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Transformation of vocational skills for doormat craftsmen from persons with disabilities using assistive technology

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ABSTRACT

Vocational skills in an inclusive society are needed in business trips within an organization. The Mitra Sejahtera Center for Disability Empowerment (PPDMS) is an organization of persons with disabilities that is productive in producing patchwork mat products in quite a large capacity. This research wants to reveal how assistive technology in their business can change their vocational skills before and after knowing technology. This study uses a qualitative approach with a unique case of doormat crafts at PPDMS in Gunungkidul Regency. The research subject is the organizational chart, including the chairman and members involved in the production of doormats. The results of this study indicate that their vocational skills underwent a significant transformation after assistive technology was introduced. Before they learn assistive technology, their skill is to weave mats with the help of conventional looms. Developing more modernly, the use of mechanization with non-machine looms accessible for persons with disabilities has changed weaving skills to weaving skills complemented by skills in spinning threads. Developing even more rapidly, engineering technology-based vocational skills create job specifications for persons with disabilities. The users of these semi-automatic machines must be skilled and understand the machine mechanization system. This research implies that with the existence of assistive technology, the transformation of vocational skills goes hand in hand with developments in technology and science.

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INTRODUCTION

The Sustainable Development Goals (SDGs) have an extraordinary impact on the development of equality between people worldwide, including Indonesian people, both non-disabled and disabled. Through a distinctive motto, namely left no one behind which illustrates the hope that no one will be left behind due to certain conditions such as poverty, vulnerability, and disability (Hoelman et al., 2015). Getting decent work and economic growth is one of the goals in the SDGs, namely goal 8. One of the targets in goal 8 is to achieve permanent and productive employment and decent work for all women and men by 2030-men, including youth and persons with disabilities, and equal pay for work of equal value (Kementerian Perencanaan Pembangunan Nasional/Badan Perencanaan Pembangunan Nasional (BAPPENAS), 2020).

The involvement of disabilities in supporting the fulfillment of the 17 goals in the SDGs is, of course, inseparable from government support which can be seen from various regulations in various sectors. For example, various laws, regulations, and other policies encourage various parties to provide opportunities for persons with disabilities to play a role and participate in sustainable development in Indonesia. The problem is that the implementation of the SDGs is still the same as the MDGs. Some groups in society are still left behind, for example, people with disabilities (Trani & VanLeit, 2010).

This can be proven by providing opportunities to work; not all sectors can accept persons with disabilities to work there. Article 53 of Law no. 8 of 2016, it was evident that it is stated that starting from the central government to the regions, as well as state-owned enterprises, are required to accept at least 2% of persons with disabilities from the number of existing employees. For private companies, it is 1%. The company owner does not necessarily do this. However, according to Csillag et al. (2019), it is caused by an unsupportive ecosystem, and there is still much stigma built up in a society that the abilities of people with disabilities are still far below those of non-disabled people.

People with disabilities are the same as non-disabled people. Only the way of carrying out activities is different; some of them need assistive technology support to make it easier for them to carry out activities. Insights regarding opportunity, equality, inclusiveness and assistive technology need to be disseminated to encourage the implementation of the 8th SDGs goal without leaving anyone behind. In various countries, including Indonesia, the government has taken the best steps by collaborating with various communities, including the disabled community, in developing creative industries (Mandrysz, 2020; Rakhmani & Bhinekawati, 2020).

Pusat Pemberdayaan Disabilitas Mitra Sejahtera (PPDMS) is one of the organizations for persons with disabilities that exist in Gunungkidul Regency. This organization has a noble goal: to improve the welfare of people with disabilities in all fields in inclusive development. The purpose of this organization is in line with the opinion of Gupta and Vegelin (2016), which states that the concept of inclusive development emphasizes the dimensions of social, ecological, and political development, which emphasizes the need for sustainable economic growth in a business paradigm. PPDMS is related to social activities and economic empowerment in their daily activities.

One of PPDMS's productive businesses developing since 2019 is the handicraft of patchwork mats. As many as 35 people are involved in running this business involving five partners. From 2019 to 2020, PPDMS will participate in the doormat craft business with minimal production. The use of traditional mat-woven tools results in low product quality. This has an impact on complaints from consumers about their doormat products. In addition, the price of doormat products could be more competitive with market prices.

From 2021 to 2022, PPDMS will start innovating to accelerate production through the use of technology in production. This technology is assistive for non-machine looms used to produce patchwork mats. Before this technology, PPDMS members only had the skills to make doormats with simple woven tools. The production of mats for one day is five mats. This technology's existence impacts the need for additional technical skills to operate the technology. Vocational education and training are crucial for PPDMS members so that the transformation of production progress goes well. After using this technology, the production of PPDMS mats significantly increased, where it can produce 30 mats a day. The production process is also more effective and saves time.

The description above attracted researchers to explore the impact of the use of assistive technology on the transformation of the vocational skills of disabled mat craftsmen in PPDMS. Hopefully, the findings from this study will illustrate the application of technology to increase the productivity of persons with disabilities. In particular, this research aims to determine the effect of using assistive technology on business progress and identify the tools needed to accelerate the doormat business with assistive technology.

RESEARCH METHOD

Setting

The research method uses qualitative case studies. This research involved the PPDMS disability group organization, whose address is Kapanewon Nglipar, Gunungkidul Regency, Yogyakarta Special Province, Indonesia. The reasons for choosing this group were because: (1) PPDMS is a community empowerment organization for persons with disabilities who are active in socio-economic activities; (2) PPDMS has a clear organizational structure such as a chairman, secretary, treasurer, and members; (3) PPDMS has several partner children; and (4) PPDMS has the potential to develop entrepreneurship and an inclusive economy.

The partner children owned by PPDMS are the Disabled Persons Group (KPD) Mitra Manunggal, KPD Mitra Ananda, KPD Dadapayu Sejahtera, KPD Mitra Handayani, and KPD Mitra Mandiri. PPDMS members primarily consist of persons with disabilities who are economically vulnerable. To empower its members, PPDMS has a patchwork doormat production activity. The proceeds from the sale of the mats are to meet the daily needs of its members.

Respondent

Respondents in this study consisted of chairs, secretaries, treasurers, and PPDMS members. The chairman, secretary, and treasurer are the core team that drives PPDMS activities, especially in the production of patchwork mats. PPDMS members are 35 people who have a role in producing patchwork mats. Almost all PPDMS members are persons with disabilities, but they have the enthusiasm and willingness to be independent.

Role of the Researcher

The researcher acts as a participant observer. Researchers were involved in the production of patchwork mats carried out by PPDMS. Besides acting as a participant observer, the researcher also acts as an interviewer. For more than eight months, the researchers observed and were involved in producing patchwork mats using assistive technology access for persons with disabilities. Researchers also conducted interviews with research respondents during the observation.

Data Collection Procedure

Data for this case study research were collected using participant observation and interviews. Participant observation was used to collect data on the advantages and disadvantages of using assistive technology in patchwork production. In-depth interviews were used to explore the impact of using assistive technology on improving the vocational skills of persons with disabilities. Researchers used field notes to record any research data obtained during participant observation.

Data Analysis

The research data analysis was carried out by adopting qualitative data analysis techniques from Miles and Huberman (1994), which consisted of data collection, data reduction, data display, and drawing conclusions. Data from participant observations, interviews, and field notes were read, reduced, and analyzed to answer research questions. The researcher summarizes and synthesizes the patterns that emerge as answers to research questions, including adding and deleting irrelevant data. The researcher also triangulated the data by triangulating sources and methods to ensure the validity of the data.

RESULT AND DISCUSSION

Result

Pre-conditions

Vocational skills for persons with disabilities in running a doormat business through assistive technology have recently been carried out. This was conveyed by informant 1 "before there was a vocational skills improvement program through assistive technology, we only practiced on our own and developed our own business. The results are unsatisfactory, and customers often receive complaints." This initial condition indicates minimal technological touch in mat production for persons with disabilities. Researchers explored the initial conditions through in-depth interviews with the PPDMS central board consisting of the chairman, secretary, treasurer, and field implementers, who were key informants who could be explored to explain the history of the doormat craft business.

The journey of the doormat business at PPDMS was first established in 2019 with ten active members with disabilities. These people have limitations or experience physical barriers, such as the disabled, blind, and families who have children with disabilities. So far, work has been done in each house with a manual woven tool the size of an average doormat. Every time they reach a specific target, families with disabilities collect them at PPDMS to be marketed conventionally to buyers using word-of-mouth. This concept is running slowly due to low product quality and the absence of contributions from various parties to run this mat business.

The vocational skills of doormat craftsmen at that time were mat weaving skills. The basic skills of weaving with conventional equipment cause the development of the mat business not to work optimally. This vocational skills analogy is equivalent to odd jobs with a minimum skill level. Regarding the educational background of the doormat workers, most workers come from elementary and junior high school graduates. Informant 1 revealed that "our human resources are minimal given their educational background and skills. We usually participate in training organized by the relevant Social Services, but they are not specifically relevant to our doormat business." Conventional manufacturing processes become obstacles in accelerating business performance.

"The demand for turnover at that time put much pressure on PPDMS to move to support the organization's economy and impact on family welfare," said informant 2. The primary vocational skills of woven mats for persons with disabilities have made the mats add value for social observers of persons with disabilities. The sense of community togetherness makes traditional woven doormat products sell well in the community.

Assistive Technology of Doormat Production

The development of doormat production increased when assistive technology arrived in 2020. This was conveyed by informant 1 "in 2020, the involvement of universities has made our doormat business move quickly. Appropriate technological assistance adapted to our conditions makes our work system efficient." This expression shows that technology in conventional businesses changes how people with disabilities work from manual to mechanical. This mechanization was introduced as an early transition to the advancement of doormat production technology. Informant 3, the partner's son, explained, "assistive technology for wheelchair users is needed to produce doormats with more effective and efficient assistance and methods." The contribution of assistive technology, even though it is included in the mechanical category, can still be accepted by the doormat craft business group.

The initial assistive technology known to doormat makers of persons with disabilities can help increase production by up to 200%. Informant 4 believes that "turnover resulting from the mechanized work of making doormats had doubled from the turnover before we were introduced to production technology. Therefore, the turnover we get can be used to run programs in PPDMS." Assistive technology can impact an organization's economic growth. People with disabilities need technological assistance to accelerate their performance and impact their welfare.

The mechanization of assistive technology in 2020 is in the form of non-machine looms accessible for persons with disabilities. The loom is made of wood that is managed by the surrounding environment. Informant 1 explained, "collaboration with universities has produced

assistive technology innovations for non-machine looms for our doormat business operations. The materials used use natural materials in our area, such as wood and joining techniques that use locked wood joints. In addition, in 2022, these mat craftsmen and universities will innovate in making mat weaving technology with a semi-automatic drive system. This technology is far more efficient than mechanization because the work system adopted is semi-automatic. Assistive technology can be an effective and efficient work transformation in managing the PPDMS mat business.

Vocational Skills of Persons with Disabilities in the Use of Assistive Technology

The trend of assistive technology in various businesses of people with disabilities is growing for those who are productive, creative, innovative, and collaborative with various parties. Informant 1 explained that "PPDMS grew rapidly because the internals was very supportive in encouraging us to be active in the organization inside and outside. Inside it means that we protect all members, and outside we constantly promote our work program. As a result, we participate in many vocational training pieces, both in-house and out-of-house training. The vocational skills possessed by persons with disabilities are influenced by organizational leadership, where the role of the leader is to liaise between the organization and stakeholders. Effective communication from the head of the organization can be a link in accelerating the vocational skills of persons with disabilities. They find it very difficult to develop their vocational skills if there is no special mentor to develop vocational skills. Additionally, vocational skills for using assistive technology are needed in the role of trainers and assistants.

The skill transition from self-taught and guided learning is found when using assistive technology in mat production. Skills in using non-machine and semi-automatic looms provide a variety of vocational skills. Vocational skills in operating non-machine looms can be done by certain people who understand tool mechanization. The observation shows that there are special techniques when the tools used are still semi-conventional. In moving the camran, the right and left levers must be paid attention to by the mat craftsmen so that the hands are not pinched, and the woven crossing process can be tight and well-formed.

In the yarn spinning process, persons with disabilities work in two stages: transferring the yarn to a special place to separate the threads. The following process is to transfer to the large roll by regularly pulling one small roll after another. The vocational skills of persons with disabilities began to shift when the initial conditions were not familiar with non-machine looms, shifting by gaining experience and skills in spinning yarn as a material for woven doormat hooks.

Vocational skills when using semi-automatic mat production machines differ from vocational skills using semi-conventional looms. Vocational skills for using semi-automatic machines are specifically for skilled workers who are proficient in weaving. Due to the limited number of tools, the operation is only done by certain people with basic skills, namely weaving and understanding how the machine works. This shows a change in vocational skills from skilled manual weaving to weaving with the help of looms and weaving using machines.

Doormat craftsmen from persons with disabilities experience significant vocational skills transformation with assistive technology. Especially for assistive technology in the production of doormats, the existence of these tools supports the vocational abilities of persons with disabilities, both hard and soft skills. Observations related to hard skills show that people with disabilities can produce up to 50 meters of mats daily or around 100 pcs. This production speed is supported by a machine work system that has been adapted to the size and ergonomics of workers.

Repeated observations on the work habits of workers in using assistive technology show that precision and accuracy in work grew significantly with an emphasis on quality and quantity control. In addition, the mass-produced workflow with assistive technology requires them to work beyond the target so that it can become a mat stock that can be marketed in large capacity. With this assistive technology, PPDMS has been able to market its products regularly and at a large capacity.

Discussion

Inclusion in the labor market and access to work for persons with disabilities has long been agreed upon by various countries, including Indonesia, through the United Nations Convention on

the Rights of Persons with Disabilities (UNCRPD). However, social inclusion has yet to materialize for persons with disabilities who are still very much excluded from social and political-economic life (Georgiadou et al., 2022). Based on the results, the number of people working is only around 44% of the total 17 million people with disabilities in Indonesia. Meanwhile, based on data provided by the International Labour Office (ILO) in 2015, around 15% of the world's population experience disabilities, and 80% or 785 million people are of working age.

Various factors can affect the work participation of persons with disabilities, and it is very important to understand for planning and government policies as well as recommendations for social workers to improve the welfare of persons with disabilities (Bartram & Cavanagh, 2019; Nofiani et al., 2022). For example, by providing assistive technology and improving vocational skills for persons with disabilities that are adapted to the conditions of each person with disabilities. Vocational skills for persons with disabilities are not only related to inclusion in the world of work but will also be related to the quality of life of persons with disabilities (Beyer et al., 2010; Foley et al., 2012; Verdugo et al., 2019). Because improving vocational skills is expected to support persons with disabilities in meeting quality standards of life and better facing challenges at work to reduce unemployment rates in this marginalized group (Smythe et al., 2020).

Based on the results of research conducted by Ebuenyi et al. (2020), it is known that apart from increasing vocational skills, the provision of assistive technology that is not suitable or difficult to accommodate is also a challenge for persons with disabilities in paving the way towards equality in work. Assistive technology has a positive impact on changing the lives of persons with disabilities, ensuring they can access every aspect of society, from daily activities that promote independent living skills to vocational and recreational activities (Paris & Miller, 2018).

The problem in PPDMS around 2020 is that they are slow in weaving mats due to the inaccessibility of the tools used by persons with physical disabilities. So it is necessary to develop an accessible ATBM for persons with physical disabilities. The presence of more accessible tools is expected to support and improve the quality of the products made and the speed of producing quality products. Because based on research conducted by (Collins & Collet-Klingenberg, 2018), there is a significant increase in persons with disabilities regarding their vocational abilities when they use assistive technology.

The development of mat looms to make them more accessible by embedding assistive technology is carried out through a need assessment process for users. This research has revealed some of the limitations and needs of prospective users to be very important to know. This is in line with the results of research conducted by Kisanga et al. (2018). An understanding of the conditions and needs of users with disabilities in designing friendly tools to overcome their challenges and increase the productivity of people with disabilities. In addition, the use of assistive technology support can also make it possible to eliminate stigmatization in society through forms of support that prioritize the abilities of persons with disabilities rather than the obstacles they have (Wicker et al., 2022).

CONCLUSION

Vocational and Technical teachers' perception of HOTS in Indonesia was very positive. It was indicated by an 80.05% level of agreement that students need to be equipped with HOTS. However, teachers still have significant difficulties integrating HOTS concepts and principles into their lesson plans and implementing HOTS in their classrooms. MOEC and relevant stakeholders need to acknowledge that HOTS teaching is a process rather than an event. Therefore, they should not target the deadline for HOTS implementation. From the MOEC perspective, support and facilitation should be provided with a focus on teacher empowerment. To speed up the transition process from the current practices towards teaching HOTS successfully, MOEC should provide a template of lesson plans and teaching materials as references. Workshop, in-house training (IHT), sabbatical teaching, and other activities should also be conducted. The number of pilot schools should be assigned as a model for other schools to implement successful HOTS teaching. Curriculum and other related programs at the university level should be reviewed and revised to meet the needs of HOTS teaching at vocational and technical schools.

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