THESIS WRITING GUIDANCE BOOK

(Revised Edition)

BIOLOGY EDUCATION
FACULTY OF TEACHER TRAINING AND EDUCATION
UNIVERSITY OF MUHAMMADIYAH MALANG
2016
THESIS WRITING GUIDANCE BOOK
BIOLOGY EDUCATION

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FOREWORD

The accomplishment of educational process in Biology Education Faculty of Teacher Training and Education University of Muhammadiyah Malang (FTTE-UMM) signs by requiring students to write undergraduate thesis. This is applied in purpose of training students in composing academic writing. Assessing the success, students are to defend their works before the examiners of the school board.

It is to note that thesis writing quality is not only accounted by the content or other writing materials, but also determined by its logical order. Therefore, to assure the objected quality is achieved, Thesis Writing Guidance Book is needed. This book is designed in purpose of helping students in their proposal, seminar, research, thesis advisory, and exam.

Biology Education has published thesis writing guidance book since 2009 and it has become the reference for both students and teaching staff. However, analyzing students’ need and demand, some inputs from lecturers and students, also following new policies from the university, the book needs to be reviewed and revised.

The revision itself was done in 2015 and there were some significant aspects added: 1) a new policy taken that students who wrote a thesis about non educational topic are now expected to direct it into educational issues so that the finding can be developed to be a source of learning in Biology, 2) assessment and final score rubrics, 3) layout, 4) writing system and citation, 5) logical order, and 6) article writing and academic publication. Other aspects that are considered as important are: referencing, miss typing, etc, so that they need to be added to this revised edition.

Next, in 2016, another revision was finalized after the approved decision made by all lecturers at school meeting. Also, the existing school dynamic, needs, and a reflection from accreditation results are addressed. The revision includes, 1) operationalization and rationalization of policies for non-educational thesis that will be directed to education field in accordance with KKNI (curriculum standard) (Level 6, to differentiate work load between students of undergraduate from master level, 2) Explanation of research development, and Classroom Action Research (CAR), 3) Explanation related to the implementation of proposal seminar, and 4) Attachment of thesis guidance record (logbook).

We hope that all related parties (students and lecturers) would use and follow this thesis guidance book well. We fully realize that the compiled book is still far reaching the perfection; therefore, constructive feedback is very welcomed. Thus, we
say our gratitudes to anyone for the appraisal and recommendation. Also, to all individuals, proofreaders, and editors, the Biology Education Department Boards extend the appreciation for their hard work.

Malang, December 2016

The Head of Biology Education Department

Dr. Yuni Pantiwati, MM., M.Pd.
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CHAPTER I

GUIDELINES

A. Definition, Points, and Thesis Writing Objectives

Undergraduate students of Biology Education, Faculty of teacher Training and Education University of Muhammadiyah Malang (FTTE-UMM), have to finish the study load of the required unit of course (UoC). The study load consists of: (i) lecture, practice, project, and (ii) social activity in the form of Social Field Work (KKN), internship, biology-related internship. Before finishing the study, every student is required to write a thesis as his/her final project. It is an academic activity that weights 6 UoC. This thesis writing is begun by literature review and proposal writing, followed by seminar, research, and finally summed up by research finding (which student will defend his/her findings before the examiners). Thesis is a scientific writing composed based on the findings (includes reviewing the literature).

Based on Bahasa Indonesia Dictionary (Kamus Besar Bahasa Indonesia (KBBI)), thesis defined as a compulsory scientific writing which is a part of academic teaching. Thesis is a term used for scientific writing as requirement to achieve bachelor degree (S1) in every university in Indonesia. Thus, thesis has become the distinguishing feature between bachelor degree and diploma. Undergraduate thesis is also different from master thesis and dissertation, mainly on its scientific content. Furthermore, thesis is also a requirement to finish undergraduate education and to get an award as Bachelor of Education (S. Pd.) at Biology Education FTTE-UMM.

Thesis is composed by a student who has met the requirements (will be explained separately). Thesis topic or theme proposed by a student should picture the study he/she is taking or must be in his/her interest. In this case, students of Biology Education are to write around these issues: 1) Biology education (includes research development, quasi experiment, qualitative research in Biology Education, and classroom action research), 2) health
biology, 3) food and nutrition biology, 4) environment biology, and 5) science biology, also 6) biotechnology and biological renewable energy.

For the non-education thesis, it will be directed to education by developing it into a source of biology learning. This is the difference between Biology Education FTTE-UMM and other related courses or schools that have similar study areas of science such as agriculture, animal husbandry, health, medicine, pharmacy, and biological science.

The research data are analyzed and interpreted using the correct method to answer a problem under the guidance of lecturers in the field. Thesis writing process conducted by students to get supervision; there are two supervisors who are the lecturers at a college where students are studying. Both supervisors are called as supervisor I and supervisor II.

The purpose of thesis writing is to provide students with understanding of logical and scientifical thinking, so that when describe and discuss a problem, they can construct it systematically and structurally. Writing a thesis also aims at training students to conduct research as a whole, recognize and formulate problems, structur research objectives and hypotheses, design methods of data collection and analysis, write research report and account for the finding academically. As a scientific work in general, thesis serves as a medium of scientific communication between students and the academic community in order to develop knowledge. Thesis is also a treasury of science to complete the literature and documentation of certain fields of science.

This book is composed as guidelines for students of Biology Education FTTE-UMM in writing a thesis. In addition, the book can also be used by the supervisors to run on his/her academic duty.

B. Procedure of Thesis Title Submission

1. Theme/Research Field

The theme or research topic is free, but still within the framework of Biology and Biology Education. Students can choose topic of their thesis in accordance to their respective interest. Students can write a thesis in the field of biological science education, health biology, food and nutrition biology, environmental
biology, science biology, biotechnology and biological renewable energy. In accordance to the provisions of FTTE UMM 2015, stated in the Scientific Writing Guidelines, all science students who based their research on pure science should combine it with the field of education (described in detail in other chapters in this guidelines).

2. Procedure of Submission

The procedure of submission of thesis title is as follows:

a. Student submits a form of the title including: the identity of researcher, the plan of research, the subject matter encountered, the formulation of the problem, the title plan of the study, and the verification form/verification from the thesis bureau, and the approval of Supervisor I and Supervisor II.

b. Student submits a form of the title to the Study Program.

c. For students who conduct a joint-research with their lecturers, they can provide special information on the blank submission so that it can be a consideration for the thesis bureau.

3. Selection of Thesis Title

The selection mechanism of the thesis title is as follows:

a. The thesis title that is proposed by the students selected by the Study Program Selection Team (thesis bureau).

b. The selection team determines the approval or rejection of the thesis title.

c. Determination of the approval or rejection of the thesis title is given no later than one week from the submission day at the Study Program.

d. The candidate of supervisors decided by the Study Program considering on students’ proposal and other attention from the Study Program.

e. The title that is approved and rejected will be returned to the students with notes. The Study Program selection team can also invite students to have a discussion in person (face-to-face).
C. Thesis Supervision

1. Standard Operating Procedure of Thesis Supervision
   a. Supervising students’ thesis is an integral part of lecturer’s academic responsibility (followed by moral responsibility).
   b. Thesis supervisors consists of Supervisor I and Supervisor II.
   c. Students are entitled to nominate their supervisor I (2 lecturers) and Supervisor II (2 lecturers). The submissions will be one of the considerations of the thesis bureau to determine the supervisor. To this concern, the submission can be approved, partially approved, or even rejected and handed in to other supervisors in respect of expertise, equity, etc.
   d. The thesis bureau has full authority in accommodating the supervising proposal, arranging the distribution of mentorship, and taking charge in the submission of letter of assignment to the dean of FTTE.
   e. Supervisor I and Supervisor II are decreed by Statement of Letter (SK)/Letter of Duty of Dean of FTTE. Supervisor I has the same rights and obligations as the Supervisor II.
   f. Students must fill the logbook of thesis supervision correctly in accordance to the course of supervision, especially important notes and inputs. To this, supervisors are also required to sign the provided column.
   g. Thesis bureau will periodically check the students' logbook, thus making it as material consideration in case of problems arise during the process of supervision.
   h. Thesis exam proposal will be conducted when students get their supervisors’ approval.

2. Things Related to Students
   a. Students whose thesis title is approved will start to compose a research proposal afterwards under the supervision of the appointed supervisors (as per the official duty letter).
b. One student is supervised by two supervisors (Supervisor I and Supervisor II) who have the same position and role.
c. The supervision is done at least ten times, demonstrated in logbook notes approval statement of supervision (format attached).
d. Supervisor who objects student's thesis topic or title is entitled to refuse supervision of the student concern by submitting an official letter or declaring it to the Study Program.
e. Thesis supervision is estimated to finish it for one semester (6 months) or two semesters at the maximum. If exceed the allocated time, students are to apply for extension to the Study Program.
f. Extension is given at the maximum of one semester.
g. Students should always carry a thesis guidance book and also the logbook every time coming to thesis supervision (see the attached format).

3. Things Related to Supervisors
   a. Each supervisor supervises about four students per class.
   b. Supervisor allocates time for supervision.
   c. Process of supervision is run on schedule.
   d. Supervisor is willing to meet beyond the supervisor schedule.
   e. Supervisor is present and plays an active role during seminar of proposal and exam.
   f. Supervisor motivates students to complete thesis on time.
   g. Supervisor provides information related to relevant and authentic reference (recommended to share or provides the reference).
   h. Supervisor signs the logbook.

D. Seminar of Proposal
1. Students whose proposal is approved by both supervisors are allowed to apply for seminar to the thesis bureau by carrying the following documents:
   a. Thesis proposal completed with approval form of proposal and signed by both supervisors (see attachment).
b. The printed proposal of statement letter for seminar (see attachment).
c. The attendances of seminar activities (see attachment).
d. Announcement/Invitation to attend seminar for other students (see attachment).
e. Seminar control card (evidence has attended other students’ seminars, minimum number of attendees will later decided by thesis bureau; see attachment).

2. Thesis bureau determines seminar schedule and source person/examiner.
3. The seminar of proposal will be conducted if it is attended a minimum of 1 supervisor, 2 source persons/examiners, and 15 students. If the condition is not met, the seminar is postponed/suspended.
4. Supervisor has the role as moderator and student companion in the running seminar.
5. Students are required to create presentation into slides then present their research proposal.
6. Source person/examiner asks questions and gives constructive feedback related to the research topic.
7. Participants of the seminar are welcomed to ask questions, give suggestions, critiques, and inputs.
8. Notulen (appointed from one of students attending the seminar) who records all feedbacks from the source person/examiner, supervisor, and even from the participants on the provided sheet by the thesis bureau and affixes the signature.
9. The source person and supervisor discuss whether the proposal presented is eligible to be forwarded to research stage or not.
10. The source person and supervisor fill the statement form, sign, and then announce the statement letter (result of discussion).
11. Students whose proposal is declared unqualified, they are required to conduct another seminar.
12. Students who change their research topic are required to follow the procedure of thesis title submission from the beginning.
E. Thesis Exam

1. Registration and Requirements

a. The proposed thesis for exam must meet the requirements after being approved by the supervisors with the signature on the approval form.
b. Registered as a student in the semester when the exam is held (already done the course enrolment (KRS)).
c. Has completed all the courses load.
d. Does not have D and E score.
e. Shows the Card of Study Result (KHS), provisional transcript, and the last course enrolment (KRS).
f. Submit a valid copy of Students’ Identity Card.
g. Submit two copies of high school diploma (legalized).
h. Submit a copy of community service (KKN) certificate.
i. Submit a statement letter of thesis supervision and its control card.
j. Submit 4 copies of thesis draft to thesis bureau and later will be handed in to the examiners. The submission is decided by the bureau.
k. Pay off the fees determined by the Study Program, faculty, and university (see attachment).
l. Make a legal statement declaring that the thesis is students’ own work not a work of plagiarism or taken from others’ works.
m. Meet other requirements which are not yet mentioned here, decided by the university, faculty, or Study Program.

2. Thesis Exam Scheme

The scheme of thesis exam at Biology Education FTTE-UMM consists of two types, they are:

a. Independent Exam

Research draft and a report are done → Supervisor approval → Completing the administration (transcript, BAP) → Form submission of the exam to Study Program → Completion of administrations to the faculty → Exam scheduling (by students and supervisors) → determining the examiners → exams → Graduate (revision)
b. Reguler Type
Research and a report done → Supervisor approval → Completing administration for Study Program (transcript, BAP) → Proposing exam to the Study Program → Completing administration for the faculty → Scheduling the exam (by Study Program) → Determining thesis examiners → Exam → Graduate (revision).

3. The Implementation of Thesis Exam
a. Schedule of thesis exam determined by the Study Program.
b. Thesis exam is led by the head and helped by the secretary.
c. Examiner team consists of Examiner I, Examiner II, and Supervisor. The examiner team is stipulated through Statement Letter/Letter of Duty.
d. Thesis exam can be suspended if the supervisors do not come without any approved reason.

4. Assessment
a. Assessment is done based on scoring variable in the form of numbers and description.
b. Some aspects to score by the examiners consist of various variables, as described in Table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Scoring Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Research Authenticity</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Research Significance</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Relevant to the Study Program</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Research Problem</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Purpose of the Study</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Scope and Relevance of Reference</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Hypothesis Formulation</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Method</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Data Organization</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Depth of Analysis</td>
<td></td>
</tr>
</tbody>
</table>
No  | Scoring Variabel                                      | Score |
---  | -----------------------------------------------------|-------|
11.  | Accuracy of Conclusion and Suggestion                |       |
12.  | Ability in Answering the Questions                   |       |
13.  | Research Continuity                                  |       |
14.  | Presentation (powerpoint, tool, OHP, flash)          |       |
15.  | Material Expertise                                   |       |
16.  | Performance                                          |       |

Final Score = Total / 16 = ..... or .......... (alphabet)

c. To supervisors, other than assessing on the exam, they also have to assess students’ thesis supervision, using the variable shown in the Table 2 below:

**Table 2. Scoring Variable of Thesis Supervision**

<table>
<thead>
<tr>
<th>No</th>
<th>Research Variable</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Honesty</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Self-control</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Diligence</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Problem Solving</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Tolerance</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Consistency on Supervision</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Ethics and Politeness</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Responsibility</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Punctuality</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Self-Awareness</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Communication</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Respect</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Discipline</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Motivation</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Revision Feedback</td>
<td></td>
</tr>
</tbody>
</table>

Final Score = Total / 15 = ..... or .......... (alphabet)
d. Score Conversion as described in Tabel 3, as follows:

**Tabel 3. Score Conversion**

<table>
<thead>
<tr>
<th>Standard of Mastery (%)</th>
<th>Alphabet Score</th>
<th>Numeric Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;80,0</td>
<td>A</td>
<td>4</td>
</tr>
<tr>
<td>75,0 – 80,0</td>
<td>B+</td>
<td>3,5</td>
</tr>
<tr>
<td>70,0 – 74,9</td>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>60,0 – 69,9</td>
<td>C+</td>
<td>2,5</td>
</tr>
<tr>
<td>55,0 – 59,9</td>
<td>C</td>
<td>2</td>
</tr>
<tr>
<td>40,0 – 54,9</td>
<td>D</td>
<td>1</td>
</tr>
<tr>
<td>&lt;40,0</td>
<td>E</td>
<td>0</td>
</tr>
</tbody>
</table>

e. The decision of final score is done through a meeting led by the coordinator of examiner team based on scores given by each examiner openly. The result is written in the exam statement letter (*see attachment*).
f. Students failed the exam may have the repetition.

5. Thesis Revision

a. Thesis revision after the exam is on the responsibility of supervisor I and Supervisor II, Examiner I dan Examiner II as the consultant.
b. Students consult to the four consultants for the revision and ask signature of approval.
c. Revision schedule after the exam is determined by thesis bureau, normally for 7-10 days. The revision process also determines the final score.
d. Thesis approval sheet is signed by the examination committee after the thesis has been bind.
CHAPTER II
TECHNICAL RULES

A. Thesis Writing Requirements

1. Papers

   The paper used for thesis writing is A4 80 g (210 mm x 297 mm) (one side).

2. Typing

   Typing is presented using font, numbers, unit, space, margin, indent, the beginning of sentence, chapter, sub-chapter.

   a. Font, Space, and Typing style

      Thesis draft must be typed using font *Times New Roman*, size 12 and all texts have the same rule, except table and image caption. Italic is used for foreign language terms.

      Thesis title is centered or symmetrical in the center without full stop at its end. If the title has more than two lines, thus, it should given only one space. Thesis title is written in capital (block letter), font 14 and bolded, without contraction, except for general term like PT, CV, UD, etc.

      Thesis title is in capital, font used is *Times New Roman* size 12 bold, symmetrical in the center without full stop. All words in the sub-chapter started with capital except conjunction and preposition, without full stop.

      Sub-heading is three spaces below the title, bolded, and symmetrical.

      Sub-sub-heading is typed with margin, left (4 cm), three spaces below the last paragraph and bolded. Likewise, all letters in the beginning of sub-sub chapters are capitalized without full stop. If the writer needs more points to the explanation, alphabet order or numbers are used to the bottom. It is not justified to use any hyphens, notations, or other signs.

      Sub-heading, sub-sub heading, and so on, are typed using *Times New Roman* font, size 12 and bolded.

      The space between rows in typing of contents or paragraphs is 2 spaces.

      Abstract, direct quotation, title of table listing, and image exceed than
Some rules to the writing mechanic in thesis writing are explained as follows:

1) Preposition, example "guna", "buat", "untuk", "bagi" (shows purpose); "oleh" (shows agent); "sampai", "hingga" (shows effect); "dari" (shows origin), "hingga", "sampai" (shows effect); "terhadap", "akan", "ke", "kepada" (shows direction); "atas", "di", "pada", "antara", "dalam" (shows location); "dengan" "berkat" (shows tools); and "tentang", "mengenai" (shows matter), those aforementioned term are not proper to use in the beginning of a sentence. These prepositions are used normally in the sentences, not initiating sentence.

2) Conjunction, like "maka", "sehingga", "sedangkan", "dan", "atau", "tetapi", "namun", "agar", "jika", "ketika", "seandainya", "karena", and "bahwa" are also not proper to begin sentence.

3) Translation of "where", "when", and "of" in English are not always has the meaning of "di mana", "ketika", and "dari" in bahasa Indonesia, but they should be translated correctly based on its standard.

4) It is to note that writing "ke" and "di" as prefix, should be distinguished by "ke" and "di" as preposition. For example in the word "dipukul" (the word di- and pukul are connected) and "di rumah" (the word di- and rumah are separated).

5) Word separation must be done carefully, in accordance with the correct rule of Bahasa Indonesia.

6) The number that initiates a sentence must be described, for example: ten rats.

7) Symbol or formula should not be at the beginning of a sentence.

8) Punctuation and clause should follow the EYD.
b. Language

Thesis is written in formal bahasa Indonesia or based on the correct spelling of bahasa Indonesia (EYD), avoiding the foreign terms. Foreign language that does not have coinage in the bahasa or there is no the adopted language from the local language must be italicized.

Writing a thesis should use sentence/transitional signals between one definition to another, so that the flow of the content is clear. Avoid writing that only list definitions, theories, and others.

Thesis writing should pay attention to the rules of making sentences and paragraphs. Sentences should not be too long and unclear. The use of punctuation at the end of the sentence should be carefully observed. Good paragraph consists of 3-5 sentences, that in terms of typing or layout will look neat. Paraphrasing should also consider the cohesion and coherence of sentences or paragraphs.

Translation of foreign languages into Indonesian or vice versa, should be done carefully and accurately. This is to avoid misinformation, different understanding between author and reader, and various impacts that may cause if the work is used as reference by others.

c. Presentation of table and figure

It should be noted that presentation of tables and figures should contain all necessary information completely and clearly, so that readers do not need to search for information from the description of text. If referring to table/figure needed, to include number of tables/pictures is just sufficient.

1) Presentation of Table

The font size/ font in the table should be smaller than the explanation in the text (we recommend using Times New Roman size 10). The table title is written briefly and clearly, and centered just above the table, without dot, and should be bolded. The first letter in the first word of the title is capitalized, and the next one is lowercased (except
the name of city, place, person, college, and others). If the table is more than one line then it should be written one space.

In its principle, table should not cut off. If the table is too large, the size of the letter can be minimized but still easy to read. If the table still has to be cut off, table in the next page should be given a number and description (continued) without any title. If the table is set in landscape, then top of the table should be written in the left. A table that has more than 2 pages or should be folded, should be placed in the attachment. Lines in the table are just a line to the side (horizontal) while the line up (vertical) is not included.

Sample of the Right Table:

**Tabel 4. Type of Collembola on All Habitat Types throughout the Upper DAS Brantas upstream**

<table>
<thead>
<tr>
<th>No</th>
<th>Types of Collembola</th>
<th>Types of Habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Forest</td>
</tr>
<tr>
<td>1</td>
<td><em>Ascocyrtus</em> sp Yosii</td>
<td>Yes</td>
</tr>
<tr>
<td>2</td>
<td><em>Coecoloba</em> sp Yosii</td>
<td>Yes</td>
</tr>
<tr>
<td>3</td>
<td><em>Collophora</em> sp Delamare</td>
<td>Yes</td>
</tr>
<tr>
<td>4</td>
<td><em>Cryptopygus thermophilus</em> Axelson</td>
<td>Yes</td>
</tr>
<tr>
<td>5</td>
<td><em>Entomobrya proxima</em> Folsom</td>
<td>Yes</td>
</tr>
<tr>
<td>6</td>
<td><em>Folsomia octoculata</em> Handschin</td>
<td>Yes</td>
</tr>
<tr>
<td>7</td>
<td><em>Homidia cingula</em> Bömer</td>
<td>Yes</td>
</tr>
<tr>
<td>8</td>
<td><em>Hypogastrura consanguinea</em> Folsom</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td><em>Isotomurus palustris</em> Muller</td>
<td>Yes</td>
</tr>
<tr>
<td>10</td>
<td><em>Lepidocyrtus vestitus</em> Handschin</td>
<td>Yes</td>
</tr>
<tr>
<td>11</td>
<td><em>Onychiurus fimetarius</em> Linne</td>
<td>Yes</td>
</tr>
<tr>
<td>12</td>
<td><em>Pseudachorutes javanicus</em> Handschin</td>
<td>Yes</td>
</tr>
<tr>
<td>13</td>
<td><em>Pseudisotoma sensibilis</em> Tullberg</td>
<td>Yes</td>
</tr>
<tr>
<td>14</td>
<td><em>Salina javana</em> Handschin</td>
<td>Yes</td>
</tr>
<tr>
<td>15</td>
<td><em>Sminthurides aquaticus</em> Bourel</td>
<td>Yes</td>
</tr>
<tr>
<td>16</td>
<td><em>Sphaeridia</em> sp Linnaniemi</td>
<td>Yes</td>
</tr>
<tr>
<td>17</td>
<td><em>Sphyrotheca dawydoffi</em> Denis</td>
<td>Yes</td>
</tr>
<tr>
<td>18</td>
<td><em>Superodontela deharvengi</em> Yoshii &amp; Suhardjono</td>
<td>Yes</td>
</tr>
<tr>
<td>19</td>
<td><em>Thalassaphorura</em> sp Bagnal</td>
<td>Yes</td>
</tr>
<tr>
<td>20</td>
<td><em>Willemia</em> sp Bömer</td>
<td>Yes</td>
</tr>
</tbody>
</table>
If the table quoted from the reference or author modifies some data derived from various sources, then the citation is indicated with a symbol on the data and at the bottom of the table referring the source intended.

2) Presentation of Figures

Figures in the thesis include flow charts, graphs, maps, photos, and work diagrams. Presentation of figures in thesis writing follows the following provisions:

a) The title of figures is written underneath the figure, without full stop, written in bold. The first letter on the first word of the title is capitalized, the next one is lowercase. If the title of the figure is more than one line then it must be written in one space. Captions are written in empty places in the figure and not on the other pages. When the image is presented widening along the height of the paper, the top of the image is placed on the left.

b) Figures consisting of several parts shall use sequence description (a), (b), and so on, with captions covered in the title section of the figure. All the figures must be arranged on the same page. Figures should be framed/outlined with 1 pt size.

c) Coloured figures should be printed in colours and set in contrasted colour.

d) If the figure is cited from a reference, thus the citations must be annotated in the end of the title. For figure accessed from the internet, it is supposed to consider on its resolution and sharpness.

e) Figure derived from scanning, should also consider on its resolution and sharpness. If possible, the scanning should also be completed with text.

f) Figures larger than paper size should be minimized but still value its meaning. If figures cannot be minimized, such as map, it can be
folded. Each figure is placed on a blank page and not mixed with text, portrait or landscape.

d. Symbols, alphabets or signs that cannot be typed must be hand-written neatly using black ink.

e. Margin
   Margins are arranged as follows:
   1). Top : 4 cm
   2). Bottom : 3 cm
   3). Left : 4 cm
   4). Right : 3 cm
   The space contained on the text page must be filled in, meaning that typing must be from the left to the right border, and no empty space is allowed unless it starts with a new paragraph, and so on.

f. Page Number
   1) First section of a report, it starts from page cover until the foreword given page number in small case Roman alphabet, (i, ii, iii, iv, dst.). Special on the acknowledgement is not given page number and not counted in the page.
   2) The main and the last section of CHAPTER I until the end use Arabic number as page number (1, 2, 3, 4, etc).
   3) The page number is placed in the top right, except if there is a title or chapter in the top of that page. Page number in the Chapter is not written, but counted as the page number. Page number is typed in 3 cm from right and 1,5 cm from the bottom.

h. Total Page
   The total page of a thesis is not limited; however, 45 of the minimum and 200 maximum.

h. Cover
   The colour of thesis cover for Biology Education is plain baby blue. It should be hard cover, bind in atero with plastic as lamination. The thesis cover should be identified with student’s name, student’s ID, thesis title,
and year of graduation, all written using Times New Roman (normally font 14 and bolded).

B. Thesis Sections

Generally, thesis consists of three sections, they are: (1) Introduction, (2) Content, (3) Conclusion and Attachment.

1. Introduction

   The first section of a thesis should cover:
   a. Outside Cover
   b. Inside Cover
   c. Approval Sheet
   d. Legalization Sheet
   e. Statement Letter
   f. Motto
   g. Foreword
   h. Abstract
   i. Table of Content
   j. List of Table (if necessary)
   k. List of Figures (if necessary)
   l. List of Attachment (if necessary)

Below are details of thesis first section:

a. Outside Cover (Sample of the format is attached)

   Outside cover consists of:
   1) Thesis title
      
      Thesis title is a short sentence describes the problem discussed. It should be short and brief. A good title has the maximum of 24 words in bahasa Indonesia.
   2) Thesis content
   3) University of Muhammadiyah Malang Logo, its colour is blue with 5cm diameter.
4) Student’s name and ID
The name should match with the certificate of birth or high school certificate. Student’s ID is written below the name and preceded with “By:” just above the name. Also, it should cover the Name of Study Program, Faculty, University and they are written as follows: Biology Education, Faculty of Teacher Training and Education, University of Muhammadiyah Malang.

5) The Year of Thesis Accomplishment
The year of thesis accomplishment is a year that the final exam is run, placed just under University of Muhammadiyah Malang.

b. Inner Cover (*Sample of format is attached*)
Inner cover should cover:

1) Thesis Title
2) Content
3) Thesis Purpose
The thesis purpose should be written like this way: This thesis is addressed to the Faculty of Teacher Training and Education University of Muhammadiyah Malang as one of the required process accomplishing the Bachelor Degree in Biology Education.

4) University of Muhammadiyah Malang Logo
The logo of University of Muhammadiyah Malang is blue with 5cm diameter.

5) Student’s name and ID
The name should match with the certificate of birth or high school certificate. Student’s ID is written below the name and preceded with “By:” just above the name.

6) The Name of Study Program, Faculty, and University
The Name of Study Program, Faculty, and University are written as follows: Biology Education, Faculty of Teacher Training and Education, University of Muhammadiyah Malang.

7) The Year of Thesis Accomplishment
The year of thesis accomplishment is a year that the final exam is run, placed just under University of Muhammadiyah Malang.

c. Approval Sheet (see attachment).
The approval sheet consists of supervisors’ recommendation or statement, legalized by their signatures stating that the thesis under their supervision is eligible for exam.

d. Legalization Form (see attachment).
Legalization form stating that the thesis has been defended before the examiner boards, proven with the legalization from the FTTE Dean and Examiner Board.

e. Statement Page (see attachment).
The statement page declares that the work is authentic not plagiarism, the whole or some parts, except the citation that has been referred. Student’s thesis is free from cheating, (plagiarism, duplication, and manipulation). The statement is signed by the student with stamp.

f. Motto (see attachment)
Motto contains wiseword, proverb, or other quotation that is feasible with the thesis. It is to note that motto can only be derived from the Qur’an and Hadits according to the thesis topic.

g. Foreword
The foreword contains praises to Allah for His mercy and blessing, short description about the intention of writing the thesis, and saying gratitude. The gratitude is addressed to:
1) The FTTE Dean.
2) The Head of Study Program and the Secretary of Study Program.
3) The Supervisors.
4) Staff at related units, such as the Head of Laboratorium, or others at schools, organizations, and so on.
5) The Lecturers at the Study Program.
6) Family, father, mother, siblings, wife/husband, child, and so on.
7) Other parties that need to be mentioned.
8) Other parties that cannot be mentioned one by one.
Afterwards, the foreword is ended by extending the feedback for the readers.

h. Abstract
Abstract is a short description about the research, purpose, methods, important findings discovered, and the main conclusion. Abstract is composed in paragraphs and its length should not exceed than 300 words. Abstract contains only text, not reference, figures, and table. Also, it should not have signature.
An abstract is typed in one space, including the title. The word "Abstrak" and "Abstract" are capitalized, bolded, and centered. Student's name is capitalized, two spaces below the title and started from left margin, then followed by a thesis title. The first letter of every word is capitalized except the preposition and conjunction. In addition, the word, "Supervised by ..." (the name of supervisor, without the title, should be capitalized). Abstract should be completed with keywords that consists of 3-5 words. Abstract is written in English, thus, the spelling and grammar must adjust the US/British English. Using transtool software is not suggested.

i. Table of Content
Table of content contains titles, chapters, and sub headings written in the thesis with the page number. The title of table of content is capitalized without full stop and placed in the center, two spaces below the page. The "Page" is in the right corner, two spaces below the title of Table of Content and ended in 3 cm in the right corner. The order of table of content is two spaces underneath. If the table of content needs more than one page, it is continued to the next page and still given the word "Page" in the upper right corner. Page number in every chapter, sub-heading, sub-sub heading (if necessary) are placed 3 cm in the right corner.
The space between chapters, chapter, and sub heading is two; meanwhile, the line in sub heading is one. To differentiate between chapter, sub heading, and sub-sub heading (if necessary), indent is used. Title of every chapter is capitalized. The first letter of every word in
the sub heading title and sub-sub heading is capitalized, except the preposition and conjunction.

j. List of Table
List of table contains all tables used in the thesis including page number. List of table written in the new page and typed as Table of Content. Two spaces under the List of Table which is in the center, exactly in the beginning of the left margin is written with "Number"; meanwhile, on the right side is written with "Page" which ended in the right margin. The number of table uses Arabic number, typed in the in the middle of "Number", two spaces below Number and Page. Title of the table in the List of Table must be the same as the title in the text, and not given full stop. The end of the table title is connected with dots with page number where the table is found in the text.

k. List of Figures
List of Figures contains all images used in the thesis along with its page. List of figures in the new page is separated and ordered like List of Table. Graphics, maps, and images are all in Arabic number.

l. List of Attachment
List of Attachment contains necessary attachments for the thesis writing. Not like List of Tables and List of Figures, attachments do not have to be listed if there is only one attachment used in the thesis. Attachment writing follows the aforementioned rules in the List of Tables and List of Figures. Attachments can be in the form of tables, figures, or texts and so on that is important and necessary to support the thesis, and all mentioned in order based on numbers citation in the text.

2. Format of Thesis Contents
Content normally consists of these sections:

a. Introduction
b. Literature Review
c. Research Method
d. Finding and Discussion

e. Conclusion

However, the thesis content for research and development and action research are different, therefore, this section will be explained in separated chapter.

3. Conclusion/Thesis Completion

a. The final section of a thesis contains important and relevant parts of the research, which are not yet stated in the main part. They consists of: reference, attachments, a permission letter of conducting research, and etc.

b. Reference or bibliography is a form of various references that are used as a reference when conducting research or thesis writing, such as journals, books, research reports, scientific papers, proceedings, potpourri, magazines, encyclopedias and so forth. (Reference or bibliography writing is discussed/described on a separate page).

c. Appendix is a data collection instrument, steps in calculating or describing data, work label, permit or evidence of research implementation (certificate of research, documentation/research photograph, photo of materials, and other things deemed necessary information to support the validity of research/thesis)

d. Researcher Biodata. Biodata must be complete, made in narrative-description form, containing information about full name, place and date of birth, home/home address, and temporary residence along with phone and phone number to contact, e-mail, education level, research/scientific experience, intra-extra campus organizational experiences, achievements, and others deemed necessary information. Biodata is made up of half page of paper.

C. Citation

The quotations or citaions obtained should be arranged systematically, so that between the first paragraph and the following paragraphs show a
sequential relationship. Therefore, quotations obtained from a literature need to be in line, do not deviate from the intended meaning. The facts put forth are referenced from the authentic source, using the name-year citation in the brackets. No citation from the original source can only be done in a forced state (the original source is very hard to find).

How to cite correctly:

1. Author’s name is placed as the first sentence, example:

   Birkerland (1989) found that reef flats are the main habitat for sea cucumbers so that the presence of these biota on the coral reef is quite prominent.

2. Author’s name is placed in the middle of the sentence, example:

   The leaf threshold according to Verheij (1984) will spur the growth of buds and stimulate development.

3. Author’s name is placed at the end of the sentence, example:

   Madura Cow (*Bos javanicus*) is the result of mixing Bali cattle (*Bos sondaicus*) and Zebu (*Bos indicus*) (Soerjoatmodjo, 2002).

4. Two authors, example:

   Sea cucumbers have been an international trade commodity or commonly known as “beche-de-mer” (Conand & Sloan, 1989).

5. More than two authors, example:

   Coral spesies do symbiosis with Zooxanthellae symbiotic algae (Burke *et al*., 2002).

6. Reference more than one title, example:

   *Zooxanthellae* is a unicellular algae of the Dinoflagellata group, largerly derived from the Genus Symbiodinium (Karleskint, 1998; Akmal, 2002).
D. How to Write Reference

The reference or bibliography should be consistent with the Publication Manual of the American Psychological Association 6th Edition (APA, 2010). The reference or bibliography is written in a single space. Between one reference and the next one is spaced one and a half spaces. The first row is using left margin and the next line jutted in. In the reference or bibliography, all authors’ names should be listed, should not use *et al.*

1. Reference from Books or Translated Books
   a. Reference from books
      Name of author, followed by year of publication in parentheses, ended with full stop, title of book is written in italics capitalized only in the first word (this goes the same for all references, except name of the administrative region, person's name, scientific name, and other language-compliant/EYD must use capital letters at the beginning of the word), the publisher's city and the name of the publisher. Example:


   b. Reference from translated books
      Original author, followed by original year of work in brackets, title of translation (italicized), translated by, year of translation, name of publishing place and name of translation publisher. If the year of original book is not listed, it is written with *no year.* Example:

c. Reference from a book contains compiled articles (with editor)
How to write a reference from a book containing a collection of articles with an editor is like writing a referral from a book plus a writing (Ed.) If there is one editor and (Eds.) If the editor is more than one among the author's name and the year of publication. Example:


d. References from articles in textbooks (with editors)
The author of the article, the year in parentheses, the article title is italicized, given the word In: the title of the book's then name of editor is given (Ed or Eds), the title of the book is italicized, page/pp., publisher name and publisher city. Example:


2. Reference in Article Forms in Scientific Magazine/Journal
Author, year in brackets, article title, magazine or journal name (must be italicized), volume, number in brackets, and pages. Example:


3. Reference in Article Forms in Online Journal
Author, year in brackets, article title, magazine or journal name (must be italicized), volume is written in italics, number in parentheses, page, DOI address if present, or website address/Open Journal System if DOI does not exist. Example:

a. Article or poster presented in scientific seminar
   Author, year and month in the bracket, title italicized, name of seminar, institutional organizer, year/place of seminar. Example:


b. Article published in proceeding
   Author, year, title italicized, proceeding name, ISBN, page/pp. Example:


c. Reference from Thesis/Dissertation
   Author, year, title italicized, “unpublished thesis” in the bracket, institution, place. If is it online draft, website address must be mentioned.


d. Reference from article and newspaper
Author, year and published date in the bracket, title, name of newspaper italicized and page. Example:


e. Reference in article and magazine
Author, year and published date in the bracket, title, name of magazine italicized, volume or edition italicized, publication number in the bracket, and page. Example:


f. Reference from article in the internet (open source article/individual work)
Avoid any reference that does not have author, personal blog, or articles from official institution without being verified. Author, year in the bracket, title italicized, website address. Example:


g. Reference from a document by official institution without author’s name.
Institution name in the bracket, book/document title italicized, city of publication and the publisher’s name. Example:


h. Official regulations issued by the government or related institutions. The name of the rule is written completely and clearly. Example:
5. Special Notes on Referencing

a. Author’s Name More than One Word

If the name of author consists of two or more names, surname or first name followed by commas and abbreviations of each other then followed by period.

Example: Ibrahim Alfatih written: Alfatih, I.
Cyra Azalia Aufaa written: Aufaa, C. A.

b. Name with Hyphen

A name that is more than two words but an inseparable unity is connected with a hyphen.

Example: Ronnie McDouglas written: McDouglas, R.
Hassan El-Bayanu written: El-Bayanu, H.

c. Writing a Bachelor’s Degree

Scholarship and other degrees may not be included in the writing of names in the bibliography, except in acknowledgements or preamble (at the beginning of the thesis).

d. Reference without an Author

If not possible, considering on the importance and validity of a reference, then use the term “Anonim” or “Anonymous” for reference without author’s name.

e. Reference without a Year

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Undang-Undang Republik Indonesia Nomor 20 Tahun 2003 Tentang Sistem Pendidikan Nasional.

Peraturan Pemerintah Republik Indonesia Nomor 4 Tahun 2014 tentang Penyelenggaraan Pendidikan Tinggi dan Pengelolaan Perguruan Tinggi.

If not possible, considering on the importance and validity of a reference, then give a note “(Without a Year)” or “(Tt)” for reference without the year.
Chapter III
WRITING SYSTEM ON THESIS CONTENTS

A. Quantitative Research

The Systhematics on thesis content for quantitative research (with or without experiment [for example, analytical and observational descriptive]) are as follows:

CHAPTER I INTRODUCTION
1.1 Background of Study
1.2 Statement of Problems
1.3 Research Objective
1.4 Research Benefit
   1.4.1 Theoretically
   1.4.2 Practically
1.5 Research Scope and Limitation (if exists)
1.6 Definition of Key Terms (if exists)

CHAPTER II REVIEW OF RELATED LITERATURE AND HYPOTHESIS
2.1 ............... (adjusted with the research topic)
2.2 ............... (adjusted with the research topic)
2.3 and so forth according to the number of sub-heading studied
2.4 Theoretical Framework
2.5 Research Hypothesis (if exists)

CHAPTER III RESEARCH METHOD
3.1 Approach and Research Type
3.2 Location and Research Time
3.3 Population, Sampling Technique, and Sample (adjusted with the types of qualitative research)
   3.4.1 Population
   3.4.2 Sampling Technique
3.4.3 Sample
3.4 Research Variable
  3.4.1 Types of Variable
  3.4.2 Definition of Operational Variable
3.5 Research Procedure
  3.5.1 Research Preparation
  3.5.2 Experiment Design (for experimental research)
  3.5.3 Implementation and Research Procedure
3.6 Data Collection Method
  3.6.1 Data Collection Technique
  3.6.2 Research Instrument (this section is intended for research that requires validity testing and instrument reliability)
3.7 Data Analysis Technique

BAB IV RESEARCH FINDINGS AND DISCUSSIONS
  4.1 Research Findings
    4.1.1 Data Presentation
    4.1.2 Data Analysis Results
  4.2 Discussions

BAB V CLOSING
  5.1 Conclusion
  5.2 Suggestion

Each section is described as follows:

1. Introduction (CHAPTER I INTRODUCTION)
   a. Background of Study
      Background of study is presented chronologically directed to the statement of problems. Background of study is information systematically arranged in regards to the phenomena and problems to be studied. Problems arise
when expectations of ideal conditions (*das sollen*) of a matter does not go in line with the reality (*das sein*). The background explains why the problem wants to be researched (the research of interest), the importance of the problem, and the approach used to solve the problem both from a theoretical and practical side. The background is based on previous facts, data, references, and research findings that can reinforce the reasons why this research is necessary.

b. Statement of Problems
The statement of problems in the form of research questions related to the focus of attention to be studied. The questions that arise in the statement of problems needs to be answered and proven. It will be a reference in the writing of research objectives, presentation of results and discussion, and conclusions.

c. Research Objectives
Research objectives are statements to be achieved, adapted to the statement of problems. Research objective writing should use operational verbs that are measurable and viewed, such as knowing, analyzing, describing, explaining, testing, proving, and applying a concept or conjecture.

d. Research Benefits
Research benefits are theoretical and practical. The benefits should be used for the development of science and technology, and the interests of society, the world of education in general and so forth according to the field or topic studied. This writing or determination of these benefits becomes the basis also in the writing of suggestions in the closing section of the thesis.
e. Research Scope

This section describes the breadth of research scope. The research scope can be limited by location restriction of the study, limiting the number of variables to be studied, and limiting the subject or sample of the study. Limitations or limitations of the research do not necessarily exist, but limitations are often required so readers can address the research findings according to the conditions. Limitations of the research points to an avoidable circumstance in the study. The limitations often occurred in terms of the scope of the study that has to be done for procedural, technical, or logistical reasons.

f. Definition of Key Terms

Definisi of Key Terms are necessary if predicted there will be a difference in meaning or lack of clarity of meaning if terms are not given. The terms that need to be affirmed are terms that relate to the basic concepts discussed in the thesis. The criterion that a term contains a basic concept is if the term is closely related to the problem studied or the research variable. The definition of terms is presented directly, in the sense of not elaborating its origin. Definition of the terms put more emphasis on the understanding given by researchers.

2. Review of Related Literature (CHAPTER II REVIEW OF RELATED LITERATURE, completed a conceptual framework and where possible equipped with research hypothesis).

Review of related literature is a compilation of explanations derived from many references related to the topic of research that supports its complete content. The review of related literature is a citation summary that has been analyzed and intended to explain a problem. It presents anything related or contradictory to one researcher to another, agrees to the approach used to solve the problem, and also describes the relevant previous researches.

A student/researcher who is going to write a thesis is required to have some literatures to be analyzed, read, studied, noted, quoted, translated, and
cited as the first step of his research work. Thus, to review the literature has some functions as follows:

a. To know and understand the explanations, views, concepts and theories, methods needed to research the stated problems.

b. To make a note, quote, citation of important materials from any literatures reviewed, as a reference for a theoretical framework and concepts adjusted to the scientific approach used to research a problem.

c. To have a reference to be verified (to prove) and analysed (check, elaborate) data compiled and discussed in the data presentation, thus, understanding and conclusion can be derived as research findings.

The chapter of literature review can be divided into several sub-headings in accordance to the needs. To use the latest literature \((\text{the last ten years})\) is highly suggested. This will be more helpful for researcher to understand the issue of the related topic clearly. Sufficient literature will improve researcher’s confidence to select methods, conduct study, and plan arguments in discussing problems arise during the study.

If observation is conducted on certain species, it is necessary to include the classification and description of the species. In this classification must also include “authority name” or “descriptor” and the first year of the description is published. If the species has a synonym then also include a synonym for a new paragraph. Classification, synonym, and description can be placed in a separate chapter at the beginning of the Literature Review. Classification can be written in the form of a ladder, horizontal shape, or vertical one.

The final section of Literature Review comes with a Conceptual Framework. Conceptual Frameworks are usually completed or ended with illustrations in the form of charts/drawings of idea flow to facilitate understanding, based on the results of literature review. For experimental research, Hypotheses need to be formulated clearly. Hypothesis is a form of statement as a temporary answer to the question/statement of problems.
3. Research Method (CHAPTER III RESEARCH METHOD)

The research method presents steps that will be taken in the research. This section can be broadly divided into:

a. Approach and Type of Research

Researchers are required to describe the approach and types of research they choose in this part amongst other alternative approaches and research types referred from valid references. The approach and research type has been elaborated completely and in detail during the lecture of Research Method.

b. Location and Research Time

Researchers describe the location where the research conducted and the time used ranging from preparation of the proposal to the preparation of research reports. If necessary, the location is provided with a clear address so as to facilitate verification if necessary or to facilitate further investigators if they wish to access the location.

c. Population, Sampling Technique, and Sample

The researchers describe the population presented in the location of study, sampling techniques, and then the representative samples used to represent the population.

d. Research Variable

Research variable is any aspect in research which data want to be collected. Each research variable must be described its type, parameter calculated, and indicator arisen of the parameter criteria explained. Furthermore, definition of operational variable is also elaborated based on the characteristics analyzed to ease the researcher conduct observation comprehensively of a research object. The preparation of operational definitions should be done because the observed concepts or constructs investigated will facilitate the measurement. In addition, the
preparation of operational definitions enables others to do the same so that what the researchers do is open for reexamination by others.

e. Research Procedure

Researcher explains the procedures, steps or process taken in his research and research design. This section may describe the research preparation stage; specifically in experimental design, researcher can describe its design to be carried out, as well as the implementation phase and the research flow. This section is also used to describe the tools and materials used.

The experimental design is a procedure of applying actions into an experiment to a certain condition or environment that becomes the basis of arrangement and method of statistical analysis of the result data. Students can plan environmental design, for example, using Complete Randomized Design, Randomized Block Design, and or other appropriate design.

The basic principle of the experiment, are: 1) Repetition: the allocation of a particular treatment to several experimental units under the same conditions; the goal is to analyze the variety of errors; Minimize errors; Improve accuracy; 2) Randomization: intended for each unit of probation to have equal opportunity to be given a treatment. Statistically, it is used for the validity in drawing conclusions so that it can be objective. 3) Environmental control: efforts to control the diversity arising as a result of heterogenity of the environmental conditions.

Some terms related to experimental designs are: 1) Treatment: a procedure or method applied to the experimental unit. It is equal to level of the factor. 2) Experimental Unit: the smallest unit in an experiment given a treatment. It is also a unit where treatment is randomly assigned. 3) Unit of Observation: the cluster division of an experimental unit, where the treatment response is measured. 4) Factor: free variables are tried in
the experiment as the compiler of the treatment structure. 5) Types: the types of factor tested in the experiment.

Meanwhile, research flow is a concise presentation of what researcher will do, it is explained in pictures/flow charts about group selection, treatment, measurement, and data analysis.

f. Data Collection Method
Researcher explains techniques used to collect data, describes kinds of instruments and measurement scale used along with the designs of data table (if possible). Researcher can also elaborates research development covering instrument types, instrument indicators, instrument validity test, and instrument validity.

g. Data Analysis Technique
Researcher explains data analysis techniques used includes data analysis with descriptive statistics, data analysis with inferential statistics, and testing requirement analysis or other relevant analyses to be used. In descriptive data analysis, it can be presented in table of frequency distribution, histogram, diagram or other relevant techniques.

4. Findings and Discussions (CHAPTER IV FINDINGS AND DISCUSSIONS)

a. This section is the most important part of the thesis as it contains all the scientific findings obtained as a result of scientific research and explanation which is logically can explain the reasons for obtaining those results.

b. Research findings describe Data Description and Analysis Results of data that has been conducted. In this section, a researcher organizes findings systematically along with a mathematically correct argument about the scientific information gained in the research, especially information that is relevant to research problems. To clarify the presentation, research findings can be demonstrated in the form of table, curve, graphic, picture, or in other forms based on the need. It should be noted that some forms of
presentation require high precision. Research findings presentation in the form of table, curve, graphic, picture, or any other forms must cover all information needed completely, communicatively, and clearly.

c. Discussion is a section where researcher expresses opinions and arguments clearly, freely, briefly, and logically. The opinions of the previous researchers that have been quoted in the Literature Review need to be repeated but referred to as necessary. In other words, researchers has to use the literature that is most relevant to the results obtained. In this section, the researcher can also show the similarities and discuss the differences between the previous research with the findings. Speculations sometimes occur in the discussion but avoid if it is excessive.

d. The discussion of research findings obtained can be presented in the form of theoretical description, both qualitatively and quantitatively.

e. The discussion section is completed with development study of research findings into a learning source (better to present this in separated subbab/subsubbab; the explanation of this can be observed in a separate chapter in this guideline book).

5. Conclusion (CHAPTER V CONCLUSION)

The conclusion part consists of conclusions and suggestions.

a. Conclusion, it consists a brief description of the research findings and discussion to answer points in the statement of problems. Therefore, what is been concluded must be in line with the statement of problems and research objective, both the content and the amount.

b. Suggestion, it provides suggestions on what needs to be followed up in the future research, weaknesses that need to be completed in the research as a recommendation for future research. The researcher should mention clearly to whom the suggestion is addresses, in this case it needs to be adjusted to the information presented in the research benefit section.
B. Research Development

Systematics section of the thesis content for research development is as follows:

CHAPTER I INTRODUCTION
1.1 Background of the Study
1.2 Objective of Research Development
1.3 Product Specification Expected
1.4 The Importance of Research Development
1.5 Assumption and Limitation of Research Development
1.6 Definition of Key Terms/Operasional Definition

CHAPTER II LITERATURE REVIEW
2.1 ................ (adjusted with research topic)
2.2 ................ (adjusted with research topic)
2.3 And so forth based on many sub-bab discussed
2.4 Conceptual Frameworks

CHAPTER III RESEARCH DEVELOPMENT METHOD
3.1 Development Model
3.2 Time and Subject
3.3 Data Collection Method
3.4 Development Procedure
3.5 Data Analysis Technique

CHAPTER IV RESEARCH DEVELOPMENT FINDINGS
4.1 Presentation of Development Findings
4.2 Presentation of Experiment Data
4.3 Data Analysis Findings
4.4 Product Revision

CHAPTER V CONCLUSION
5.1 Revision of Product Analysis
5.2 Suggestion on Utilization, Dissemination, and Further Product Development

Each is elaborated as follows.

1. Introduction (CHAPTER I INTRODUCTION)

a. Background of Study
The background details the research and development context of the problem to be solved. The background presents results of the preliminary studies or need assessment that has been done. The alternative offered as a problem solver along with its rationalization is put forward at the end of the background discussed. The results of literature review in the form of theories and empirical findings relevant to the developed product need to be presented in an integrated way in the background.

b. Research Development Objectives
The objective of research development is formulated based on the problems to be solved and using the alternative that has been selected. The formulation of research development objectives should be oriented to the fulfillment of needs so that possible attainment of ideal conditions as described in the background will be achieved. The objectives of research development are written in the statement form, e.g. “... the study aims at developing interactive teaching media on course .....”.

c. Product Specification Expected
This section provides a complete overview of the product characteristic expected from the research development. Product characteristics cover all important identities that can distinguish one product from another. The expected product, for instance, in the form of learning media, modules, textbooks, learning package, assessment tool, model, or other products that can be used to meet the needs (problem solving) in learning/education. Each product has different specifications from one another, so that to identify various specifications, the developer must research some related literatures.
d. The Importance of Research Development

This section details arguments on the reason of need fulfillment and alteration on the current real situation into an ideal condition. In other words, the importance of research development is to reveal the reason why the existed problems are significant and urgent to be solved. This section also details relation between the urgency of problem solving and the broader context of the problem. This relation is intended to explain that solving a micro-context problem can actually contribute to a broader problem solving of another problem.

e. Assumption and Limitation of Research Development

Assumption in research development is a basis to determine product characteristic resulted and the justification of model selection and development procedures. Assumption should be raised from validated theories, expert views, or empirical data relevant to the problem to be solved using the product to be developed.

The limitations of research development reveal the limitations of the resulting product to solve the problems encountered, particularly for the broader context of the problem. This description means that the product designed from research and development activity addressed by the users in accordance to the assumptions. Then, it becomes their basis and supporting conditions that need to be available.

f. Definition of Key Terms/ Operasional Definition

This section details specific terms used in the product of research development expectation, either in its model or procedure used as well as from the product produced. The terms that need to be limited are only those invites different interpretation by the readers or users. The limited terms should be defined as operational as possible. The more operational the terms, the less likely will be different.
2. **Literature Review (CHAPTER II LITERATURE REVIEW)**

This section is intended to reveal a comprehensive frame of reference on the concepts, principle, or theories used as a basis for solving problems encountered or in developing the expected product. The reference frame is formulated based on the study of various theoretical and empirical aspects relating to the problems and efforts to be taken to solve them. The descriptions in this chapter are expected to be theoretical foundation of why the problem needs to be solved and why the product to be developed is selected. The theoretical studies of the model and procedures to be used in development also required to be addressed in this section, especially in order to justify the product to be developed.

This section also needs to be completed with relevant research in purpose of giving an overview of the linkage of development efforts with other efforts that may have already been pursued by other experts to approach the same or relatively similar problems. Thus, the development effort to be undertaken has a solid empirical foundation.

The final section should include a conceptual framework containing an idea of development, which raises based on relevant theoretical studies and previous studies, related to the product to be developed.

3. **Research Development Method (CHAPTER III RESEARCH DEVELOPMENT METHOD)**

a. Research Development Model

The Development Model is the basis to develop a product. The development model can be a procedural model, conceptual model, and theoretical model. The procedural model is a descriptive model, indicating the steps to be followed to produce a product. The conceptual model is an analytical model, which mentions the product components in detail and shows relationships among components to be developed. In addition, theoretical model is a model that draws a frame of mind based on relevant theories and is supported by empirical data.

In the development model, researchers pay attention to three aspects,
they are 1) Describing the Model Structure used briefly as the basis of product development. 2) If the model used is adapted from the existing model, it is necessary to explain the reasons for selecting the model, the adjusted components, and the strengths and weaknesses of the model compared to the original one. 3) If the model used is self-developed, it is necessary to describe the components and links between the components involved in the development.

b. Research Development Procedure

Research development procedure will present several procedures that will be taken by the researcher to create a product. The development procedure is different from the development model in describing the components of product design developed. In the procedure, the researcher mentions the properties of components at each stage of development, explains analytically the function of the components in each stage of product development, and elaborates the relationships among the components in the system. If the development model is procedural, thus the development procedures follow the steps as seen in the model. If the development model is conceptual or theoretical, thus the procedure needs to be restated.

Borg and Gall (1983) developed a mini-course through 10 steps: 1) conducting preliminary research to collect information (literature review, classroom observation), identify problems encountered in learning, and summarizes the issues. 2) Planning (identification and definition of skills, objective formulation, learning sequence determination, and expert test or small-scale test, or expert judgment). Developing early product types includes: preparation of teaching materials, handbooks, and evaluation tools. 4). Conducting initial field trials, conducted on 2-3 schools using 6-10 expert subjects. Collection of information/ data is done through observation, interview, and questionnaire, and continued with data analysis. 5). Revising the main product, based on input and suggestions from the initial field test results. 6). Conducting a major field trial, done to
3-5 schools, with 30-80 subjects. Test/assessment of student achievement are done before and after the learning process. 7). Revising operational products, based on inputs and suggestions of key field results. 8). Conducting operational field tests (conducted on 10-30 schools, involving 40-200 subjects), data collected through interviews, observations, and questionnaires. 9). Refining the final product, based on suggestions in the field trials. 10). Deploying and implementing products, reporting and disseminating products through scientific meetings and journals, in collaboration with publishers for product socialization for commercial, and monitoring distribution and quality control.

c. Product Trial

Model or product trial is a very important part of developmental research, which is done after the product design is completed. The model or product trial aims to determine whether the product made is feasible to use or not. Model or product trials also look at the extent to which product is created to achieve goals and objectives.

A good model or product meets two criteria: instructional criteria and presentation criteria. Trial done 3 times: (1) Expert test (2) The limited test conducted on small groups as users of the product; (3) Field Test (Field Testing) with a test of the quality of the model or product developed is truly empirically tested.

d. Design Trial

There are three stages in the test of the product, namely 1) Individual tests (Expert or Validation test, done with the respondents of product design experts. This activity is done to review the initial product and provide input for improvement. This validation process is called Expert Judgment or Delphi Technique, followed with Concept and Revision I. 2) Small Group Trial, or a limited test conducted on small groups as product users and then followed by Revision II. 3) Field Test. The results of the field test were
conducted for revision III as well as the development of End Products and Dissemination.

e. Subject Trial

Characteristics of subjects test need to be presented clearly, in terms of number and how to select the Subject. Something to consider in choosing the Subject are 1) Determination of Subjects used in accordance with the objectives and scope and stages of research development. 2) Subjects should be representative, related to the type of product to be developed, consisting of experts in the field of study (material experts), product design experts (media experts), and product user targets. 3) The number of test subjects depends on the preliminary field test.

f. Data Types

In the trials, data is used as a basis to determine the effectiveness, efficiency, and attractiveness of the resulting product. The type of data to be collected should be tailored to the required information about the product being developed and the learning objectives to be achieved. Data collected may only collect data about problem-solving related to effectiveness and efficiency, or data on the attractiveness of the resulting product. Data presented should be associated with the design of the study and the subject of particular trial. Data on the accuracy of the contents can be made on the subject of the content expert, small group, or all the three. In Expert Test, the data revealed include the accuracy of the substance, the accuracy of the method, the density of product design, and so forth.

g. Data Collection Instrument

In the data collection, a researcher can use various data collection techniques or measurements tailored to the characteristics of data to be collected and research respondents. Data collection techniques used can be in the form of observation, interviews, and questionnaires. Data collection can use the existing instruments. This requires clarity about the characteristics of the instrument, including validity, reliability, and has been
used where and to measure what. Instruments can be developed independently by the researcher; therefore it is necessary to consider on the clarity of the development procedure, the level of validity, and reliability.

h. Data Analysis Technique

Data analysis technique used is adapted to the type of data collected. The reasons for using the technique selected should also be explained.

4. Research Development Findings (CHAPTER IV RESEARCH DEVELOPMENT FINDINGS)

a. Presentation of Research Development Findings

This section presents the result of product development, starts from the preparation step, need assessment, development step, validity step, and trial.

b. Presentation of Experiment Data

All data collected from product trial is presented in this section. Data presentation is better to present in table, chart, or picture, in order to gain a clear communication. Before analysis, this data need to be classified its types and product components to be developed. This classification is advantageous for product revision.

c. Data Analysis Result

This section presents in detail the analysis results of experiment data. Several aspects to consider in data analysis are: 1) Data analysis includes the procedures of data organization, reduction, data presentation in the form of table, chart, or graphic. 2) Data is classified into several kinds and product components to be developed. 3) Data is analyzed descriptively or even quantitatively 4) Presentation of analysis result is limited on factual thing, without wider presentation, that can be used as the basis for product revision. 5) In data analysis, the use of calculation and statistic analysis is in line with the stated problems, and the product to be developed. 6)
Presentation is formulated well and adjusted with the product users and readers. 7) Analysis conclusion needs to be presented in the last section in this point, as the basis for product revision.

d. Product Revision

Product revision is conducted if in the product use in real condition lays weaknesses. In the trials, it is better for developer to always evaluate the product working, in this case is the working system or action. The conclusion derived from the analysis result of trial data explains that the product tried is used as the basis of decision making whether the product resulted needs revision or not. The decision making to revise the product is completed with the support/ correction that the product to revise will be better, efficient, more attractive, and easier for the users. The components need to be revised is supposed to be explained clearly and in detail.

5. Conclusion (CHAPTER V CONCLUSION)

a. The Revised Product Study

The final form of the product developed after the revision needs to be examined objectively and thoroughly. The review should be based on the theoretical foundations discussed in Chapter II, Chapter III, and the results of the study lead to opportunities of using it for problem solving. Product strengths and weaknesses should be described completely with a comprehensive review of the interrelationships between the products and the problems that want to be solved. Opportunities for other problems of product utilization also need to be identified, and at the same time accompanied by prescriptions on how to anticipate new problems.

b. Suggestion on Utilization, Dissemination, and Further Product Development

The suggestions in this section are directed to three aspects: suggestions for product utilization, suggestions for product dissemination to broader
targets, and suggestions for development of further developmental needs. Any suggestion should be based on the results of the product review as discussed in the preceding item. The disclosure should use clear statements and attempt to make the one suggestion explicitly different from other suggestions. Arguments also need to be included in every suggestion submitted.

C. Classroom Action Research (CAR)

Systematic parts of the content of the thesis for classroom action research are as follows:

CHAPTER I INTRODUCTION
1.1 Background of Study
1.2 Statement of Problems
1.3 Research Objectives
1.4 Research Significance
1.5 Research Scope
1.6 Definition of Key Terms

CHAPTER II LITERATURE REVIEW
2.1 Theoretical Analysis
2.2 Conceptual Framework
2.3 Action Hypothesis

CHAPTER III RESEARCH METHOD
3.1 Research Design
3.2 Researcher’s Role in the Field
3.3 Location and Research Time
3.4 Research Subject
3.5 Variable and Operational Definition
3.6 Data and Data Source
3.7 Research Procedure
3.8 Technique and Data Collection Instrument
3.9 Data Analysis Technique

CHAPTER IV RESEARCH FINDINGS AND DISCUSSIONS
4.1 Research Findings
4.2 Discussions

BAB V CLOSING
1.1 Conclusion
1.2 Suggestions

Each section will be described as follows:

1. Introduction (CHAPTER I INTRODUCTION)

a. Background of Study

Background of study contains the issues raise, with the following criteria: (1) clear and not the result of theoretical studies, (2) real happening at school, based on teachers' observations or education staff at school, and (3) can be inspired from previous research findings, but derived from factual learning problem. Problems analyzed must be important and urgent to be solved, and can be implemented (considering on availability of time, cost, and other supporting capacity), problem identification with supporting data. Problems are analyzed to determine the root cause. The first step in action research is to identify the problem that must be perceived and identified by the researcher himself. Similar to other researches, the problem is basically derived from a gap or discrepancy between reality (das sein) and the expected state (das sollen).

As a thing to consider on choosing a CAR-based thesis, there are several criteria to determine a problem: (1) The problem should be important to the person who proposed it and significant in terms of the development of the institution or program; (2) the problem should be able to be solved; (3) the statement of the problem must reveal some fundamental dimensions of
causes and factors, so that solutions can be made on these fundamental issues rather than on superficial phenomena.

In formulating and arranging the background in the CAR, there are provisions that need to be followed: the contents of the background should describe the “problem”; “action”; and “action innovation” so as to fulfill good and right rules. In its practice, the content of background of the study as follows: 1) How should/be? (link with existing theories or called “hope”); 2) What is the problem in class? (reality); 3) What are the main issue? (focus on problem); 4) What are the planned actions to solve the problem? (action); and 5) What is the different from the action in general? (innovation).

b. Statement of Problems
The formulation of CAR problems should be based on the background of the issues previously mentioned. Some basic aspects and provisions to be followed in formulating the problem, namely: 1) formulation aspects (in clear, specific, and operational terms); 2) the core aspect (the value of the benefit and its applicability and the question being asked not only the result but also the process); and 3) innovative aspect (a new thing that has been done).

c. Research Objective
The research objectives are formulated briefly and clearly based on the problems and ways of solving the problems raised, consistent with the formulation of the problem, and describes the results to be achieved.

d. Significance of Research
Significance of Research is clearly and systematically explained, so that the theoretical or practical significance of the students, teachers, related to educational components of the school, and others are possible. Point out the innovations that will result from this research.
e. Scope and Research Limitation
This section describes the breadth of CAR coverage. The scope of the study can be limited using location and time. Limitations of the study describe the things or variables that can actually be covered in the scope of the study, but because certain methodological or procedural difficulties, not due to the timing and logistics of the researcher, cannot be covered in research.

f. Definition of Key Terms/ Operational Definition
To clarify the titles and issues discussed, they can be described into some of the definitions of key terms conceptually and operationally. This section aims to equate the perception between researcher and readers.

2. Literature Review (CHAPTER II LITERATURE REVIEW)
   a. Theoretical Study
   Theoretical study contains theoretical reviews with the concept of learning and the context of the CAR that has been commonly used. The study using this theory can foster ideas and underly proposals of action research design. Therefore, to run this study, it must be supported by theories, findings, and other research materials. This will support the choice of actions to address the problems. This description can be used to construct a frame of thought or concept in research. In this section, it describes theoretical and empirical study that arise ideas as the basis of CAR, previous research findings related and supported choice of action to solve the research problem, and conceptual framework to be used in research-based on theoretical studies.

   b. Conceptual Framework
   The conceptual framework contains theoretical explanations to diagnose problems, and devices a research model to be performed. Conceptual frameworks can also be assisted by displaying charts that will make it easier for readers to know the direction of the research, and provide
guidance for researchers in the decomposition of research instrument variables and indicators.

c. Hypothesis
The hypothesis in classroom action research serves to direct action that a researcher will be doing to prove inductively. The action hypothesis is formulated by mentioning allegations about the changes that will occur if an action is taken. The hypothesis of action is formulated in the form of hypothesis statement not question, such as can use “declarative” or with “if … then …”.

3. Research Method (CHAPTER III RESEARCH METHOD)
   a. Research Design
   CAR tends to be classified as qualitative research, especially on the meaning of what happens in the learning process, whether related to the initial conditions of learning and what happens after the implementation of the action. In general, this section describes the model and concept of the CAR used, and the reason for using the model. For example, the researcher explained that the research was done using design of Classroom Action Research of Kemmis & Taggart model (1988) with 2 or more cycles. Each cycle consists of 4 stages, namely 1) Planning, 2) Implementation of Action, 3) Observation, and 4) Reflection. The results of this reflection are then used to improve the next planning (revise planning).

   b. Researcher Role in the Field
   In accordance with the characteristics and objectives of CAR, a researcher is a party who feels the problem that needs to be resolved. If the researcher is a classroom teacher or a subject teacher, then he or she is the first person to feel the problem and most concerned with problem solving or an answer to the problem. Accordingly, this section describes how the intensity and quality of researcher's attendance at school / class. In the implementation of learning, as much as possible that carry out
learning is the teacher, this means students need to collaborate with teachers. This section describes researcher’s roles, what is to be done. If there are people who help, it should also be told the role / task of each.

c. Location and Research Time
The location describes where the study was conducted, containing 1) school address, 2) geographic description of the school and its environment, and 3) description of school characteristics / achievement. Meanwhile, the research time contains a description of research activities and the estimated time of its implementation (in the form of a matrix). Related to this, researcher should explain 1) when the research is done; it can be described from the preparation of proposal preparation, instrument preparation, data collection, data analysis, discussion and report of research findings. 2) give the reason about data collection / action execution was done at that time.

d. Research Subject
This section describes the subject of research which includes elements of the class / grade / semester names, the number of students in the class, and the psychological and sociological conditions of the students (including sex).

e. Variable and Definition of Operational Variable
Research variable is an object in research so that become the point of attention in research. The variables used in classroom action research such as student activities, learning models used, and others. The variables to be studied can also be grouped, for example in the form of input variables (students), process variables (use of media and methods), and output variables (specific abilities or competencies).
Further explained also the definition of operational variables, namely defining the variables based on the observed characteristics to facilitate \

researchers making a careful observation of a research object or facilitate the measurement.

f. Data Types and Data Source
This section describes the type of data required and the source/data source. Data derived from the subject is called the primary data. It should be described what form the data are, how many data are and so on. Data derived from other than the subject is called secondary data. Secondary data also needs to be explained about what is going on, how many, and so on.

g. Research Procedure
The procedures performed in the CAR basically determine the actions taken in each cycle consisting of: 1) planning, 2) acting, 3) observing, and 4) reflecting. These four procedures are performed sequentially and are cyclical. This means that, if perceived action has not given the expected results, the researcher is required to do the next cycle with the same stages. In this case, of course, that the next cycle is done by considering the results of reflections made in the previous cycle.

As a guideline for the successful implementation of CAR, some of which need to be well planned, are 1) creating lesson scenarios, 2) preparing learning tools that support the implementation of actions, 3) preparing research instruments, and 4) stimulating the implementation of actions and also testing their implementation in field.

h. Data Collection Technique
Data collection techniques in the CAR contain descriptions of ways of collecting data, for example through 1) test, 2) observation, 3) interview, 4) document analysis, 5) focus group discussion, etc. Meanwhile, instruments used to collect data adapted to the techniques used. For example, because the technique used is a test, then the tool / instruments are the
item. Likewise, since the techniques used are interviews, the tools / instruments to collect data are guidelines and interview sheets and so on. This section can also describe stages / steps of data validation. Tools / instruments to collect data and data obtained need to be validated. Validation methods are adapted to the necessary tools and data, for example a written test should be validated by the creation of the grid, while the interview / data validation is validated through triangulation (source / method).

i. Data Analysis Technique

Data analysis techniques adapted to the data. When the data is in the form of number / quantitative, it is analyzed by comparative descriptive analysis that is comparing quantitative data from initial condition, cycle I, cycle II and next cycle (if any). Meanwhile, if the data is categorized / qualitatively analyzed with qualitative analysis based on interview / observation and reflection from initial condition, cycle 1, cycle II, and the next cycle (if any). The thing to remember is that CAR tends to follow the way of qualitative data analysis, which is very important to the meaning that can be developed from the existing data (descriptive), which is closely related to the context and dynamics of learning that occurs when data are collected. Certain statistical procedures can be used when absolutely necessary.

4. Findings and Discussions (CHAPTER IV FINDINGS AND DISCUSSIONS)

a. Research Findings

This section describes all four stages of CAR for each cycle. The description begins with what is done at the planning stage. The following is described how the implementation of the action takes place in actual learning situations from the first meeting to the last meeting in the form of measurement of first cycle learning outcomes. Also described how the implementation of observations conducted simultaneously with the implementation of the action.
In the presentation of observation and interpretation activities described how the implementation of observation as an attempt to record the processes that occur during the learning takes place. This section describes the results of the recording thoroughly and accurately, especially about the teachers’ behavior and students in the learning process. The types of data and/or information recorded during the observation may be quantitative and qualitative data, depending on the impact of the expected action or outcome. Based on the data presented, it is concluded that it is the extract from the presentation of data that has been organized in the form of statement or sentence short, brief and meaningful, which is in the research findings.

b. Discussions
The discussion section contains the researchers’ ideas related to what has been done and what is observed, described, analyzed in the previous section. The description of this idea is related to the results of the study of theory and other relevant research results. This section can also be completed by an analysis of the implications of the research findings (which is certainly supported by the study of theory and other research results). The discussion section of PTK for thesis/student level is not directed to generalization due to the consideration of study limitations and student research experience.

5. Closing (CHAPTER V CLOSING)

a. Conclusion
This section has the answer of research questions and as much as possible to find the principal finding qualitatively (not only in the form of qualitative data presentation).

b. Suggestions
This section contains suggestions/recommendations/follow-up that is proposed. All suggested things should be in accordance with the benefits formulated in the introduction, and should be described in the discussion
section.
CHAPTER IV
GUIDELINES ON SCIENTIFIC RESEARCH DEVELOPMENT INTO EDUCATION

A. Background

In accordance with the provisions of FTTE (Faculty of Teacher Training and Education) UMM 2015, detailed in the Scientific Writing Guidelines, all university-based science students are highly recommended to combine the thesis with the field of education. This effort is usually taken by utilizing the process and research results for learning resources. The various combinations of scientific fields with education are mostly led to their use as learning resources. Based on this category, research findings utilization as a learning resource can be developed into three forms. The first form is the use of processes and products as learning resources for learning on certain basic competencies, certain classes, and a certain level of school. The second form is the use of research products as a source of learning in its form as a book. The book in question is a textbook for students. As a textbook, the designation can be as a book of enrichment or popular reading books. The third form is the utilization of research products as a learning medium embodied in the form of comic, brochures, interactive learning media, or other forms. Description or explanation of each form can be observed in the book of Writing Guidelines for Scientific Paper published by FTTE UMM.

In response, the Biology Education Study Program of FTTE UMM translates the policy specifically, that the combination or the intended development is limited to the study of potential users or planning. Thus, students undertaking pure research or the like simply conduct the review (in accordance with the terms or conditions as will be described and further exemplified) and not to the stage of producing the product. This at once differentiates it from development research. The next section will describe various things related to the utilization of research findings as a source of learning. It should be noted that some of the existing terms, in their implementation, may be adapted to the existing terminology of the curriculum.
B. Alternative 1 The Use of Research Findings as a Learning Source

In order for the process and the findings of this research immediately become something that is underlined and have a clear character, thus can be utilized as learning resource hence need to be taken into consideration of research meaning as research learning resource. As a source of learning can be viewed from two aspects are the process and products. In addition, it is necessary to consider the requirements of the utilization of learning resources that include the clarity of its potential, the clarity of its objectives, its suitability with the learning objectives, the clarity of the disclosed information, the clarity of the exploration guidelines, and the clarity of the expected earnings.

1. Requirements

Below are described the discussion that the study should meet 6 requirements to be used as a learning resource, they are (e.g; there is a study entitled “Plankton Diversity Index in Pasted River Paper”):

a. Potential Clarity

The plankton object as a living creature in Semangu River that is exposed to waste as its environment provides many symptoms and problems. Among them is the influence of water quality to plankton diversity. Discovering and learning this means students are trained to interact with nature so it is possible to get first hand experience. If any object of any kind and anywhere that can provide a student learning experience on a particular problem is called a learning resource then the plankton object in the Semangu River can be classified as a learning resource.

b. Target Clarity

The objectives of the observations in this study of plankton objects include their types, density, and diversity. While the quality of water under study covered the content of DO, BOD5, Phosphate, Nitrate and turbidity, and other physical-chemical parameters as companion data.
c. Suitability with the Learning Objectives

In conducting this research, it must involve a variety of abilities both in terms of cognitive, affective, and psychomotor because this activity cannot be separated from observation activities, stating problems, formulating hypotheses, measuring, counting, declaring results, making conclusions and others. Thus, the utilization of this research as a source of learning can develop learning objectives, namely to develop aspects of cognitive, affective, and psychomotor.

d. Information Clarity Discovered

Information discovered from this research is a fact that can be developed as a concept, principle, and law. The information is about the influence of waste removal on water quality and the influence of water quality change on plankton diversity. The concept derived can be used to fill the structural concept on the main discussion about a living things and environment, after it is been selected and supplemented.

e. Clarity on Exploration Guidance

The observation of water quality in some parameters and calculation of plankton diversity can be done by high school students with guidance on modified work instructions. Measurement of water temperature, water pH, and current velocity is relatively easy to do. Meanwhile, examination of water quality in parameters of DO, BOD, Phosphate, Nitrate, and Turbidity can be done by BTKL laboratory.

f. The Clarity of Gaining

Several things can be gained using plankton on the Semangu River that is exposed to waste as learning sources are:

1) Skill development through observation, accuracy, and completeness of data collection, data conceptualization, giving meaning to various events and inferences of results.

2) Development of attitude, discipline, honesty, and work thoroughly while making identification and calculation of plankton diversity.
3) Development of the concept, it is in term of obtaining the concept of the influence of environmental factors on organism life and environmental changes.

Taking into account the six condition of utilization, it is clear that plankton in the Semangu River affected by the waste can be used as a learning source because its process and product are the source for learning biology, both can be achieved at once. The process as learning source has relation with the importance of developing biology learning skill; while the product as learning source has relations with the interest of development, particularly facts and concepts.

2. Preparation on Instructional Program

Preparation on instructional program using this research can be divided into 2 stages; analysis on research findings and development in instructional organization, they are described as follows:

a. Analysis on Research Findings

This research involves two aspects, they are process and product. In its process, this research includes scientific activities such as observation, formulating problems, determining objectives, formulating hypothesis, planning research, organizing data, and analysis and drawing conclusion. In addition, this activity trains students to have a comprehensive work and team work. In its product, this research reveals facts, analyze facts, develop concept, principle, and law as well as the use of terms to communicate scientific details as follows:

1) Facts Revealed

a) The water of Semangu before it is exposed to pulp fabrication waste have clear water colour and not foaming.

b) The Semangu River after being infected by pulp fabrication waste, the water colour becomes dark brown, foaming, and leaving sediment.
c) After being watery from Elo River, the water colour becomes light brown and the foam is getting less.

d) The water quality before infected by the waste, it has score in the average of \( \text{DO} = 7,14; \text{BOD}_5 = 4,29; \text{Fosfat} = 0,48; \text{Nitrat} = 2,83; \text{Turbidity} = 31,2; \text{pH} = 7,9; \text{Temperature} = 25; \text{Stream Speed} = 0,56; \text{Amonia} = 0,19; \text{Organic Substance} = 3,43; \text{Suspended Substance} = 1,66; \text{Nitrit} = 0; \text{Silika} = 70. \)

e) The water quality of the river after infected by the waste has the score in the average of \( \text{DO} = 2,69; \text{BOD}_5 = 29,7; \text{Fosfat} = 0,63; \text{Nitrat} = 0,44; \text{Turbidity} = 108,3; \text{pH} = 8,3; \text{Temperature} = 25; \text{Stream Speed} = 0,55; \text{Amonia} = 0,59; \text{Organic Substance} = 45,5; \text{Suspended Substance} = 4,5; \text{Nitrit} = 0; \text{Silika} = 73. \)

f) The quality of the river water after being in distance from the source of waste and obtain considerable water from the Elo river, has score in the average of: \( \text{DO} = 7,48; \text{BOD}_5 = 4,75; \text{Fosfat} = 0,59; \text{Nitrat} = 1,94; \text{Turbidity} = 94,7; \text{pH} = 8,2; \text{Temperature} = 25; \text{Stream Speed} = 1,76; \text{Amonia} = 0,16; \text{Organic Substance} = 16,3; \text{Suspended Substance} = 1; \text{Nitrit} = 0; \text{Silika} = 44. \)

g) There is a change in the quality of water in the parameter of DO, \( \text{BOD}_5, \text{Fosfat, Nitrat, Turbiditity, pH, Suhu, Amonia, Organic Substance, Suspended Substance, and Silika} \) between the water before and after being infected by the waster as well as after getting a lot of water from Elo river.

h) Plankton found in the three stations are 130 genera, consists of 74 phytoplankton genera and zooplankton genera.

i) Before it is infected by the waste, it was found 107 genera, consists of 65 phytoplankton genera and 42 zooplankton genera. After being infected by the water, it was found 44 genera, consists of 30 phytoplankton genera and 14 zooplankton genera. After being in distance from waste disposal and get the water from Elo river, the plankton was found for 89 genera, consists of 60 pytoplankton dan 29 zooplankton.
j) Indexes of plankton diversity in the rivers before infected by the waste has the average of 3.79, but after being infected by the waster has the average of 1.32, and after being in distance from the waste and get the water from Elo river has the average of 3.028. Thus, there was an a change in plankton diversity index in each observation station.

k) Phytoplankton diversity index is in the average of 2.32 (station I), 0.87 (station II), and 1.79 (station III), zooplankton diversity index has the average of 1.41 (station I), 0.35 (station II), 1.22 (station III).

l) Waste disposal from pulp fabrication has caused a change on water quality in Semangu river.

m) The watery from Elo river has a role to restore the water quality and plankton number at station III.

n) The quality of water in Nitrat parameter has a role to determine plankton diversity at station I; meanwhile, in parameter DO, and BOD5 have a role to determine the zooplankton diversity at station III.

2) A concept that can be developed

Based on the facts obtained, further it can be used to obtain the concept after going through the process of conceptualization. The concepts that can be developed through the facts found are as follows:

a) Based on the facts in the component 1,2,3,4 is derived that the concept of waters prior to exposure to waste is the unpolluted water; in the water after after exposure to waste is the polluted water and in the water far from the source of waste and obtain a lot of water from Elo eiver is water that have undergone the restoration.

b) Based on the facts in the components 1,3,5,7 is derived that the water have not been polluted has the quality with physical characterstic - normal kemik.
c) Based on the facts in the components 2 and 6 is derived that the polluted water has the quality of physical – extreme kemik, that is out of the normal range.

d) Based on the facts in the components 3 and 7 is derived that the water which is far from pollutant sources and there is a lot of water can restore the physical characteristics – kem before polluted.

e) Based on the facts in the components 2, 6, 8 is derived that pollution causes changes in the water quality and reduces the number of species living therein.

f) Based on the facts in the components 1, 3, 5, 7, 8, 10 is derived that the unpolluted water have good water quality with high plankton diversity index.

g) Based on the facts in the components 2, 6, 10 is derived that the polluted water have poor quality with low plankton diversity index.

h) Based on the facts 4, 10 found that changing concept in water quality is followed with a change in plankton diversity index.

i) Based on the fact 2, 6, 11 found that continuous waste removal into water trunk has caused the existence of contaminants and the change on the water quality.

j) Based on fact 9 found this concept: primary producer has bigger quantity than the primary consumer.

k) Based on fact component 5, 9, 10 found the concept: the life of plankton organism is strongly related to oxygen and Nitrat in the aforementioned water.

l) Based on fact component 3, 7, 13 found the concept: contaminant will be reduced if the source of contaminant is in distance as well as the melting factor.

3) Principle of Development

Based on the concepts found in the above research, the principle is developed further as follows:
a) The environment that is not contaminated its complete ecosystem development level is a stable ecosystem in its physic-chemistry and it consists of many species that has high diversity.

b) Contaminated environment is unstable environment in its physic-chemistry, it is also an environment with relatively few species or low diversity.

c) The high and low diversity can be used as an indicator of imbalance in biological system in the polluted water.

4) Law Formulation

The law formulated is: environmental change affects organism life.

5) Technology Usage

a) Water Pollution
b) Diversity Indices
c) Self purification
d) Waste

e) Water Ecosystem
f) Plankton
g) Pattern of Engagement
h) Eutrophication

3. Research Development in Instructional Organisation

Process and research product clearly has potency as a learning source. To make it more meaningful, accuracy and instructional organisation plan are needed. Some steps to consider in developing instructional organisation includes:

a. Material Selection/essential concept
b. Instructional Program Plan
c. Teaching Plan
d. Evaluation Process and Learning Result

C. Alternative 2 The Use of Research Finding as a Learning Source

Research finding in Biology (quantitative finding) can be used as materials to develop certain product. Therefore, first decide the model to use in the development. Thus, this step basically uses research development’s rules
and principle, however, it can be limited by the step resulted to first product/hypothesis without any experiment and massive production. Some of learning development models that can be used are: a) ASSURE model; b) ADDIE model; c) Jerold E. Kamp, et.al model; d) Dick & Carey model; e) IDI model; f) Gerlach & Ely model; g) Bela H. Banaty model. Students can apply certain models are considered as the most appropriate, either applying the aforementioned models or another (as long as it is supported with literature/valid reference).

The following is examplified of one model applied by a student of Biology FTTE UMM previously. Students can apply Learning Cycle 3E model that is modified into research development. According to Fajaroh & Dasna (2007) Learning Cycle model is a model consists of some phases and steps of organized activities so that students can master some targeted competences in the learning objectives through active role. Learning Cycle according to Doğru-Atay & Tekkaya (2008) helps to build new knowledge with conceptual change through interaction with environment and real world.

Students are allowed to apply the model used reaching the product validation step because in the Learning Cycle 3-E basic method does not require students to do product experiment found. The Learning Cycle 3-E step is modified from Wena (2011), as follows:

1. Exploration

Exploration is a phase for data collection or need assessment based on the needs of development. Data collection can be derived from research finding, syllabus, lesson plan, teacher or student. Data collected from need assessment is developmental need or essential concept need. Data collection in this research is only derived from research findings step I (pure research), textbooks, and syllabi. Next, present, 1) research finding step I which is appropriate and need to be developed/implemented in education/learning process, 2) Book content used and appropriate, and 3) basic competence/appropriate learning objectives. Describe the essential material needs derived in need assessment step from research findings step I, textbooks, and syllabi.
2. Explanation

Activities in this phase aims at completing, refine, and develop concepts obtained from the previous phase. Concepts that have been obtained are described based on literature review, then consulted to the mentors so that the concept becomes essential.

3. Elaboration

Elaboration is the stage of product creation. Describe the resulting product and the steps of manufacturing starting from preparation, designing design, production, and finishing. Document the process, for instance the overview of the planned product, storyboard, and the like, should be attached to the end of the thesis.
CHAPTER V
ETHICS ON THESIS WRITING

Code of ethics is a set of norms that needs to be considered in writing of thesis and scientific works in general. This norms relate to the authenticity of works, code of ethic of research, citation and referral, permission of the material used, and mention of source of data and informant.

A. Code of Ethics Relates to the Authenticity of Works

The authenticity of works is stated in signed and stamped statement letter. Students are strictly prohibited to use the “third party” services that will help write thesis, process data or even buy thesis. Conversely, students are also strictly prohibited from selling data or results of their thesis, partly or as a whole (in English terms called as no debitor and no creditor).

Thesis is the work of students’ own hands. If later is known that the students do not seriously understand or face difficulties, thus they had better to consult to his friends, experts, or any competent parties in the field. However, one should bear in mind that the work is only in the limits of consultation and discussion. The wisest step to take on is consulting all matters to supervisors or Thesis Bureau. If consulted clearly, the supervisors and study program would kindly give some solutions.

B. Research Code of Ethics

Research code of ethics aims at establishing good academic atmosphere so that students would uplift good behaviour, respect othes, carefulness, honesty, and dedication, inside and outside the campus. Research code of ethics is also an attempt to create freedom of thinking, ability for creation, dedication, and uplifting good behaviour in developing and implementing science.

Research code of ethics is an ethic guideline to conduct research, including researchers’ ethics. Meanwhile, research code of ethics is a rule to explain standard of ethic in working behaviour expected by all parties involved...
in the research under the Biology Program of FTTE UMM as an institution. Research is a work to find truth of phenomena aiming at developing knowledge and human welfare. In addition, researcher is some one through his education has an ability yo do scientific investigation on certain field and/or accross discipline.

Some aspects to consider related to research code of ethics are stated as below:

1. A research conducted by every student of Biology Program FTTE UMM must meet the rules of knowledge and is done by heart, morality, freedom, and responsibility.

2. Research that is done is an attempt to develop science, human welfare, dignity, and civilization, and free from anything related to loss and danger.

3. If a research uses animal for experiment, animal welfare and bioethics (rules related to this are set out by the faculty and university) should be taken into account.

4. Every researcher must understand research code of ethics and obey the rules.

5. Transgression on the code of ethics brings to sanctions in the form of warning, suspension, termination, and so on.

6. A research is reuired to obey to the research code of ethics and avoid any transgrassions such as:

   a. Concoction, data forgery, and such.
   b. Plagiarism, it is to proclaim or copy part or whole works of others by publication and claim it as the researcher’s own work.
   c. Autoplagiarism, it is to reexplain sentences, words, data, or ideas of scientific research that has been published without stating its reference. This action is also defined as a work of duplication.

7. Research must be conducted based on methods, procedures, and scientific result that can is accountable.

8. Researcher’s obligation on his research are:

   a. researcher is responsible to interpret his research findings and conclusions in order to be understood.
b. Researcher must be responsible for his research fellow.
c. Researcher are not to hide or exaggerate his research weakness.
d. Researcher must explain explicitly the significance of research subject.

C. Code of Ethics in Citation and Referencing

Writing scientific work involves the activities of citation and referencing. This activity is highly suggested because citation and referencing helps to develop knowledge. However, researcher must be honest when citing materials or referring ideas taken from others’ source. The use of materials or ideas without citation and reference will be considered as plagiarism or autoplagiarism. Therefore, students must specially and legally state the authenticity of his scientific work, declaring that the work is not an act of academic fraud or taking others’ ideas and free from any plagiarism. This statement is stated in the front section of the thesis.

Detail information and discussion can refer to Thesis Writing Guidance Book published by FTTE UMM. Students and supervisors can read in detail the Rules of Ministry of National Education the Republic of Indonesia Number 17 2010 about Prevention and Countermeasure of Plagiarism in Higher Education.

D. Code of Ethics on Licencing of Material Used for Research

Researcher using any materials for a source (such as instruments, charts, images, and tables), are required to get the licence from the owner of the work in written form. If the owner is not reachable, the researcher must cite the source explaining that the materials are wholly or partly taken, modified, or developed.

E. Code of Ethics for Reference to Source of Data or Informant

Name of data source, informant, or research subject, ultimately in qualitative research, are not allowed to be mentioned if the mention of name can bring the source of data and informant in danger. Thus, the names of source of data and informant can be stated in codes or pseudonym.
CHAPTER VI
ARTICLE WRITING FOR SCIENTIFIC PUBLICATION

A. Requirements
1. This article writing guidelines refer to the guidance of draft submission of Indonesia Journal of Biology Education (JPBI) published by Program of Study of Biology FTTE UMM. If student is willing to join any local, national, and international seminar, as well as publishing scientific journal, they have to fully refer to the guidance or policy of the committee or the managing editor of the related journal.
2. Draft is written based on template that can be downloaded in the website of Biology Education Program of Study of FTTE UMM (http://biology.umm.ac.id) or in JPBI website (http://ejournal.umm.ac.id/index.php/jpbi) or can also refer to article writing guidance for scientific article stated in Chapter 4, Scientific Work Writing Guidance published by FTTE UMM.

B. Writing System
1. The article system includes: tittle; author (without academic degree); abstract in two languages (Indonesia and English) maximum in 200 words detailing research purposes, methods, and findings; keywords; introduction (without tittle) consisting background of study, literature review, and research purposes; methods; findings and discussions; conclusions and suggestions; reference (write only the referred sources).
2. Draft is attached with abstract in two languages (Indonesia and English) for the maximum of 200 words, along with keywords.
3. Author’s name is written without academic degree and placed below the tittle. Author’s name should be completed with corresponding address also institution’s name and address with email and contact number.
4. Draft is written in Bahasa Indonesia or English following essay format with tittle in each article except introduction page presented without tittle. The tittle of articles is written in capital, centered, font 14, tittle of sections is
written with different font (all sections of the title and sub-chapters are bolded or bolded and italicized), and do not use number in each sub-chapter.

C. Referencing
1. Reference should be from literatures in the 10 last years. The reference is prioritized on primary sources in the form of research report (such as thesis, and dissertation) or research articles in journal and/or scientific magazines).
2. Referencing and citation use in-text citation bracket (name, year). Source reference in direct quotation should be completed with page number and author. Example: (Pantiwati, 2015).


Regulations of Ministry of National Education Republic Indonesia Number 17 Year 2010 about Prevention and Penanggulangan Plagiat di Perguruan Tinggi.


attachment 1. cover (outside) format of undergraduate thesis proposal

undergraduate thesis proposal to be finalized by students, supervised intensively by advisors meanwhile for scientific biology research is directed to educational biology

undergraduate thesis proposal

by:
student’s name
student id:

program of study biology education
faculty of teacher training and education
university of muhammadiyah malang
20xx
UNDERGRADUATE THESIS PROPOSAL TO BE FINALIZED BY STUDENTS, SUPERVISED INTENSIVELY BY ADVISORS MEANWHILE FOR SCIENTIFIC BIOLOGY RESEARCH IS DIRECTED TO EDUCATIONAL BIOLOGY

UNDERGRADUATE THESIS PROPOSAL

Submitted to Faculty of Teacher Training and Education
University of Muhammadiyah Malang
As one Requirements to Achieve Bachelor Degree in Biology Education

By:
STUDENT’S NAME
STUDENT ID:

PROGRAM OF STUDY BIOLOGY EDUCATION
FACULTY OF TEACHER TRAINING AND EDUCATION
UNIVERSITY OF MUHAMMADIYAH MALANG
20XX
UNDERGRADUATE THESIS PROPOSAL TO BE FINALIZED BY STUDENTS, SUPERVISED INTENSIVELY BY ADVISORS MEANWHILE FOR SCIENTIFIC BIOLOGY RESEARCH IS DIRECTED TO EDUCATIONAL BIOLOGY

UNDERGRADUATE THESIS

By:
STUDENT'S NAME
STUDENT ID:

PROGRAM OF STUDY BIOLOGY EDUCATION
FACULTY OF TEACHER TRAINING AND EDUCATION
UNIVERSITY OF MUHAMMADIYAH MALANG
20XX
 attachment 4. cover (inside) format of undergraduate thesis

undergraduate thesis proposal to be finalized by students, supervised intensively by advisors meanwhile for scientific biology research is directed to educational biology

undergraduate thesis

submitted to faculty of teacher training and education
university of muhammadiyah malang
as one requirements to achieve bachelor degree in biology education

by:
students name
student id:

program of study biology education
faculty of teacher training and education
university of muhammadiyah malang
20xx
Attachment 5. Format for Seminar Approval

APPROVAL SHEET

Thesis Proposal under the Title:

THE TITLE OF THESIS PROPOSAL TO BE FINALIZED BY A STUDENT, SUPERVISED INTENSIVELY BY ADVISORS

By:
STUDENT’S NAME
STUDENT’S ID:

Has met the requirements for seminar and been approved on

……………………………

Approved by,

Advisor I

Advisor II

Dr. Advisor I, M.Pd.

Dr. Advisor II, M.Si.
Attachment 6. Format for Exam Approval

APPROVAL SHEET

Thesis under the title:
THE TITLE OF THESIS PROPOSAL TO BE FINALIZED BY A STUDENT, SUPERVISED INTENSIVELY BY ADVISORS

By:
STUDENT’S NAME
STUDENT’S ID:

Has met the requirements to be defended before the Examiner Board and been approved on

........................................

Approved by,

Advisor I
Adviser I, M.Pd.

Advisor II
Adviser II, M.Si.
Attachment 7. Format for Approval Sheet

APPROVAL SHEET

Has been defended before Thesis Examiner Board
Program Study of Biology Education
Faculty of Teacher Training and Education
University of Muhammadiyah Malang
and this is accepted to meet the requirements of winning
Bachelor Degree
Biology Education
on: ______________________

Approved by:
Faculty of Teacher Training and Education
University of Muhammadiyah Malang

Dean,

Dr. Poncojari Wahyono, M.Kes.

Examiner Board: Signature
1. Full name and academic degree 1. ....................
2. Full name and academic degree 2. ....................
3. Full name and academic degree 3. ....................
4. Full name and academic degree 4. ....................
STATEMENT LETTER

I the under signed:

Name : 
Place and Date of Birth : 
Student’s ID : 
Faculty : Teacher Training and Education
Program of Study : Biology Education

Hereby declare truly and accurately that:
1. Thesis under the title “……………………………………………” is my own work and it does not contain others’ work to gain academic degree in any higher education, also it does not involve others’ work or opinions, partly or completely, except citations with valid sources or references.
2. If later known the thesis has plagiarism, I am aware of disqualification and my academic degree is terminated and to be proceed under the law.
3. This thesis can be a reference in a non exclusive royalty free licence.

Hereby the statement is made truthfully and to be used accordingly.

Malang, ................
Stated by,

signature & stamp
Rp. 6.000

Student’s Name
ID:
Attachment 9. Example of Motto and Acknowledgement Sheet

MOTTO

.................................................................
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.................................................................
.................................................................
(Translation of the Qur'an in Ministry of Religious Affairs version)

.................................................................
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(Hadits must be derived from authentic source)
FOREWORD

Praise be to Allah subhaanahu wa ta’ala for His mercy and blessing for finishing the thesis under the title of “………………………………”. Peace and salutation to the knowledgeable one who could read the signs of Allah, he is the Prophet Muhammad shalallahu ‘alayhi wa sallam.

During thesis completion, the writer has gained many helps, advisory, guidance, and motivation from many parties. Therefore, he would say his gratitude to:

1. Dr. Poncojari Wahyono, M.Kes., as the Dean of Faculty of Teacher Training and Education University of Muhammadiyah Malang
2. Dr. Yuni Pantiwati, MM., M.Pd., as the Head of Biology Education FTTE UMM.
3. Dr. Rr. Eko Susetyarini, M.Si., as the Secretary of Biology Education FTTE UMM.
4. Mr/Mrs ............. as advisor I who has given the advisory and motivation for thesis completion.
5. Mr/Mrs ............. as advisor II who has given the advisory and motivation for thesis completion.
6. Lecturers of Biology Education FTTE University of Muhammadiyah Malang for all knowledge given during the teaching and learning process.
7. Mom and Dad for their endless love, sacrifice, and pray.
8. .........................etc
9. Many parties that cannot be mentioned here.

May Allah subhaanahu wa ta’ala give them double rewards. Finally, no rose without thorn, the writer is fully aware that the work is far reaching the perfection. Hence, any constructive critiques and suggestions are welcomed. It is hoped that the thesis will be useful for science and knowledge development in Indonesia.

Malang, .........................
Writer,

Student’s Name
ABSTRACT


Teos leaf has been used as natural dyes produces red colour for a long time; however, it is still rarely used for its difficulty in the extraction process and often unstable on food. Antocyanin contained in teos leaf is soluble in polar solvent. Solvent Polar such as water cannot stabilize antocyanin as it will be stable in acid condition. The use of anorganic acids to reduce pH of pigment is not safe because of the residue left is dangerous for health. Meanwhile, the use of low organic acid such as citric acid is safer as it does not bring negative effect for body.

The research objectives are to find the influence of adding citric acid to the characteristic of antocyanin extract of teos leaf and to test stability of red colour and its organoleptic in ice cream as media of Macro Flash learning. The research is divided into 3 steps, research step I is extracting the antocyanin of teos leaf; step II is testing the best antocyanin stability also testing organoleptic in ice cream; step III is studying the development of research finding for Macromedia Flash media. The types of research for step I and II are True Experimental Research with the research design The Posttest-Only Control Group Design 1 factor. The research step III is research development. Research design I and II use a Completely Randomized Design (RAL) in non factorial pattern. Concentration of citric acid is (0%, 6%, 8%, 10%, 12% and 14%) and concentration of the best antocyanin is (0%, 1%, 2% dan 3%). Data (I) is in content, rendement, pH, and intensity of antocyanin colour. Data (II) are pH, colour intensity, and organoleptic of ice cream. Data Analysis Techniques used in the two tests are Analysis Variants 1 Factor and Duncan Multiple Range Test.

Research findings show there is influence on concentration of citric acid to the characteristic of antocyanin extract and adding concentration of antocyanin on the best teos leaf affects the stability of red colour and organoleptic in ice cream. Adding 14% of citric acid results in pigment with content of 443.36 mg/L, rendement of 62.22%, pH 2.43, brightness of 35.10, red colour intensity of 52.84 and yellow colour intensity of 18.51. Adding 3% of the best antocyanin results in antocyanin ice cream with pH 3.92, brightness 55.08, red colour intensity 45.13,yellow colour intensity 19.58 and tends to the favor of the panelist. This research finding can be used as Macromedia Flash learning.

**Keywords:** Antocyanin, Citric Acid, Teos Leaf, Ice Cream
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### CHAPTER I. INTRODUCTION

1.1 Background of Study ....................................................... 1
1.2 Statement of Problems .................................................... 2
1.3 etc............................................. 3

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### FORMAT OF RESEARCH PROPOSAL SUBMISSION

#### Researcher Identity

Name: ______________________________________
ID: ______________________________________

#### Research Planning

Major: 
- ☐ Education
- ☐ Health Biology
- ☐ Biological Science
- ☐ Environmental Biology
- ☐ Biotechnology
- ☐ Food and Nutrition Biology

Problems Found:
- ...........................................................................................................................
- ...........................................................................................................................
- ...........................................................................................................................

Statement of Problem:
- ...........................................................................................................................
- ...........................................................................................................................
- ...........................................................................................................................

Research Title Plan:
- ...........................................................................................................................
- ...........................................................................................................................
- ...........................................................................................................................

Verified by Thesis Bureau: Signature

Recommendation: Rejected/Reviewed/Accepted and Consulted to Advisors.

#### THESIS ADVISORY APPLICATION

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Attachment 15. Invitation to Examine Thesis Proposal

In accordance with research proposal seminar of a student,
Name: ..................
ID: ..................
Day/Date: ..................
Time: ..................
Venue: ..................

We request you to kindly examine him/her. Hereby the invitation letter is made, thank you.

Wassalamu’ alaikum warahmatullahi wa baarakatuh

Malang………….. 20…..
Head of Biology Program

Notes:
1. If the examiner is unable to attend at the scheduled hour, please inform the program far in advance.
2. Students must remind each examiner prior to the seminar.
Invitation to Join Proposal Seminar (for students)

Number : E.5.b/ /Biology-FTTE/ UMM//20..
Attachment : --
Subject : Invitation to Join Proposal Seminar

To : Mr/Mrs............................

Assalamu’ alaikum Wr. Wb

Assalamu’ alaikum warahmatullahi wa baarakatuh

In accordance with research proposal seminar of a student,
Name : .............
ID : .............
Day/Date : .............
Time : .............
Venue : .............

We invite students (in particular who are completing thesis) to participate the event. Hereby the invitation is made, thank you.

Wassalamu’ alaikum warahmatullahi wa baarakatuh

Malang............. 20.....
Head of Biology Program

.................................

Notes:
1. Students are to bring seminar control card
2. Students are to pay attention during the event
The committee of research proposal seminar (Skripsi) for Undergraduate Program (S1) Faculty of Teacher Training and Education University of Muhammadiyah Malang on:

Day/Date :
Venue :

Has conducted research proposal seminar of:
Name :
ID :
Study Program : Biology Education
Proposal Title :

Examined by:

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Final Decision (Cross the unnecessary):
- It is eligible to continue without revision
- It is eligible to continue with revision
- Not eligible to continue

Approved by,
On behalf of the Dean
Vice Dean I
Dr. Trisakti Handayani, M.M

Malang, ...................
Coordinator of Examiners

(________________)
# HEADER OF STUDY PROGRAM

# ATTENDANCE OF PROPOSAL SEMINAR

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Approved by, Malang, .................20XX  
Head of Biology Education, Coordinater of Examiners,

**Report on Thesis Guidance**

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Malang, ..................................
Approved by,
Head of Study Program, Supervisor I, Supervisor II,

...........................................  ...........................................  ...........................................
# Format of Thesis Exam Assessment Rubric

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## ID:

## Thesis Title:

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Total Score for Each Column

Total Score

Final Score = Total Score / 16 = …………………. or ………………………….. (alphabet)

Score conversion is as follow:

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Malang, ………………….
Examiner

(Names of Each Examiner)
# Attachment 21. Format of Thesis Advisory Assessment Rubric

## HEAD OF STUDY PROGRAM

### FORMAT OF THESIS ADVISORY ASSESSMENT RUBRIC

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ID : 
Thesis Title : 

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Total Score of Each Column

Total Score

Final Score = Total Score / 15 = ……………………or…………………………(alphabet)

Score conversion is as follow:

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<td>40.0 – 54.9</td>
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<td>&lt;40.0</td>
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Malang, ........................
Advisor I/II

(Name of Advisor)
attachment 22. report on thesis exam

---

**HEADER OF STUDY PROGRAM**

**REPORT ON THESIS EXAM**

**NEWS ON THESIS/FINAL PROJECT EXAM**

Number: E.5.b/ /BIOLOGY-FTTE/UMM/ /201.. 

The committee of final project/thesis exam for Undergraduate Program (S1) Faculty of Teacher Training and Education University of Muhammadiyah Malang on:
- Day/Date: 
- Venue: 

Has held Final Project/Thesis Exam of:
- Name: 
- ID: 
- Study Program: Biology Education
- Thesis Title: 

Examiners are below:

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*) Score is written in alphabet 
  Average score: 
  Result: Pass/Fail*) 
  Category: Eligible/Not Eligible*)
  To be published and spotlighted in UMM Web

Approved by, 
On behalf of the Dean Malang, .....................
Vice Dean I Coordinator of Examiners

Dr. Trisakti Handayani, M.M (__________________)
Number : E.5.b/ /Biology-FTTE/ UMM/../20..
Attachment : 1 (one) file
Subject : Invitation for Thesis Examination

To : Mr/ Mrs.............................

Assalamu’ alaikum warahmatullahi wa baarakatuh

In accordance with research proposal seminar of a student,
Name : ...............
ID : ............... 
Day/Date : ............
Time : ............... 
Venue : .............

We request you to kindly examine the student. Hereby the invitation letter is made, thank you.

Wassalamu’ alaikum warahmatullahi wa baarakatuh

Malang............ 20.....
Head of Biology Program

----------------------------------

Notes:
1. If the examiner is unable to attend at the scheduled hour, please inform the program far in advance.
2. Students must remind each examiner prior to the seminar.
3. Deadline for Revision,.................................
## Attachment 24. Form of FTTE Thesis Exam Application

### FORM
### APPLICATION OF FTTE THESIS EXAM

| **Student’s Name** | : .......................... |
| **ID** | : .......................... |
| **Study Program** | : BIOLOGY EDUCATION |
| **Address** | : .......................... |
| **Telephone** | : .......................... |

### Requirements:

1. 2 copies of thesis payment receipt legalized by Finance Bureau and eligible to join exam
2. 2 copies of Her-registration and Community Service (KKN) receipt legalized by finance bureau
3. A copy of registration (Renim) receipt for students in semester 15 above
4. 2 copies of KKN & PPL (Internship) receipt legalized by Vice Dean III
5. 2 copies of legalized high school certificate
6. Provisional Transcript and Original Final Score Card (verified and signed by head of program)
7. Personal Detail for Undergraduate Certificate with photo
8. News on Thesis Advisory (signed by advisors and approved by head of program)
9. Publication Draft and CD

Received by,  
Student,

[Cut here]

### FORM
### APPLICATION OF FTTE THESIS EXAM

| **Student’s Name** | : .......................... |
| **ID** | : .......................... |
| **Study Program** | : BIOLOGY EDUCATION |
| **Address** | : .......................... |
| **Telephone** | : .......................... |

### Requirements:

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6. Provisional Transcript and Original Final Score Card (verified and signed by head of program)
7. Personal Detail for Undergraduate Certificate with photo
8. News on Thesis Advisory (signed by advisors and approved by head of program)
9. Publication Draft and CD

Received by,  
Student,
STUDENT’S PERSONAL DETAIL
1. NAME : ......................
2. ID : ......................
3. PLACE & DATE OF BIRTH : ......................
4. ADDRESS/ TELP/HP : ......................
5. NAMES OF PARENTS : ......................(father)
                          : ......................(mother)
6. ADDRESS : ......................
7. OCCUPATION : ......................

THESIS TITLE
................................................................................................................
................................................................................................................

PASSPORT-SIZE PHOTO

| 3 X 4 | 3 X 4 | 3 X 4 | 3 X 4 |

Notes:
1. PERSONAL DETAIL must be neatly typed
2. Personal Detil to complete: (Full name, place & date of birth) must correspond to the previous certificate (High School Level)
3. Photo (Black White) is attached in the form above under this condition:
   (for certificate)
   3.1 Male: White shirt, coat and tie (not UMM coat)
   3.2 Female : National dress code
   3.3 No glasses
   3.4 Passport-size photo (3 x 4 = 4 sheet for faculty/program) (Passport-size photo 4 x 6 = 3 sheet and. 3 x 4 = 2 sheet for BAA)

Malang,......................
Student

...........................................
STUDENT’S PERSONAL DETAIL
1. NAME : .............
2. ID : ................
3. PLACE & DATE OF BIRTH : ................
4. ADDRESS/TEL/HP : ......................
5. NAMES OF PARENTS : ...................(father)
                             ...................(mother)
6. ADDRESS : .........................
7. OCCUPATION : ....................... 

THESIS TITLE
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PASSPORT-SIZE PHOTO

3 X 4 3 X 4 3 X 4 3 X 4

Notes:
4. PERSONAL DETAIL must be neatly typed
5. Personal Detail to complete: (Full name, place & date of birth) must correspond to the previous certificate (High School Level)
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   3.3 No glasses
   3.4 Passport-size photo (3 x 4 = 4 sheet for faculty/program) (Passport-size photo 4 x 6 = 3 sheet and. 3 x 4 = 2 sheet for BAA)

Malang,..............

Student
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# SEMINAR ATTENDANCE CONTROL CARD

Name                       : .................................................................
ID                         : .................................................................

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<th>No</th>
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<th>Student who run the seminar (Nama dan NIM)</th>
<th>Person in Charge of the Seminar</th>
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Malang, ....................., 20....
Thesis Bureau

Photo wearing UMM coat

Thesis Writing Guidance
Biology Education-FTTE-UMM | 100
LOGBOOK
THESIS ADVISORY

NAME : .................................................................
ID : ...........................................................................
Advisor : 1 ..............................................................
         2 ..............................................................

BIOLOGY EDUCATION PROGRAM
FACULTY OF TEACHER TRAINING AND EDUCATION
UNIVERSITY OF MUHAMMADIYAH MALANG
# THESIS GUIDANCE RECORD

## CHAPTER I

<table>
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Malang, ........................, 20....
Thesis Bureau

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# THESIS CONSULTATION RECORD

## CHAPTER II

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Malang, .................., 20....

Thesis Bureau

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# THESIS CONSULTATION RECORD

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Malang, .................., 20....
Thesis Bureau

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### THESIS CONSULTATION RECORD

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Malang, ...................., 20....
Thesis Bureau

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**THESIS CONSULATION RECORD**  
**CHAPTER V**

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Malang, ................., 20....
Thesis Bureau

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# ABSTRACT AND PUBLICATION DRAFT CONSULTATION RECORD

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Malang, .................., 20....
Thesis Bureau

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**Thesis Writing Guidance**

*Biology Education - FTTE-UMM* | 107
NOTES ON RESEARCH HINDRANCE

To be filled by student

Feedback/Thesis Bureau Notes

Malang, ...................., 20....
Thesis Bureau
## SPECIAL NOTES

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Malang, ................., 20....
Thesis Bureau

..................................................
Committee of Thesis Examination ........................................... Faculty of Teacher Training and Education, University of Muhammadiyah Malang on:

Day: ................................................ ..............................................
Date: ................................................ ..............................................
Location: ................................................  ..............................................

has held a thesis exam for students:

Name: ................................................ ..............................................
NIM: ................................................ ..............................................
Thesis title : ............................................... ...............................................

Board of Examiners :
1. Dr. ....................... , M.Hum. ..............................
2. Dr. ....................... , M.Si. ..............................
3. Dra. ............................., M. Pd. .............................
4. Drs. ............................., M.Kes. .............................

Examiners Scoring Rubric

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Total

Final Value: Total Amount / 30 = ............ or ............ (letter)
Result: pass / not pass *
Category: decent for publication / unfeasible publications *

Knowing, Malang, .......................................... ..........................................
Dean / Vice Dean I, Head of Examiner Committee,

................................................................. .............................................................

Note :
1. Score 1 (bad); 2 (fair); 3 (good); 4 (very good)
2. *) strikethrough the unnecessary element(s)
3. Value Conventions are as follows:
   A = 3.50> ; B + = 3.25 s.d 3.50; B = 2.75 s.d 3.24; C + = 2.50 s.d 2.74;
   C = 2.00 s.d 2.49; Failed <2.00