

Assistive Technology of Vocational Skills Learning For Children With Cerebral Palsy

N Dede Khoeriah, Eka Yuli Astuti, Tirta Ardiansyah, Teti Ratnawulan, Yoga Budhi Santoso, Emay Mastiani, Ranti Novianti

Abstract: Children with Cerebral Palsy generally need mobility assistance and correction aids. Assistive technology is a technology that is created and developed to help someone with disability to be able to carry out their daily activities independently without relying on others. The potential of children with CP also needs to be developed through job skills education that uses the tools that they need so that children's CP can learning optimally. This study aims to describe the profile of the abilities and difficulties of children with CP in skills learning and describe the vocational skills learning using assistive technology to 21st century skills for CP in the School in Cileunyi. This study uses descriptive research with a qualitative approach. The research subjects were 10 (ten) children with CP and two teachers. Data collection use methods of observation, interviews and documentation. data validity use triangulation method. The result show that the purpose of skills learning for children with CP is to have readiness and independence in work when they are adults. Steps for learning vocational skills through task analysis towards 21st century skills using multimedia and methods that environmentally friendly. Use of the tools based on needs assessment in previous learning and using the tools and materials that are easy to find and environmentally friendly. Learning vocational skills using environmentally friendly assistive technology and various steps as preparation to be able to live independently in the community. The use of innovative vocational learning technology aims to: (1) assist the children's learning activities, (2) increase children's self-confidence to be able to participate in learning, (3) help children adapt to their nearest environment, (4) vocational learning is intended so that children can develop their potential to achieve independence and life skills.

Keyword: Assistive Technology, Vocational, Cerebral Palsy.

I. INTRODUCTION

Children with Cerebral Palsy (CP) generally experiencing the physical or motorized limitations in carrying out activities and mobilities. Cerebral Palsy (CP) is a condition that characterized by difficulties in controlling body movements and muscle coordination caused by damage to the brain. [1] states that children with CP "depends on its location and severity, the brain injury that causes a child's movement disorders may also cause other problems. These problems include mental retardation, seizures, language

disorders, learning disabilities, and vision and hearing problems." Motoric barriers are often accompanied by other obstacles to the intellectual, auditory, and visual aspects that effect to the difficulties of linguistic, interaction and communication.

To be able to carry out the daily activities, these children generally need support tools. Assistive Technology is a technology that is created and developed in order to help someone with disabilities to be able to carry out their daily activities independently. Therefore, children with CP who experiencing stiffness, paralysis is difficult for controlling movement and experiencing the balance and rhythmic disorders that require assistive technology to help them carry out the activities. [2] explained that "people with a diagnosis of cerebral palsy (CP) often have significant physical limitations that prevent exploration and full participation in the environment. Assistive Technology (AT) systems can provide opportunities for people with CP to interact with their world, enabling communication, and daily living skills".

The ability of CP child limbs is different from each other. It depends on the type of CP that related to how large the damage to the brain. The tools that used to develop the potential of motion can be mobilization and correction aids. Mobilization tools can help them to move and carry out activities in their environment. While correction tools can help improve or correct body posture and reduce worse impacts. This correction aid is ultimately expected to correct the function of the motion of certain body parts. The mobilization tool can be formed as the wheelchair for children with CP type of paraplegia and diplegia, and brace (walking aids) and AFO shoes (Ankle Foot Orthosis) as a leg aid for mobility and correction.

The conditions and the potential of children with CP who attend Special Schools are very diverse. Schools as formal education institutions have a function to foster and provide insight, knowledge, and skills for their students. For children with special needs, education has an important function in the development of their potential and abilities so they can interact and participate with the surroundings and have the skills as a provision for living in the community independently. According to [3] life skills are needed by each individual for the continuity of his/her life." The concept of life skills is in accordance with what was revealed by [4] that for children with special needs in elementary and secondary classes requires a focus on learning self-help skills or daily living skills and functional academics.

Revised Manuscript Received on May 15, 2019.

N Dede Khoeriah, His Department Name, Universitas Islam Nusanantara, Bandung Indonesia.

Eka Yuli Astuti, His Department Name, Universitas Pancasakti Tegal, Tegal, Indonesia.

Tirta Ardiansyah, His Department Name, Universitas Pancasakti Tegal, Tegal, Indonesia.

Teti Ratnawulan, His Department Name, Universitas Pancasakti Tegal, Tegal, Indonesia.

Yoga Budhi Santoso, His Department Name, Universitas Pancasakti Tegal, Tegal, Indonesia.

Emay Mastiani, His Department Name, Universitas Pancasakti Tegal, Tegal, Indonesia.

Ranti Novianti, His Department Name, Universitas Pancasakti Tegal, Tegal, Indonesia.

To be able to adjust to the social life is certainly not easy for children with CP. In fact, many children with CP who have not been able to be independent both in taking care of themselves and in social life. In the observations of researchers, the role of learning in schools that focus on developing skills to support CP children's independence is have not optimal yet. Skill learning programs (vocational) have not focused on the abilities and needs of children with CP. Even though this is absolutely necessary. The potentials that children have to need to be developed through vocational skills education truly from educational institutions, so children with CP can play an optimal role in accordance with their potential. This is in accordance with the aim of providing skills according to the [5] namely to develop the power of appreciation and work ethic in the field of arts and crafts. Besides that, in line with the education message shown in the Republic of Indonesia Law number 20 of 2003 concerning the National Education System, Chapter V Article 12 section (1) b. every child in each education unit, get education services according to their talents, interests, and abilities. Adaption of systematic data collection methods to specific student needs, and careful analysis and interpretation of assessment data in light of real decisions affecting students[6]. Furthermore, [7] explained, There are organizing training activities for children with special needs such as simple entrepreneurship, the practice of caring for plants, and arranging flowers, making fertilizer from organic waste, skills in fisheries, foreign language skills, pantomime or theater, vocal, and music. And [8] explained that the direction of skills learning, including two objectives, namely: (1) the direction of learning to prepare for further education, so that it focuses more on academic and social personal skills and (2) to prepare children with special needs to enter the workforce.

The principles of applying the direction of skills learning model for children with special needs include: (1) types of skills adapted to their conditions and limitations; (2) schools function as social rehabilitation units for children with special needs and provide basic pre-vocational skills; (3) flexible vocational learning, continuous, direct practice (real life) and repetitive. Based on these principles, skills learning services for children with CP need to be adjusted to the problems of movement disorders that they have so they can guide developments that can help the independence of motion and the independence of work[9].

To help with the independence of the motion and independence of the work, the use of assistive technology in learning is absolutely necessary. The use of tools that will be used in skills learning is an opportunity for children with CP to be able to improve their motion ability and at the same time the opportunity to learn skills that will help them achieve 21st-century skills to lead life skills [10].

The research focus is aimed at obtaining an overview of 1) the profile of the ability of vocational skills in children with CP; 2) Problems faced by CP children with vocational skills; and 3) developing modification tools as assist if technology to support CP children in vocational learning.

II. METHOD

This study used the qualitative approach with descriptive method. The aim of this study to obtain an overview of the

objective conditions of the abilities of CP children in vocational skills tasks, the problems faced by CP children and the implementation of vocational skills learning to enhance CP children's life skills to 21st-century life skills.

Creswell [11] stated qualitative research as a method based on the philosophy of post positivism, which is used to examine the natural conditions of the objects, whereas the researchers act as a key instrument. The technique of data collection used triangulation and data is analyzed by inductive or qualitative, and the results of qualitative research more emphasis on meaning than generalization. According to [12], [13] the aim of qualitative research is describing existing phenomena, both natural and human engineering, which pays more attention to the characteristics, quality of interrelationships between activities. The data collection is carried out with in-depth observations and interview techniques. The respondents are children with cerebral palsy, vocational teachers, regular teachers, and the principals. The location of research at Special School in Cileunyi, Bandung, West Java.

III. RESULT

The ability of children with CP in vocational skills before

The vocational skills were chosen is processing a kind of fried bananas called "pisang aroma". The children's ability is described based on several indicators. The indicators are determined based on aspects (1) ability to identify tools and materials, (2) psychomotor ability through the process, (3) ability to completing tasks, (4) ability to obey the norms or rules in work. In the aspect of the ability to identify tools and materials

The vocational skills were chosen is processing a kind of fried bananas called "pisang aroma". The children's ability is described based on several indicators. The indicators are determined based on aspects (1) ability to identify tools and materials, (2) psychomotor ability through the process, (3) ability to completing tasks, (4) ability to obey the norms or rules in work. In the aspect of the ability to identify tools and materials, 70% of respondents are in the category "good" and 20% in the category "enough" and 10% is "less". In the aspects of the psychomotor ability in the process are very varied. 30% of respondents are in category "good", and 30% in category "enough" which means there is a little prompt from the teachers, and 40% in the category "less". In the aspect of the ability to completing tasks, 30% of respondents are in "good" category. They working carefully and finished the tasks. 60% respondents in "enough" category and 10% in "less" category. In the aspect of the ability to obey the rules of the work, 50% of respondents are in the category "good", 40% "enough" and 10% "less". All of the children with CP also observed in religious aspects related to the strengthening of character education as long as the learning process. And the result is 100% respondents prayed both before and after. In aspects responsibility, 20% shows the willingness to help each other, and 10% working individually to complete his tasks and need extra time to finish, and 10% is fully dependents to



others, and 60% are trying to finish the tasks with many prompts from the teachers.

The problems faced by the children with CP in vocational learning.

The description of the data shows that most of the children with CP have difficulties in vocational learning. The average ability in the aspect knowledge has a "good" value, while the psychomotor ability of vocational skills has "enough" value, and in the other aspects the values are "good", but the percentage is not clearly strong, only 40%-50%.

The problems faced by children related to vocational learning are (1) children have difficulty using simple tools, this is related to the psychomotor ability to holds the tools and balance in holding tools, (2) lack of confidence to participate in the learning process step by step so that they prefer to assist by the teachers, (3) they didn't understand very well the whole instruction so the steps taken are incomplete and must be reminded.

Assistive Technology in Vocational learning (culinary art)

Based on the previous data regarding the child's ability and the problems faced in previous learning, some modified equipment has used as assistive technology for the children. The tools used are (1) knife, spoon, and fork that adapts from the standard weighted eating utensils This kind of equipment have handles made of wood which is fit to the child's hand. It's easier to hold than standard equipment, (2) plates and bowls which are also provided with thin wood so that they are easily held by the child and do not fall easily or spill. The plates and bowl were adapted from the standard non-slip plate and bowl tool, (3) wooden planks (wooden cutting boards) with the handle on both ends and made a variety of different size, so some of them could be stored in a wheelchair safely, (4) Stoves equipped by wooden handles to light the fire more easily.

During the time of learning, this process is equipped with an image that illustrates the steps that must be done by students. The image contains the sequence of activities and the size of those papers are large enough to be clearly visible in the room. As a result, to use this tool, 80% of children have the enthusiasm to follow those steps and do confidently. And the others need fully prompts from the teachers [14].

Cerebral Palsy children is a physical disability that makes it difficult for children to control their muscles and movements a caused by damage to the brain. Damage areas in the brain cause various types of CP children such as spastic, athetoid, rigid, ataxia, tremor and mixed types. More specifically, due to damage in the brain, children experience complex obstacles such as physical and motoric obstacles, intellectual intelligence, social emotions, visual, audio, kinesthetic obstacles, and even sensations. To overcome these problems, education services are provided with learning that includes various development capabilities, namely (1) intellectual and academic development, (2) assisting physical development, (3) improving children's emotional development and self-acceptance, (4) maturing social aspects, (5) maturing morally and spiritually, (6) increasing self-expression, and (7) preparing for the future of the child. [15] explained that children with CP have

limitations that certainly affect their learning achievement unless special education services are provided. The need for special education services for CP children can include special teaching, scheduling, guidance, therapy, equipment, and technology. [16] explained that to overcome the problem CP children needs rehabilitation. Rehabilitation aspects can be classified into three fields, medical or medical rehabilitation, social rehabilitation, and work/skills rehabilitation.

Culinary art is a kind of vocational skills. This is one of the materials to support life skills that must be owned by everyone, including CP children, because life skills are very useful to solve problems that occur in life both at home and in society. To develop life skills of CP children, the teacher strives to carry out learning that is appropriate to the child's abilities and refers to 21st-century skills.

Basic components in learning functional skills for special needs children are: (1) courage and strict school policy to enact interest-based skills learning curriculum, talent and post-school work needs; (2) the learning process cannot be limited to school time and or only limited to class hours, to achieve skills learning outcomes in the level of vocational/economic activity (advanced level); (3) skill learning is carried out in a real atmosphere, by activating the role of business partners; (4) the role of special needs parents is also very important to follow up to practice skills learning outcomes in daily life, especially for functional skills to help themselves for special needs children with low mental abilities. If necessary a contract learning model is applied; (5) the creativity of teachers greatly influences the success of learning the skills of special needs children; (6) to empower the independence of special needs children through skills learning, it is necessary to acknowledge the community's competence or performance of special needs children [17].

In vocational learning, the materials are based on assessments of children's abilities and previous learning. In the process of culinary art making friend bananas with sugar, an assistive technology is used as a tool. Aids are believed can be used to increase independence in children with CP as expressed by [18] that "Assistive technology-based programs are effective for promoting independence of children with cerebral palsy: (1) Implications for Rehabilitation, (2) A basic form of assistive technology such as a microswitch-based program may be useful and helpful for supporting adaptive skills of children with cerebral palsy and different levels of functioning, (3) the same program may improve the participants' indices of positive participation and constructive engagement with beneficial effects on their quality of life, (4) The positive social ratings provided by experts are sensitive to the matter, may recommend a favorable acceptance and implementation of the program in daily settings.

Assistive technology used here is realized to be very specific and casuistic because it is based on the results of needs assessment. By prioritizing creative product created through the process of identifying, exploring and utilizing

the potential and available resources. So, the tools used in this learning are made by paying attention to these principles namely using existing materials and tools and they are easy to obtain, environmentally friendly but have value for their use in the learning. Equipped classroom with pictures that visualize simple steps in processing bananas fried with sugar that can be easily seen and followed by students in an effective way in classroom management.

IV. CONCLUSION

Learning vocational skills for Cerebral Palsy children in Cileunyi SLBN leads to 21st-century skills using assistive technology to achieve their learning goals. Used of tools based on needs assessment in previous learning and using tools and materials that are easy to find and environmentally friendly. Learning vocational skills is using environmentally friendly assistive technology and various steps as preparation to be able to live independently in society.

The use of this innovative vocational learning technology aims to: (1) help children's learning activities, (2) increase children's self-confidence to be able to participate in learning, (3) help children to adapt to their nearest environment/circumstances (4) learning vocational is intended to develop children's potential to achieve independence and life skills. The implementation of vocational learning using assistive technology starts from the preparation, process and follow-up stages. Preparation begins with analyzing basic competencies, arranging metrics of the dimensions of the thinking process and dimensions of knowledge. The implementation starts with strengthening the character of prayer together, the stages of the learning process in accordance with the task analysis also refer to the knowledge dimensions (factual, conceptual and procedural) that are conveyed through the scientific approach by outlining the learning steps in detail.

To build the empowerment of cerebral palsy children in living in their circumstances, the increased knowledge and skills needed to equip vocational skills through learning with assistive technology that is in accordance with the needs and potential that need to be done and needed an integrated handling, collaborating between teachers, parents and the community according to the role function.

REFERENCES

1. E. Geralis, *Children with cerebral palsy: A parent's guide*. UK: Woodbine House, 1998.
2. A. Z. and M. Jenko, "Assistive Technology For People With Cerebral Palsy," *East. J. Med*, vol. 17, no. 4, pp. 194–197, 2012.
3. K. S. and J. Thorogood, "'Life skills' Courses and Children with Special Needs : an Exercise in Caution," vol. 2, 1987.
4. P. P. C. Hallahan, D. P., Kauffman, J. M., *Exceptional learners: An introduction to special education*. Upper Saddle River: NJ: Pearson, 2015.
5. DEPDIKNAS, *Panduan Pelaksanaan Kurikulum Pendidikan Khusus*. Jakarta: Direktorat Pembinaan Sekolah Luar Biasa, 2006.
6. V. A. and N. Students, "Petzy Vocational Special Needs Students in the Middle / Junior High," pp. 15–24, 1981.
7. Mudjito, "Implementasi Pendidikan Ketrampilan berbasis Kemandirian bagi Anak Berkebutuhan Khusus Jenjang Pendidikan Dasar," 2011.

8. D. K. & D. Wadsworth, "Physically Challenged Students," *Child. Educ*, vol. 69, no. 4, 1993.
9. S. D. W. and D. D. Witt, "Primary Prevention — Life Skills for Young Children," *Educ*, vol. 23, no. 2, pp. 45–50, 1995.
10. R. W. and K. Renk, "Psychological Correlates of Quality of Life in Children with Cerebral Palsy," *J. Dev. Phys. Disabil*, vol. 19, no. 5, pp. 427–447, 2007.
11. J. W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. London: Sage Publication, 2013.
12. J. W. Creswell, *Educational Research: Planning, Conducting, and Evaluating Quantitative and Qualitative Research*. Boston: MA: Pearson, 2012.
13. N. S. Sukmadinata, *Metode Penelitian Pendidikan*. Bandung: PT.Remaja Rosdakarya, 2012.
14. A. P. da Silva, "Low Cost Assistive Technology to Support Educational Activities for Adolescents with Cerebral Palsy," *Disabil. Rehabil. Assist. Technol*, vol. 13, no. 7, pp. 676–682, 2018.
15. D. D. S. & R. Luckasson, *Introduction To Special Education*. United State of America: United State of America, 1995.
16. M. L. Aisen, "Cerebral Palsy: Clinical Care and Neurological Rehabilitation," *Lancet Neurol*, vol. 10, no. 9, pp. 844–852, 2011.
17. H. Jaya, "Keterampilan Vokasional Bagi Anak Berkebutuhan Khusus Perawatan Dan Perbaikan Alat Elektronika."
18. F. D. F. Stasolla, A. O. Caffò, V. Perilli, A. Boccasini, R. Damiani, "Assistive Technology for Promoting Adaptive skills of Children with Cerebral palsy: Ten Cases Evaluation," *Disabil. Rehabil. Assist. Technol*, pp. 1–14, 2018.

AUTHORS PROFILE



First Author personal profile which contains their education details, their publications, research work, membership, achievements, with photo that will be maximum 200-400 words.



Second Author personal profile which contains their education details, their publications, research work, membership, achievements, with photo that will be maximum 200-400 words.



Third Author personal profile which contains their education details, their publications, research work, membership, achievements, with photo that will be maximum 200-400 words.

