THE CONSTRUCTION OF STUDENT WORKSHEETS: MATERIAL, PATTERN, AND SYSTEMATICS

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A R T I C L E   I N F O

A B S T R A C T

There are several kinds of supporting media in teaching and learning process. Student worksheet or Lembar Kerja Siswa (LKS) is a printed-based media used as a medium to help deliver messages from teaching objectives. It is used as a guide for students in carrying out activities or assignments, both individually or in groups. The use of LKS as a learning media has several advantages and disadvantages. However, a teacher as an educator needs to know how and what to consider in choosing a good LKS for the students to use, as a LKS of good quality has several criteria and requirements in it.

INTRODUCTION

Learning is a complex process that occurs in all people that lasts a lifetime, from the time one was a baby to the time he/she dies. One sign that someone has learned something is a change in behavior in him/her. These behavioral changes involve those that are knowledge (cognitive) and skills (psychomotor) as well as those concerning values and attitudes (affective). Student involvement in the teaching and learning process is an implementation of student activity in the classroom that can support the learning process, including by discussing, reading and understanding subject matter, carrying out the tasks instructed by the teacher or looking for other material sources that can help they understand the lesson.

Teaching materials are materials or subject matters that are arranged systematically, written or unwritten, which are used by teachers and students in the learning process or teaching and learning activities in an effort to facilitate student learning to achieve learning objectives. The interaction between educators and students is very effective if supporting media is available. Supporting media used in schools are

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commonly referred to as learning media. Learning media is a medium or tool to help deliver messages from teaching objectives. In teaching and learning activities, learning media are needed to facilitate a teacher in delivering the materials or learning objectives. However, before the media is used as a tool, the media should meet several criteria as good media.

Sudjana and Rivai (2009) provide several criteria for selection of good learning media, namely accuracy with learning objectives, meaning learning media are chosen on the basis of established instructional goals; support for the content of learning materials that are facts, principles, concepts, generalizations, and procedures very much need the help of learning media so that they are easy to understand by students; ease of obtaining media; easy to use both by teachers and students; the time available to use it; and good media is in accordance with the level of thinking of students, so that the meaning contained therein can be understood by students.

The presence of media in the teaching process is not a necessity, but they act as a complement if needed to improve the quality of teaching and learning. Learning media can be interpreted as a vehicle containing messages to be delivered by teachers and studied by students, it can also be a learning resource that contains tools, processes, rules, and can be used independently (Kurniawan, 2011).

Lismawati (2010) states that learning media consists of main media and supporting media. Specific schools or educational units can determine the main media and supporting media in accordance with the needs or applicable curriculum. Public schools included in the national education office certainly use the main media in accordance with the curriculum prepared by the ministry of education. However, for the use of supporting media to support the teaching and learning process so that it suits better, schools have the freedom to choose according to the needs and trends of the school without having to depend on other parties.

According to Arsyad (2011), the media can help in teaching and learning activities. Media that can be used include human-based media, print-based media, visual-based media, audio-visual media, and computer-based media. Learning resources are a reference of objects and materials used for learning activities. Teaching materials can be grouped into four, namely (1) printed materials, including handouts, books, modules, student worksheets, student brochures, leaflets, wallcharts, photos / drawings; (2) audio teaching materials, such as cassettes, radios, vinyl records, and audio compact disks; (3) audio visual teaching materials, such as video compact disks, films; and (4) interactive teaching materials, such as interactive compact disks (Majid, 2007). Arsyad (2011) further stated that printed-based learning materials that are most commonly known include textbooks, manuals, journals, magazines, and loose sheets. LKS is included in the printed material media which is made through a printing process. This printed media (LKS) presents its message through letters and pictures illustrated to clarify the message or information presented.

In addition, printed or text-based media also has advantages and disadvantages. Susilana and Riyana (2008) stated several advantages and disadvantages of print-based media, namely:

- Advantages:
  a) can present a large number of messages or information,
  b) messages or information can be learned by students according to their needs, interests and speed,
  c) can be learned anytime and anywhere because it is easy to carry,

d) will be more interesting if it is equipped with pictures and colors,
e) repairs / revisions are easy to do.
- Disadvantages:
a) The manufacturing process requires a long time,
b) A thick printed book might be boring and reduce students' interest in reading it,
c) If the binding and paper are poor, the printed material will be easily damaged and torn.

STUDENT WORKSHEET

In general, LKS is a complement or a means of supporting the implementation of lesson plans. According to Komalasari (2010), LKS is a form of a book for practice or homework that contains a set of questions in accordance with the subject matter. Prastowo (2011) states that student worksheets are sheets containing assignments that must be done by students. LKS are students' guide to carry out investigation or problem solving activities (Trianto, 2010). Student worksheet is one of the printed teaching materials that can be purchased or made. The worksheet contains a summary of materials and practice questions that help and facilitate students in their learning activities (Sherly, Ridlo, & Priyono, 2012). The worksheet is in the form of instructions or steps made by the teacher or instructor to students to complete the assignments provided. This is in line with Hariyanto (2015) saying that Student Worksheets are sheets containing assignments that must be done by students. A task that is ordered in the LKS must be clear on the basic competencies that will be achieved. Meanwhile, according to (Prastowo, 2014) student worksheet is a printed teaching material in the form of sheets of paper containing materials, summaries, and instructions for the implementation of learning tasks to be done by students, both theoretical and / or practical, which refer to basic competencies of what students must achieve, and their use depends on other teaching materials. It can be concluded that in LKS, students will get materials, summaries, assignments related to the materials, and there are directions for understanding the materials provided so that it will make students learn independently. The teacher does not give answers but students are expected to be able to solve the problems contained in the worksheet with guidance or instructions from the teacher, to increase student learning activities (Wati, Suyatna, & Wahyudi, 2015).

LKS as a support to increase student activity in the learning process can optimize learning outcomes. Farida (2004) concludes in her research that using LKS makes the teaching and learning process more effective, and the students are highly recommended to have their own. According to Ernawati, Ibrahim, & Afiif (2017), LKS can make it easier for students to understand the materials provided, is full of tasks and assignments to practice student independence. Through LKS, students are given the responsibility to complete the tasks and feel the need to do them by themselves, especially if the teacher gives full attention to the results of their work, so students are actively involved in learning. Lismawati (2010) explains that LKS has several characteristics, the first being consisting of only a few pages, not up to one hundred pages. LKS is printed as a specific teaching material to be used by certain education level units. It contains a brief description of the subjects, dozens of multiple choice questions, and content questions. Other studies have also used and developed LKS to support and enhance the teaching of various subjects as well (Sagita, 2016; Fannie & Rohati, 2014; Astuti & Setiawan, 2013; Yusuf, 2010; Asmawati, 2015; Yasir, Susantini, & Isnawati, 2013; Anggraini, Wahyuni, &

Lesmono, 2016; Septiani, Ridlo, & Setiati, 2013; Haryonik & Bhakti, 2018; Lamapaha, 2017; Muhaiminu & Nurhayati, 2016; Gitriani, Aisah, Hendriana, & Herdiman, 2018).

The role of LKS is very large in learning and its use in learning can help teachers direct their students to find concepts through their own activities. In addition, LKS can develop process skills, increase student activity, and optimize learning outcomes. Prastowo (2011) states that LKS has four functions, namely: as a teaching material that can minimize the role of educators, but maximize the role of students; as a teaching material that makes it easier for students to understand the materials provided; as a concise and rich teaching material for practice; LKS also serves to ease the implementation of teaching to students.

Student Worksheets must be arranged with a clear and objective purpose. According to Prastowo (2011), the preparation of LKS aims to present teaching materials that make it easier for students to interact with the materials provided; presents tasks that increase students' mastery of the material provided; train students' learning independence; the preparation of LKS also aims to facilitate educators in giving assignments to students.

LKS is designed to be used by students independently and the teacher only acts as a facilitator. If the design of worksheets developed is too complicated for students, students will have difficulty understanding the worksheets. Lismawati (2010) stated that LKS has several advantages. From the aspect of use: is the easiest media. It can be learned anywhere and anytime without having to use special tools. From the aspect of teaching: compared to other types of learning media, it is often said to be superior because it is a sophisticated medium in developing students' ability to learn about facts and be able to explore general and abstract principles by using realistic arguments. Then from the aspect of the quality of the learning messages delivery, student worksheets are able to expose words, numbers, music notation, two-dimensional images, and diagrams very well. Lastly, from an economic aspect: it is economically cheaper compared to other learning media.

Besides having advantages, there are also disadvantages. First, it is not able to present movements. Second, it is difficult to provide guidance to readers who have difficulty understanding certain parts - it is difficult to provide feedback for questions that have many possible answers or questions that require complex and deep answers. Third, it does not accommodate students with limited reading skills because the media is written at a certain reading level. Fourth, it requires prerequisite knowledge so students can understand the material described; students who do not meet the prerequisite assumptions will experience difficulty in understanding. Fifth, LKS tends to be used as a memorization tool; there are some teachers who only require students to memorize data, facts, and numbers. Lastly, LKS sometimes contains too much terminology and terms that it can cause a great cognitive burden on students. It is also a one-way presentation because this media is not interactive so it tends to be used passively without adequate understanding.

HOW TO COMPOSE GOOD STUDENT WORKSHEETS

LKS are said to be of good quality if they meet the requirements (Darmodjo & Kaligis, 1992) as follows:
- Didactic Requirements
  LKS must follow the principles of effective teaching and learning, namely:
  a. Note individual differences.

b. Pressure on the process to find concepts.

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

d. Can develop social, emotional, moral and aesthetic communication skills in students.

e. The learning experience is determined by the student's personal development goals and is not determined by the subject matter material.

- Construction Requirements

  Construction requirements are conditions relating to the use of language, sentence structure, vocabulary, difficulty level, and clarity which in essence must be appropriate in the sense that users can understand, namely students. To construct good LKS, we need to:

  a. Use a language appropriate to the maturity level of students.

  b. Use clear sentence structure.

  c. Having a sequence of lessons according to the level of student ability.

  d. Avoid overly open questions.

  e. Not refer to source books that are beyond the capability of students.

  f. Provide enough space to give students the freedom to write answers or draw on the worksheet.

  g. Use simple and short sentences.

  h. Use more illustrations than words.

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

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

  k. Have an identity to facilitate administration.

- Technical Requirements for LKS Arrangement

  a. Writing

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

  (2) Use rather large bold letters for the topic, not regular letters that are underlined.

  (3) Use short sentences, no more than 10 words in a row.

  (4) Use frames to distinguish command sentences from students' answers.

  (5) Try to make the comparison of the size of letters with the size of a matching picture.

  b. Picture

  A good picture for LKS is an image that can convey the message / contents of the image effectively to LKS users.

  c. Appearance

  Appearance is very important in LKS. Students will first be interested in the appearance, not in the content.

DEVELOPING LKS

LKS is a stimulus or teacher's guidance in learning that will be presented in writing, so in developing it, one needs to pay attention to the criteria of graphic media as the visual to attract the attention of students (Fannie & Rohati, 2014). In order to develop beneficial student worksheet, one needs to pay attention to the design and development steps as follows:

Determine the Design

Like other teaching materials that use printed media, LKS design basically does not recognize restrictions. The limit mentioned is the imagination of educators. However, there are two things that need to be considered when designing LKS, namely the level of students' reading ability and their knowledge.

LKS is designed to be used by students independently. That is, the teacher as an educator only acts as a facilitator, and it is the students who are expected to play an active role in learning the material contained in the worksheet.

Steps for LKS Development

To use LKS that are interesting and can be used maximally by students in learning activities, there are steps taken, namely the choosing of learning objectives, material collection, preparation of elements, as well as examination and refinement. Developing student worksheets can be done by adapting the steps of developing a module / learning package (Suryobroto, 1986) through the following steps:

1. Set competency standards, titles and learning objectives (basic competencies) to be achieved.
2. Analyze and describe basic competencies as indicators with the following steps:
a) Formulate basic competencies to be achieved.
b) Select and describe learning materials based on basic competencies to be achieved.
c) Make indicators of achieving basic competencies.
    Criteria for good indicators (Tim Peneliti Program Pascasarjana, 2001), is that they:
a) Contain the characteristics of the purpose to be measured.
b) Contain one operational verb that can be measured.
c) Are closely related to the material being taught.
d) Can be made into an evaluation of 3-5 items.
3. Establish procedures, types, and class-based assessment tools in accordance with the mission of the curriculum used by the school
4. Establish alternative activities (learning experiences) that can provide optimal opportunities for students to develop science process skills in themselves.
5. Establish and develop materials / media / sources that are appropriate to the basic abilities to be achieved, the characteristics of students, facilities (facilities and infrastructure), and the characteristics of the student's environment.
6. Compile a complete worksheet, i.e., pouring the results that have been made into a worksheet.

CONCLUSION

LKS are student worksheets that contain an outline of material, assignments or student activities that are arranged systematically so as to facilitate students in learning, in order to achieve instructional goals. They are teaching materials that have been packaged in such a way that students are expected to be able to study these teaching materials independently. Therefore, student worksheets are basically sheets that are used as a guide in learning and contain tasks that must be done by students in a particular study. In addition, it can be said that student worksheet is a complementary learning device that contains instructions and steps for activities that students must do and contains a set of questions according to the material being studied. It helps the learning process to be more student-centered, with the teacher who acts as the

facilitator. Using LKS is one of the easiest ways to practice materials taught in class. However, a LKS has several criteria and requirements for it to be of good quality. Educators are suggested to be careful in choosing the appropriate LKS for their students. The better the quality of the student worksheet is, the better it will be for the students and the teaching and learning process.

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