Improving Vocational Ability To Grow Hydroponics Through Direct Learning Models For Children With Light Mental Retardation

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Abstract : The background of the problem in this study is to look at the vocational ability to grow hydroponics for light mental retardation children in Perwari Padang Slb. The problem is found that children have not been able to do hydroponic farming because hydroponic farming has never been taught to children. The purpose of this study was to prove whether the direct learning model can improve the ability to grow hydroponics for light mental retardation children in class VIII C in Perwari Padang SLB. This type of research is an experimental research that is by using quasi-experimental or also called quasi-experiment with a single group design of pretest and posttest. Based on the results of the study This study concludes that the direct learning model can improve the vocational skills of hydroponic cultivation for light mental retardation children in class VIII C in Perwari Padang SLB. The results of this study can be taken into consideration for teachers to be able to use direct learning models to improve children's vocational abilities, especially in teaching how to grow crops in a hydroponic manner.

Keywords: Hydroponics, Direct Learning, light retardation

INTRODUCTION

Skills education is one of the skills that must be provided as a process of acquiring life skills given in class or at school by teachers, especially for the level of the Special Senior High School and Senior High School. In line with government regulation (PP) No 19 of 2005 concerning National Education Standards article 13 paragraph 1 and 2 regulates life skills which curriculum for SMP / MTs / SMPLB or other forms of equivalent SMA / MA / SMALB or other forms of equivalent, SMK / MAK or other equivalent forms can include life skills education. The education of life taste referred to in paragraph 1 covers personal skills, social skills, academic skills and vocational skills.

Vocational skills are skills that are given as part of the process of acquiring life skills given by teachers in class or at school to introduce students to the world of work and provide learning to have an attitude of respect for the results of work that has been done. It is also useful for practicing independence, socializing, and emotional self-learners. Learning skills in schools are designed by adjusting the abilities, needs, and potential of students so that later, students are

able to follow the learning skills provided.

Learning skills provided at school are taught by teachers using a variety of models, strategies and learning methods that are tailored to the learning objectives of the skills provided. One learning model that is often used by teachers in teaching skill learning is the direct learning model. The direct learning model is teacher-centered. In the learning process, the teacher explains the knowledge and skills that will be given and trained to the child step by step and requires the child to learn a basic skill by following the steps given and getting information that can be taught step by step. According to Purwantoro[1], Direct learning models have many advantages including making lessons more effective because the teacher will use more time to demonstrate and explain the steps and skills of the material and the teacher manages the contents of the material and the flow of information received by students so as to maintain focus on what must be achieved by students. Zahriani[2] mention key components of the direct learning model including "modeling, reinforcement, feedback, and estimation or assessment". They determine instructional design principles, which include framing learning performance into goals and tasks, solving these tasks into smaller component tasks, designing training activities for mastery, and organizing learning events in sequence, which makes prior learning achievements as prerequisites for moving to advanced lessons.

The direct learning model has steps that must be prepared. The steps of direct learning according to Wana, Pangestu, & Agustina[3] are as follows: (1) Preparing children and conveying learning objectives; (2) Demonstrating children's skills and knowledge ; (3) Guiding training when learning takes place ; (4) Provide feedback that aims to find out children's understanding of the lessons taught ; (5) Provide training opportunities for children. A direct learning model is a teaching approach that is specially developed to help children's learning and teaching processes that relate to declarative knowledge and procedural knowledge that is well structured and can be taught with a pattern of gradual activities that is step by step. Through the direct learning model, the teacher can measure the ability of children's understanding of learning and provide opportunities for all children to do further exercises, through special attention to applying more complex situations or doing it in everyday life. Direct learning models are usually used to teach skills, including farming skills[4] .

As we know, science and technology are increasingly developing, therefore we must prepare ourselves to deal with these changes with education. Indonesia is an agrarian country and has the potential to be developed no exception in the world of agriculture. With the development of science and technology, we can find out that plant cultivation techniques are also developing, from the traditional to the modern. The various cultivation techniques developed have the aim of achieving the desired productivity, among which is by means of

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[1] K J Purwantoro, "Penerapan Model Pembelajaran Direct Instruction Untuk Meningkatkan Hasil Belajar Mata Pelajaran Sistem Pendingin (Application Of Direct Instruction Learning Model To Improve," *Learning Outcome Of* 16, no. 1 (n.d.): 21–24.

[2] Zahriani, "Kontektualisasi Direct Instruction Dalam Pembelajaran Sains," n.d.

[3] P R Wana, W T Pangestu, and D A Agustina, "Menggunakan Metode Pembelajaran Mind Mapping Dan Direct Instruction Pada Siswa Kelas V," n.d.

[4] R Venisari, Gunawan, and Sutrio, "Penerapan Metode Mind Mapping Pada Model Direct Instruction Untuk Meningkatkan Kemampuan Pemecahan Masalah Fisika Siswa Smpn 16" (Mataram, n.d.).

hydroponic farming. Hydroponic farming is one of the modern methods of farming without using soil planting media but by using water, nutrients, and oxygen. Although hydroponic farming uses water planting media, the seeds of the plants used are still the seeds of land plants. This farming is very suitable for those who like to grow crops and usually cultivate hydroponic farming in many urban areas because the urban land is getting narrower. According to Halim[5] "Hydroponics is a cultivation system that relies on the growing water media or farming without soil". Hydroponic farming basically has many advantages compared to farming with other media, besides it can be done in a limited and environmentally friendly land, but there are also many other advantages.

Hydroponics has many advantages when compared to conventional farming. The advantages of farming with a hydroponic system according to Kusmawati[6] are as follows: (1) Hydroponics is environmentally friendly; (2) Hydroponics does not damage the soil; (3) The roots of hydroponic plants can be checked periodically; (4) Watering does not have to be done every day; (5) Crops can be consumed entirely; (6) Faster plant growth; (7) Can save the use of plant fertilizer; (8) Does not require a lot of labor; (9) Cleaner working environment; (10) Free from pests and plant diseases; (11) Can be planted anywhere; (12) Can be planted at any time because it does not know the season. Before carrying out the planting process, we must first know the appropriate planting media criteria. According to Alviani[7] an excellent growing media must-have criteria as a medium that does not affect the nutritional content does not clog the irrigation system and has good pores. Besides hydroponic cultivation also needs to consider four important elements as a critical success factor, namely the concentration of dissolved nutrients, the amount of dissolved oxygen, sunlight and the acidity level of the solution (PH). In the use of planting, the media must pay attention to several aspects so that plants can grow and develop well including the availability of water, oxygen, and nutrients other than that the planting media used must not contain toxic substances that can harm plants[8] .

Based on the results of the assessment that has been carried out for children with light mental retardation class VIII consisting of five children in one class, the results obtained that the child can take care of simple plants such as watering plants and pulling weeds that are on the plants. The assessment carried out is the motor assessment, which in motor children have no problems or disturbances so that it can be used to work well. Responding to this matter, researchers are interested in teaching skills in agriculture that are more modern because, as we know it is increasingly sophisticated now, researchers feel they need to be taught how to plant crops that are also modern by using a hydroponic system to plant pakchoy. Growing pakchoy hydroponically can be guaranteed cleanliness. Pakchoy belongs to the mustard group, but has a shorter shape and broadened leaf stems. Pakchoy has stemmed leaves, oval shape, dark green

[5] Norsaleha Mohd. Salleh et al., "Kecerdasan Emosi Bertauhid Dalam Kalangan Remaja Muslim Malaysia," *GEOGRAFIA Online TM Malaysian Journal of Society and Space* 12, no. 5 (2016): 179–190.

[6] A Kusmawati, *Budi Daya Tanaman Teknik Hidroponik*, ed. H S Yulianto and Ed) (Depok: Cv Arya Duta, n.d.).

[7] P Alviani, *Bertanam Hidroponik Untuk Pemula*, ed. W Rini and Ed) (Yogyakarta: Bibit Publisher, n.d.).

[8] AM Moesa, *Nasionalisme Kiai; Konstruksi Sosial Berbasis Agama*, 2007, accessed October 16, 2019, https://books.google.com/books?hl=en&lr=&id=sVBnDwAAQBAJ&oi=fnd&pg=PR1&dq=tafsir+nasionalisme+dan+agama&ots=J42NWYPVBz&sig=VNw8RlBvu-zQ5UjkSzIiNnHUESs.

and shiny, does not form a head, the body is slightly upright or half horizontal, arranged in a tight spiral and attached to a depressing stem. The pakchoy leaf stalks are white or light green, fat and fleshy and the pakchoy plant reaches a height of 15-30 cm. Morphological diversity and maturity are quite large in various types in this group arranged in a tight spiral and attached to a depressing stem. The pakchoy leaf stalks are white or light green, fat and fleshy and the pakchoy plant reaches a height of 15-30 cm. Morphological diversity and maturity are quite large in various types in this group arranged in a tight spiral and attached to a depressing stem. The pakchoy leaf stalks are white or light green, fat and fleshy and the pakchoy plant reaches a height of 15-30 cm. Morphological diversity and maturity are quite large in various types in this group[9]. Pakchoy is a plant that has many benefits and contains a variety of important nutrients that are good for the body. Judging from the nutritional content, pakchoy is high in vitamin A and vitamin C in which both types of vitamins play an important role as antioxidants in the body. The function of the oxidant itself is to protect body cells to stay healthy and prevent the formation of free radicals in the body. Not only contains vitamin A and C, but pakchoy also contains vitamin K to prevent heart disease and stroke and vitamin E for skin health and pakhcoy also contains calories, protein, fat, carbohydrates, and fiber. The direct learning model is proven to be able to improve the vocational ability to grow hydroponics for light mental retardation children, evidenced by the results of the percentage of *pretest* and *posttest* children.

METHOD

This type of research is an experiment in the form of quasi-experimental or *quasi-experiments*. Quasi-experiments are included in quantitative research methods. Quantitative research is a research method for examining certain research subjects, using research instruments, quantitative data analysis aimed at testing established hypotheses. This research approach is quantitative because the research data are numbers and analyzed statistically using a single group design *pretest and posttest* consisting of one single group (without any comparison group) to see the child's initial ability before being given treatment and the child's final ability after being given treatment. Design is a design, framework or form of how the research will be carried out or carried out. According to Sanjaya[10] design is a design prepared in advance so that researchers can use it as a reference in conducting the experiments themselves so that the data obtained is compelling to be used as a material in formulating all generalizations. The form of a single group design with *pretest* and *posttest is* almost the same as a single group design without *pretest* only the difference is there before being given treatment, first the subject is given a test called a *pretest*[11] . In the execution of the first to do *the pretest* (T1) to see the initial ability of children to different ways of farming pakchoy hydroponically, after the obtained results are then treated (X) using direct instructional model as a model of learning, then only then do *posttest* (T2) to see the results of children in hydroponically growing pakchoy have been given treatment through direct learning models. After the results of the *pretest* and *posttest* will then be tested using

[9] Ida Hamidah et al., *Ideas for 21st Century Education: Proceedings of the Asian Education Symposium (Aes 2016), November 22-23, 2016, Bandung, Indonesia* (Routledge, 2017).

[10] D R H Wina Sanjaya, *Penelitian Tindakan Kelas* (Prenada Media, 2016).

[11] Wina Sanjaya, *Perencanaan Dan Desain Sistem Pembelajaran* (Kencana, 2015).

the *Mann Whitney* test.

The research subject can be in the form of living objects or inanimate objects, humans, and others that will be used as materials or targets in research. Subjects in this study were light mental retardation children who were in class VIII SLB Perwari Padang with a total of five people consisting of four boys and one girl. In this study, there are two variables, namely the independent variable and the dependent variable. The independent variable in this study is the direct learning model, while the dependent variable in this study is hydroponic cultivation. Variables are the basic terms in research, which in research usually uses two variables. The research variable is an attribute, nature or value of a person, objects or activities that have certain variations determined by researchers to be studied and then conclusions drawn. In this researcher, the data collection technique used is by using an ACT by recording the results of an activity carried out and calculating the child's success correctly by predetermined criteria. Provision of tests given to children by asking children to do hydroponic pakchoy farming according to instructions. Data collection tools or instruments used in the form of test instruments that contain steps to grow pakchoy hydroponically to assess the results of children doing how to grow pakchoy hydroponically. To process the results of writing data used non-parametric statistics, this is because the subject of writing is small and the distribution and population do not require normative testing. Non-parametric statistics do not test population parameters but test distribution. Non-parametric statistics do not imply many assumptions that the analyzed data do not have to be normally distributed and are used to analyze normal, ordinal data.

RESULT AND DISCUSSION

The study was conducted during development activities on Saturdays and at recess on Tuesday, Wednesday and Thursday. Data collection is carried out under research instruments and data collection techniques that have been determined. The data obtained by researchers based on the ability of students to carry out hydroponic pakchoy farming activities that are processed under data analysis techniques using the *Mann Whitney* test formula. Material is given when *pretest* and *posttest* that is to test how the initial ability of the subject before being given treatment as well as the ability of the final subject after being treated with a direct learning model in carrying out hydroponic pakchoy planting activities. The results of data collection in conducting hydroponic pakchoy farming can be seen in the following table:

Table 1. *Pre-test* and *post-test* values

No.	Subject	*Pre-test* Value (X1)	*Post-test* Value (X2)
1	AD	68	95
2	FT	45	86
3	AL	41	45
4	BM	64	91
5	SR	41	64

The next step after obtaining the results of the *pretest* and *posttest* values is by determining the rank of each research subject before being given a treatment (T1) and after being given a

treatment (T2) to be analyzed using the *Mann Whitney* test formula. The results are in the following table:

Table 2. Rank Analysis Data

No	Subject	Value	Rank
1	AD	95	1
2	BM	91	2
3	FT	86	3
4	AD	68	4
5	BM	64	5.5
6	SR	64	5.5
7	FT	45	7.5
8	AL	45	7.5
9	SR	41	9.5
10	AL	41	9.5

Determine the rank of *prestige* and *posttest* based on the rank analysis table above, so we get the number of rank and *prestige posttest.*

Table 3. Perth R1 and R2 calculations

No	Subject	X1	X2	Q1	R2
1	AD	68	95	4	1
2	FT	45	86	7.5	3
3	AL	41	45	9.5	7.5
4	BM	64	91	5.5	2
5	SR	41	64	9.5	5.5
amount				**36**	**19**

After determining the *rank*, the next step is to analyze the data that has been obtained using *the Mann Whitney test.* And it is known that the number of *pretest* students (n_1) = 5 people with rank = 36 and the number of *posttest* students (n_2) = 5 students with rank = 19 The data obtained were entered into the *Whitney Mann* test. From the results of the calculation of the data obtained, the results obtained from Uhitung = 0.5 taken from the smallest count value, then consulted with Utabel at a significant level of 95% and $\alpha = 0.05$ ie 2. So based on calculations and adjusted to the table obtained by $U_{hit} = 4$ and $U_{tab} = 2$. Hypothesis testing obtained by U test obtained $U_{hit} = 4$ adjusted to the table at 95% significance level and $\dot{\alpha} = 0.05$ for n = 5 obtained $U_{tab} = 2$. From these results obtained, $U_{hit} > U_{tab.}$ This means that H_a received and H_o rejected. This means that the direct learning model can improve the ability to grow hydroponics for light mental retardation children in class VIII C in SLB Perwari Padang.

This study discusses the influence of the direct learning model in teaching hydroponic pakchoy farming for children with light mental retardation class VIII, starting from preparing equipment and materials, making media for planting, planting, caring, and harvesting in Perwari

Padang SLB.

According to Ekasari, Gunawan, & Sahidu[12] the direct learning model is a learning model explicitly created to help the learning process of students who deal with declarative knowledge and procedural knowledge that is well structured and can be taught with a stepwise learning pattern step by step one step.

According to Yulia[13]Agriculture is one of the most important activities known in human civilization. In farming activities, it can plant various human needs, one of which is vegetables, including Pakchoy vegetables. Pakchoy cultivation is currently developing rapidly in the tropics because pakchoy is temperature tolerant both in the highlands and in the lowlands and can produce well in areas with temperatures 27˚-32˚C. At the age of 30-35 days after planting pakchoy can be harvested.

Hydroponic pakchoy farming can be done by anyone who has understood or for beginners and can also be taught or applied to children with special needs, one of which is mentally disabled children. According to (Efendi, 2005: 90) light mental retardation or educated children are children who are unable to attend regular school programs, but they still have skills that can be developed through education even though the results are not optimal.

In this study an increase in the ability of children to grow hydroponic pakchoy after being treated using direct learning models. This can be seen from the comparison of the *pretest* and *posttest* results that researchers have done. Where there were 16 meetings with *Pretest*, four meetings were held in completing the stages of farming to see the initial abilities of each student in conducting hydroponic Pakchoy farming. From the results of the pretest Furthermore, given treatment or *treatment* using a direct learning model as much as 8 times the meeting, to the stage of treatment or *treatment*, no rating given. In the third stage, the *posttest,* which is the child's final ability to grow hydroponic lettuce, which is held 4 times too.

From the results of the comparison of the percentage of *pretest* and *posttest, it is* seen that an increased comparison of the ability to grow pakchoy hydroponics for light mental retardation children in class VIII C in Perwari Padang SLB after being treated using the direct learning model. With that, it is proven that there is an increase in ability that has been demonstrated by field activities.

CONCLUSION

Based on the research results the data collected were analyzed using the *Mann Whitney* test which produced $U_{hit} > U_{tab}$, Ha was accepted Ho was rejected, thus the calculation of $U_{hit} = 4$ and at a significant level of 95% or $\dot{\alpha} = 0.05$ obtained $U_{tab} = 2$, for n = 5 it means that it can be concluded that at the level $\dot{\alpha} = 0.05$ it is proven that the Lagsung Learning Model can increase the ability to grow pakchoy hydroponic for light mental retardation children in class VIII C in SLB Perwari Padang.

[12] R R Ekasari, Gunawan, and H Sahidu, "Pengaruh Model Pembelajaran Langsung Berbantuan Media Laboratorium Terhadap Kreatifitas Fisika Siswa SMA," n.d.

[13] Kusmawati, *Budi Daya Tanaman Teknik Hidroponik*.

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