CHAPTER II

LITERATURE REVIEW

A. Theoretical Framework

1. Teaching Materials

a. Definition of Teaching Materials

One of the teachers' tasks is to create an interesting learning atmosphere in order to have a fun teaching and learning process for students. One way to create fun learning is using fun teaching materials which can make students feel interested in and enjoy to learn it. Teacher also need to determine the right teaching materials in order to help students to achieve competence. Teaching materials as one of the important components in the learning process need to be designed appropriate to the needs and characteristics of students in each educational unit. Each model of teaching materials is made based on certain considerations, easy to learn, appropriate to the ability of students, or practical and efficient in terms of procurement costs.

Teaching materials or instructional materials generally consist of knowledge, skills, and attitudes that must be learned by students in order to achieve predetermined competency standards (Depdiknas, 2006:4). Pannen and Purwanto (2001:6) defined teaching materials as materials or learning materials that are arranged systematically and used by the teachers/instructors/lecturers and students in the learning

process. Chomsin Widodo and Jasmadi (2008) stated that teaching materials are a set of teaching resources containing of learning materials, methods, boundaries, and how to evaluate systematically and interestingly designed in order to achieve expected goals, that is achieving competence or sub-competence with all the complexity. It means that a teaching material must be designed and written with instructional rules because it will be used by the teacher to help and support the learning process.

From the opinions above, we can conclude that teaching materials are media to achieve teaching and curriculum goals arranged systematically and intact, so they create a fun learning environment, facilitate students and teachers in the teaching and learning process. Teaching materials must be able to respond to any changes and anticipate any developments will occur in the future.

b. The Benefits of Teaching Materials

Teaching materials have benefits for the teachers and students (Depdiknas, 2008). The benefits of teaching materials for the teachers are as follows:

1) Get teaching materials that fit the curriculum and students' needs.
2) Did not dependent on textbooks that are sometimes difficult to obtain.
3) Teaching materials become richer because they are developed in various ways reference.

4) Increase the knowledge and experience of the teacher in writing teaching materials.
5) Teaching materials will be able to develop effective learning communication between teachers and students because students believe in their teachers.
6) Obtain teaching materials that can help the process of learning activities.
7) Can be submitted as work that add credit numbers for the purposes of promotion.
8) Increase teacher's income if the results of his/her work are published.

The benefits of teaching materials for students are as follows:

1) Learning activities become more interesting.
2) Students get more opportunities to study independently with teacher guidance.
3) Students get convenience in learning every competency that must be mastered.

c. The Form of Teaching Materials

Prastowo (2013) stated that teaching materials in terms of shapes are divided into four types, as follows:

1) Printed, is a number of materials prepared in paper which has function for learning or delivery information. For examples: handouts, books, student worksheets, brochures and wall chart.

2) Audio, is all systems that use radio signals directly, which can be played or heard by someone or a group of people. For examples: tapes, radios, and compact audio.
3) Audio visual, is everything that allows audio signals to be combined with sequential moving images. For examples: video, compact disk, and film.
4) Interactive teaching material, is combination of two or more media (audio, text, graphics, images, animations, and videos) that are manipulated or treated to control commands and or natural behavior of presentations by users. For example: compact disk interactive.

2. Student Worksheet

a. The Definition of Student Worksheet

Depdiknas (2004) defined student worksheet as sheets that contain tasks that must be done by students. Student worksheet is usually in the form of instructions, steps to complete a task, a task ordered in the activity sheet must be clear of the basic competencies to be achieved. According to Trianto (2008) student worksheets are sheets of tasks that must be done by students. Students worksheets are student guides used to carry out investigation or problem solving activities. Student worksheets contain a set of basic activities that must be carried out by students to maximize understanding in efforts

to form basic abilities based on indicators of learning achievement that must be taken.

Badjo (1993) said that student worksheet is a worksheet that contains information and orders or instructions from the teacher to students to do a learning activity in the form of work, practice, or applying learning outcomes to achieve a goal. Warsito (1999) argued that student worksheet is a supporting learning resource in the learning process that contains a summary of the material, exercises, can be accompanied by questions to be answered, questionnaires to be filled out or diagrams to be completed.

Based on experts statements about student worksheet, it can be conclude that student worksheet is a printed material in the form of sheets of paper containing a summary of the material and instructions for the implementation of learning tasks that must be done by students which are packaged based on learning needs and can be used independently by students to achieve the learning objectives.

b. The Function and Benefit of Student Worksheet

Based on guidelines for implementing learning material of SMP in Depdiknas (2008), the functions of student worksheet are:

1) As a learning guide, student worksheet contains questions whose answers are in the textbook. The students will be able to do the task on worksheets if they read the textbook.
2) As a reinforcement.

3) As a practical guide.

According to Prastowo (2013), student worksheet has four functions as follows:

1) Minimize the role of teachers and make students be more active.
2) Make students easy to understand the material.
3) Concise teaching material and many tasks for practice.
4) Facilitate the implementation of teaching for students.

Sukamto (2009) stated that student worksheet has benefits as follows:

1) Provide real experiences for students.
2) Helps learning variations.
3) Generate students' interest.
4) Improve teaching and learning retention.
5) Use time effectively and efficiently.

From the explanation above, we can conclude that the functions and benefits of student worksheet are helping teachers in teaching and learning process, making it easier for students to understand the materials, and making students be active in doing many tasks to be practiced.

c. The Purposes of Student Worksheet

The use of student worksheet in teaching and learning process is usually not the main and only teaching material for learning a material. Teacher usually combines using the textbooks and student

worksheet to be more perfect. The use of interactive learning media also needs to be added so that students easily and quickly understand the material being studied.

According to Prastowo (2013), the purposes of student worksheet are as follow:

1) Present teaching materials that make it easier for students to interact with the material provided.
2) Present assignments that enhance students' mastery of material provided.
3) Train students' learning independence.
4) Facilitate educators in giving assignments to students.

From the explanation above we can conclude that the purpose of student worksheet in teaching and learning process in general is giving innovative teaching material based on the learning objectives. Innovative student worksheets help and train students' independence in the learning process. Student worksheet gives teachers the ease of giving assignments for students because it presents a sequence of steps that are useful for understanding the content of the material.

d. The Systematic of Student Worksheet

To make student worksheet, we need to pay attention to good and coherent steps in order to produce good and appropriate student worksheet applied in learning. Diknas in Prastowo (2012:221) stated that good steps in making student worksheet are stated as below:

1) Curriculum analysis

   It is very important in planning to make student worksheet.

2) Arrange maps of student worksheet needs

   It is done to determine the quantity of worksheets needed.

3) Determine the title of student worksheet

   In determining the title of student worksheet, it must determine other supporting components of student worksheet such as competence and learning to be achieved and the purpose of using the student worksheet and the other components.

4) Write the student worksheet

   There are four steps to write student worksheet:

   a) Formulate basic competence

   b) Determine the assessment tools

   c) Arrange material

   d) Arrange the structure of student worksheet

   Six elements and formats in arrangement of student worksheet according to Prastowo (2014:208) are explained in the following table 2.1.

Table 2.1 Structure and Format of Student Worksheet

No	Structure of Student Worksheet
1	Title
2	Learning instruction
3	Competences to be achieved
4	Supporting information
5	Assignments or work steps
6	Assessment

Abdurahman (2015) stated that the structures of student worksheet are as follows:

1) Title of activity, theme, sub-theme, class, semester
2) Learning objectives in accordance with basic competence
3) Tools and material
4) Work steps
5) Data table
6) Discussion questions

The format of student worksheet is developed based on syllabus and lesson plans in the learning phase based on Government Regulation No. 65 of 2013 concerning Process Standard.

From the explanation above, we can conclude that the structures of student worksheet in general are stated below:

1) Title, subject, semester, place
2) Instructions for learning
3) Competencies to be achieved
4) Indicators
5) Supporting information
6) Tasks and work steps
7) Assessment

There are two kinds of student worksheet that are developed in learning at school.

1) Unstructured Student worksheet

Unstructured student worksheet is sheets that contain the means for subject matter, as a tool for student activities that are used to deliver lessons. Student worksheet is a teaching aid that can be used to accelerate learning, give encouragement to learn to each individual, contains a little clue, written or oral to direct task to students.

2) Structure Student Worksheet

Structured student worksheet contains information, examples and assignment. This student worksheet is designed to guide students in a work program or subject, will little or no assistance from the counselor to achieve the learning goals. In the student worksheet, the instructions and directions have been compiled. The student worksheet can not replace the teachers' role in the class. The teacher keeps an eye on the class, encourages and provides guidance to each student (Indrianto, 1998).

e. The Criteria of Student Worksheet

Student worksheet has an important role in teaching and learning process because the teacher has guidance to give assignments for the students. To make an interesting student worksheet, we should pay attention to several things. Arsyad (2011) stated that a good student worksheet must have some requirements as follows:

1) Consistency

Use a consistent format on every page.

2) Format

Long paragraphs use the face of one column, paragraphs of short text use face columns.

3) Organizations

The arrangement of information texts are easily obtained by students.

4) Attractiveness

Introduce each new chapter or section in a different way.

5) Font size

Choose the font size that is in accordance with the students, message and environment, avoid using capital letters for the entire text.

6) Empty space

Space around the title, margins, spaces or columns, beginning of paragraphs, adjusting spaces between rows and spaces between paragraphs.

Good quality student worksheet requirements (Hendro Darmodjo and Jenny R.E Kaligis, 1992:41-46) are as follows:

1) Didactic Conditions

As one of teaching and learning process facilities must fulfill didactic requirements, meaning that student worksheet must follow the principles of teaching and learning as follows:

a) There are not individual differences.

b) Pressure on the process of finding concepts.

c) Have a variety of stimulus through various media and student activities.

d) Can develop social, emotional, moral, and communication skills aesthetics in student.

e) Learning experience is determined by students' personal development goals and not determined by the subject matter.

2) Construction Terms

The construction requirement is the conditions relating to the use of language, sentence structure, vocabulary, level of difficulty, and clarity in essence. It must be effective in the sense that it can be understood by students. The requirements of arranging student worksheets are as follows:

a) Use languages that matches the maturity level of students.

b) Use clear sentence structure.

c) Have a set of lesson plans that are in accordance with the level of ability of students.

d) Avoid very opened questions.

e) Does not refer to source books that are beyond the readability students.

f) Provide sufficient space to provide flexibility to students to write, answer, or draw on student worksheets.

g) Use simple and short sentences.

h) Use more illustrations than words.

i) Can be used for all students, both slow and fast students.

j) Have clear and useful learning goals as a source of motivation.

k) Have an identity to facilitate administration.

3) Technical Terms

Technical requirements relating to the presentation of student worksheet are in the form of writing, images, and appearance.

a) Writing

1.1) Use printed letters and do not use Latin or Roman letters.

1.2) Use large bold letters for the topic, not ordinary letters underlined.

1.3) Use no more than 10 words in a row.

1.4) Use a frame to distinguish command sentences from students' answers.

1.5) Try to compare the font size with the size of the matching image.

b) Images

A good image in student worksheet is an image that can covey the contents of the subject matter that is being delivered or being studied, so the students understand the material presented well.

c) Appearance

The appearance of student worksheet must be interesting because the students will interested in the cover. The student worksheet is made as attractive as possible.

According to Ibrahim in Sularno (2012:212), student worksheet must fulfill the elements of pedagogic, construction, and technical requirements. These requirements are illustrated in the following table 2.2.

Table 2.2 Terms of a good student worksheet

No	Student Worksheet Requirements	Good Aspect of Student Worksheet
1	Pedagogic	Emphasize the process of finding concepts or instructions to find out.
2	Construction	Use language that fits the level of development of students. Use a simple, short, and clear sentence structure. Has systematic sequence, clear learning objectives, identity to facilitate administration.
3	Technical	Use large bold letters for the topic. The number of words in one row is more than 10 words. Images must be able to convey message effectively, large and clear in details. Display must be attractive and fun. Views are arranged in such a way that there is a harmonization between pictures and writing.

Based on the explanation above, we can say that making student worksheet must fulfill didactic, construction, and technical requirements. If the requirements are complete, the student worksheet is ready to be created. Requirements become controls and signs for educators in making student worksheet.

f. Steps to Make Student Worksheet

The process of making student worksheet must relate to the Lesson Plans. According to Suyanto, Paidi, and Wilujeng (2017:7) to make student worksheet we must pay attention to the following steps:

1) Conduct curriculum analysis; competency standards, basic competencies, indicators, learning materials and time allocation.
2) Analyze syllabus and choose alternative learning activities that are most suitable with the analysis results of competency standard, basic competence, and indicators.
3) Analyze lesson plans and determine the steps of learning activities.
4) Arrange the student worksheet in accordance with exploration activities in Lesson Plans.

Rahmawati (2006:25) stated that steps in making student worksheet are as follows:

1) Analyze the curriculum

   At this stage, we identify the curriculum with indicators of learning outcomes.

2) Making lists of maps and title of student worksheet

Arrange the student worksheet needs map which is compiling the material needed to achieve the indicators to be achieved then determining the titles that will be made at the student worksheet.

3) Writing student worksheet

Write student worksheet in the form of a text, this text is then consulted to experts so it has no errors in its contents. When the text has an error, the script is corrected immediately and if there is not error, it will proceed to the process of designing the student worksheet on the computer.

From the explanation above, we can conclude that to make student worksheet we must pay attention to good and proper preparation such as analyze curriculum, syllabus, lesson plans and make maps of needs for students.

3. Higher Order Thinking Skills

a. The Definition of Higher Order Thinking Skills

Alice Thomas and Glenda Thorne (2009) define Higher Order Thinking Skills (HOTS) as a way of thinking at a higher level than memorizing or retelling something that others tell. Margana (2017) argued that HOTS deals with the application of the high level of thinking which includes synthesizing, evaluating, and creating. Those sub-three thinking skills are concerned with handling the productive tasks.

Kemendikbud Dirjen Dikdasmen (2014:13) stated that HOTS are the ability to recall information and assessments to measure abilities that consist of transferring one concept to another, processing and applying information, looking for links from various information vary, use information to solve problems, examine ideas and information critically.

According to Ernawati (2017:196-197) HOTS are ways of thinking that not only memorize verbally but also interpret the essence of what is contained, to be able to interpret, meaning needed integralistic thinking by analysis, synthesis, association to draw conclusion towards the creation of creative and productive ideas.

Based on the explanation above, it can be conclude that HOTS is the ability to think not only to remember, recall, and refer without doing processing but also the ability to think and analyze information critically, be creative, and use information to solve problems.

b. The Aspect of Higher Order Thinking Skills

Anderson and Krathwohl (2000) stated that indicators to measure Higher Order Thinking Skills includes:

1) Analyze
   a) Analyze incoming information and organize information into smaller parts to recognize patterns or relationship.
   b) Able to recognize and distinguish the cause and consequences of a complicated scenario.

c) Identify or formulate questions.

2) Evaluate

a) Provide an assessment of solutions, ideas, and methodologies using suitable criteria or existing standards to ensure value of effectiveness or benefits.

b) Make hypotheses, criticizing and testing.

c) Accept or reject a statement based on the criteria already set.

3) Create

a) Make a generalization of an idea or perspective on something.

b) Designing a way to solve the problem.

c) Organize elements or parts into new structures that has never been before.

Sudarmin (2012) explained that HOTS can be realized through integration in learning and assessment processes. Developing HOTS items must follow the rules set, both writing items in general and the level of students' thinking. The HOTS question can be designed using operational verbs that are in accordance with the cognitive domain, analyzing, evaluating, and creating.

Teacher can make questions using operational verbs in cognitive analyzing. Based on revised taxonomy of Bloom, cognitive operational verbs can be seen in the following table:

Table 2.3 Revised Bloom's Taxonomy Action Verbs

Definitions	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations	Present and defend opinions by making judgements about information, validity of ideas, or quality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	• Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationship • Simplify • Survey • Take part in • Test for • Theme	• Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove	• Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan

		• Rate • Recommend • Rule on • Select • Support • Value	• Predict • Propose • Solution • Suppose • Test • Theory

According to Wayan Widana (2017:3-7), HOTS questions are highly recommended to use in various forms of class assessment. The characteristics of HOTS questions are:

1) Measure higher order thinking skills

   Higher order thinking skills are not the ability to recall, restate or recite. Thus, the answers to HOTS questions are not explicitly stated in the stimulus. Higher order thinking skills include the ability on problem solving, critical thinking, creative thinking, reasoning, and decision making. Higher order thinking skills are one of the important competencies in the modern world, so each student must have it. The terms to solve problems in HOTS are:

   a) Ability to solve unfamiliar problems.
   b) Ability to evaluate strategies for solving problems from a variety of different perspectives.
   c) Find out new completion models that are different from the previous methods.

2) Based on contextual problems

   HOTS questions are assessments based on real situations in daily life, where students are expected to be able to apply classroom

learning concepts to solve problems. The following are described five characteristics of contextual assessment, abbreviated as REACT.

a) Relating, the assessment is directly related to the context of real life experience.
b) Experiencing, the assessment emphasizes exploration, discovery, and creation.
c) Applying, assessment that requires the ability of students to apply knowledge acquired in the classroom to solve problems.
d) Communicating, assessment that requires the ability of students to be able to communicate the model conclusions to the conclusions of the problem context.
e) Transferring, assessment that requires the ability of students to transform the concepts of knowledge in class into new situations or contexts.

3) Use various forms of questions

a) Multiple choice

In helping the students get the meaning, a vocabulary development employing multiple choice exercises is an alternative technique to avoid shift to mother tongue (Suwartono, 2019). Multiple choice questions usually consist of the subject matter (stem) and answer choices (options). One of

the options is the correct answer to the question and the others are called distractors. (Suwartono, 2009).

b) Complex multiple choice

It aims to examine students' comprehension of a problem comprehensively related to one statement to another. It contains a stimulus that is sourced from a contextual situation.

c) Completion

It is a question that requires participants to fill in short answers by filling in words, phrases, numbers, or symbols. Characteristics of complementary questions are as follows:

1.1) The part of the sentence that must be completed should only be one part in the ratio of the items, and at most two parts so it is not confusing students.

1.2) The answer demanded by the question must be short and definite, in the form of words, phrases, numbers, symbols, places, or times.

d) Short answer

Short answer questions are questions whose answers are in the form of words, short sentence, or phrases to a question.The characteristics of short answer questions are as follows:

1.1) Using direct questions or command sentences.

1.2) Questions or orders must be clear, in order to get a short answer.

1.3) The length of words or sentences that must be answered by students on all questions is relatively the same.

1.4) Avoid using words, sentences, or phrases taken directly from the textbook, because it will encourage students to imply remember or memorize what is written in the book.

Every step/keyword answered correctly is given a score of 1, and the wrong answer is given a score of 0.

e) Essay

Essay question is a question whose answer requires students to organize ideas or things they have learned by expressing the idea using their own sentences in written form.

B. Relevant Research

Student worksheet is one of teaching materials which has an important role in teaching and learning process. Therefore, selecting and developing student worksheet based on *higher order thinking skills* (HOTS) is very important to improve students' skills. Many studies provide the development student worksheet based on *higher order thinking skills* (HOTS) that are relevant to the research that will be carried out.

Nur Asma (2018) investigated "The Development of Students Worksheet Based on Higher Order Thinking Skills (HOTS) in Learning Mathematics at the Fifth Grade of SD Negeri 2 Rawa Laut Bandar Lampung". The purpose of the research is to analyze the condition, potential and process of learning using student worksheet based in higher order

thinking skills in Mathematic learning. The design of study uses the development of education developing by Sugiyono which has ten steps to do research and development. The conclusions of the research are: (1)There are conditions and potential for developing student worksheet based on HOTS because SD Negeri 2 Rawa Laut does not use HOTS student worksheet yet; (2) The learning process using student worksheet aims to improve high order thinking skills at the cognitive level of C4-6, namely analysis, evaluation and creation; (3) The product of student worksheet based on HOTS is effectively applied based on the results of the learning scores of the pre-test and post-test. The post-test scores increased than pre-test scores; (4) Student worksheet based on HOTS are efficiently implemented based on the time spent less than planned.

In addition, Afsari A.S (2017) conducted 'The Development of Student Worksheet Based on Higher Order Thinking Skills in Cell Topic at the Science Eleventh Grade in SMA Negeri 16 Makassar". This research develops student worksheet based on higher order thinking skills in cell topic and find out the validity and efectivity of the student worksheet. The student worksheet is developed by using 4D development model or Thiagarajan model which consists of 4 main stages, namely: (1) define, (2) design, (3) develop, (4) disseminate. This research only uses three stages because of time constraints and the purpose of this study only for trials to produce products, not for dissemination purposes and this research is also the first study was tested at the school level, especially at Senior High School. The conclusions

of the research are: (1) The worksheet is valid with an average score of 3.55; (2) The student worksheet is effective because the students' positive responses are more than 90 %. The strength of the research are; (1) The developed student worksheet can improve high order thinking skills; (2) The developed student worksheet can be used as an exercise to develop and optimize high order thinking skills' students on biology subject; (3) The developed student worksheet can be used by teachers to improve high-level thinking ability of students. The weakness of the research are the time allocation used is less than the number of questions available and not all students can understand the contents of HOTS biology student worksheet.

Isra Khasyyatillah and friends (2017) investigated "Development Higher Order Thinking Skills (HOTS) Worksheet in Momentum, Impulse, and Collision for Senior High School Grade XI Semester 1". The research aimed to develop higher order thinking skills (HOTS) worksheet in momentum, impulse, and collision for Senior High School Grade XI Semester 1. The research used 4D model development. The procedure includes define, design, develop, and disseminate. This research was carried out until develop steps. Data collection instruments used validation sheets for 5 validators, included 3 lecturers and 2 teachers. Based on the result of data analysis showed that all aspects got average score in the range of 3,4 to 4 categories of high and very high. Thus, higher order thinking skills (HOTS) worksheet was valid.

Those studies have similarity to the current study that is developing worksheet based on *higher order thinking skills* (HOTS). The differences of the previous studies and the current study are the using of data collection instruments, data analysis technique and the materials.

C. Conceptual Framework

Educational goals can be achieved through the teaching and learning process. Factors to reach the success of the teaching and learning process are the role of educators, the condition of students, learning resources, learning media, infrastructure, learning environments, and adequate systems.

Currently, the education requires human resources to have higher order thinking skills (HOTS) aspect. One of the efforts to achieve this aspect is developing teaching material such as student worksheet. Student worksheet can be used to improve the students' thinking skills.

In reality, teaching and learning process in SMP Negeri 1 Purwanegara is good, but it still has some problems. Based on the observation of the researcher, one of the problems is the use of worksheet provided can't improve the students' higher order thinking skills yet. To solve it, the researcher needs to develop the provided worksheet to be student worksheet based on HOTS. Hopefully, it can be used to improve students' thinking skills by doing analysis, evaluation and creation.

The researcher does some steps to develop the student worksheet based on HOTS. First, the researcher collects some data related to the target needs and learning needs of the students by conducting the needs analysis. The data

collected from the need analysis are used to create the draft of student worksheet based on HOTS. After developing the students worksheet based on HOTS, is evaluating the materials to check appropriateness of the materials. The evaluators are expert of content and expert of design. The result of the data is used to create and develop the final draft of materials. Then, it is tested to the students to know the effectiveness of the student worksheet and students' perception.

The research framework is described as follows:

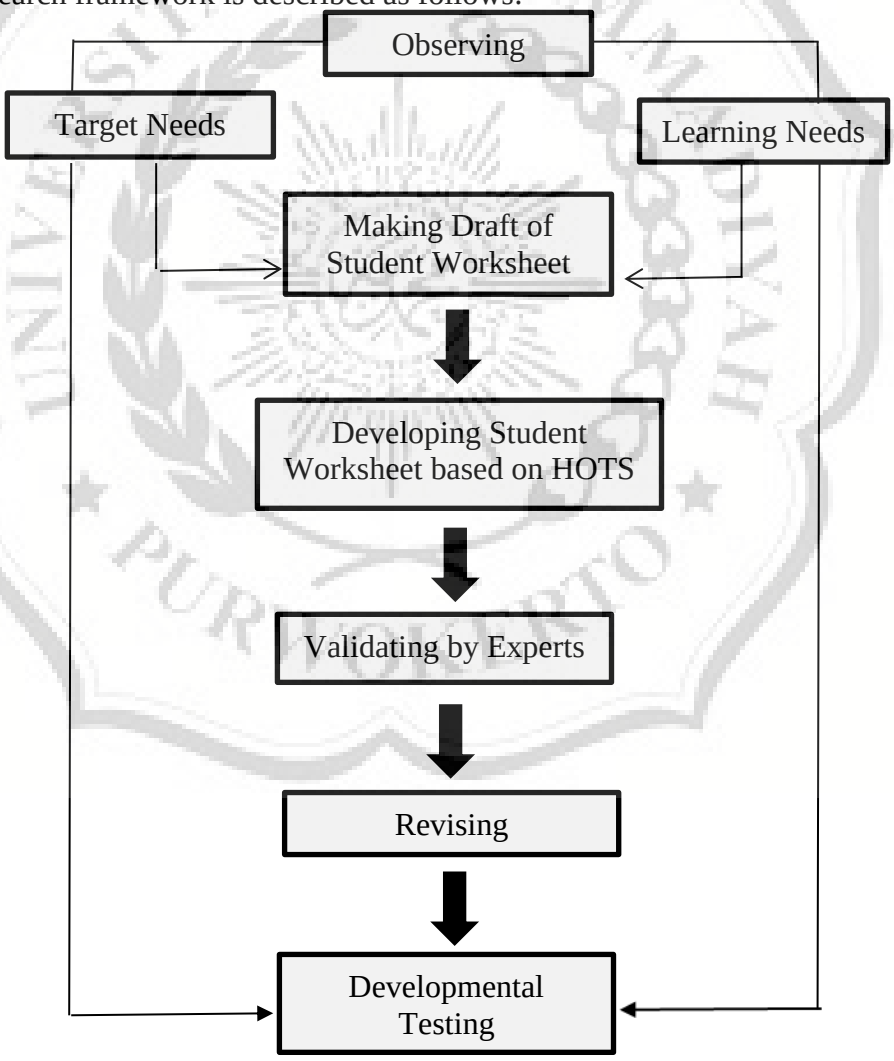

Figure 2. 1 Conceptual Framework