Macromedia Flash Animation Media in Science Learning Based on the Direct Instruction Model on ecosystem component material in Elementary Schools

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Abstract: The current demands of the 2013 curriculum, especially in science learning, require students to be active in learning. But in reality, when the learning process is taking place, it can be seen that learning is presented as teacher-centered. The aim of the research that researchers hope is to increase the participation and ability of students to explore and solve problems given during the learning process. Direct Instruction Model (Direct Instruction) is a learning model where the teacher does not play a role in delivering the material but the teacher helps students to be able to explore their basic skills and is able to find information that has been given by the teacher step by step. The use of Macromedia Flash in learning will attract the attention of students because Macromedia Flash is designed to create motion or animation media that will attract the attention of students. From the results of the research that the researchers have done, it was found that students were very active and enthusiastic during the learning process as evidenced by the high level of participation and students' understanding of the material presented. From the results of the research that the researchers have done, it has been seen that by using the *Direct Instruction Model* with the help of Macromedia Flash in science learning, ecosystem component materials are able to increase the activity, participation and ability of students to solve the problems given.

Keywords: Natural Science Learning, Direct Instruction Model, Flash Medical Macro

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INTRODUCTION

We can know that education is an effort to realize a dynamic culture of aging. Law Number 20 of 2003 relating to Indonesia's national education system states that education plays a role in developing abilities and forming character and how national civilization has dignity which is useful for educating the nation's life (Hamid et al., 2020) .

Education in elementary schools is a learning activity in which there are three underlying components, namely knowledge, attitude and psychomotor. In the application in everyday life these three aspects become a main thing.

In learning in elementary schools, students will be given knowledge training which will be implemented six years in a row, so that they can apply all the things that students get in their daily lives (Morelent et al., 2022) . In addition to students being able to apply it in their daily lives, the provision of knowledge, attitudes, and psychomotor that students have obtained during the learning process is able to increase the level of quality Human Resources (HR).Improving the potential of human resources (HR) is one of the goals of education, developing students' self-abilities to the maximum we can carry out during learning activities carried out by the teacher, the potential that is able to be developed by this teacher is the potential for the skills and personal characteristics of the participants educate. In accordance with RI Law which discusses the National Education System No. 22 of 2003 which says that education is one of the efforts of students who are able to actively develop the potential that exists in each student which is related to: spiritual, self-control, personality, intelligence and skills that society, nation and state really need (Damayanti & Dewi, 2021) .

We know that the world of education is very important to improve the human resources of students so that they will be able to create a good life in the future.Several factors play an

important role in the development of education. One of the things that causes the development of the world of education is the development of technology. We can do so many things in the development of this technology, one of which is the development of education both in terms of media and in terms of the development of learning. Technology has many important roles in the learning process. By utilizing this technology, we are able to create various forms of animation, graphic explanations and also coloring that can make the media seem real. One important part of learning is the use of learning media.

To increase students' achievement, it is necessary to use good and interesting learning media (Bunyamin et al., 2020). The use of the lecture method which is very commonly used today by teachers can be changed and collaborated using the internet network (Online Learning). The use of various kinds of applications in teacher learning must be able to take advantage of the internet network to be able to find various references in making learning media, the various variations shown earlier can increase interesting learning in the learning process.

Applying technology to the fullest in the learning process is a current obstacle for teachers, especially for teachers who have a higher age. In developing this technology, a teacher must also relate it to the learning material that will be carried out, this is in line with the pedagogic knowledge of students (Sholihah et al., 2016). From some of the explanations above, it can be said that by applying good technology in learning, students are able to master the pedagogical stages of these students interacting with each other which will form what is now often called Technological Pedagogical Content Knowledge (TPACK).

Science learning is a branch of science that studies phenomena and symptoms that occur in nature. In science learning, the participation of students is carried out in activities in the learning process which are carried out through observations of the scientific method carried out. To learn how to process scientific objects really requires direct student involvement through the observation process. It is hoped that what has been done by students will be able to provide a more comprehensive understanding to students so that science learning is usually abstract in nature or just an understanding of text theory. The importance of learning science which is directed at the real experiences of students is needed with evidence through data and facts on every observed phenomenon (Londa et al., 2018) . 36 Assimilation: Indonesian Journal of Biology Education, 2(1): 35-41 .

Learning planning is closely related to how the teacher prepares the learning process which will increase the activeness of students during the learning process. Student activity during the learning process is one of the main factors in student-centered learning. To build student activity, we can implement it by using learning media that attracts the attention of students. Planning interesting learning must also be adjusted to the concept of learning material that will be implemented so that students' understanding of learning concepts can be carried out in depth. Mahdjoubi & ARahman (2012) explained that in presenting learning material that is done visually it is able to influence the amount of stored information and is able to process memory optimally so as to improve student learning outcomes.

Several aspects of science learning are usually highlighted by various groups, namely teaching and learning strategies. This can be seen from the existence of constructive input and efforts from various parties who are working on how to develop these teaching and learning strategies so that students are able to master and apply concepts from learning science itself in everyday life (Hamid et al., 2020). One of the things that becomes a problem seen in science learning is the weak learning process that is applied.

The learning process carried out in the classroom mostly only directs students to memorize the material or information provided without having to understand and develop the information that is remembered in everyday life. This happens due to the lack of the teacher's role in utilizing various media in learning (Susilana and Riyana, 2001 7 :3). What we know is that the essence of the teaching and learning process itself is a process of communication about the delivery of information from sources of information conveyed through certain media to recipients, namely students. Another opinion also says that in learning teachers are more active than students, teachers who use more lecture methods and students who only listen to what is explained by the teacher. So that it causes low student science learning outcomes (Fitria, 2017). This is also due to

obstacles that occur in the learning process in the communication process between students and teachers due to the lack of use of media during learning so that students do not understand the material presented (Merduati, 201 8 : 3).

This learning media is also a tool used during the learning process which functions to increase students' understanding in achieving the desired learning goals. Thinking is indivisual, like a guidebook which is usually less contextual, the language is difficult for students to understand. One of the things that can overcome these problems is by using and developing a Macrimedia Flash-based science learning media that students can do during the learning process (Hamid et al., 2020)

This Macromedia Flash application is a plugin software whose benefit is to open or view animated images, videos, as well as games that are on one of the plugin system websites. (Situmorang & Andayani, 2019) is very much liked and hunted by world animation lovers, including in learning physics, because learning a physics concept will be easier to understand with real moving animation. Macromedia Flash software will be very important for students who find it difficult to understand a concept because of the abstractness of the material.

This media can also improve students' skills in utilizing technology. Interactive multimedia is an effective learning medium for increasing students' active listening to critical thinking (Vivit Febrian Danang Priandana, 2015) .Application Macromedia Flash this is wrong one software plugins which the benefit is to open or view animated images, videos, as well as existing games in one of the plugin system websites (Situmorang & Andayani, 2019) this is very liked and hunted by world animation lovers, including in learning physics, because in learn something draft physics will more easy understood with animation move in a manner real. Software Macromedia Flash will very important for participant educate which difficult in understand something draft because the abstractness of the material. This media can also improve the skills of students in utilizing technology. Interactive multimedia is a learning media effective way to increase students' active critical listening (Vivit Febrian danang Priandana, 2015).

The use of animated media is considered very important considering the complex content of material in science learning, especially in Ecosystem material in Learning Theme 5 Sub-theme 1 class V SD. Through the use of Macromedia Flash, students are able to understand the Ecosystem components displayed through animated videos that are created and broadcast on this Macromedia Flash application. Because of this, through the use of animated media students can more easily understand the learning material provided by the teacher as well as being able to understand the learning material delivered by the teacher as well as important concepts on the material of the human circulatory system can be conveyed properly

With the use of media development made with the help of Macromedia Flash, it is expected to be an alternative way to fulfill the learning objectives desired by the teacher. As isthe use of this media and students who are so interested in participating in learning are expected to be able to improve student learning outcomes as evidenced by the final report of the results of the evaluation that the teacher has done.The phenomenon that is often found by teachers regarding the lack of motivation of students during learning takes place which has an impact on student learning outcomes which are so low. Therefore, with this research, it is hoped that all the problems that teachers find regarding students who are not active or less motivated will be solved by using this media.

Because what we know is that students, especially in elementary schools, have a very high interest in the images or sounds presented during learning. Therefore it is very appropriate if a teacher implements the use of this learning media which is designed in Macromedia Flash where the teacher can add visual and audio-visual objects to the media. And researchers hope that colleagues or other teachers are able to apply it in their respective classes

METHOD

This study uses the literacy method (literature study) by examining various literature related to the application of *Direct Instruction* -based learning models (Direct Learning). *and using* Macromedia Flash applications .The research that the researchers did was development research , where the researchers developed a design of learning media with the Macromedia

Flash type that was applied to the direct instruction *model* . Types of development can be developed in the form of lesson plans, student worksheets, student response questionnaires to learning, activity sheets and student activities.

When the researcher conducted the research, there were several obstacles that the researcher encountered and also during the validation instrument on the learning device being developed. The subjects that the researchers used in this study were fifth grade students at SDN 07 Koto Alam, Palembayan District, Agam Regency, West Sumatra. The material that the researchers raised as research material was the Ecosystem subject matter in natural science material. The learning design model that the researcher will make is referring to the 4-D development plan. The RPP design model which refers to 4-D development consists of 4 stages, namely Define, Design, Develop, and Disseminate (Wardani & Setyadi, 2020).

The following are some descriptions of the 4-D development stages:

1. Defining stage (Define)

   At this stage the researcher collects various information related to the media or product that will be developed later. The selection of products that are in accordance with the learning material raised must be appropriate. The stages that we can do at this stage are: initial analysis, student analysis, task analysis, and concept analysis.
2. Design (Design)

   At this stage, the researcher makes the initial design which will later be developed
3. Development (Develop)

   This development stage consists of the media validation stage and the media trial stage. The media validation stage consists of media validation and material validation. At the time of media validation there are aspects of appearance and writing that are presented
4. Dissemination

   The media that we have created and processed will be disseminated and promoted to other schools

Results and Discussion

Learning media that utilize technology in its use is one of the most sophisticated media, or in other words, it meets novelty and keeps up with the times. Some of the advantages that we can feel in the world of education are being able to stimulate students' desire to learn and observe learning and being able to promote critical awareness, deliver material more easily and several other benefits that can be felt (Purwati, 2021)According to Sandman in the book [6, p. 266] states that the media is everything that can channel messages from the sender to the recipient of the message to stimulate the thoughts, feelings, concerns, and interests of the recipient of the message in such a way that an exciting learning process occurs between the two. (Mahendra et al., 2021)

TPACK is defined as a relationship or interaction between knowledge technology (audio, visual, internet, etc.) and pedagogic knowledge (related to processes, practices, strategies, techniques, models, etc.), and also knowledge of the material being taught where it is used to assist teachers in developing and improving the learning process of students. Technological Pedagogical Content Knowledge (TPACK) is one that teachers must understand, because in its implementation the application of this technology is based on aspects of students' pedagogic knowledge and also the characteristics of the material (Technology et al., 2022) .

The thing that should be a concern in this TPACK is the existence of various forms of pedagogical technology interactions and also the material being taught. The picture below is a way of working that we can do in this TPACK lesson.

One thing that teachers need is so that teachers can use any appropriate technology to be applied in learning based on pedagogical aspects and material characteristics (Koehler & Mishra, 2005). One of the requirements of TPACK is the multi-interaction of technology, pedagogy and the material being taught. This can be depicted in an image below:

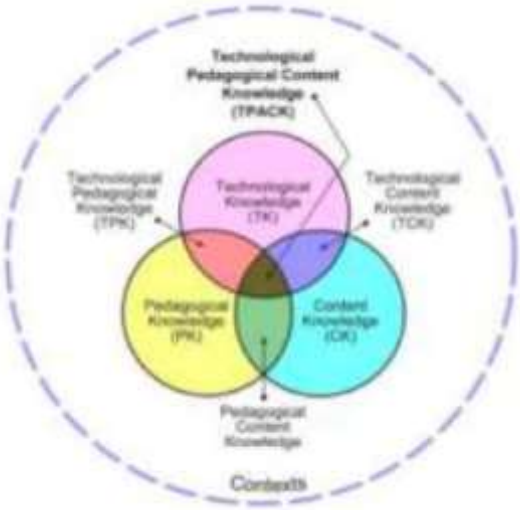

Diagram 1. *TPACK Learning Framework*

Below are the components in TPACK

1. *Technology Knowledge* (TK) is an understanding of the use of *hardware* and *software* in ICT
2. *Pedagogy Knowledge* (PK) is knowledge about learning theory, strategic approaches and learning models that can be used during learning or lesson planning
3. *Content Knowledge* (CK) is knowledge about subject matter or content
4. *Pedagogy Content Knowledge* (PCK), namely knowledge of how to explain subject matter using pedagogical strategies so that the material is more easily understood by students
5. *Technology Content Knowledge* (TCK), namely knowledge of how ICT tools can be used to research and create subject matter knowledge, for example knowledge of online dictionaries, SPSS.
6. *Technology Pedagogy Knowledge* (TPK), namely the teacher's knowledge of technology to facilitate pedagogical approaches

To improve student learning outcomes and also to facilitate them in the form of learning media, they must have a level of understanding and also the skills and creativity of teachers in developing them and applying them using various technological devices, this is a demand from learning in the Era of society *5.0* . and also in several studies that researchers have found that implementing learning related to TPACK is able to increase the level of understanding of learning material and also increase student competence after using this Communication and Information Technology (Khaira et al., 2021) .

From the various definitions and components contained in TPACK, we can conclude that TPACK is the integration of pedagogical development of learning materials by utilizing technology in the teaching and learning process.The advantages and quality of integration of the changed technology as the technology itself is used and reprocessed which will later be used during the learning process and the level of teaching quality where this is done to understand specific task strategies and general assignment strategies (Syaflin, 2022)This study uses the literacy method (literature study) by reviewing various literature related to the application of the *Direct- based learning model Instructions* (Direct Learning) and application usage Macromedia Flash.

Learning Media

According to the Ministry of National Education (Kuncara & Mulyani, 2021) the term learning media, namely learning media, comes from Latin, which is the second form of "medium" which literally means intermediary or introduction. In general, the meaning of this learning media is

something that can channel information from sources of information to recipients of information. The process of teaching and learning is also basically a communication process, so that the media used in learning is called learning media. Learning media is a combination of learning materials and learning tools.

The use of this learning media in the learning process can increase the desires and interests of new students, increase student motivation, increase stimulation during the learning process, and even affect the psychology of students in the learning process. The use of this learning media at the learning introduction stage really helps the effectiveness of the learning process and the delivery of messages and content from the lesson at that time, according to Wiratmojo , P and Sasonohardjo (Iwan Falahudin, 2014).

To increase effectiveness and efficiency during learning, it is very necessary to develop various learning models that are very creative and innovative. This is very important to be implemented during the learning process so that the learning that is carried out does not seem unattractive, monotonous, one-way interaction and boring resulting in problems when delivering information to students. Therefore it is very important to use this learning media in the learning process because it will cause the activeness of students to increase and learning is not boring (Ali Muhson, 2010).

The benefits that we can feel in general if we use the media during the learning process are the smooth interaction between students and teachers, and also the learning that is carried out will feel more effective and efficient. But specifically the benefits that we can feel if we use learning media according to Kemp and Dayton (Ali Muhson, 2010), namely:

a. Submission of learning materials can be uniformed
b. The learning process becomes clearer and more interesting
c. The learning process is more interactive
d. Efficient in time and effort
e. Improving the quality of student learning outcomes scales
f. The use of this media learning process can be done anywhere
g. Media can foster a positive attitude of students
h. Changing the teacher's role in a more positive and productive direction

Macromedia Flash

Computer-based learning media has various models, one of which we will apply is Macromedia Flash (Anwar, 2020). Macromedia Flash during the learning process is not only its application in the context of playing games. However, the use of Macromedia Flash is able to provide opportunities for students to improve their physical abilities, emotional abilities and reasoning abilities of students. For in the field of education in the learning process, Macromedia Flash has various benefits that we can feel, including:

1. With the improvement of this technology, we can display teaching materials in various forms of animation
2. The teaching materials we make can be stored in CD or Soft Copy form so that we can access them more easily and share them
3. The use of a foreign language can improve students' language skills.

Some opinions of experts say that with the use of Macromedia Flash series 8 which uses abstract forms, it can be made concrete/real through the various forms of animation that are presented, so that it can attract the attention of students when shown to students. Macromedia Flash is also a program designed for media animation and professional web applications (et al., 2021) .The use of learning media that we present with the Macromedia Flash application is expected to be able to make students motivated and increase students' understanding of the learning process. With so many features presented in the Macromedia Flash application, it is able to attract the attention of students during the learning process.

RESULTS

Habits that are very visible about the development of learning media that occur in schools that are applied by teachers are teacher centered, learning based on books, and learning activities that are less interesting, while what students want in the learning process is the teacher using learning media that attracts the attention of participants students so that the learning objectives to be achieved by the teacher are not fulfilled.Learning media is media that is used in the learning process that functions to convey messages or information from the teacher to students so that learning objectives are achieved. 4 Learning media is also a means or tool used by teachers in the learning process to increase student understanding in achieving the desired goals

Therefore, the development of Macromedia Flash-based learning media which is applied to science learning with Ecosystem material in Elementary Schools is very effective because the various animations that have been made and displayed by the teacher are able to attract the attention of students when delivering learning material and also the participants. students easily understand the learning material displayed.

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