The Effect of Project Model through the Scientific Approach to the Ability to Prepare the Tools and Ingredients of Hydroponics Vegetables Cultivation of Deaf Students in Agriculture Skills Class SLB Negeri Balikpapan

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Abstract: The learning process of students with hearing impairment (deaf students) is adjusted to its characteristics. Agricultural skills are subjects that provide opportunities for students to gain experience in producing a product. This study aims to analyze the effect of project model through the scientific approach towards the ability to prepare tools and planting ingredients of hydroponic vegetables of Deaf students in farming skills class SLB Negeri Balikpapan. This research is Quantitative Pre-Experimental research with One Group Pretest-Posttest design. A pretest is performed prior to treatment. Posttest is performed to measure the effect of treatment. The number of samples in the study was 30 deaf students in SLB Negeri Balikpapan. The results showed that there was an increase in pretest-posttest average value as follows. 1) The project model obtained a pretest average of 47.83, post-test 79.17. 2) Ability to prepare the vegetable planting of hydroponics vegetables, the pretest average value was 48.30, and posttest was 80.27. 3) Scientific Approach, the average value of pretest was 49.40, posttest value was 78.07. 4) Ability to prepare planting vegetable hydroponics, the average value of pretest was 47.20, posttest was 80.33. Based on the data analysis, it can be concluded that: 1) The project model has the significant effect on the ability to prepare hydroponic vegetable apparatus of Deaf students in farming skill class of SLB Negeri Balikpapan. 2) The scientific approach has a significant effect on the ability to prepare hydroponic vegetable cultivation tools for Deaf students in farming skill class of SLB Negeri Balikpapan. 3) The project model has a significant effect on the ability to prepare the ingredients of Hydroponic vegetables of Deaf students in farming skill class SLB Negeri Balikpapan. 4) The scientific approach has a significant effect on the ability to prepare the ingredients of Hydroponic vegetables of Deaf students in the SLB Agricultural Skill class of Balikpapan State. 5) The project model through a scientific approach has a significant effect on the ability to prepare tools and ingredients of Hydroponic vegetables for Deaf students in farming skill class SLB Negeri Balikpapan.
Keywords: Project Model, Scientific Approach, Tool And Material Plant, Hydroponics

Education of students with hearing impairment (deaf students) at Special High School (Sekolah Menengah Atas Luar Biasa/SMALB) is the same as education of reguler students in general High School. The difference between SMALB and general High School is in the aspect of learning process. The learning process at SMALB, emphasizes 60% aspects of skills, 20% cognitive aspects and 20% affective aspects (SMALB curriculum, 2006). In contrast to learning at the general high school level which emphasizes 60% cognitive aspects, 20% affective aspects and 20% psychomotor aspects. Thus, the learning process at the SMALB-B education level is on the priority scale in the aspect of skills (Sartinah, 2012).

Skills is a learning material given to SLB students to make students as graduates able to live independently in the community. Agriculture is one of the skills fields given in SLB State Balikpapan. Agricultural skills are subjects that provide opportunities for students to gain experience in producing a product or at least experience completing a stage of producing a product.

The agricultural product package developed is more directed at high value products in the school environment so that students gain conceptual, adaptive, creative and realistic experience. The aspects discussed in the agricultural skills of ornamental plant cultivation packages are ranging from planning, implementing and evaluating in the overall cultivation of ornamental plants. Students have to has an entrepreneurial spirit to be able to entrepreneurship by directing students to learn to sell their work. One of them in this study is hydroponic vegetable plants. Agriculture using a hydroponic system does not require extensive land in its implementation, but in the hydroponic agriculture business, it is only worth considering because it can be done in the yard of the house, roof of the house or another land (Roidah, 2014).

Based on observations made at Balikpapan State SLB school since December 2015, especially in the ability to prepare hydroponic vegetable planting tools and materials through preliminary study questionnaire sheets and observation sheets, it is known that

the learning models and tools used by teachers in Balikpapan State SLB in agricultural subjects teachers often use lecture methods in learning, this results in the teaching and learning process tends to be teacher-centered so that the students tend to be passive. Students with hearing impairment have difficulty preparing hydroponic vegetable planting tools and materials.

When preparing the hydroponic vegetable planting tools and materials, they often do not know the names of the tools and materials that must be used in hydroponic vegetable planting. There were students who were completely unaware of the tools and ingredients for planting hydroponic vegetables, but some knew the tools and ingredients for planting hydroponic vegetables but did not know their names and usefulness. Only two of the eight students at SLB Balikpapan were able to identify the hydroponic vegetable planting tools and materials or they were only able to master seven (70%) of the ten indicators, then three students had only four indicators (40%) and two students master two indicators (20%). This has greatly hampered the learning process of agricultural practices. Although at the time of hydroponic vegetable planting practice the students were invited to identify the tools and materials for hydroponic vegetable planting in the next meeting, most of them tended to forget both the hydroponic vegetable planting tools and materials used.

Based on research conducted by Suastini (2015) mentioned that the implementation of Project-based Learning has an important role for teachers in the learning process. The implementation of Project-based Learning, the teachers can make innovations in learning so that the material presented can be easily accepted by students.

Project-based learning is done in the hope that students can be more active in learning and able to solve daily problems related to this material. In learning with a project model through a scientific approach, the creativity plays a role in order to design or make a product of Gufron & Anik (2011). Based on research conducted by (Susilowati *et al.*, 2010) it can be seen that project-based learning affects student learning outcomes.

This scientific approach is characterized by a prominent dimension of observation, reasoning, discovery, validation and explanation of a data. This scientific approach brings students closer to the learning process scientifically so that they are real in every learning activity, the steps applied are more detailed and cover more broadly than the approaches and methods previously applied. From the students themselves, the application of the scientific method is expected to produce productive, creative, innovative and affective students through strengthening integrated attitudes, skills and knowledge.

Scientific approach is closer to the students in the learning process scientifically so that it is real in every learning activities, the stages are applied in more detail and covers more widely than the approaches and methods previously applied. Based on research conducted by Suastini (2015), it can be seen that the application of a scientific approach with project appraisal can improve learning outcomes. This research is also supported by research conducted by Arsani & Novi (2015) that the application of a scientific approach with project appraisal can improve learning outcomes.

METHOD

The approach used in this research is quantitative approach. This type of research is Pre-Experimental Designs with One Group Pretest-Posttest Design research design (Wahyudi & Sujarwanto, 2014). In this design, the test is done before treatment (T1) so that a comparison can be made between T1 and T2 to determine the effectiveness of treating X. If T2> T1 is significant then it can be concluded that the difference is due to treatment (X).

The population of the study was 30 students of SLB Balikpapan. The sampling technique used in this study is the sampling census (total population) means the entire population is sampled. So the number of samples in the study were 30 students of SLB Balikpapan.

This research was conducted in SLB Balikpapan in Syarifudin Yoes street RT 89, Damai Bahagia Village, South Balikpapan District, Balikpapan City, East Kalimantan Province. Selection of this location because researchers become teachers in this SLB, thus the researchers know the conditions in this SLB. The research time was conducted from May 3 until June 30, 2016. The analysis technique used multiple linear regression analysis.

FINDINGS AND DISCUSSION

Findings

The results of testing the effect of the project model towards the ability to prepare hydroponic vegetable cultivation tools for students with hearing impairment in farming skills class SLB Balikpapan, it was obtained that the value of t arithmetic of 23.433 with a significance value of 0.000. Because the value of t arithmetic > t table, it can be said that there is an effect of the project model on the ability to prepare hydroponic vegetable planting tools for deaf students in the Balikpapan State SLB skills class. So, the first hypothesis in this study is accepted.

This result is in the same idea with research conducted by (Sastrika *et al.*, 2013), Tamim & Grant (2013), Turyantana (2013), Bas (2011), Suastini (2015), and Arsani & Novi (2015) that the project models affect

towards students' abilities. This can be explained that one program that can be done to develop a play and child-centered strategy is the project approach.

The results of testing the effect of the scientific approach towards the ability to prepare hydroponic vegetable planting tools in the agricultural skill class for students with hearing impairment in SLB Balikpapan, it was obtained that the t value was 18,999 with a significance value of 0,000. Because tcount> ttable then it can be said there is effect of scientific approach towards the ability to prepare hydroponic vegetable cultivation tool of Students in hearing impairment in farming skill class of SLB Balikpapan. So, the second hypothesis in this study is accepted.

This is in line with research conducted by Suastini (2015), and Arsani & Novi (2015) that the scientific approach affects students' abilities. It can be explained that the application of a scientific approach can both make students active in constructing knowledge and skills encourage students to conduct an investigation to find the facts of a phenomenon.

The results of testing the effect of the project model on the ability to prepare the planting of hydroponic vegetables for students with hearing impairment in the farming skills class SLB Negeri Balikpapan, it was obtained the result that the value of t count of 27.316 with a significance value of 0.000. Because the value of t count> ttable then it can be said there is effect of project model to ability to prepare to plant of hydroponic vegetables of students with hearing impairment in farming skill class of SLB Negeri Balikpapan. So, the third hypothesis in this study is accepted.

This is in line with research conducted by (Sastrika *et al.*, 2013), Tamim & Grant (2013), Turyantana (2013), Bas (2011), Suastini (2015), and Arsani & Novi (2015) that the effect of project models towards students' abilities. This can be explained that the project approach enables children to acquire knowledge and skills.

The results of testing the influence of the scientific approach on the ability to prepare hydroponic vegetable planting material for deaf students in Balikpapan State SLB agricultural skills class obtained results that the t value was 17,625 with a significance value of 0,000. Because the value of tcount> t table can be said to have an effect of the scientific approach towards the ability of deaf students in skills class of the Balikpapan SLB. So, that the fourth hypothesis in this study is accepted.

This is in line with research conducted by Suastini (2015), and Arsani & Novi (2015) that the scientific approach influences students' abilities. It can be explained that in doing these processes, teacher assistance is needed. However, the teacher's assistance must decrease with increasing adult students or higher student classes.

The results of testing the effect of the project model through a scientific approach to the ability to prepare tools and materials for hydroponic vegetable planting deaf students in SLB Balikpapan in agricultural skills class obtained results that the Fcount value was 316,211 with a significance value of 0,000. Because Siginifsisi value <0.05, it can be said that there is an effect of the project model through a scientific approach to the ability to prepare tools and materials for hydroponic vegetable planting of deaf students in the SLB Balikpapan in agricultural skills class. So, the fifth hypothesis in this study is accepted.

This is in line with research conducted by (Sastrika *et al.*, 2013), Tamim & Grant (2013), Turyantana (2013), Bas (2011), Suastini (2015), and Arsani & Novi (2015) that project models with the scientific approach affect students' abilities. This can be explained that project-based learning is carried out in the hope that students can be more active in learning and able to solve daily problems related to this material.

Discussion

The project model is one of the strategies that can be chosen to develop the principle of playing while learning and making children the center of learning in early childhood education. This is in accordance with Dockett (2002) statement that one program that can be done to develop a strategy for playing and child-centered is called the project approach.

The project model is one way of providing learning experiences to children. Children are immediately confronted with everyday problems that require children to carry out various activities according to the project given by the child to gain experience that will shape the behavior of an ability possessed.

The scientific approach to learning brings a rational-minded climate that is based on conclusions on intelligence, logic and empirical evidence (Sudjarwanto, 2005). Learning with a scientific approach is a learning process that is designed in such a way that students actively construct concepts, laws or principles through observing stages (to identify or find problems), formulate problems, propose or formulate hypotheses, collect data with various techniques, analyze data, draw conclusions and communicate concepts, laws or principles found.

Learning based on a scientific approach is more effective than traditional learning. The application of a scientific approach, besides being able to make students active in constructing their knowledge and skills, can also encourages students to conduct investigations to find facts from a phenomenon or event, meaning that in the learning process, students are taught and used to determine scientific truth, not invited to opinion, let alone slander in seeing a phenomenon. They are trained to be able to think logically, consistently and systematically by using high-level thinking capacity.

The objectives of project learning (Roopnarine &

Johnson, 2011) in each education there are four types of learning objectives in project methods that must be addressed including knowledge, skills, renewal and feelings.

The project approach enables children to acquire knowledge and skills. In learning the child can observe (observation), ask questions in observing activities, collect information, associate / process information / reason, communicate learning, form networks. As in the objectives of the Kemendikbud (2013) project approach is to improve the ability of the intellect, especially the ability to think high-level students, to shape the ability of students to solve a problem systematically, the creation of learning conditions where students feel that learning is a necessity, obtained learning outcomes high, to train students in communicating ideas, especially in writing scientific articles, to develop students' character.

The application of the scientific approach to learning involves process skills such as observing, classifying, measuring, Learning Approaches and Strategies for predicting, explaining, and concluding. (Ferguson *et al.*, 2014) defines the scientific approach, namely the learning process in which students are invited to think logically, consistently and systematically, because actually learning itself is a scientific (scientific) process. In carrying out these processes, teacher assistance is needed. However, the teacher's assistance must decrease with increasing adult students or higher student classes.

In the scientific method the main purpose of the preliminary activity is to strengthen students' understanding of concepts that have been mastered that relate to new subject matter to be studied by students. In this activity, the teacher must strive so that students who do not understand a concept can understand the concept, while students who experience conceptual errors can be eliminated.

Deaf students have difficulty preparing hydroponic vegetable planting tools and materials. When preparing the hydroponic vegetable planting tools and materials, they often do not know the names of the tools and materials that must be used in hydroponic vegetable planting. There were students who were completely unaware of the tools and ingredients for planting hydroponic vegetables, but some knew the tools and ingredients for planting hydroponic vegetables but did not know their names and usefulness.

Project-based learning is done in the hope that students can be more active in learning and able to solve daily problems related to this material. In learning with a project model through a scientific approach, creativity plays a role in order to design or make a product of Gufron & Anik (2011).

The scientific approach brings students closer to the learning process scientifically, so that, it is real in every learning activity, the steps applied are more detailed and cover more broadly than the approaches and methods previously applied.

CONCLUSIONS

The project model has a significant effect on the ability to prepare hydroponic vegetable planting tools in the skill class for the students with hearing impairment in SLB State Balikpapan.

The scientific approach has a significant effect on the ability to prepare hydroponic vegetable planting tools in the skill class for the students with hearing impairment in SLB State Balikpapan.

The project model has a significant effect on the ability to prepare hydroponic vegetable planting materials in the skill class for the students with hearing impairment in SLB State Balikpapan.

The scientific approach has a significant effect on the ability to prepare hydroponic vegetable planting materials in the skill class for the students with hearing impairment in SLB State Balikpapan.

The project model through a scientific approach has a significant effect on the ability to prepare tools and materials in the skill class for the students with hearing impairment in SLB State Balikpapan.

Teachers should use the project model through a scientific approach in providing learning to agricultural skills to students in order to increase students' abilities.

Students learn agricultural skills especially in hydroponic vegetable planting should use project models and scientific approaches to improve understanding of hydroponic farming skills.

The further researchers should conduct research using different models and approaches. Therefore, the ability to prepare hydroponic vegetable planting tools and materials for deaf students will be more developed, and get new learning and more variety that can be used to improve the ability to prepare hydroponic vegetable planting tools and materials for deaf students.

REFERENCES

Arsani., & Novi, N. W. (2015). *Penerapan Pendekatan Saintifik Dengan Penilaian Proyek Untuk Meningkatkan Hasil Belajar Dan Kemampuan Berkomunikasi Siswa Kelas IVB SDN Dangin Puri*. *3*(1)

Dockett, S. (2002). *Play and Pedagogy in Early Childhood Bending The Rules*. (Sutrisno, penerjemah). Jakarta: Elex Media

Bas, G. (2011). Investigating the effects of project-based learning on students' academic achievement and attitudes towards English lesson. *The online journal of New Horizons in Education, 1*(4).

Gufron., & Anik. (2011). *Model Pembelajaran Inovatif, Bahan Seminar Pengembagan Model-Model Pembelajaran Inovatif*. Salatiga: UKSW.

Kemendikbud. (2013). *Permendikbud No.81A Tentang Implementasi Kurikulum*. Jakarta: Kementrian Pendidikan dan Kebudayaan

Roidah, I. S. (2014). Manfaat Penggunaan Pupuk Organik untuk Kesuburan Tanah. *Jurnal Universitas Tulungagung Bonorowo, 1*(1), 30-42.

Roopnarine, J. L., & Johnson, J. E. (2011). *Pendidikan anak usia dini dalam berbagai pendekatan*. Jakarta: Prenada Media Grup.

Sastrika, I. A. K., Sadia, W., & Muderawan, I. W. (2013). Pengaruh Model Pembelajaran Berbasis Proyek Terhadap Pemahaman Konsep Kimia dan Keterampilan Berpikir Kritis. *Jurnal Pendidikan dan Pembelajaran IPA Indonesia,* 3(1).

Sartinah, E. P. (2012). *Pengembangan Model Bimbingan Karier Untuk Pemahaman Diri Dan Pemahaman Pekerjaan Siswa Tunarungu SMALB-B.*(Disertasi). DISERTASI dan TESIS Program Pascasarjana UM.

Ferguson, S. D., Saliga III, R. P., & Omaye, S. T. (2014). Investigating the effects of hydroponic media on quality of greenhouse grown leafy greens. *International Journal of Agricultural Extension, 2*(3), 227-234.

Suastini, N. P. (2015). *Pendekatan Saintifik Dengan Penilaian Proyek Untuk Meningkatkan Ketrampilan Berbicara Dan Sikap Sosial Kelas IV SDN Tonja*. *3*(1).

Sudjarwanto, A. (2005). *Ikhtisar Ke Arah Implementasi Pendekatan Saintific (Saintific Approach) Dalam Pembelajaran di Sekolah*. Prosiding FKIP UM Metro.

Susilowati, I., Iswari, R. S., & Sukaesih, S. (2013). Pengaruh Pembelajaran Berbasis Proyek Terhadap Hasil Belajar Siswa Materi Sistem Pencernaan Manusia. *Journal of Biology Education, 2*(1), 82-90.

Tamim, S. R., & Grant, M. M. (2013). Definitions and uses: Case study of teachers implementing project-based learning. *Interdisciplinary Journal of Problem-Based Learning, 7*(2), 1-3.

Turyantana, I. K. (2013). *Penerapan Model Pembelajaran Berbasis Proyek Untuk Meningkatkan Aktivitas dan Tercapainya Ketuntasan Hasil Belajar Menulis Karya Ilmiah Siswa Kelas XI IPS 1 SMA Saraswati Seririt.* Fakultas Bahasa Dan Seni Universitas Pendidikan Ganesha Singaraja.

Wahyudi, A., & Sujarwanto. (2014). *Metodologi Penelitian Pendidikan (SSR & PTK)*. Surabaya: Unesa Unipress.