are aware on any risk that might be involved in any activity.
- Participant must be well prepared with notes, books and other reference materials deemed relevant to the theme of the *in situ* PBL program.
- The competencies in solving complex problems are required for the efficient and effective problem solving in future real-life situations faced by the participants.
- The indemnity form is a contractual document which states that the organizing committee will not be held responsible for any form of loss, damage and/or injury.
- The students will be given a program evaluation form, student evaluation form, feedback evaluation form and exit survey will be a document meant to gather information on the effectiveness of the whole program.

Resources

a) Case Writer
Refer to Chapter 3 (Activity).

b) Tentative program
Refer to Appendix 1.

c) Select participant

1. Consent form.
2. Health declaration form.
3. Feedback form. Please refer to Chapter 4 (Post-activity).
    i) Program evaluation form.
    ii) Facilitator evaluation form.
    iii) Student evaluation form.
    iv) Feedback evaluation.
    v) Exit survey.

Supplementary

a) Select participant

Refer to Chapter 4 (Post-activity).

Appendix 1

Sample of Program from *in situ* One Health PBL under Malaysia One Health University Network (MyOHUN)

MALAYSIA ONE HEALTH UNIVERSITY NETWORK (MyOHUN)
IN-SITU ONE HEALTH PROBLEM BASED LEARNING
15 – 17 September 2017 and 22-24 September 2017 (Session 1 and 2)
DEER BREEDING CENTRE,
THE DEPARTMENT OF VETERINARY SERVICES, LENGGONG, PERAK

PROGRAM

FRIDAY, 15 & 22 SEPTEMBER 2017	
9.00am	Registration
10.30am	Depart from Faculty of Veterinary Medicine, UPM
5.00pm –6.00pm	Arrival in Lenggong, Perak
6.00pm – 7.00pm	Check In and Free Time
7.00pm – 8.00pm	Dinner
8.00pm – 9.00pm	**Introduction to One Health and One Health Competencies** *Professor Dr Stanley Fenwick/Associate Professor Dr Mohd Hezmee Mohd Noor*
9.00pm-10.30pm	**Night Walk- Observation on Animal Behavior and Briefing on Animal – Human Conflicts**

SATURDAY, 16 & 23 SEPTEMBER 2017	
7.00am – 8.30am	Registration and Breakfast
9.00am – 10.00am	**Briefing by Deer Breeding Centre Personnel** *Dr. Nurul Aizzati Nadri*
10.00am – 10.30am	Tea Break
10.30am –1.00pm	***Problem (eg. Zoonotic Disease) Investigation using OH Approach- Trigger 1 and Discussion @*** ***Demo on Deer Management by Staff of PTH Lenggong***
1.00pm – 2.30pm	Lunch and Prayers
2.30pm – 5.00pm	***Problem Investigation using OH Approach- Trigger 2 and Discussion @*** ***Demo on Deer Management by Staff of PTH Lenggong***
5.00pm – 6.30pm	**Problem Investigation using OH Approach- Trigger 3 and Discussion**
6.30pm – 7.30pm	Free Time and Prayers
7.30pm – 10.30pm	Dinner and Group Circles

SUNDAY, 17 & 24 SEPTEMBER 2017	
8.00am – 9.00am	Registration and Breakfast
9.00am – 10.30am	**Problem Investigation using OH Approach- Trigger 4 and Discussion**
10.30am – 11.00am	Tea Break
11.00am – 1.00pm	**Problem Investigation using OH Approach- Trigger 5 and Discussion**
1.00pm – 2.30pm	Lunch and Prayers
2.30am – 4.30pm	**Summary and Reflections of Program**
4.30pm	Check Out/Travel Back to UPM

CHAPTER 3:
CONDUCTING AN *IN SITU* PROBLEM BASED LEARNING

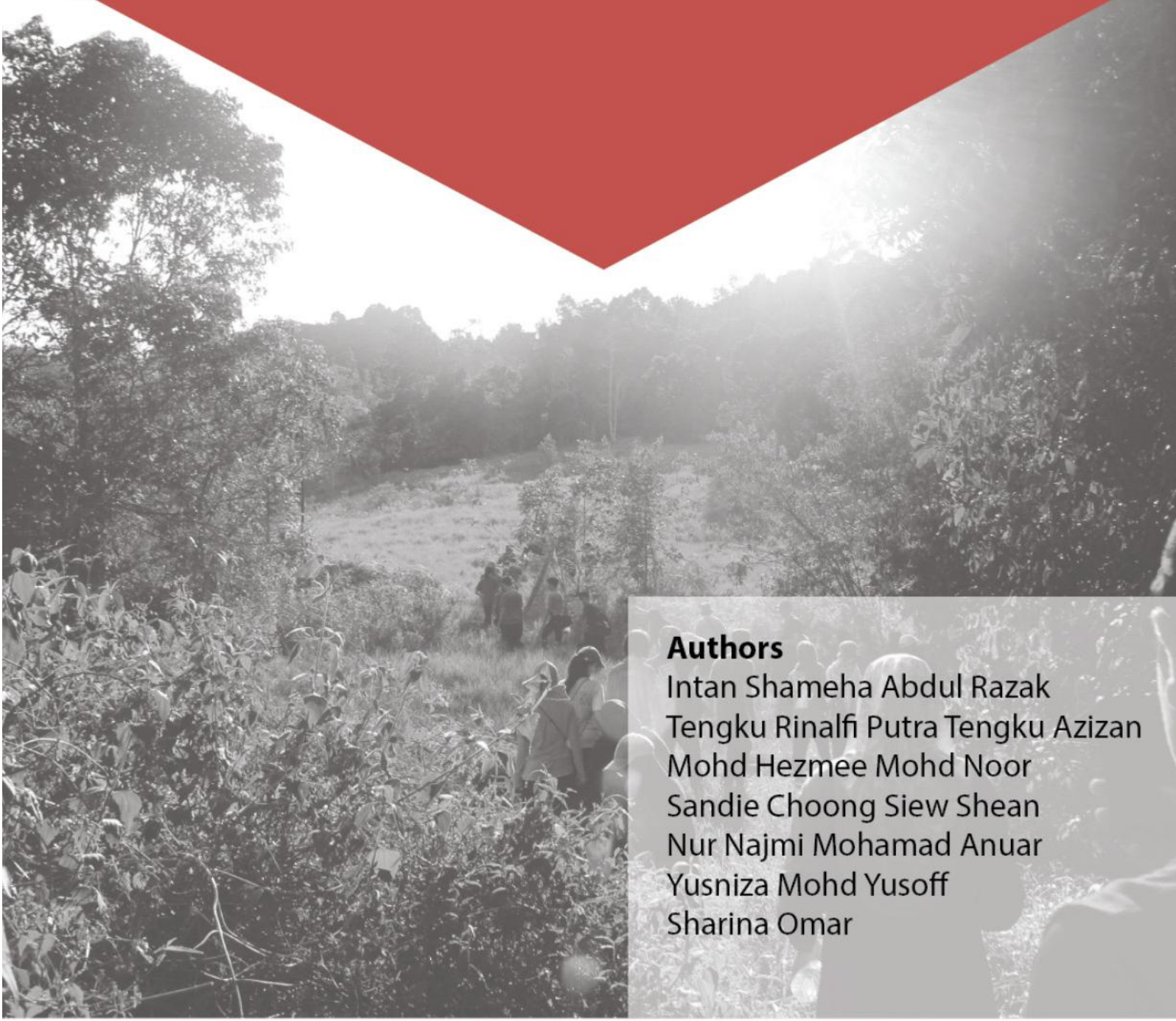

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Table 3.0 Overview on the activities of an *in situ* PBL

Person in charge	Items	Description	Page
-	**3.0 Overview of activity**	3.0 Description and overview of Chapter 3	35
▪ Organizing committee ▪ Coordinator	**3.1 Registration**	3.1 Registration • Gathering of participants, facilitators and organizing committee. • Briefing before boarding.	36
▪ Organizing committee ▪ Coordinator ▪ Collaborator	**3.1.1 Travelling, arrival & check in**	3.1.1 Travelling • Headcount before departure at each pit stop. Arrival • Allocation of groups. • Distribution of program kits and itinerary. Check-in • Check-in to accommodation.	37
▪ Organizing committee ▪ Coordinator ▪ Collaborator ▪ Facilitator	**3.1.2 Introduction to an *in situ* PBL**	3.1.2 Introduction to an *in situ* PBL. • Briefing on the safety matters. • Briefing on the program, rules and regulations. • Introduction to the OH concept, *in situ* PBL, FILA table. • Ice breaking.	38
▪ Organizing committee ▪ Coordinator ▪ Facilitator	**3.2 Morning roll call**	3.2 Morning roll call • Daily attendance and headcount. • Physical exercise. • Briefing on activities of the day. • Breakfast and refresh before group activities.	39

▪ Facilitator	**3.2.1 *In situ* PBL Session**	3.2.1 *In situ* PBL Session. • Assign roles (chairman, scriber) for PBL discussion. Roles may be rotated for each trigger. • Trigger delivery. • Hand over: - FILA table - case information - supplementary materials	40
▪ Organizing committee ▪ Coordinator ▪ Facilitator ▪ *In situ* officer	**3.2.2 Value added PBL related activities**	3.2.2 Value added PBL related activities. • PBL related excursion.	42
▪ Organizing committee ▪ Coordinator ▪ Facilitator	**3.2.3 End of day - facilitator postmortem**	3.2.3 End of day - facilitator postmortem. • Postmortem of Day 2 & Day 3. • Ad hoc plan/decision. • Day 3 program briefing.	43
▪ Organizing committee ▪ Coordinator	**3.2.4 Reflection**	3.2.4 Reflection • All participants will be debriefed by the coordinator.	44
▪ Organizing committee ▪ Coordinator ▪ Facilitator	**3.2.5 Debriefing**	3.2.5 Debriefing • Feedback from participant.	45
▪ Organizing committee ▪ Coordinator	**3.2.6 Check-out**	3.2.6 Check-out	45
▪ Program coordinator ▪ Secretariat	**3.2.7 Arrival at the end point**	3.2.7 Arrival at the end point. • To remind all participants to take all of their belongings with them.	45

The following table further describes the activities.

Activity 3.0 : Overview of activity
Description
In this activity chapter, the activities conducted during *in situ* PBL is elaborated with the example of PBL cases provided. The *in situ* activities may take place adjacent or away from the institution, depending on the case or theme of the PBL. Therefore, if the location is far, the duration of the program should be planned well for travelling. The activity starts with registration and travelling, briefing on the program, introduction to the One Health Concept and *in situ* PBL. For the PBL cases given to the student, it may consist of 4 or 5 triggers which should be divided timely and expected to finish within 1.5 to 2 days. The two examples of the cases with a different number of triggers and activities are provided in this chapter. A value-added activity can be included particularly if there is an *in situ* site that will give the participants the insights and exposure to the real scenario of the cases given. An excursion is also excellent to further inculcate One Health competencies such as leadership, teamwork and responsibilities to others. It is important to remind the participants on the proper outfit and gear needed for the excursion activities. At the end of the program, reflection and debriefing should be done to ensure the objectives of the program is achieved to improvise the running of the whole program in future.
Activity 3.1: Registration
Person in charge
▪ Organizing committee ▪ Coordinator
Description
➢ Gathering of participants, facilitators and organizing committee. ➢ Need to follow the current health regulation requirement. ➢ Registration and health declaration form need to be filled up and submitted to organizing committee. ➢ Distribution of the program kits and itinerary. ➢ Briefing by coordinator before departing to *in situ* location on safety, pit stop(s) (if applicable). ➢ Headcount of all participants for each vehicle before departure. ➢ At least one first aid trained personnel following the convoy in case of any emergency.
Supplementary

1. Itinerary & logistic notes.
2. Health declaration form.
3. List of participants' names.
4. List of items (e.g. stationeries, portable AV system, walkie-talkie).
5. PBL kits (e.g. case and trigger).
6. Program kits (e.g. itinerary, pen, nametag, notebook).
7. First aid kit.

Activity 3.1.1: Travelling, arrival & check-in (if applicable)

Person in charge

- Coordinators
- Organizing committee
- Collaborator (*in situ* PBL committee)

Description

- Travelling
  - Headcount before departure at each pit stop.
  - Any emergency needs to be attended as soon as possible.

- Arrival
  - Arrive at training site.
  - Organizing committee will divide the participants into groups.

- Check-in
  - Check-in for accommodation.

Briefing session was held before the start of *in situ* PBL

Supplementary

1. Name list of participants
2. First aid kit
3. List of items

Activity 3.1.2: Introduction to an *in situ* PBL

Person in charge/ Secretariat

- Coordinator
- Organizing committee
- Facilitators
- Collaborators

Description

- Briefing on the site safety by the collaborator.
- Briefing on the program, rules, and regulations by the coordinator.
- Talk on "*in situ* PBL OH approach" - introduction to the OH concept and *in situ* PBL.
- Introduction of the FILA table - detail explanation on the concept and how to use it.
- Ice breaking session / introduce to group members.

Ice breaking session

Supplementary

1. *In situ* PBL information e.g. maps, emergency exit.
2. Names and contact numbers of person in charge during emergency.
3. FILA table.
4. Presentation slide on "*in situ* PBL One Health approach".

Activity 3.2: Morning roll call

Person in charge/ Secretariat

- Facilitators
- Organizing committee
- Participant leaders

Description

- Physical exercise to start the day (Day 2 & Day 3).
- Head counts: all participants must attend the morning row call with appropriate exercise attire. Group leaders will check attendance of all members and report to the participant leaders. If anyone is missing, the participant leaders will locate the missing person(s) with the help of the group leaders.
- Latecomers will be penalized (penalty will be decided by facilitators before the day).
- Morning exercise: 30 minutes (10 minutes warm up, 15 minutes' exercise, final 5 minutes stretching and cool down).
- Quick brief of the program for the rest of the day before participants break out for breakfast & refreshed before PBL sessions.

Supplementary

1. FILA tables
2. Case information - refer to PBL kits

Activity 3.2.1: *In situ* PBL session

Person in charge/ Secretariat

- Facilitators
- Organizing committee
- Logistic officers (if need transportation is needed to different places, e.g. waterfall, river, market, fishing village, animal enclosure, laboratories, quarantine station etc.).
- Site personnel (if the program involves the need to visit different sections on site, e.g. store, paddock, kitchen, etc. that require staff access/explanation/guided tour).
- Facilitators/invited guest (if the program involves activities beyond discussion of the PBL cases, e.g. ultrasonography, animal capture, transportation of animals/equipment or others).

Description

- The program coordinator will start the session with a quick brief of the day: objectives to achieve, timeline, etc.
- The participants break up into groups with their assigned facilitator.
- The participants will quickly introduce themselves within the group, if this was not done yet during activities in Day 1.
- Facilitators will guide the groups: select the lead and scribe for the session. The group members will rotate roles for each trigger to ensure active participation from all members.
- Delivery of the triggers by facilitator.

- The lead will read out the trigger, other members will discuss and search references they brought. Points raised by the group will be recorded by the scribe to fill up the FILA table
- Facilitators may from time to time offer some points to the group if the group discussion is veering off course.
- Facilitator could also provide clues, but not direct answers, to guide the discussion.
- The facilitator should encourage the quiet member(s) to contribute to the discussion, particularly on their field of studies. For example: ask some related questions, opinions, and feedbacks.
- Dynamic of group members need to consider as not to exceed the time allocated for the session or day.
- Facilitators should ensure satisfactory learning outcomes are achieved by the participants at the end of each trigger.
- All documents such as FILA tables, triggers and supplementary materials should be handed-in to facilitators after the discussion ends.

Discussion among students after the delivery of the triggers by facilitator

REMARKS

- An *in situ* PBL case may consist of 4 to 5 triggers only. Examples of an *in situ* PBL module are shown on page 39-56

- Time allocation for each trigger may vary based on a case as designated in the tentative program. Example of an *in situ* PBL tentative program is shown on Chapter 2 (Pre-activity), page 26.

Resources

Reading materials - refer to references related to the case: textbooks, notes, articles, online search (if internet access is available).

Supplementary

- FILA tables.
- Case information - refer to PBL case sample in the appendix.

Activity 3.2.2: Value added PBL related activities

Person in charge

- Program coordinator
- Facilitators
- Organizing committee
- Safety officer
- First aider
- Logistic officers (if the program involves the need for transportation to different locations)
- Site personnel

Description

- An excursion is an excellent opportunity to further inculcate One Health competencies such as leadership, teamwork and responsibilities to others.
- Excursion planning is made prior to the start of the program.
- Excursion site(s) should be visited 1-2 days before the event by facilitator/site personnel to ensure safety of site.
- All participants would have been informed of materials, equipment, attire and other preparations needed for the excursion before the start of the program.
- At the start of activity, a safety briefing by the designated officer on the do's and don'ts should be conducted to ensure safety for all participants, animals and environment.
- A head count should be done before the groups move out and when the groups return.
- During the excursion, the facilitators should ensure that none of the participants are left behind or separated too far from the main group.

- Contingency plans should be in place in case of emergencies, whether the entire group should turn back or the directly affected participants and designated facilitators would return to the starting point or short cut to the end point.

Excursion activity in Sungai Kinabatangan was held as part of the *in situ* program

REMARKS

- Attire and gear must suit the activities.

Resources

Reading materials - refer to relevant safety protocols, first aid manual.

Activity 3.2.3: End of day - Facilitator postmortem

Person in charge/ Secretariat

- Program coordinator
- Facilitators
- Organizing committee

Description

- Recap of activities for the day by program coordinator.
- Feedback and reflection from facilitators: good points to be retained for next program/activity; less effective ones should be improved on or avoided.

- Address any issue that arise for the day or *ad hoc* decisions that needs to be made.
- Briefing for next day activities.

Recap of activities for the day by program coordinator

Activity 3.2.4: Reflection

Person in charge

- Program coordinator
- Facilitators
- Organizing committee
- Participants

Description

- Feedbacks from facilitators and participant representatives on the likes and dislikes of the program. This is especially important and required to improvise the running of the whole program in future. This topic may include the activities, safety measures, suitability of the place, time of the program as well as the program module (PBL case / material that has been presented) and food provided.
- Lastly, participants are required to fill in the Program Evaluation Form.

Supplementary

- Program Evaluation Form.

Activity 3.2.5: Debriefing

Person in charge/ Secretariat

- Program coordinator
- Facilitators

Description

- The case statement needs to be re-read for a better understanding by highlighting the key words / important indicators/ contents that are important to come up with the differential diagnosis.
- Conclude the case by giving the final diagnosis by associating the findings described previously.

Activity 3.2.6: Check-out

Person in charge

- Organizing committee
- Program coordinator

Description

- Before leaving their accommodation and program venue, remind participants to:
  - Clean up
  - Return borrowed items, turn off lights, fans and water before leaving the venue.
  - Ensure no personal belongings and materials used during the program are left behind in the program area or accommodation.
- Secretariat to ensure all the keys are returned to the logistic person in charge.
- Head count before boarding the bus to ensure that all participants leave the program venue.

Activity 3.2.7: End of Program

Person in charge

- Program coordinator
- Secretariat

Appendix 2

Cases presented in this guideline were adapted from A Problem-Based Learning Approach to One Health Cases

In situ PBL Module: Tuberculosis

SUMMARY OF CASE:

Keeping wildlife in captivity pose a significant risk towards the health of the human keepers and the animal itself. A sound management of captive wildlife would include a properly documented health assessment of the animals as well as the workers working with the animals. Communicable diseases, especially of viral or bacterial origin, would opportunistically jump from one species to the other when the condition is just right. This case opens up the possibility of a disease being transmitted from human to animals. This is more commonly known as reverse zoonosis. It highlights the risks and the management plan following a case of tuberculosis in an orangutan sanctuary that is open for public visitation.

Learning Goals:

1. To describe appropriate procedures or measures in the investigation of the problem.
2. To interpret the laboratory and diagnostic imaging results in relation to the case and its rationale.
3. To suggest and describe confirmatory tests for diagnosis of tuberculosis and to rule out other differentials.
4. To interpretation the rationale of diagnostic work up performed to diagnose tuberculosis in non-human primate
5. To describe the importance of biosecurity and management of captive wildlife in relation to the case.
6. To understand the One Health concept and its importance in disease outbreak management.
7. To identify proper way(s) to perform risk communication to members of the public.

TRIGGER 1: THE DEATH OF AN ICON

Jerome Kaino Orangutan Rehabilitation Centre (JKORC) is a popular tourist attraction under the Borneo Wildlife Inc. The JKORC has 20 captive Orangutan and approximately 120 free roaming Orangutan with few other species of animals within the sanctuary. On the 10th of January 2015, the oldest Orangutan (30 years old) in JKORC was found dead in the quarantine premise. It had a history of fever and chronic weight loss for the past 6 months. Despite multivitamins supplementation and improved nutrition regimen, the condition of the orangutan continued to deteriorate before death. A week later, a free roaming orangutan died after having fever and showing respiratory distress. This orangutan had no history of sickness.

Key Learning Issues

1. Outline the steps to investigate the deaths that occurred within a short period of time
2. List the causes of low-grade fever, chronic weight loss and inappetence among orangutans.
3. List the possible causes of death of the orangutan in this scenario.

FILA Table

Facts	• JKORC is a popular tourist attraction. • It has 20 captive orangutan and approximately 120 free roaming Orangutan with other species of animals within the sanctuary. • On the 10th of January 2015, the oldest Orangutan (30-years old) in JKORC was found dead following a 6-month history of fever and chronic weight loss. • Despite multivitamins supplementation and improved nutrition regimen, the condition continued to deteriorate before death. • A week later, a free roaming orangutan died following fever and respiratory distress. This orangutan had no history of sickness.
Idea	• Death of the old orangutan may be the index case. • Symptoms in the orangutan suggest chronic disease. • Death of several animals within a short period suggests ongoing infection(s). • Malnutrition and chronic infection could possibly be the causes of death.

Learning Objective	• Information on JKORC management. • Additional clinical information on dead orangutan. • Medical history of the orangutan. • Origin of orangutan. • Type of broad-spectrum antibiotics commonly used for treating orangutans/primates. • Type, nature and condition of animal housing and enclosures in JKORC. • Health status of orangutan caretakers. • History of chronic weight loss, low grade fever and cough in orangutan. • Causes of death of the orangutan. • Method of assessment of body temperature in orangutan. • Any precedence of short period multiple orangutan deaths in JKORC. • Recent changes in JKORC management and management team. • Weather pattern during the month of the incidence. • Source of orangutan food. • Recent introduction of animals to JKORC.
Action Plan	• Interview the JKORC management and staff. • Analysis of orangutan and worker health records • Common cause of deaths among orangutan in JKORC

1. **Outline procedures to investigate death of several orangutan that occurred within a short period.**

- This should be started with analyses of history, clinical signs and epidemiological pattern to short-list the possible causative agent(s).
- Post-mortem examination should be performed on the dead animals to suggest the possible cause of death.
- Suitable samples should be taken to identify the most likely causative agent(s).
- Relevant authorities should be informed of the incident once the cause of death is identified for the implementation of control and prevention measures.

2. **List the causes of low-grade fever, chronic weight loss and inappetance among the zoo animals.**

- Low-grade fever could be caused by viral and bacterial infections, blood protozoa, immunological diseases and cancer.
- Chronic weight loss: poor quality nutrition, chronic gastroenteritis and diarrhea, pneumonia, tuberculosis or paratuberculosis, endoparasitism, chronic kidney

disease, chronic liver disease, chronic wasting disease (transmissible spongiform encephalopathy of wildlife caused by prions).

- Inappetence: tuberculosis, bacterial, fungal, viral or oral cavity infections, inflammation, foreign body obstruction, vomiting, diarrhea, pneumonia, multisystematic disorder, pain and old age.

3. List possible causes of death of orangutan in this scenario.

- Possibly infectious or non-infectious agents:
- Infectious agents: Tuberculosis, melioidosis, salmonellosis, toxoplasmosis, epizootic hemorrhagic disease and other emerging agents.
- Non-infectious agents: feed and feeding, pasture, low-grade poisoning, deficiencies and old age.

TRIGGER 2: HISTORY

Further history taking on the management of JKORC was performed. According to the JKORC manager, some animals have been kept in the center for more than 20 years. Throughout the period, there was frequent introduction of new animals into the center. The center is maintained on rotational basis of 15 workers and 10 volunteers at any one time. The quarantine area lies approximately 1km from the living quarters of the workers. It is surrounded by standard fencing and the core quarantine space is made of surrounding brick walls and steel mesh. Additional information on the sick orangutan were obtained from the workers. According to them, the symptoms included weakness, inappetence, chronic weight loss and nasal discharge, whereas other animals appeared to be healthy.

Key Learning Issues

1. Discuss the diagnostic workout for the dead orangutan.

FILA Table

Facts	• There were frequent introduction of animals or employee into JKORC. • Some orangutan had been residents of JKORC for more than 20 years. • Animal keepers consisted of local workers and foreign volunteers. • Workers lived in quarters 1km from animal enclosures. • Symptoms in affected orangutan were inappetence, weakness and chronic weight loss. • No precedent of several animal deaths in the JKORC occurring within a short period.
Idea	• Frequent introduction of new animals and/or employee could be the source of infection. • Foreign volunteers could be the source of emerging and re-emerging infections. • Human to animal (or *vice versa*) disease transmission. • Close contact between animals and the staff facilitates disease transmission. • Disease of the respiratory or digestive system.

Learning objective	• How disease diagnosis is performed. • Investigators who are involved in disease diagnosis. • Samples to be taken for diagnostic workout. • If the two deaths had a common etiology. • Implication of the distance between staff living quarters and animal enclosures. • Implication of the frequent contact of staff with the animals • Infectious and non-infectious diseases that could produce the clinical symptoms in these animals.
Action plan	Refer to laboratory manual and others references on the procedures for collection, transportation, storage of samples and analyses of laboratory results.

1. Discuss the diagnostic workout

- Samples to be taken are based on the postmortem findings.
- Samples might include organs for histopathology, bacteriology, virology, parasitology and chemical analysis, and are selected based on tentative diagnosis.
- Tests to confirm include isolation and identification of microorganism, which include immunohistochemistry, polymerase chain reaction essay and sequencing.

TRIGGER 3: INVESTIGATION AND DIAGNOSIS

The death of orangutan prompted the veterinarian to conduct a post-mortem examination. Gross post-mortem lesions included caseous abscesses in the lungs, particularly apical and diaphragmatic lobes of the lungs. Similar caseous materials were also present in the mediastinal lymph node. Histopathology examinations revealed granulomatous lesions with giant cells in both organs. Ziehl Nielsen staining of the tissues sections were positive for acid-fast bacteria. No significant bacteria were observed on the blood and MacConkey agars. Other results of the investigation are pending. Concurrently, in another situation, two volunteers and one keeper complained that they too were having from chronic cough. They were immediately sent to the nearby hospital for further checkup.

Key Learning Objective:

1. List the acid-fast organisms.
2. List the diseases characterized by chronic granulomatous inflammation.
3. List the possible causes of death of the sanctuary animals.
4. List the most possible zoonotic disease affecting both the orangutan and volunteers/keeper.

FILA Table

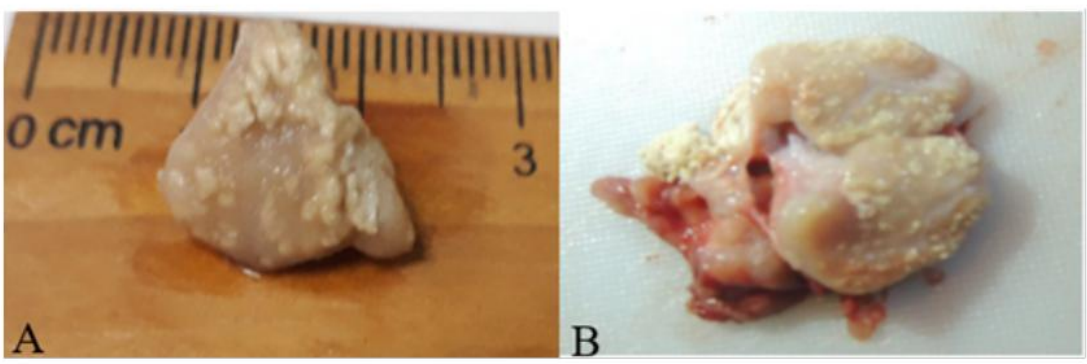
Facts	• Post-mortem examination revealed granulomatous lesion with caseous necrosis in the lung and mediastinal lymph nodes. • Lung and lymph node were positive for acid-fast bacteria • No significant bacteria isolated on blood and MacConkey agar. • Two volunteers and one keeper were suffering from chronic cough. • The volunteers and keeper were sent to hospital for further checkup.
Ideas	• Acid-fast organism causing chronic granulomatous inflammation in the respiratory tract and associated lymph nodes is mostly likely a case of tuberculosis. • The disease could be transmitted from animals to human (zoonotic) or from humans to animals.
Learning Objective	• Diseases that cause granulomatous lesion and caseous necrosis in the lung. • Acid-fast organism. • Other diagnostic tests to that could narrow down the differential

	diagnosis. • Possible zoonotic disease based on the clinical signs showed by the orangutan and volunteers/keeper.
Action plans	• Review diseases of the respiratory system of non-human primates.

1. List the acid-fast organisms.
Mycobacterium sp and *Nocardia* sp.

2. List the diseases characterized by chronic granulomatous inflammation.
Tuberculosis (*Mycobacterium tuberculosis*), leprosy (*Mycobacterium leprae*), syphilis (*Treponema pallidum*), cat-scratch disease (*Bartonella* spp), sarcoidosis, Crohn's disease (immune reactivity towards intestinal bacteria and self-antigen), nocardiosis, melioidosis (*Burkholderia pseudomallei*).

- Post-mortem findings:



(A) Type-1 tuberculosis-like lesion (TBLL) necrotic/miliary (A) and (B) Type-4 TBLL cavitation lesion in submandibular lymph node (Source of image: Azlan Che' Amat)

3. List the possible cause(s) of death of the orangutan.
Tuberculosis, melioidosis, salmonellosis, epizootic hemorrhagic disease.

4. List the possible zoonotic disease based on the clinical signs showed by the orangutan and volunteers/keeper.
Tuberculosis

TRIGGER 4: RESPONSE AND SCREENING

Six weeks later, the results on bacteriological culture were obtained. Samples that were cultured on Lowenstein Jensen agar were positive for *Mycobacterium tuberculosis.* The veterinarian immediately notified the State Veterinary Department and the Ministry of Health. A response team was sent to the centre to conduct further investigation. Three workers were tested positive for *M. tuberculosis*. One of them had cough for the past 2 weeks. Cultures of saliva from the affected orangutan were also positive for *M. tuberculosis.* The response team was concerned about latent infections among asymptomatic animals that had been in contact with the dead animals and infected workers. However, the in-contact other animals were tested negative for *M. tuberculosis*.

Key Learning Objective:

1. State the differential diagnoses for chronic respiratory disease in humans.
2. Outline the methods in obtaining a diagnosis of pulmonary tuberculosis.
3. List the authorities and personnel that should be involved in the management of the tuberculosis.
4. Discuss the epidemiology of tuberculosis.
5. Discuss the treatment of tuberculosis in human.

FILA Table

Facts	• *M. tuberculosis* was isolated from dead orangutan. • The Department of Veterinary Services and the Ministry of Health were involved in the investigations. • Three workers were positive for tuberculosis. • Cultures of orangutan saliva were positive for *M. tuberculosis*. • Other in-contact animals were negative for tuberculosis.
Idea	• Possibility of human to animal and vice versa transmission of tuberculosis – zoonosis. • Asymptomatic animals and humans in a latest phase of tuberculosis. • Tuberculosis was the cause of deaths in orangutan.
Learning Objective	• Causes of chronic cough in humans. • Definition of latent infection. • Sample type and method of collection from orangutan for tuberculosis screening. • Routine screening procedures for tuberculosis screening tests. • Sensitivity and specificity of tuberculosis screening tests. • Sources of *M. tuberculosis* infection and its mode of transmission.

	• Mode of disease transmission between humans and animals in animal facility.
Action Plan	• Read on the epidemiology, immunology, and microbiology of tuberculosis. • Read on how to respond to a case of confirmed tuberculosis in human patients. • Refer to WHO website on tuberculosis.

1. State the differential diagnoses for chronic cough in humans

In humans, coughs that last more than 3 weeks is chronic. Chronic cough can be caused by pulmonary tuberculosis, lung carcinoma, chronic obstructive airway disease, bronchiectasis, asthma and gastro-esophageal reflux (GERD).

2. Outline the methods of obtaining a diagnosis of pulmonary tuberculosis

Obtain relevant history and conduct physical examination. Confirmation of tuberculosis-positive tests can be done by microscopically examining a direct smear of sputum stained for acid-fast bacillus (AFB), tuberculin skin (Mantoux) tests, bacterial culture and sensitivity testing, chest radiography, molecular diagnosis (not routinely done unless indicated).

- Microscopy: obtain sputum specimens for three consecutive day, preferably the early morning sample, bronchial washings and tissues. Stain direct smears or tissue sections with the Ziehl-Neelsen stain and microscopically examine to detect AFB.
- Culture and antibiotic sensitivity testing: Use egg-based media (Lowenstein-Jensen medium). Acid-fast bacillus could be detected approximately 8 weeks after inoculation. Use radiometric method (BACTEC™) and the organism can be detected at approximately 2 weeks.
- Radiography: Chest X-ray would show lesions at the apical and posterior segment. Presence of cavities suggests active lesions. CT scan is useful for detection of extra-pulmonary lesions.
- Tuberculin skin (Mantoux) test: The results can be obtained after 72 hours. An induration diameter <10 mm is considered negative. A positive test indicates tuberculous infection, but not necessarily active disease. The test is of low sensitivity and specificity.
- Nucleic acid amplification test (PCR): The method entails the amplification of nucleic acid regions specific for *M. tuberculosis*. The test is most useful for the rapid confirmation of tuberculosis patients with AFB-positive specimen. It is also

useful for the diagnosis of AFB-positive specimen. It is also useful for the diagnosis of AFB-negative pulmonary and extra-pulmonary tuberculosis.

Describe the immunopathogenesis of tuberculosis

Tuberculosis is caused by *M. tuberculosis, M. bovis* or *M. avium*. The underlying pathology is chronic granulomatous inflammation. Immunopathogenesis of the disease involves Type –IV hypersensitivity reaction. Following infection, *M. tuberculosis* enters macrophages by endocytosis and replicates within the phagosome. The organism has a protective mechanism that blocks fusion of macrophages phagosomes and lysosomes. At approximately 3 weeks' post-infection, the macrophages are activated to become bactericidal through the action of TH1 cells. TH1 cellular response occurs as soon as the mycobacterial antigens enter draining lymph nodes and presented to the T cells. TH1 cells respond by producing IFN- gamma that enables that macrophages to contain the infection through formation of phagolysosomes, increase in nitric oxide production causing destruction of *M. tuberculosis* cell wall, and formation of granulomas with central necrosis and containing the organism. Products of activated macrophages also serve to promote recruitment of more macrophages, elimination of organism and initiation of tissue repair. These products also cause chronic inflammation by increasing release of lysosomal enzymes, reactive oxygen and nitrogen species, growth factors, and other mediators of inflammation.

3. List the authorities and personnel that should be involved in the management of tuberculosis.

The authorities and personnel that should be involved in the management of tuberculosis are hospitals and primary care medical professionals, district or state health officers and division of respiratory medicine and communicable diseases of the Ministry of Health.

4. Discuss the epidemiology of tuberculosis.

Human is the natural host for *M. tuberculosis*, cattle for *M. bovis* and avian for *M. avium*. They, however, can cross-infect almost all mammals. Tuberculosis can be transmitted through contact, via aerosol or droplets. In this scenario, it is suspected that transmission of *M. tuberculosis* from infected workers to the orangutans occurred via direct contact. Since the other death is in free roaming orangutan, there is probably a breach of biosecurity in which the quarantined orangutan has some form of extended contact with the infected worker. It is suggested that the source of infection to orangutan is from the staff or other free roaming animals, while the affected staff might get the infection from members of the public.

Appendix 3

In situ PBL Module: Leptospirosis

SUMMARY OF CASE:

Six school children were admitted to a hospital with complaints of fever, rashes, and conjunctivitis. Since dengue fever is common in the district where the children live, they were initially managed as a case of dengue fever but the condition deteriorated despite treatment. The affected children were among the 30 school children who visited a botanical garden 10 days prior to the manifestation of symptoms. With time, some affected children developed jaundice, breathlessness, and symptoms of renal failure. Based on these observations, blood samples were screened for infectious diseases, and leptospirosis was confirmed. The attending medical practitioner notified the public health authorities of the cases.

Since there was a history of the 6 affected children that took a swim in a lake during the visit to the botanical garden, a public health team visited the botanical garden to investigate. It was a school holiday, and the botanical garden was crowded while rubbish was piling up in some areas. Rats were noticed scrounging at the rubbish dumps and surrounding areas. Therefore, a few rats were caught, and the lake water were sampled for laboratory analyses. These samples were positive for pathogenic *Leptospira* sp. and the case was confirmed as an outbreak of leptospirosis. The local authorities eventually implemented control and preventive measures, including temporary closure of the botanical garden. The Geographical Information System (GIS) was used to identify the zones that were prone to leptospirosis. After one month, the botanical garden was permitted to resume operations but with scheduled surveillance by the local authorities.

Learning Goals:

1. List differential diagnoses for patients with fever, erythematous rash, and conjunctivitis
2. List the differential diagnoses of patients with jaundice, breathlessness, and renal failure.
3. List signs and symptoms of leptospirosis in humans and animals.
4. Describe the epidemiology of leptospirosis.
5. Discuss the clinical management of leptospirosis in humans and animals.
6. Develop a response plan in an outbreak of leptospirosis using the One Health approach.
7. Describe the control and preventive measures for leptospirosis using the One Health approach.
8. Explain how multidisciplinary agencies can contribute to the management of disease outbreaks.
9. Identify methods to create public awareness of leptospirosis.
10. Discuss the impact of leptospirosis on animal production, the community, and the country.

TRIGGER 1: HOLIDAY FEVER

Ali, a primary school student, was admitted to a general hospital following a 6-day high-grade fever. He subsequently developed erythematous rashes and conjunctivitis on the day of admission. Since dengue fever was common in the district, Ali was suspected of suffering from the disease and treated accordingly. Two days later, another student, Jeya, was admitted to the same hospital with similar symptoms that persisted despite treatment. By the end of the week, another 4 students were admitted with similar symptoms. When blood tests were negative for dengue fever, it caused concern among hospital personnel because the cause of the illness was unknown. The doctors were informed that the sick students were among a group of 30 from the same school who visited a botanical garden two weeks ago.

Key Learning Issues

1. List the differential diagnoses for an illness with fever, erythematous rash, and conjunctivitis.
2. Discuss the response procedure and parties involved when more than one patient with similar symptoms are admitted to the hospital.
3. Define 'disease outbreak'

FILA table

Facts	• The Botanical Garden is a popular tourist attraction. • The district where the botanical garden is located is a known dengue-endemic area. • Ali and Jeya are primary school children, admitted to the same general hospital with a high-grade fever of 6 days duration, subsequently developed an erythematous rash and conjunctivitis, and by the end of the week another 4 children were admitted with similar symptoms • the sick children were among a group of 30 from the same school who visited a botanical garden two weeks before. • Blood test was negative for dengue fever, and these caused concern among hospital personnel because the cause of the illness was unknown.

Idea	• The sickness of the 6 primary school children may be the index case • The persistent similar symptoms shown by the 6 school children implicates an outbreak of infection • Infection is a possible cause of illness.
Learning Objective	• Information about the botanical garden • Additional clinical symptoms on the admitted ill children. • Medical history of the primary school children
Action Plan	• Interview the botanical garden management and staff • Visit the botanical garden for investigation and samplings

4. **Outline procedures to investigate sudden disease outbreaks within a short period.**
   - Short-list possible differential diagnoses
   - The doctors, community health workers and public health experts should form a team to investigate the botanical garden as well as within the district. This should include a detailed history and an epidemiological investigation to understand the disease pattern.
   - Relevant authorities should be informed of the incident once the cause of sudden outbreak is identified for the implementation of control and prevention measures.

5. **List the causes of high-grade fever, erythematous rash and conjunctivitis**
   - High-grade fever can be a result of infection by virulent virus or bacteria that leads to septicemia.
   - Erythematous rash: human parvovirus, erythema multiform, leptospirosis
   - Conjunctivitis: Bacterial agent, viral agent such as Adenovirus, herpes simplex virus and allergens

6. **List possible causes of sudden illness among primary school children in this scenario**
   - This is a case of point epidemic from a common source of infectious or due to non-infectious agents.
   - Infectious agents: *Leptospira*, covid-19 virus, dengue virus and other emerging agents.
   - Non-infectious agents: Allergens, contaminated drinking water by poison, chemicals, and pollutants

TRIGGER 2: CHAOTIC WATERS

All school children who visited the botanical garden participated in camping activities. It was a school holiday and there was a large crowd of visitors. As a result, rubbish was piling-up in several places, including the camp area that was adjacent to the lake. Rats were observed roaming the rubbish dump and vicinity of food stalls that served visitors. However, only 6 school children showed clinical presentation of illness ten days later. The sick children had gone swimming in the lake.

Key Learning Issues

1. Describe the mode of transmission of the disease.
2. Explain the difference between infectious and contagious diseases.
3. Explain how to determine the source of infection in this case

FILA Table:

Facts	• School children visited the botanical garden during holidays and there was a large crowd of visitors • The children participated in camping activities • The garden was filled up with rubbish in several places including the camp area adjacent to a lake • Rats were seen roaming within the food stall vicinity • Symptoms manifest only by 6 children • The sick students swam in the lake inside the botanical garden
Idea	• Crowds can cause water pollution and be the source of contamination or infection • Presence of rats within food stall could be the source of infection. • Animal to human (or *vice versa*) disease transmission. • Contamination facilitates disease transmission. • Pathogens in the lake.
Learning objective	• How disease diagnosis was performed • Types of sample to be taken for diagnostic workout • Implications of the non-hygienic facilities • Infectious and non-infectious diseases that could produce the clinical symptoms in these primary school children.
Action plan	Refer to the laboratory manual and other references on the procedures for collection, transportation, storage of samples and laboratory analyses.

Discuss the diagnostic workout

- Water samples from the lake and left-over food samples from the food stall are taken for microbiological examinations.
- Tests to confirm the laboratory findings include:
    - bacterial and viral culture and isolation, polymerase chain reaction assay and sequencing.
    - Poison and heavy metal levels in the samples

TRIGGER 3: SPIRAL ENCOUNTER

A few days after admission to the local hospital, the condition of the children deteriorated, and some developed jaundice, breathlessness, and renal failure. The medical practitioner collected and sent blood samples for infectious disease screening. Meanwhile, the patients were treated with antibiotics. Based on the clinical observations, an outbreak of leptospirosis was suspected, and the attending medical practitioner notified the public health authority. A team consisting of representatives from the Health Department, Department of Veterinary Services, and Department of Environment visited the botanical garden to investigate. The investigators collected water samples from the lake and caught several rats in the vicinity of the camping ground for laboratory analyses.

Key Learning Objectives:

1. Describe the differential diagnosis for patients with jaundice, breathlessness, and renal failure.
2. Define leptospirosis and list the carriers of the disease.
3. Describe the epidemiology of leptospirosis in an outbreak.
4. Describe the clinical signs and symptoms of leptospirosis in humans and animals.
5. Describe the laboratory techniques in the diagnosis of leptospirosis.

FILA table

Facts	• The condition of the hospitalized school children deteriorated • Jaundice, breathlessness and renal failure were observed in some of the affected children • Patients were treated with antibiotics • Blood samples were collected for infectious disease screening • Leptospirosis outbreak was suspected • A team consisting of representatives from the Health Department, Veterinary Services Department, and Department of Environment visited the botanical garden for an investigation • Investigators collected water samples from the lake and caught several rats within the vicinity for laboratory analyses
Ideas	• Etiological agents might be a bacterial organism • The underlying clinical manifestations of high grade fever, erythematous rash, conjunctivitis, jaundice, breathlessness renal failure indicate severe septicaemia or toxaemia • Most likely the children contacted the infection from swimming in the contaminated lake • The disease is transmitted to humans (zoonotic) through contamination of the lake or premises
Learning Objective	• Diseases that causes jaundice, breathlessness, and renal failure • Understand laboratory diagnostic tests in the diagnosis of leptospirosis as well as those that could narrow down the differential diagnosis • Possible zoonotic disease based on the clinical signs showed by the children • Epidemiology of leptospirosis in an outbreak • Clinical manifestation of leptospirosis in humans and animals • Understand leptospirosis and its carriers
Action plans	• Read on the zoonotic bacterial diseases

1. List the zoonotic bacterial organism

- *Leptospira* spp
- *Salmonella* sp
- *Brucella* sp.

2. List the diseases characterized by jaundice, high grade fever, breathlessness and renal failure.

- Malaria
- Dengue fever
- Viral hepatitis
- Leptospirosis

3. Describe the clinical symptoms of leptospirosis in humans and animals.

a) Leptospirosis in humans [1]

Leptospirosis is a bacterial disease that is caused by bacteria from Genus *Leptospira.* A wide range of symptoms can be manifested by infected humans and be mistaken for other diseases while others may show no symptoms at all. The clinical symptoms that an infected human with leptospirosis can be categorized into two phases. The first phase includes fever, chills, headache, muscle aches, vomiting, diarrhea. A person can become sick for 2 days to 4 weeks. When the second phase occurs, an infected person can have show a severe condition such as kidney failure, liver failure or meningitis.

b) Leptospirosis in animals [2,3]

Rodents and other wild and domesticated animals are all susceptible to leptospirosis. However, rodents are implicated in most instances in human cases contracted through skin abrasion and mucosa of mouth, nose and eyes. Humans too can acquire infection from contaminated water with *Leptospira* or from infected animals. Dogs are most commonly affected with *Leptospira* often following exposure to or drinking from rivers, lakes or streams; exposure to potentially infected wildlife, farm animals or contact with rodents or other dogs. Similarly, the clinical signs in dogs too vary in which some may not exhibit any signs, while others may have a mild and transient illness and recover, and some may develop severe conditions and eventually lead to death. Signs of leptospirosis include fever, chills, muscle tenderness, increased thirst, dehydration, vomiting, diarrhea, inappetence, lethargy, jaundice, conjunctivitis. In severe cases, the disease can cause kidney failure with or without liver failure with occasionally severe lung disease portrayed by dyspnea.

4. Describe the laboratory techniques for diagnosis of leptospirosis

Diagnosis is often based on serology in conjunction with clinical symptoms presented, history of possible exposure and the presence of risk factors. Below are the diagnostic methods that can be done to come out with a definitive diagnosis of leptospirosis:

a) Dark-field microscopy
Organisms may be detected by dark-field microscopy in fresh urine.

b) Isolation and identification
Samples that can be taken are blood, urine or other clinical materials for isolation and identification of *Leptospira*. Samples from suspected animals can be cultured onto Ellinghausen, McCullough, Johnson and Harris (EMJH) medium supplemented with 1% bovine serum albumin and Tween 80 and incubated at 30^{o}C for up to 3 months. Blood samples from early infection approximately within 2 weeks from initial infection can also be used for isolation purposes. Urine samples should be collected from patients after the first week onset of illness. Urine samples left to stand for long periods may become acidic and decrease the viability of leptospires. Thus, it is important for urine samples to be inoculated onto the medium within two hours of sample collection.

c) Serology
   i) Microscopic Agglutination test (MAT)
   Serum samples from suspected animals collected with different dilution of serum samples are prepared. An equal volume of neat and diluted serum samples is added with live culture grow in liquid medium. Samples are considered MAT positive if at least 50% of leptospires agglutinated with the serum at titre $\geq$ 1:100 for single serum specimen or $\geq$ 4-fold increase in the titre of paired sera samples are significant diagnostically accompanied with clinical symptoms exhibited by the animal host consistent with leptospirosis. To achieve positive diagnosis using gold standard MAT, a minimum of two serum samples should be taken within at least 10 days apart from the initial serum samples.

   ii) ELISA
   Antibodies against *Leptospira* are detected using an IgM-enzyme-linked immunosorbent assay (ELISA) based on the predominant serovars in a particular country as antigen. IgM titre of $\geq$ 160 is regarded as positive.

d) Molecular technique
Samples that can be taken for PCR are similar for isolation and identification. The principle of the technique is the detection of leptospiral DNA in those samples. PCR has shown to be sensitive and specific based on the amplification of leptospira 16S rDNA (*rrs*) and *lipL32* genes.

References

1. https://www.cdc.gov/leptospirosis/
2. https://www.who.int/zoonoses/diseases/leptospirosis/en/
3. https://www.avma.org/resources/pet-owners/petcare/leptospirosis

TRIGGER 4: BACK TO BUSINESS

The microscopic agglutination test (MAT) for leptospirosis showed a titre of 1:400. Pathogenic *Leptospira* sp. was isolated from water samples and rats. Upon laboratory confirmation of the disease, the affected children were treated with broad-spectrum parenteral antibiotics. To determine leptospirosis-prone zones, the botanical garden was mapped using the Geographical Information System (GIS). The Municipal Council implemented control measures to contain the disease and neighbouring cattle farms were advised not to use unprocessed water from the lake. To prepare for the impending increase in the number of patients coming down with leptospirosis, the local hospitals were alerted. At the same time, the Health Department and Municipal Council officers began monitoring the rat population in the botanical garden and surrounding areas. After one month, the botanical garden was allowed to resume operations after the food stalls were cleaned to the required hygiene standards. To monitor the cleanliness of the lake, the Municipal Council conducted a scheduled analysis of the lake water.

Key Learning Objectives:

1. Outline strategies for the prevention and control of leptospirosis.
2. List the parties to be involved in handling an outbreak of leptospirosis.
3. Describe the surveillance program for leptospirosis.
4. Discuss the approach in the management of leptospirosis.
5. Describe a response plan for the leptospirosis outbreak using the One Health approach.
6. Describe strategies to create public awareness on leptospirosis.
7. Discuss the impact of leptospirosis on the country's economy, tourism, livestock industry and public health.

FILA table

Facts	• The disease causing agent is identified as *Leptospira* sp through laboratory test confirmation • The disease agent was isolated from contaminated water samples and rats found within the garden vicinity • Patients were treated with broad spectrum parenteral antibiotic • The botanical garden was mapped out using GIS for determination of leptospirosis prone zone • Control measures were implemented to contain the disease spread • Neighbouring cattle farms were advise not to use unprocessed water from the lake • The botanical garden was closed, local hospital alerted, health and municipal department staff began rat population monitoring within and around the botanical garden • After a certain period, food stalls were cleaned and the botanical garden resumed operations
Ideas	• Leptospirosis is treatable and preventable in humans • No established recommended treatment regimen of leptospirosis in rats • The infected rats are a source of infection • The lake, swimming pool and/or river and premises contaminated with infected rat urine are conducive for the transmission of leptospirosis
Learning Objective	• Contact tracing procedure in disease outbreaks • Stake holders involved in investigation and policies on leptospirosis • How to increase awareness on leptospirosis among the public • Control and prevention of leptospirosis in humans using the One Health approach • Recommendation to the botanical garden on management as well as strict hygiene • Policies on leptospirosis as it affects the country's economy, tourism, livestock industry and public health
Action plans	• Refer to relevant webpages for information on policies and contact-tracing procedures in transmissible disease outbreaks in Malaysia.

1. **Discuss the One Health approach in control of zoonotic diseases**

   One Health is a public health management approach involving people, animals and the environment. The One Health approach is a coordinated multidisciplinary and multisector local, national and international collaboration to detect, prevent and control emerging and re-emerging diseases at the animal-human-ecosystem interface. Thus, the success of the One Health approach in the monitoring and control of public health threats lies in the full cooperation of the physicians, veterinarians, environmental experts, policy makers and the community. This can be achieved through the understanding of mode of diseases spread among people and animals and in the environment

2. **Recommend good and effective communication strategies for dissemination of information on leptospirosis facility environment**

   Dissemination of information on leptospirosis can be done through awareness campaigns and educational programmes for workers, animal keepers, wildlife officers, veterinarians, medical doctors, policy makers and the public.

CHAPTER 4:
ASSESSMENT OF AN *IN SITU* PROBLEM BASED LEARNING

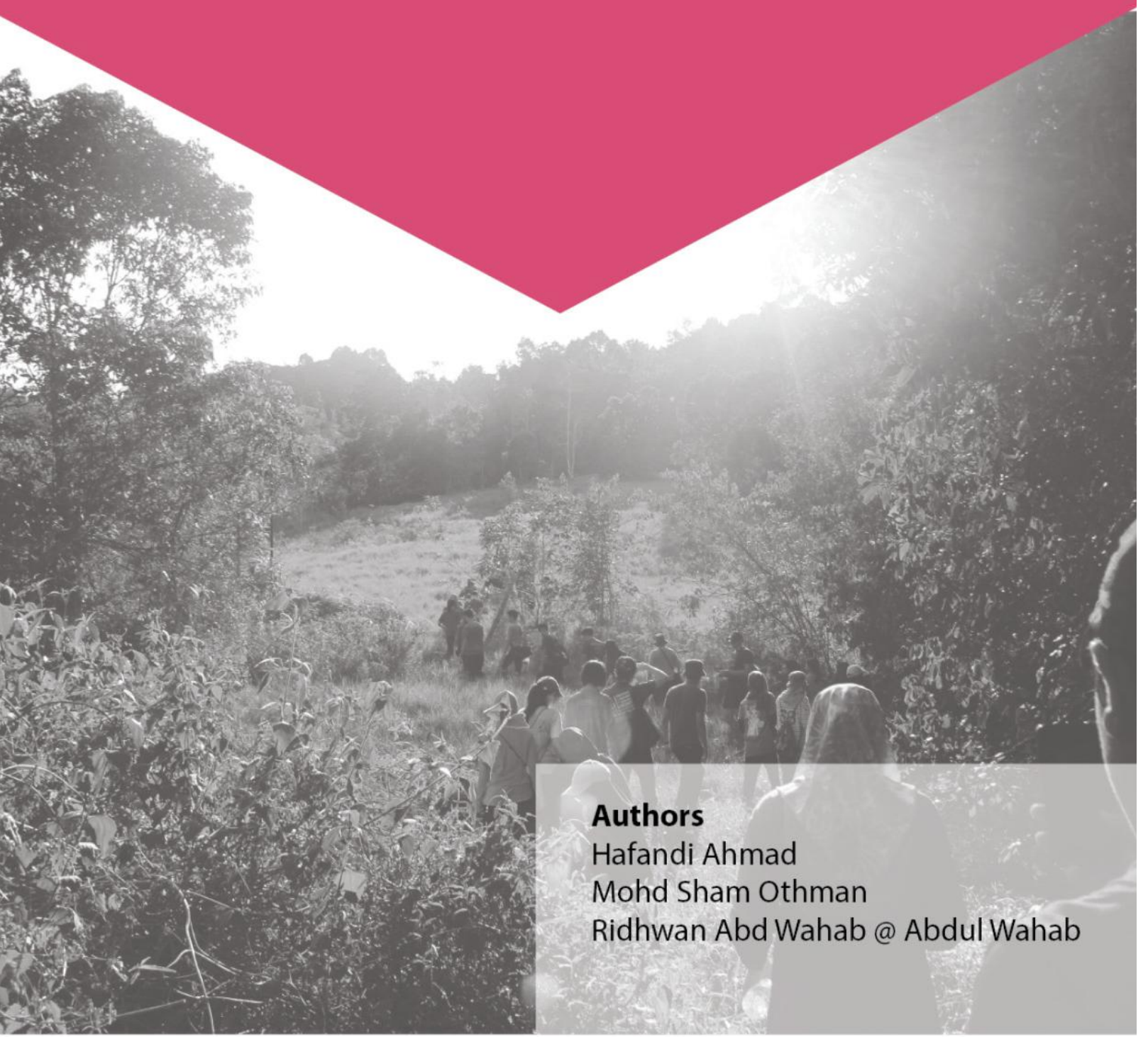


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Table 4.0 Overview on the assessment activities for an *in situ* PBL.

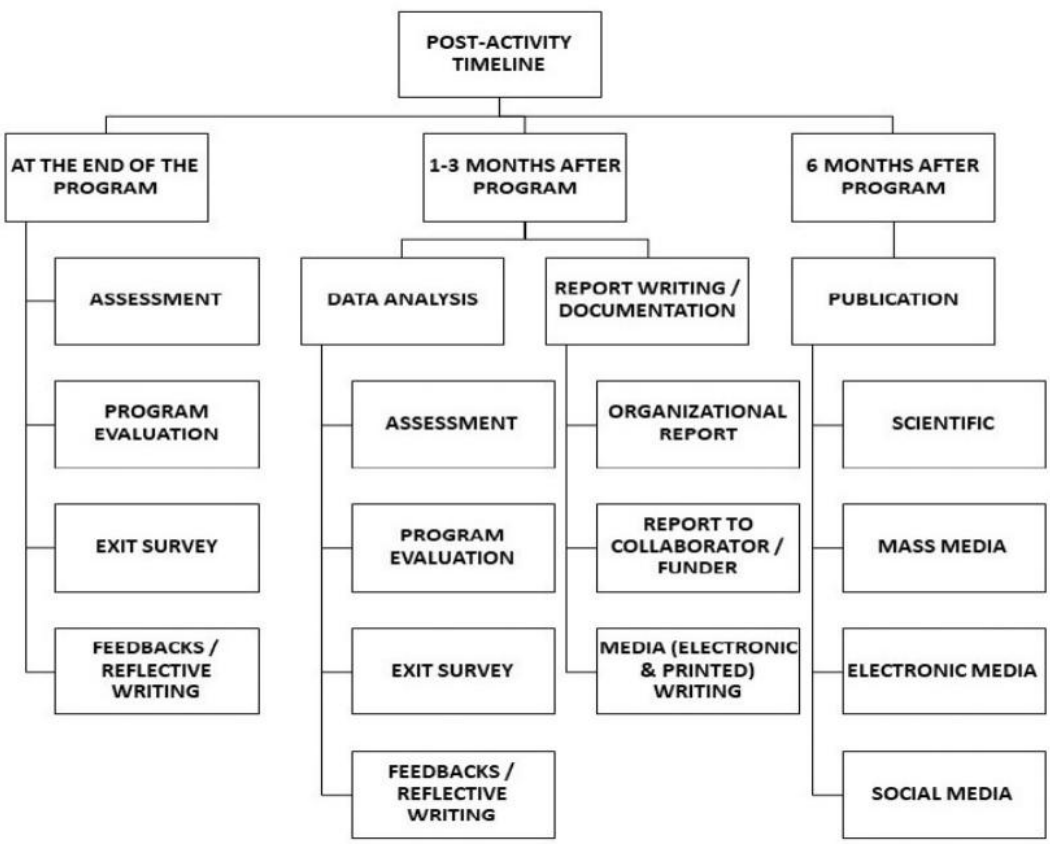
Person in charge	**Items**	**Description**	**Pages**
-	**4.0 Overview of post-activity**	4.0 Description on a brief summarization about objectives of conducting post-activity assessment at the end of an *in situ* PBL and how to conduct those activities.	71
▪ Coordinator ▪ Facilitator	**4.1 Assessment**	4.1 Assessment of participant. • Oral presentation • Poster presentation • Multimedia presentation • Mind map • Written report • Performing art • Individual Interview • Written exam • Quizzes	72
▪ Facilitator ▪ Coordinator ▪ Collaborator	**4.2 Program evaluation**	4.2 Program evaluation (a) Evaluation by the participant and facilitator. • Program • Facilitators • Coordinators • Collaborators • Organizing committee (b) Evaluation by the coordinator. • Program • Facilitators • Participant • Collaborators (c) Evaluation by the collaborator. • Program • Coordinators • Facilitators • Participant (Refer to Appendices 5 – Evaluation form)	74

▪ Facilitator ▪ Coordinator ▪ Collaborator	**4.3 Exit survey** 	4.3 Exit survey (a) Participant, facilitator, coordinator and collaborator feedback through: • exit survey • reflective writing • improvement/suggestion (b) Exit survey CAN be merged into program evaluation (see Activity 4.2) along with reflective writing and improvement/suggestion feedback (see Activity 4.4). (Refer to Appendix 6 - Exit survey)	76
▪ Facilitator	**4.4 Feedbacks** 	4.4 Participant and facilitator will be given the opportunity to provide feedback through: • exit survey • reflective writing • improvement/suggestion (Refer to Appendix 7 - Reflection form)	77
▪ Coordinator	**4.5 Documentation**	4.5 Documentation (a) SWOT analysis based on the feedbacks (see activity 4.2, 4.3 and 4.4) to determine the sustainability of the program. (b) Provide documentation such as report, video, newsletter/magazine, and social media posts.	79

Activity 4.0: Overview of post-activity

Description

A post-activity assessment and evaluation are conducted after the completion of an in-situ PBL program/activity. The aim of this part is to assess whether project goals have been met, to determine whether learning outcomes (LO) has been achieved, to decide if the project has been managed successfully, and to ensure that the stakeholders benefit from the project. By conducting a thorough and timely post-activity assessment and evaluation, we can identify key lessons learned and then apply them to the planning and management of future projects. One of the main take-home message of this part is whether the learning outcomes are realistic, achievable and reproducible for future programs. This part also deals with recognizing shortcomings and mistakes to avoid repeating them in future projects. Consequently, we can determine a better and more effective ways to manage the project. The assessment can also help us discover strategies, suggestions and tips for improvement and for further development. Furthermore, the assessment allows us to recognize project achievements and acknowledge people's efforts. We can identify techniques and approaches that worked, and devise steps whether we want to use it or not in the future. There are five clusters of activities that we recommend to conduct during post-activity assessment at the end of an *in situ* one health PBL activity; 1) Assessment, 2) Program evaluation, 3) Exit survey, 4) Feedbacks and 5) Documentation. These activities can be conducted according to the suggested timeline below.



Activity 4.1 : Assessment

Person in charge

- Coordinators
- Facilitators

Description

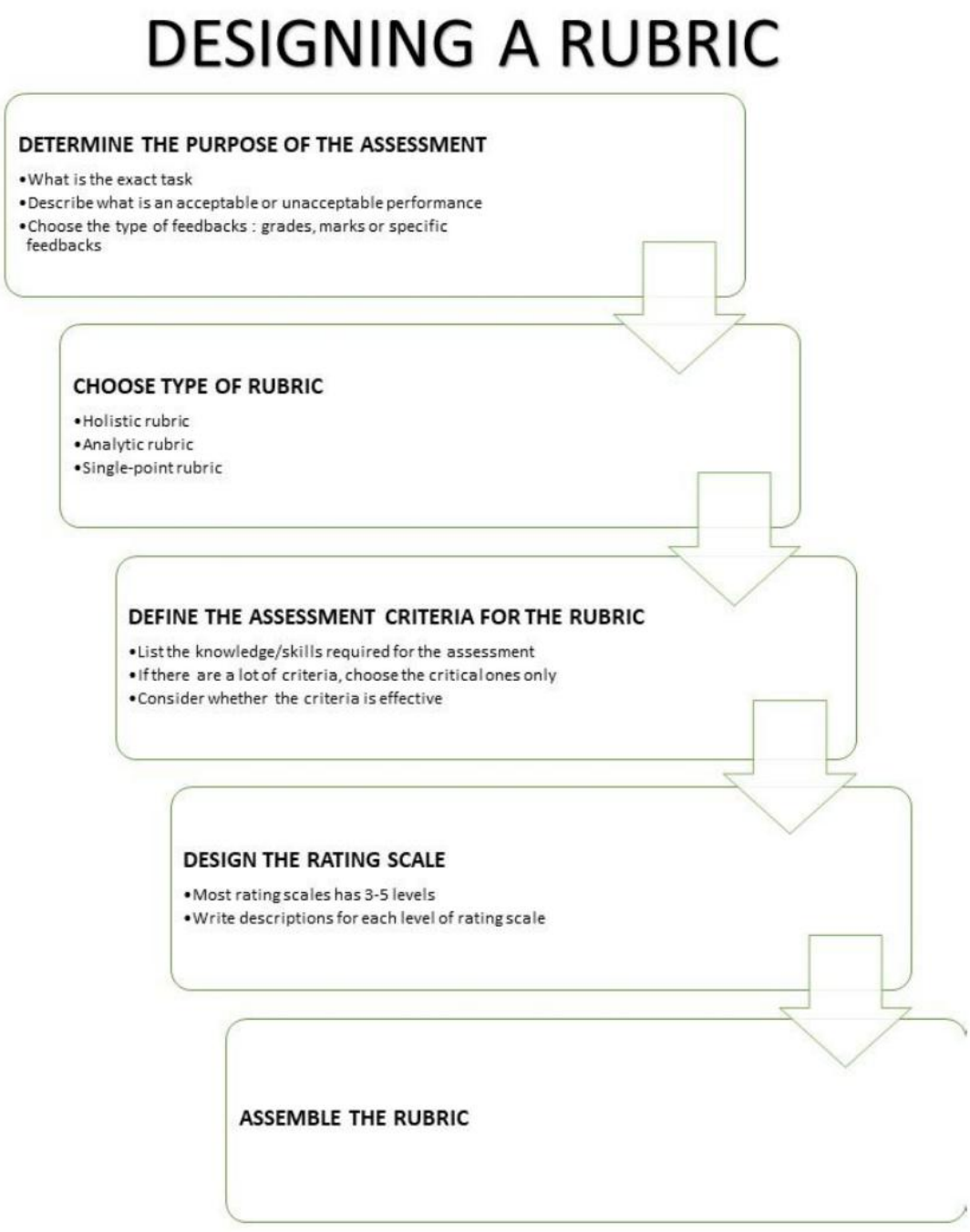
- Various presentation methods could be employed to assess participants' achievement and understandings including:
  - Oral presentation
  - Poster presentation
  - Performing art (including stage performance)
  - Multimedia presentation (including videos)
  - Written report
  - Mind map
  - Individual Interview
  - Written exam
  - Pre and post quizzes

- Participants are expected to present the overall take-away message and information they have gathered during the program.
- This activity will be a tool to evaluate knowledge, understanding, presentation skills and creativity of the participants.

Resources

1. Presentation rubrics.
2. Presentation aids.
   - Computer
   - LCD
   - Paper
   - Marker
   - Performance props
3. Presentation venue.
   - Classroom
   - Hall
   - Outdoor presentation (including campfire)
4. Interview question and criteria checklist.
5. Question bank and answer scheme (based on the case).

Supplementary



References:

1. http://www.brown.edu/sheridan/teaching-learning-resources/teaching-resources/course-design/classroom-assessment/grading-criteria/designing-rubrics
2. http://www.cultofpedagogy/holistic-analytic-single-point-rubrics

Activity 4.2 : Program Evaluation

Person in Charge

- Participant
- Coordinator
- Collaborator/funder

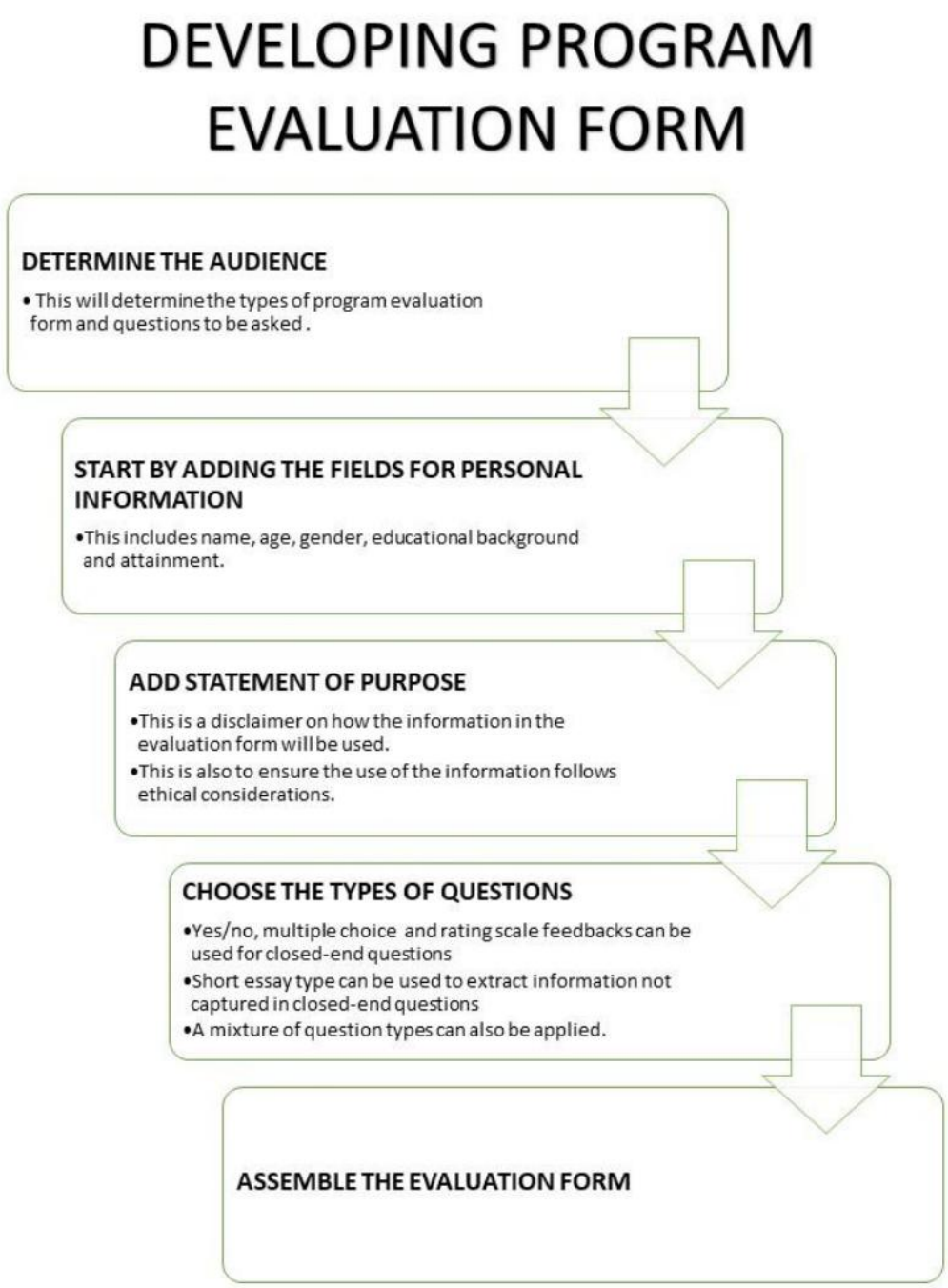
Description

- This activity is conducted to gather feedback about the content of the whole program. The person involved will be asked about the strengths and relevance of the program and whether the content is optimized to achieve the objectives and program outcomes outlined.
- Based on the feedback from the participants, facilitators, coordinators and collaborator, a SWOT (strengths, weaknesses, opportunities and threats) analysis could be conducted. The outcome of the SWOT Analysis will be useful to determine the sustainability of the program.
- All of the persons involved will be able to evaluate the program.
- Feedback CAN be merged with exit survey and questionnaire (see Activity 4.3), reflective writing and improvement/suggestion feedback (see Activity 4.4).

Resources

3. Program evaluation form.
   Refer to Appendix 5.
4. Sample forms can be obtained from
   https://www.sampleforms.com/sample-workshop-evaluation-forms.html.

Supplementary



Reference:

1) http://www.sampleforms.com/sample-workshop-evaluation-forms.html

Activity 4.3 : Exit Survey

Person in Charge

- Facilitator
- Coordinator
- Collaborator

Description

- This activity is conducted to gather feedback about the management of the whole program.
- Based on the feedbacks from the participants, facilitators, coordinators and collaborator, a SWOT (strengths, weaknesses, opportunities and threats) analysis could be conducted (see Activity 4.5).
- The outcome of the SWOT Analysis will be useful to determine the sustainability of the program.
- Exit survey CAN be merged into program evaluation (see Activity 4.2) along with reflective writing and improvement/suggestion feedback (see Activity 4.4).

Resources

1. Example of exit survey.
   Refer to Appendix 6.

Supplementary

1. https://www.eventbrite.co.uk/blog/post-event-survey-ds00/
2. https://www.questionpro.com/survey-templates/workshop-survey-template/
3. https://www.surveymonkey.com/mp/workshop-survey-template/

Activity 4.4 : Feedbacks

Person in Charge

- Facilitator

Description

- Reflective writing is an evidence of reflective thinking which involves:
  - Reviewing the program.
  - Analyzing the program.
  - Thinking carefully about what the program means for the participants & facilitators.
- Improvement/suggestions allows future amendments of the program structure and content.
- Responses and feedbacks from this activity can be used for a SWOT (strengths, weaknesses, opportunities and threats) analysis of the program (see Activity 4.5).
- Everyone involved are given the opportunity to provide feedback through reflection and improvement/suggestion.
- Reflective writing and improvement/suggestion feedback can be merged into program evaluation (see Activity 4.2) along with an exit survey (see Activity 4.3).

Reflection and feedback sessions by students at the end of the program

Resources
1. Example of reflection form. Refer to Appendix 7. 2. Improvement/suggestion form.
Supplementary
1. http://www.uvm.edu/~dewey/reflect.pdf 2. https://paperovernight.com/blog/reflection-paper 3. http://isthismystory.com/learning/how-do-i-write-a-good-personal-reflection/

Activity 4.5 : Documentation
Person in charge
▪ Coordinator
Description
➢ The coordinator is expected to prepare a SWOT (strengths, weaknesses, opportunities and threats) analysis to determine the sustainability of the program. ➢ The coordinator and the organizing team are also expected to analyze data and provide documentation in various forms including: • Written program report. • Scientific publication. • Multimedia & video report. • Mass media reports including newsletters, magazine and newspaper. • Social media posts. ➢ The participant is expected to submit/produce: • Written report. • Scientific publication. • Multimedia & video report for assessment purpose.

SABTU 29 JULAI 2017 — UTUSAN MALAYSIA • MUKA 25

§ APA BERLAKU

PESERTA bergambar kenangan sewaktu program dijalankan.

LATIHAN CEGAH ZOONOTIK

SEJAK kebelakangan ini, penyakit berjangkit yang disebarkan oleh haiwan menanjakkan peningkatan, sekali gus menimbulkan kebimbangan dalam kalangan masyarakat.

Kekhuatiran itu turut timbul ekoran wabak penyakit anjing gila semakin meningkat serta menjadi tular di media sosial dan elektronik.

Justeru, bagi meningkatkan kesedaran dan kefahaman tentang penyakit jenis itu, Malaysia One Health University Network (MyOHUN) dengan kerjasama Fakulti Perubatan Veterinar, Universiti Putra Malaysia (UPM) baru-baru ini menganjurkan Latihan Pencegahan Zoonotik Haiwan Liar dan Kesihatan Ekosistem Tropika.

Sebanyak 40 penuntut Kursus Perubatan dan Veterinar UPM, Universiti Kebangsaan Malaysia (UKM); Universiti Malaysia Sarawak (Unimas); Universiti Malaysia Sabah (UMS) dan Universiti Malaya (UM) menyertai latihan itu.

ILYAS HANAFI RAZALI membentangkan hasil perbincangan dalam Latihan Pencegahan Zoonotik Haiwan Liar dan Kesihatan Ekosistem Tropika.

Ketua Projek, **Dr. Tengku Rinalfi Putra Tengku Azizan** berkata, latihan tertumpu kepada penyakit yang boleh berjangkit daripada haiwan kepada manusia dan sebaliknya.

"Latihan ini turut dilaksanakan untuk memupuk kesedaran mengenai pemeliharaan haiwan liar yang terancam dan meningkatkan kefahaman terhadap punca mereka disenaraikan sebagai spesies terancam," katanya kepada S2.

Tengku Rinalfi menambah, peserta juga diberi latihan bagi memboleh kan mereka memahami tentang interaksi antara hidupan liar, manusia dan alam sekitar.

"Peserta yang juga duta One Health diberi pendedahan menyeluruh mengenai tanggungjawab mereka dalam memelihara serta mewujudkan kehidupan lebih baik dalam putaran ekosistem," katanya.

Program itu turut disertai pekerja Pusat Pemulihan Orang Utan Sepilok (SORC) dan enam felo Southeast Asia One Health University Network (Seaohun) dari Vietnam, Thailand, Bangladesh dan Malaysia.

Antara pengisian utama sepanjang program itu adalah perkongsian ilmu menerusi sesi ceramah khas yang dikendalikan Dr. Chris Whittier dan Prof. Dr. Stanley Gordon Peawick dari Universiti Tufts, Amerika Syarikat.

Selain mendekati haiwan liar menerusi ekspedisi Gua Gumantong dan Sungai Kinabatangan, peserta juga menyertai lawatan ke SORC untuk mempelajari tingkah laku, habitat dan pemakanan Orang Utan.

Dalam pada itu, seorang peserta, Ilyas Hanafi Razali berkata, latihan tersebut membantu meningkatkan pemahamannya tentang penyakit berkaitan.

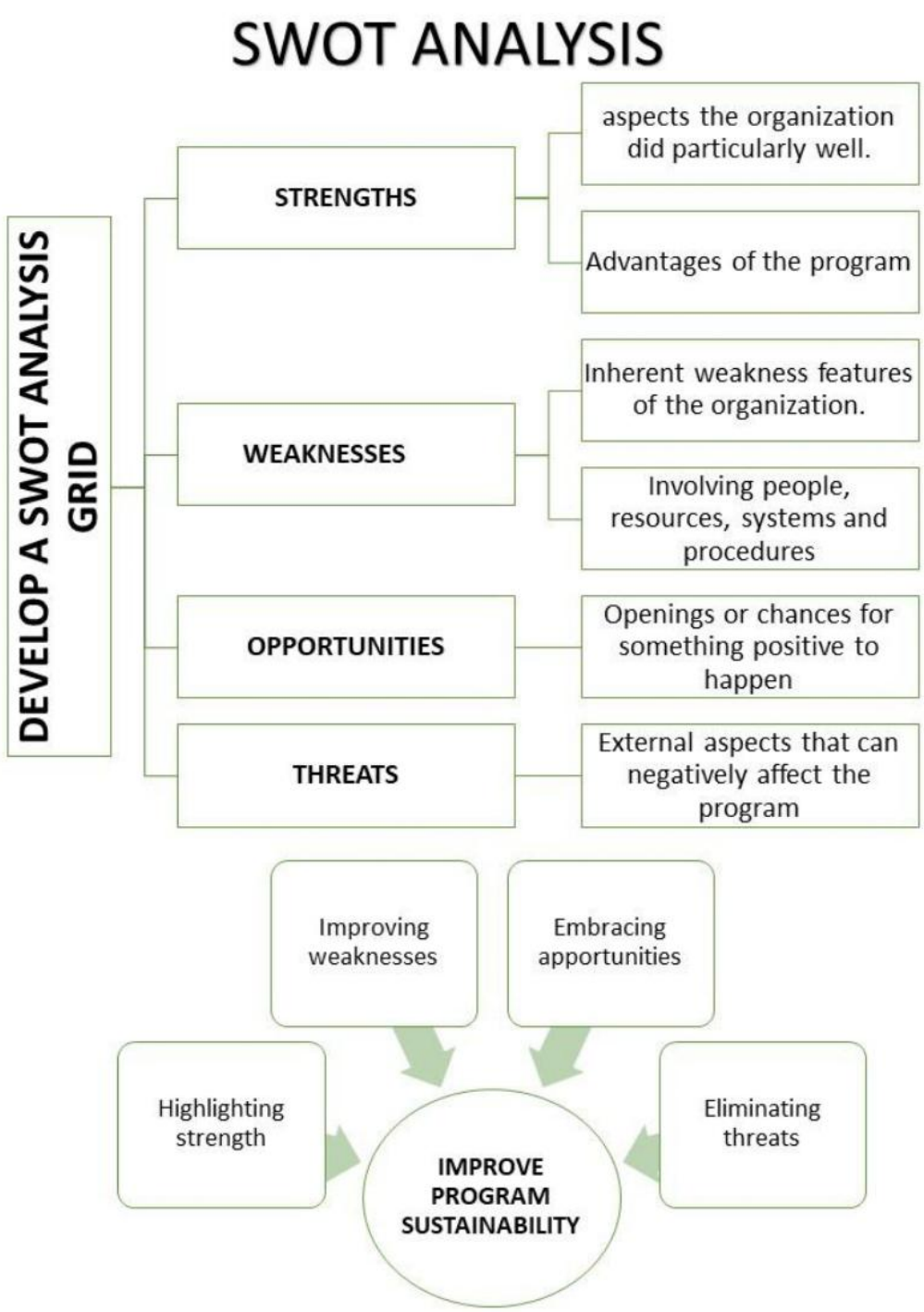
"Menerusi pengalaman ini, saya dapat memahami kesan penyakit bawaan haiwan kepada manusia dan impak terhadap komuniti jika tidak dihentikan," katanya.

SEORANG peserta diberi peluang mendekati anak gajah dalam mengenali kehidupan spesies haiwan tersebut.

Resources

1. Program report.
2. Social media reports.

Supplementary



Reference:

1) https://www.mindtools.com/pages/article/newTMC_05.htm

Appendix 4

Presentation assessment form

a) Observation report

Participation and Communication Skills	Cooperation / Team building Skills	Comprehension / Reading Skills	Knowledge / Information Gathering Skills	Role	Observation Report
				Chair person	
				Secretary	
				Scribe	
				Member	
				Member	
				Member	
				Member	

Scale for marks:

1- Unsatisfactory
2- Marginal
3- Satisfactory
4- Good
5- Outstanding

Guidelines of observation report for Problem based learning assessment.

Score	Participation and Communication Skills	Cooperation / Team building Skills	Comprehension / Reading Skills	Knowledge / Information Gathering Skills
1	- Does not respond to verbal/non-verbal cues from others - Does not speak or listen to others or only to tutor	- Does not contribute to identifying learning issues - Does not give others the opportunity to speak or interrupts others - Unwilling to acknowledge other's views or take up any tasks	- Does not demonstrate understanding of basic (biological, behavioral and/or population concepts) - Does not seek clarification of concepts	- Has no call of previous knowledge - Not prepared for session
2	- Rarely asked questions - Responds only to verbal cues - shows limited non-verbal response during discussion - Discussion or description cannot be understood by others	- Rarely participate in identifying the learning issues - Takes up tasks only when asked by others - Tends to dominate discussion	- Demonstrates understanding of basic concepts with considerable guidance - Rarely seek clarification of concepts	- Has limited recall of previous knowledge - Prepared for only certain learning issues
3	- Occasionally asks questions - Responds to verbal / non-verbal cues - Occasionally presents ideas clearly	- Volunteers to perform tasks (eg. To scribe read case) - Participates in identifying most learning issues	- Demonstrates understanding of concepts with little guidance - Draw reasonable conclusions from given data or information - Often seek clarification of concepts	- Applied previous knowledge for current issues - Prepared for most learning issues
4	- Regularly asks questions that stimulate discussion - Often presents ideas clearly and helps clarify ideas from others and for others	- Participates regularly in identifying and helps to prioritize learning issues - Encourages others to participate	- Understanding of concepts is demonstrated clearly - Draw valid conclusions with proper interpretation data or information - Recognizes flaws in data or reasoning if pointed out by someone else	- Well prepared for session - Provides references for given information - Recognizes integration of knowledge when explained by others
5	- Leads discussion among group members - Constantly present clear ideas with demonstration of listening, summarizing and clarification skills	- Asks for feedback from the group - Organizes the group - Shows empathy - Tries to bring quiet members into discussion in a diplomatic manner	- Demonstrates understanding by applying and linking concepts to problems. Explains concepts to others clearly - Integrates difficult concepts - Identifies flaws in data or reasoning independently	- Well prepared for session and identifies key references - Regularly integrates biological with behavioral and population perspectives, providing explanations

1=Unsatisfactory 2=Marginal 3=Satisfactory 4=Good 5=Outstanding

b) FILA table

(to be compile and submitted at the end of both PBL sessions)

MODULE TITLE: _____ **PBL:** _____

PART/TRIGGER NUMBER: _____ **Learning issues:**		
Facts (What you know)	**Ideas (Hypothesis)**	**What you NEED to know more?**
Action Plans		

c) FILA assessment form

GROUP:_____ TOPIC/UNIT:_____ ASSESSOR:_____

Aspect	1	2	3	4	5	Score
	Very poor	**Poor**	**Fair**	**Good**	**Very good**	
Facts History, Signalment, Statement of problem, Physical examination findings.	The student does not have grasp of any fact	The student is unfamiliar with the given information and were able to discover only rudimentary facts	The student is familiar with the given information and were able to discover only rudimentary facts	The student is familiar with expected facts but fail to write it clearly and concisely	The student demonstrate full knowledge (more than required) by uncovering all facts with clear and concise description	
Ideas Differential diagnosis, Reasoning, Hypothesis of the problem statement	The student does not have grasp of any proper idea	The student is unfamiliar with the given information and were able to generate only superficial ideas but fails to elaborate	The student is familiar with the given information, able to generate only superficial ideas but fails to elaborate	The student is familiar with expected ideas but with minimal elaboration	The student demonstrate full knowledge (more than required) by generating all ideas explanations and elaboration	
Learning issues	The student does not have grasp of any learning issues	The student is unfamiliar with the information and is able to discover only 1-2 learning issues but fails to elaborate	The student is familiar with expected 3-4 learning issues with minimal elaboration	The student is familiar with expected more than 5 learning issues with minimal elaboration	The student demonstrate full understanding (more than required) by listing all learning issues with explanations and elaboration	
Action Plan (Tentative or definitive diagnostic approach, how to source out more information to help solve the problem)	The student does not have any proper action plan	The student is uncomfortable with the listed learning issues and unable to list and elaborate the practical action plans	The student is comfortable with the listed learning issues but unable to list and elaborate the practical action plans	The student is at ease with the listed learning issues and able to list the practical action plans, but fails to elaborate	The student demonstrate full understanding (more than required) and able to list the most practical action plans with explanations and elaborations	
					Grand total (over 20)	

d) Parallel presentation

DATE: _____

Group no.	**Aspect Assessed**	**Mark (1-5 each section)**	**Total marks (/30)**	**Comments (you need to provide strong reason if you give a score of 1 or 5!)**
	Organization			
	Subject knowledge			
	Graphics			
	Mechanics			
	Eye contact			
	Elocution			
	Organization			
	Subject knowledge			
	Graphics			
	Mechanics			
	Eye contact			
	Elocution			
	Organization			
	Subject knowledge			
	Graphics			
	Mechanics			
	Eye contact			
	Elocution			
	Organization			
	Subject knowledge			
	Graphics			
	Mechanics			
	Eye contact			
	Elocution			

- Presentation rubrics (including Q&A session)

Aspect	1	2	3	4	5	Total
Organization	Audience cannot understand presentation because no sequence of information	Audience has difficulty following presentation because student jumps around		Presenter presents information in logical sequence which audience can follow	Presenter presents information in logical, interesting sequence which audience can follow	
Subject knowledge	Presenter does not have grasp of information, presenter cannot answer questions about the subject	Presenter is uncomfortable with information and is able to answer only rudimentary questions		Presenter is at ease with expected answers to all questions but fails to elaborate	Presenter demonstrate full knowledge (more than required) by answering all class questions with explanation and elaboration	
Graphics	Presenter uses superficial graphics or no graphics	Occasionally uses graphic that rarely support text and presentation		Graphics relate to text and presentation	Graphics explain and reinforce screen text and presentation	
Mechanics	Presentation has 4 or more spelling errors and or grammatical errors	Presentation has 3 misspellings and/or grammatical errors		Presentation has no more than 2 misspellings and/or grammatical errors	Presentation has no misspellings and grammatical errors	
Eye contact	Presenter reads all or report or on board with no eye contact	Presenter occasionally uses eye contact, but still reads most of the report		Presenter maintains eye contact most of the time but frequently return to notes	Presenter maintains eye contact with audience seldom returning to notes	
Elocution	Presenter mumbles, incorrectly pronounces terms and speaks too quietly for participants to hear	Presenter's voice is low. Presenter incorrectly pronounces terms. Participants have difficulty hearing the presentation		Presenter's voice is clear. Pronounces most of the words correctly and participants can hear the presentation well	Presenter uses a clear voices and correct, precise pronunciation of terms so that all participants can hear	
					Grand total	

Appendix 5

Evaluation form

PROGRAM	
INSTITUTION	
PROGRAM VENUE	
DATE	

It is important for the organizing committee to determine whether the learning outcomes (LO) are understood and achieved by the participants. This form will help the organizing committee to evaluate the program and make necessary amendments. Please tick (√) in the applicable space provided below.

ITEM			**RATING/SCALE**				
			1	**2**	**3**	**4**	**5**
			Strongly disagree	⟷			**Strongly agree**
1	**I have attained the learning outcomes (LO)/ objectives of the program**						
	LO1						
	LO2						
	LO3						
	LO4						
	LO5						
2	**The activities of the program are designed to justify these learning outcomes**		**1**	**2**	**3**	**4**	**5**
	LO1						
	LO2						
	LO3						
	LO4						
	LO5						

3	**The materials given are necessary/relevant to attain these learning outcomes**		**1**	**2**	**3**	**4**	**5**
	LO1						
	LO2						
	LO3						
	LO4						
	LO5						

4	**I have attained the learning outcomes outlined in the program**		**1**	**2**	**3**	**4**	**5**
	LO1						
	LO2						
	LO3						
	LO4						
	LO5						

Appendix 6

Exit survey

a) Participant evaluation form

PROGRAM	
INSTITUTION	
PROGRAM VENUE	
DATE	

Please take a few minutes to fill out the following questionnaire. The information will be used to improve future MyOHUN activities. Please evaluate the training/workshop/activity by ticking (√) the appropriate box. Thank you for your time.

Score	Description
1	*Very unsatisfactory*
2	*Unsatisfactory*
3	*Satisfactory*
4	*Good*
5	*Excellent*

No.	Subject	1	2	3	4	5
1.	Contents of training/workshop/activity – suitability of topics					
2.	Suitability and comfort of training/workshop/activity venue					
3.	Food served					
4.	The overall logistics were well managed					
5.	Service of Secretariat					
6.	Beneficial in providing the latest knowledge/ information					
7.	Beneficial in increasing your technical experience (applicable only for workshop/short course)					
8.	Fulfill the objective(s) of the training/workshop/activity					
9.	Allocation of time for lecture/practical/training/workshop/activity					
10.	This training/workshop/activity met my expectations					
11.	The training/workshop/activity was relevant to my work/studies					
12.	The information presented was new to me					
13.	Overall, the speakers were informative					
14.	The materials provided were useful					
15.	This training/workshop/activity helped clarify my understanding of "One Health".					
16.	I intend to take actions in my work as a result of what I learned at this training/workshop/activity.					

Your suggestion to improve this training/workshop/activity:

Example of exit survey (PBL ONE HEALTH)

PBL Module title:_____

Please tick (√) the MOST appropriate choice according to the following scale

PART 1 : OVERALL CASE EVALUATION					
Questions		**Strongly Disagree (1)**	**Disagree (2)**	**Agree (3)**	**Strongly Disagree (4)**
1.	The PBL module is easily understood				
2.	The PBL module was interesting and motivating				
3.	The PBL module is appropriate for my level of education & experience				
4.	The problem is relevant to a Malaysian scenario				
5.	The triggers are well organized and the flow is well-understood				
6.	The problem reflects real problem in life				
7.	The PBL module was challenging				
8.	The problem was easy to solve				
9.	This PBL module gives me the opportunity to enhance my communication skills				
10.	The terminologies are easily understood				
11.	This PBL module helped me to integrate basic scientific knowledge and clinical practice				
12.	Parts of the PBL module are unclear and require assumption to be made				
13.	This PBL module motivates me to search for relevant information				
14.	The module is open enough to sustain lively discussion among my group members				
15.	The problem was complex enough to have multiple forms of solutions				
16.	I'm able to identify the facts from the given PBL module				
17.	I'm able to generate ideas based on the facts				
18.	I'm able to formulate learning issues easily				
19.	I'm able to generate task/action plans to further investigate the problem				
20.	I know how to source out information on One Health				

21.	The PBL module encourages critical thinking				
22.	The PBL module facilitate team building and group management				
23.	The PBL module allows for exploration of international policies on trans-boundary disease				
24.	The PBL module clarifies the concept of "One Health"				
25.	This PBL module allows for the understanding of multidisciplinary approach for disease control				
26.	I would like to work more on PBL modules on "One Health"				
27.	I would recommend a PBL approach to investigate "One Health" related problem for all student				
PART 2 : CONTENT EVALUATION (ONE HEALTH CONCEPT)					
Questions		**Strongly Disagree (1)**	**Disagree (2)**	**Agree (3)**	**Strongly Disagree (4)**
1.	The content addresses the concept of "One Health"				
2.	The content addresses the learning outcomes of the case				
3.	Fundamental sciences are presented in context of the clinical problem				
4.	Prior knowledge on fundamental sciences is required				
5.	The content covers the biology and ecology of infectious diseases				
6.	The content include epidemiological concepts of diseases and control				
7.	The content addresses issues at the level of human, animal and environmental interface				
8.	The content allows for exploration of mechanism of disease including immunology and pathogenesis				
9.	The content revolves around population, community and ecosystem ecology				
10.	The content requires multidisciplinary approach to responds to emerging pandemics				
11.	The content addresses cultural issues and anthropology				
12.	The content explores many aspects of emerging and re-emerging zoonotic diseases				
13.	The content explores local and international policies on human health				
14.	The content explores local and international policies on animal health				

15.	The content explores local and international policies on environmental and conservation				
16.	The content explores local and international policies on economics and trade				
17.	The content has an appropriate amount of material for the allotted time				
18.	The content is reliable, accurate and reflects real-life scenarios				
19.	The content is grammatically correct with appropriate terminologies				
20.	The content encourages scientific curiosity				

PART 3 : SUGGESTION AND RECOMMENDATION

1. Other comments on the content of the PBL module.

2. In your opinion, what were the strengths of this PBL module?

3. In your opinion what were the weaknesses of this PBL module?

4. What are your suggestion to improve learning skills (communication, teamwork, leadership, critical thinking) from the given PBL module?

5. Provide your quality assessment on the PBL cases scenario by choosing only one of the following:

Unacceptable Poor Average Good Excellent

*Thank you for your participation.
The information you have provided will help us to improve this PBL module.

Appendix 7

Reflection form

PROGRAM	
INSTITUTION	
PROGRAM VENUE	
DATE	

The program reflection form is designed for the participants to write reflective writing about the program. This form provides the opportunity for the participants to provide reflection and feedbacks not specifically asked in Program Evaluation Form and Exit Survey Form.

1. In your opinion, what are the strengths of the program?

_____

_____

2. In your opinion, what are the weaknesses of the program?

_____

_____

3. Suggest improvements that can be implemented for the program.

_____

_____


DEVELOPMENT OF PROGRAM MODULE ON
IN-SITU ONE HEALTH
PROBLEM BASED LEARNING
FOR ANIMAL & ECOSYSTEM HEALTH
USAID
HATTEN HOTEL, MELAKA

In situ Problem based Learning (PBL) is an innovative teaching tool using real-life setting to heighten learning experiences allowing participants to effectively engage in a pre-determined learning activities. The implementation of in situ PBL aims to create a stimulating learning environment that fosters critical thinking, communication, collaboration, and leadership. This in situ One Health Problem based Learning Guidelines Book adopted formulated One Health PBL cases relevant to the Southeast Asia region and re-framed them to suit the field setting of the in situ activity.

Focusing on the preparation of the program, this guidebook provides detailed outlines on how to successfully plan and conduct the program. The execution of this in situ PBL activity involves networking and cooperation from multiple agencies with the aim of engaging those agencies in taking part of educating our future leaders. As the name implies, this guide supports teaching and learning activities that inculcate several One Health technical and core competencies highlighting technical knowledge about fundamental of infectious diseases such as zoonosis in the context of ecosystem health, epidemiology and infectious disease management while simultaneously polishing relevant soft skills necessary for a successful endeavour with interdisciplinary partners.

This book and its material are the testaments of commitment and effort by the Malaysia One Health University Network (MyOHUN) members to educate the future workforce from the medical, veterinary, and other relevant disciplines.

PROF. DR. LATIFFAH HASSAN
Coordinator, Malaysia One Health University Network (MyOHUN)

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9 7 8 6 2 9 9 6 5 6 6 2 3

A Guide on How to Run an In Situ One Health Problem Based Learning