ICEI 2018
International Conference
on Educational Innovation

Certificate of Appreciation

Nomor : 004336/UN38.1/TU/2018

This is to certify that

Dr. Hj. Sri Joeda Andajani, M.Kes.

as

PRESENTER

in The 2nd International Conference on Education Innovation
"Multicultural Education in Digital Era"
Surabaya, July 28th 2018

Organized by
Faculty of Education
Universitas Negeri Surabaya

Budi Purwoko
Chair, ICEI 2018

Sujarwanto
Dean, Faculty of Education

Project Based Learning Through Hydroponic Farming to Students With Hearing Impairment

Asri Wijiastuti Winarno, Sri Joeda Andajani, Endang Purbaningrum, Sujarwanto
Universitas Negeri Surabaya
Surabaya, Indonesia
asriwijiastuti@unesa.ac.id

Solikatun Napiah
SLBN Balikpapan
Balikpapan, Indonesia
zarahtulastri@yahoo.co.id

***Abstract*—Students with hearing impairment (HI) have very little access to science concepts and some barrier to communication. Teachers should keep their faces and make sure their lips are in the line of sight of the student with HI. The research aimed was to investigate project-based learning through hydroponic farming on students with HI. The research design was one group pretest-posttest. A participant from special need schools about 30 participants students with HI. Treatment using hydroponic farming to produce vegetable from seeds. The research result shows that hydroponic farming supports teachers in implementing a project-based learning to make concrete and hands-on experiences together among students with HI. The experimental hydroponic farming to an increased capability to prepare tools and materials, interest in science, increased communication and synthesize information in meaningful ways. Product hydroponic farming suggested a very positive impact, there was a good acceptance by the community.**

Keywords—Student with HI; Project-based learning; Hydroponic; farming

I. INTRODUCTION

Science education curriculum to ensure that students with hearing impairment learn the content, skills, and competencies. Teaching science to students with hearing impairment required authentic experiences, need vocabulary to the acquisition of science concepts, need opportunities to talk about science-related matters with others, and need science role models [1] .Science for all in schools regardless of disabilities, cultural, and interest. [2] consider that the students must be given equal opportunities to participate in science curriculum to gain a high level of science literacy. Project-based learning through hydroponic farming to teach science to students with hearing impairment to provide science experiences in schools through practical work and enhances access and equity in science achievement. Foreman [3] found that the teachers respond to students diverse learning needs in order to enhance acquisition of scientific skills, knowledge, attitudes, and make sure that students are not isolated, or denied access to scientific equipment. Science for all that is suitable for all students by setting learning opportunities and environment adaptation. Key factors which are central to science education of students with hearing impairment, such as teachers'ability to communicate fluently in sign language, connection explanation science concepts to other concepts, need classroom discussions, differentiated teaching, realistic expectation, use hands-on in building students'experience, enhancing access to information, and time-on-task [4]

Setting learning opportunities and instruction students with hearing impairment through project-based learning would be taught to build a hydroponic micro-farm at their school site. This innovation micro farms would be built using recycled water bottles, growth fertilizer, seeds, and plastic tubing. No expensive materials there is an abundance of empty water bottles that would go to waste. Project-based learning through collaboratively work students with hearing impairment in cohorts to learn practice the entire lifecycle of creating, maintaining, and harvesting a micro farm and enhance communication skill each other students. Project-based learning is a teaching method in which students gain knowledge and skills by working for extended period of time to investigate and respond to an authentic, engaging, and complex question, problem, or challenge (bie.org). students with hearing impairment in the classroom without an interpreter won't be able to understand or follow a conversation or question that originates behind them or out of their line of sight. They avoid asking questions and give a response because they know other people have difficulty understanding their speech. The teacher can help them during discussion sessions by repeating questions and controlling the pace of the discussion and encouraging only one student to speak at a time. The teacher may consider summarizing classroom discussion orally or on the chalkboard at logical points in each instruction. The students with hearing impairment in Balikpapan state special school (SLBN Balikpapan) show lack attention, low interest, and deficiency of basic understanding, but can follow much of their teacher's science instruction as long as have appropriate materials and strategies. The students can understand the teacher speech with orally and sign language. Wellington and Ireson[5] found the role of language in science learning for students with hearing impairment that language may not only be the most important medium but also a major barrier to learning science.

The research aimed is to propose project-based learning through hydroponics vegetable planting among students with hearing impairment to achieving of science skill. This study focused on two research task, first, investigated the role of project-based learning to prepare tools for hydroponics farming, and second, investigated the use project-based learning to prepare materials for hydroponics farming among students with hearing impairment. As Vygotsky theory, solve practical task with the help students with hearing impairment of their speech as well as their hands and eyes [6] In this study the project-based learning involved students with hearing impairment in using procedural thinking and logical in a structured context. The key to developing students with hearing impairment understanding concept is the active engagement in a learning process and develop knowledge through they possess prior to these experience.

Luckner and Carter [7] found that the science instruction through multisensory strategies based on problem-solving among students with hearing impairment to enhanced science concept achievement. The teacher must be able to create the task to engage their students in hands-on activities and improve them via scaffolding [8] experiment effectiveness of content scaffolding to enhancing deaf student's learning [9]

II. METHOD

The population target of this study was students with hearing impairment grade X, XI, XII at skill classroom in Balikpapan State Special School (SLBN Balikpapan). The school administration and science teachers were underestimated to potential students with hearing impairment for learning [10] The scope of this research was to evaluate the project-based learning through hydroponics farming among students with hearing impairment to know the tools, materials, and procedure step of hydroponics planting. Research period in six months in total, including development of achievement, worksheet for intervention, and implementing experiment. The experiment based on hydroponics farming on project-based learning covered six weeks class sessions of forty minutes for each session.

The research design was one group pretest-posttest design with quantitative data analysis. This design implementing pretest before giving treatment to get comparing to posttest. The treatment focus on using project-based learning through hydroponics farming for students with hearing impairment. Thirty students with hearing impairment were given access to project-based learning models in order to investigated implementing hydroponics farming in the indoor and outdoor classroom to increase their interaction, to achievement basic science skill process and increase the ability to prepare tools and materials. Data collected from observation and test.

The sample of the research was thirty students with hearing impairment of skill classroom were selected for the purpose of the research. The age of these students ranges between 16 until 19 years old. They were selected because they were the only students diagnosed with hearing loss and mild category in their classroom. Thirty students were selected divided into two groups through the purposive assignment for treatment in skill classroom. Each group received the same instruction, the first instruction was to recognition the tools, materials hydroponics farming. The next step was the demonstration and guide assembling hydroponics farming tools through experiment. The last step was to put post-test through writing test, performance test, and oral test. The data analyzed through linear regression t-Test for a partial variable on SPSS V.19. the simultaneous variable project based learning to prepare materials and tools for hydroponic farming analyzed through multiple linear regression ANOVA on SPSS V.19.

III. RESULT AND DISCUSSION

The focus of the research was answered by administering and interpreting use t-Test on SPSS V. 19.

The first focus has investigated the role of project-based learning the ability to prepare planting tools with hydroponics farming among students with hearing impairment of skill classroom. This focus was answered by administering t-Test on total scored. The result data of pre-test from thirty participants through performance and writing test for implementing project-based learning among students with hearing impairment the average was 47.83, the median was 47.5, and the standard deviation was 5.34. The highest score 60 was done by ZH and the lowest score 40 was done by BA and JC. The result data of pre-test the ability to prepare tools of hydroponics farming among students with hearing impairment, the average was 48.30, the median was 48, and the standard deviation was 5.09. the highest score 58 was done by YL and the lowest score 40 was done by MS. This result indicated that currently the students with hearing impairment participants are not given opportunity to use laboratories or practical work in school. The students with mild category have higher scored than severe or total deaf. Mayer and Morena (1998) found most deaf students will particularly benefit from combined materials. The deaf student's dependence on visual reception of language, real-time text, or speech reading [11] Thus, multimedia classrooms functionally require consecutive processing by deaf students and alternating their attention between teachers and visual materials.

The treatment was seven sessions use project-based learning through introduction tools and materials for planting with hydroponics farming, demonstration set up tools and materials, guide assembling of hydroponics farming tools, guide sowing hydroponics farming, a guide to plant hydroponics farming, self-assembling tools, seeding, and planting hydroponics farming, harvesting of vegetable hydroponics farming. The treatment was realized for thirty participants in the state special school Balikpapan East Kalimantan. Most of the participants unfamiliar with hydroponic farming. The planting uses hydroponic farming experiment through project-based learning models by modeling and hands-on activities took place as parallel activities to school program. This research linier with activity stucture for project based learning environment [12]

The result data of post-test from thirty participants through performance and writing test for implementing project-based learning among students with hearing impairment the average was 79.17, the median was 78, and standard deviation was 5.43. the highest score 96 was done by ZH. The lowest score 70 was done by MF and JL. The result of post-test the ability to prepare hydroponic farming tools among students with hearing impairment the average was 80.27, median was 80, and standard deviation was 4.86. the highest score 95 was done by ZH. The lowest score 70 was done by MN. This condition related to Barman (1991) in Parveen [13] found that constructivist and activity based teaching approaches have better enable acquiring of science concepts among students with hearing impairment. more benefit for them through hands-on experience to develop understanding of complex process of science. The deaf students can be taught science through active explorations.

The result of pre-test and post-test were administering and interpreting use t-Test on SPSS V.19. the result showed that there is a significant more competent between implementing project-based learning to the ability to prepare hydroponic farming tools among students with hearing impairment on the total score (t= 23.433, sig=.000) on table 1.

The second focus is investigated for the ability to prepare planting materials with hydroponic farming among students with hearing impairment of the skill classroom. The result data were interpreting through t-Test on total score by SPSS V.19. the result of pre-test the ability to prepare materials hydroponic farming among students with hearing impairment, the average of thirty participants was 47.20, the median was 47, and standard deviation was 3.47. the highest score 55 was done by SS and the lowest score 40 was done

by MR. This result support on recent finding indicates that students with deaf feel difficulty in linking reading materials to classroom instructions to lack of automatic integrative processing among concepts during learning are relatively unaware of that fact (Richardson, MacLeod-Gallinger, McKee and Long. The result of post-test the ability to prepare materials of hydroponic farming, the average of thirty participants was 80.33, the median was 80, and standard deviation was 4.59. the highest score 90 was done by DW, RR, and ZH and the lowest score 70 was done by MS. Deafness refers to the complete and partial loss of the ability to hear. Moores defined deafness is a hearing impairment that is so severe that impaired in processing linguistic information through hearing, with or without amplification that adversely affects educational performance of the child.

The result of t-Test on SPSS V.19 showed a significant competent between implementing project-based learning to the ability to prepare materials of hydroponic farming among students with hearing impairment (t=27.316, sig=.000) on table 2. This research support by Stoziko project-based learning technology for improving student cognition.

Elefant (1980) found that experiment use inquiry among students with hearing impairment to increase scientific skill. Similar to this research Boyd dan George consider that the student outcome to increase through hands-on and experiment activities.

IV. CONCLUSION

Project-based learning models through hydroponic farming all about giving requisite knowledge and skills need of students with hearing impairment to understand and apply scientific concepts in academic and everyday life. The finding of this research reveals that teaching hydroponic farming to the students with hearing impairment was not a simple task, need clear interaction by oral and sign language, clear procedure or steps of activities, instruction adaptation, and interaction between the environment and the learners.

The implementation of project-based learning through hydroponic farming has significant effect to increase the ability to prepare tools and materials of vegetable planting through hydroponic farming among students with hearing impairment (t=23.433> 1.645; t=27.316>1.645, sig=.000). it is important to ensure that students communication and interaction needs and instructional adaptation are harmonized well.

REFERENCES

[1] M. S. Stinson and T. N. Kluwin, “Educational consequences of alternative school placements,” *Oxford Handb. Deaf Stud. Lang. Educ.*, pp. 52–64, 2003.

[2] S. Mukhopadhyay and E. Moswela, “Inside Practice of Science Teachers for Students with Hearing Impairments in Botswana Primary Schools.,” *Int. J. Spec. Educ.*, vol. 25, no. 3, pp. 57–67, 2010.

[3] P. Foreman and M. Arthur-Kelly, “Social justice principles, the law and research, as bases for inclusion,” *Australas. J. Spec. Educ.*, vol. 32, no. 1, pp. 109–124, 2008.

[4] I. Roald, “Norwegian deaf teachers’ reflections on their science education: Implications for instruction,” *J. Deaf Stud. Deaf Educ.*, vol. 7, no. 1, pp. 57–73, 2002.

[5] J. Wellington and J. Osborne, *Language and literacy in science education*. McGraw-Hill Education (UK), 2001.

[6] S. Im and O.-J. Kim, “An approach to teach science to students with limited language proficiency: in the case of students with hearing impairment,” *Int. J. Sci. Math. Educ.*, vol. 12, no. 6, pp. 1393–1406, 2014.

[7] J. L. Luckner, S. B. Slike, and H. Johnson, “Helping students who are deaf or hard of hearing succeed,” *Teach. Except. Child.*, vol. 44, no. 4, pp. 58–67, 2012.

[8] J. M. Tuma and J. M. Pratt, “Clinical child psychology practice and training: A survey,” *J. Clin. Child Adolesc. Psychol.*, vol. 11, no. 1, pp. 27–34, 1982.

[9] G. Borgna, C. Convertino, M. Marschark, C. Morrison, and K. Rizzolo, “Enhancing deaf students’ learning from sign language and text: Metacognition, modality, and the effectiveness of content scaffolding,” *J. Deaf Stud. Deaf Educ.*, vol. 16, no. 1, pp. 79–100, 2010.

[10]Z. Parveen, “EDUCATIONAL EFFECTIVENESS OF THE 5E MODEL FOR SCIENTIFIC ACHIEVEMENT OF STUDENTS WITH HEARING IMPAIRMENT,” *J. Balt. Sci. Educ.*, vol. 16, no. 5, 2017.

[11]J. T. Johnson, “Deaf Children of Hearing Mothers: Co-embodied Perspectives on Identity and Learning in a Preschool Classroom.” UC Berkeley, 2015.

[12]J. L. Polman, “Dialogic activity structures for project-based learning environments,” *Cogn. Instr.*, vol. 22, no. 4, pp. 431–466, 2004.

[13]J. L. Luckner and K. Carter, “Essential competencies for teaching students with hearing loss and additional disabilities,” *Am. Ann. Deaf*, pp. 7–15, 2001.