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Praxis Participatory Ergonomics: Learning Facilities in Improving the Quality of Learning at Aqobah International School

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Abstract: The quality of learning in an educational institution is influenced by the availability and support of learning supporting infrastructure. Through the Participatory Ergonomics Praxis (PEP) it can stimulate the active participation of human resources (HR) in its contribution to improving the quality of learning in educational institutions. The purpose of this study was to determine the quality of learning with a participatory ergonomics approach to learning support facilities at Aqobah International School. The method used in this research is descriptive analysis with a qualitative approach. This study uses primary data obtained through interviews with key informants and secondary data in the form of supporting documents or literature relevant to the research. The data analysis technique in this study uses a model from Miles and Hubberman which consists of data reduction, data presentation and drawing conclusions. The results of the study show that: 1) Participatory Ergonomics Praxis (PEP) through learning support facilities encourages the achievement of improving the quality of learning. 2) The application of participatory ergonomics can increase the self-awareness of human resources (HR in educational institutions through their contribution in managing learning infrastructure well. 3) The quality of education can be improved through the support and availability of infrastructure facilities in their administration and their needs in accordance with the principles of the principle -Principles of participatory ergonomics praxis, The results of the study show that: 1) Participatory Ergonomics Praxis (PEP) through learning support facilities encourages the achievement of improving the quality of learning. 2) The application of participatory ergonomics can increase the self-awareness of human resources (HR in educational institutions through their contribution in managing learning infrastructure well. 3) The quality of education can be improved through the support and availability of infrastructure facilities in their administration and their needs in accordance with the principles of the principle -Principles of participatory ergonomics praxis, The results of the study show that: 1) Participatory Ergonomics Praxis (PEP) through learning support facilities encourages the achievement of improving the quality of learning. 2) The application of participatory ergonomics can increase the self-awareness of human resources (HR in educational institutions through their contribution in managing learning infrastructure well. 3) The quality of education can be improved through the support and availability of infrastructure facilities in their administration and their needs in accordance with the principles of the principle -Principles of participatory ergonomics praxis.

Keywords: Educational institutions, infrastructure, learning quality, praxis of participatory ergonomics, quality.

Introduction

The era of disruption in the 21st century demands more mature readiness in all matters, one of which is in the field of education. Education is one of the mainstays to prepare the human resources needed to face the challenges of the times. Teaching and learning activities are the most basic activities in educational institutions. This means that the success or failure of achieving learning objectives depends on the teaching and learning process experienced by students as students in schools. Every educational institution, both formal and non-formal, strives to provide and complete existing facilities in its institution to meet the needs of all school members, be it teachers, staff, students and parents. In an effort to complement existing facilities, an educational institution is said to be

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advanced if the availability of adequate facilities and infrastructure related to the teaching and learning process of students. The teaching and learning process can be improved with the support of adequate facilities and infrastructure. Educational facilities are supporting facilities for the continuity of the teaching and learning process. This is a factor that must be considered by an educational institution because it affects the continuity of the teaching and learning process in schools. Facilities and infrastructure are needed to support the teaching and learning process, so that students are more interested and easy to accept explanations from the teacher. If the facilities and infrastructure provided are lacking, it can affect students' interest in participating in the teaching and learning process. If students have an interest in participating in the teaching and learning process, then these factors can improve student achievement. The educational process does require facilities or equipment. However, all facilities or equipment must be provided as needed. If all equipment and facilities already exist, they must be used and managed properly and correctly. Management activities include: planning, procurement, supervision, storage, inventory and deletion, as well as structuring.

Good facilities and infrastructure can create a pleasant atmosphere, both for teachers and for students. One of the factors that support the success of educational programs in the learning process is facilities and infrastructure. Educational infrastructure is one of the resources that can be used as a benchmark for school quality. The infrastructure aspect needs continuous improvement along with the development of science and technology which is quite sophisticated. Facilities and infrastructure is one part of the input, while the input is one of the subsystems. Facilities and infrastructure really need to be implemented to support the skills of students who are ready to compete with the rapid development of technology. Infrastructure is an important part that needs to be prepared carefully and continuously so that it can be guaranteed that there will always be a smooth and efficient teaching and learning process. Interest is a sense of preference and a sense of interest in a thing or activity, without anyone telling. Interest in learning is a very important thing that must exist in students so that they are able to learn, because interest can also determine the learning achievement of students themselves.

Aqobah International School is a boarding school-based school with the strengthening of religious knowledge in it, this school is designed as an international standard school. Through this international standard school level, it is necessary to develop and maintain the quality of these schools in the future, so that schools can continue to produce skilled, superior and character outcomes that can answer future challenges as agents of the nation's successor. To maintain quality, strategic steps are needed as an effort to continue to produce outputs that have a positive impact in the future. Therefore, strengthening with participatory ergonomics is a solution in building the involvement of all stakeholders in it.

Participatory ergonomics is one of the elements that can optimize human resources in an educational institution, the role of participatory ergonomics in educational institutions is to involve all elements of stakeholders in achieving the goals set. By means of participatory ergonomics, it fosters the active involvement of all elements in facilitating learning activities. Through this active involvement, it is possible to unite the vision and mission in growing and improving learning. In a study conducted by Aznam Safitri & Anggarini in 2017 stated that implementing participatory ergonomics is an effective strategy in increasing productivity.(Anggraini, 2017). Thus, if the productivity in an institution can be built, it will be able to improve the quality in it. Therefore, the main problems in this study are (1) How can the quality of facilities and infrastructure at Aqobah International School be built through participatory ergonomics? (2) How the mechanism of the role of participatory ergonomics can improve the quality of learning at Aqobah International School. The purpose of this study is to determine the role of participatory ergonomics as an effort to improve the quality of learning at Aqobah International School.

Materials and Methods

Study Area

This research was conducted at Aqobah International School which is located at Jalan Bakalan 1, Dusun Ngasem, Sawah Area, Jombok, Ngoro District, Jombang Regency, 61473. This school is led by KH. A Junaidi Hidayat, SH as Muasis at Aqobah International School. Through the school's philosophy, "All children are special and can become champions. Therefore, in its mission, the school continues to optimize the process of learning activities by carrying out effective and efficient learning activities.

Research methods

This research uses a qualitative descriptive approach. The researcher used a triangulation technique approach to extract information from key information through interviews, in-depth observations and documentation studies. Collecting data in this study used two sources, namely primary data in the form of in-depth interviews with research subjects, namely the principal, vice principal of curriculum, head of infrastructure and subject teachers at the school, as well as conducting observations in the Prambanan Muhammadiyah Vocational School. While the secondary data in this study is in the form of quality documents at Aqobah International School along with other relevant supporting documents. Researchers in analyzing data using the concept of Miles and Huberman which consists of data collection, data presentation.

Result and Discussion

Ergonomics comes from the Greek words ergon (work) and nomos (rules). Ergonomics is defined as the science, technology and art of harmonizing tools, working methods and the environment to human capabilities, abilities and limitations so as to obtain healthy, safe, comfortable and efficient conditions and environments so as to achieve the highest productivity (Manuaba, 2003). Ergonomics is very necessary in an activity that involves humans in it by taking into account the abilities and demands of the task. Human abilities are largely determined by profile factors, physiological capacities, psychological capacities and biomechanical capacities, while task demands are influenced by the characteristics of the work material, the tasks to be performed, the organization and the environment in which the work is carried out (Manuaba, 2003).

Utilization of ergonomic principles in designing a product makes the product more user-friendly, satisfying, comfortable and safe (Velasco, 2002). To facilitate and reduce the negative impacts that may arise, the application of ergonomics should use simple language, the language of the company or the language of the community. A systemic, holistic, interdisciplinary and participatory approach (SHIP) should always be used in solving problems or planning something so that no more problems are left behind or arise in the future (Manuaba, 2004). In addition, the SHIP approach should be applied in the selection and transfer of technology so that it becomes effective, with the requirements: (a) technically the results are better; (b) economically more profitable; (c) socially culturally acceptable; (d) health can be guaranteed and accounted for; (e) efficient in energy use; and (f) do not damage the environment (Caroyan, 1998)

From several ergonomics improvements that have been made by experts abroad whose data recording is good, neat and orderly, it is evident that the application of ergonomics is able to provide economic benefits, improve work safety and comfort. In fact, it has come to the conclusion that Good ergonomics is good economic. The point is, if ergonomics can be applied properly and correctly it will be able to provide better benefits. This can be accepted and justified, because the results achieved through the application of good and correct ergonomics provide benefits: (a) the use of muscle power can be more efficient; (b) more efficient use of time; (c) reduced fatigue; (d) work accidents are reduced or eliminated; (e) work-related illnesses are reduced; (f) increased job comfort and satisfaction; (g) increased work efficiency; (h) increased product quality and work productivity; (i) work errors are reduced and damage is minimized; and (j) expenses to overcome the consequences of occupational

accidents and diseases can be reduced which consequently can reduce operational costs (Manuaba, 2003).

Macroergonomics has been formally recognized as a sub-discipline in the last two decades (Kompier, 1997). The social aspects used to determine the implications of the growth, development and effectiveness of the human factors discipline or ergonomics are: (1) making breakthroughs in technology to make fundamental changes to the nature of work; (2) determine work ability related to the level of education, experience and maturity or maturity of a person; (3) provide a fundamental difference value after World War II seen from several existing facts in the form of participation in policy making, the ability to speak, the existence of social satisfaction related to work; (4) overcome the incompetence and weakness of treatment in microergonomics to reduce lost work time caused by accidents and occupational diseases and increase productivity; and (5) improving workplace conditions and product legitimacy based on safe ergonomic design (Kompier, 1997). Usually teachers and students pay less attention to the seats they sit in. Whereas the seat is a tool that plays an important role, especially for those who do activities while sitting like what students do at school. A complete seat (chair) must at least have legs, seat mats, waist and back and armrests (Nala, 1994). So that the seat is comfortable to use when studying,

At Aqobah International School, learning activities are supported by adequate learning facilities with a modern-based study room design concept by applying and implementing digital media as a means of supporting learning activities. Based on the results of observations in the school environment, the topic of attention for researchers is the infrastructure sector supporting learning activities. Because with the availability of adequate facilities, ergonomic and comfortable design of infrastructure facilities will increase comfort in the learning process carried out by students. Of course, in this case, it is of great concern to all elements of the school component in designing and preparing the availability of infrastructure in accordance with the standard operating procedures that have been determined. And in its implementation, the infrastructure sector as an effort to improve the quality of learning can be taken through strategic steps through the role of participatory ergonomics (SHIP) in these educational institutions (Nagamachi, 1995).

In this case, it is necessary to standardize the body measurements (anthropometry) of Indonesian people in general, so that in designing a seat (chair) one can refer to these measurements. If these standard measurements do not yet exist, anthropometric measurements can be made of students who will use the seat. But if the student's anthropometric data is also not available, then the following seating requirements can be used (Nala, 1994). The height of the seat mat from the floor is 38-54 cm (height of the sole of the foot to the back of the knee or popliteal). 2. The seat should be slightly tilted back (14˚-24˚ from the horizontal plane or from the floor). This tilt is necessary, so that the body does not sag forward when sitting 3. The front edge of the seat mat is slightly rounded to avoid pressure on the underside of the thighs. This front end can be raised 4˚-6˚ from the seat base. 4. The area of the seat mat should be adjusted to the size of the buttocks, namely: 40-45 cm transverse and 38-42 cm longitudinal. 5. Waist and backrests should be slightly tilted back at an angle of 105˚ – 110˚ to the seat mat. The shape of the waist and back rests should be adjusted to the curve of the vertebrae in the human body. The backrest will support the back and waist well if the size is 48-50 cm high and 32-36 cm wide. Waist and backrests should be slightly tilted back at an angle of 105˚- 110 ˚ to the seat mat. The shape of the waist and back rests should be adjusted to the curve of the vertebrae in the human body. The backrest will support the back and waist well if the size is 48-50 cm high and 32-36 cm wide. Waist and backrests should be slightly tilted back at an angle of 105˚-110˚ to the seat mat. The shape of the waist and back rests should be adjusted to the curve of the vertebrae in the human body. The backrest will support the back and waist well if the size is 48-50 cm high and 32-36 cm wide.

This knowledge plays an important role in increasing the understanding of teachers as educators about the rules that must be followed related to student seating (Nugroho, 2014). Study

table is a table that is used as a base when doing learning activities. If the study table is too high, the shoulders will be raised more often when writing or putting hands on the table and if it is too low, the posture will be bent when writing. This posture can cause back pain and pain in the neck and shoulder muscles. Related to this problem, (Sutajaya, 2001) reported that improving working conditions referring to ergonomics rules in using a microscope at the Biology Laboratory of STKIP Singaraja reduced disorders of the musculoskeletal system by 54, 03 % ($p < 0.05$). To overcome this problem, it is necessary to choose a study table that suits the wearer. In this case, (Kogi, 2006) states that the height of the desk for writing and reading in a sitting position is between 74 – 78 cm for men and between 70 – 74 cm for women. Meanwhile, (James Dul & Weerdmeester. B, 2003) stated that for activities that often use the eyes, hands and arms, the work area should be at 0-15 cm above elbow height. This knowledge plays an important role in efforts to increase teachers' understanding of the benefits of ergonomic desks for the health and comfort of students in the learning process. The blackboard which is used as a learning tool is sometimes placed in a place that is not ergonomic.

To overcome this problem, it is necessary to know the ergonomics rules that can be used as a reference in the placement of the whiteboard. In this case (Kogi, 2006) recommends that eye rotation when looking at an object, no more than 5˚ above the horizontal plane and 30˚ below the horizontal plane. This means that the placement of the blackboard should take into account the students sitting in the front and the back, so that their eye rotation remains within the range mentioned above. In other words, the height of the blackboard must refer to the eye height of students in a sitting position (James Dul & Weerdmeester. B, 2003). In addition, the problem of glare must also be taken into account, because glare causes discomfort and reduces the eye's ability to see. Glare occurs because there are parts of the field of view that are too bright compared to the general lighting level in the area. Glare can be avoided by: (1) locating the right light source against the workplace or vice versa; (2) reduce the intensity of source lighting; (3) replace the shiny material; (4) provide adequate lighting on the background causing the glare; and (5) removing contrast (Manuaba, 2004a). Teachers' understanding of ergonomics studies in whiteboard placement and glare factors that can interfere with the learning process can be used as an effort to increase teacher professionalism in managing learning facilities. Good lighting is very important, so that work can be done correctly and in comfortable situations. In addition, when doing activities, you can see objects clearly and quickly, so it doesn't tire the eyes. For learning activities (reading and writing) an illumination intensity of 350-700 lux is required (Grandjean, 1988). This data is supported by the findings of Antari (2004) who reported that the lighting intensity in the micro counseling room of IKIP Singaraja was 398.75 lux in the treatment group and 402.56 lux in the control group. To obtain illumination of 600 lux, how many watts of TL lamp is needed in an "a" m2 room, can be seen in the following formula (Manuaba, 2004a). This data is supported by the findings of Antari (2004) who reported that the lighting intensity in the micro counseling room of IKIP Singaraja was 398.75 lux in the treatment group and 402.56 lux in the control group. To obtain illumination of 600 lux, how many watts of TL lamp is needed in an "a" m2 room, can be seen in the following formula (Manuaba, 2004a). This data is supported by the findings of Antari (2004) who reported that the lighting intensity in the micro counseling room of IKIP Singaraja was 398.75 lux in the treatment group and 402.56 lux in the control group. To obtain illumination of 600 lux, how many watts of TL lamp is needed in an "a" m2 room, can be seen in the following formula (Manuaba, 2004a).

Learning through the SHIP approach requires a shift in the role of students who initially only acted as passive recipients of information to become: (a) active and innovative learners; (b) students who are able to think critically and creatively in analyzing and applying the facts, concepts and principles learned; (c) students who are able to work in a team in a conducive manner; (d) students who are able to examine problems systematically, holistically and interdisciplinary; and (e) students who are sensitive to problems that exist in society which are explored in a participatory manner

(Sutajaya, 2006). Thus, learning through the SHIP approach is expected to improve the quality of student health and the outcome of the learning process (Steven Visser, Henk F Van Der Molen, 2014).

In the SHIP approach it is emphasized that problems must be solved: (a) systemically or through a systems approach, where all factors that are in one system and are expected to cause problems must be taken into account so that no more problems are left behind or new problems arise as a result of the problem. system linkage; (b) holistic means that all factors or systems related or predicted to be related to the existing problem, must be solved proactively and comprehensively; (c) interdisciplinary means that all related disciplines must be utilized, because the more complex the existing problems are assumed not to be solved optimally if only studied through one discipline, so it is necessary to conduct cross-disciplinary studies; and (d) participatory means that everyone involved in solving the problem must be involved from the start to the maximum so that a conducive working mechanism can be realized and quality products are obtained in accordance with the demands of the times (Sutajaya, 2006). Thus the SHIP approach can be interpreted as an effort to empower someone to be more open, transparent, delegated, collaborative, able to respect differences, able to respect time and conflict management, able to work in teams, able to reduce arrogance, not monopolizing time, and aware of democracy and rights. -human rights (Manuaba, 2004a). The consequence is that through the SHIP approach, a balance can be made between the demands of the task (workload) and the capacities (ability, abilities and limitations) of human beings so that they can work effectively, comfortably, safely, healthy and efficient and achieve the highest productivity (Manuaba, 2004a). The steps in learning through the SHIP approach are: (1) three discussion groups are formed which are carried out by lottery so that each group consists of 5 - 6 participants plus one facilitator; (2) at the beginning of each lesson for each subject, a brainstorming is conducted which is guided by a facilitator and written on small paper and pasted on the blackboard or wall where the results of this work will be assessed by the facilitator and teacher who also acts as a moderator; (3) students go around observing the work of other groups guided by the facilitator; (4) students make a list of problems that refer to the results of the brainstorming in activity I and written on large paper and then pasted on the blackboard or wall and presented and assessed by the facilitator and moderator; (5) students answer each problem made by other groups and the answers are posted next to the list of problems answered and assessed by the facilitator and moderator; (6) each group makes a conclusion or summary for each other group's answers and combines it with the answers from its own group and is linked to specific learning objectives in the textbook, where the results of the work are assessed by the facilitator and moderator. The teacher's knowledge of the SHIP approach can be used as an additional insight in the application of innovative learning (Cole Dc, Rivilis I, Van Eerd D, Cullen KL, Irvin E, 2005).

Constraints that are often encountered related to the socialization of ergonomics in learning in order to improve teacher professionalism are: (1) not yet known, understood and understood about ergonomics rules that can be used as a reference or standard in designing facilities and infrastructure as well as the learning process; (2) if the rules of ergonomics are known, but because they are more concerned with certain methods in learning, the standards that apply in ergonomics are often ignored or seconded; (3) it is not known the consequences that will arise if the facilities and infrastructure as well as learning methods are not in accordance with ergonomics rules so that the learning process does not consider the abilities, abilities, and physical limitations of students; (4) there are teachers who are somewhat arrogant and think that what they apply in the learning process is good and correct, even though they have not included ergonomic elements or have not referred to physiological responses to organs that will receive negative impacts from a prolonged learning process accompanied by non-ergonomic facilities and infrastructure; (5) due to economic considerations, time allocation, and costs that must be incurred to design an ergonomic study room, resulting in ergonomics references are often

ignored because there is an assumption that if you include ergonomics rules, the costs will swell; and (6) the application of ergonomics in learning that requires innovative, proactive, and productive teachers is often not available in a school so that very applicable ergonomic principles remain within the limits of discourse (Kuorinka, 1997).

Conclusions

From the results of the study, it can be concluded as follows. (1) Teachers' knowledge of ergonomics principles in learning is very relevant in efforts to improve quality in improving learning; (2) Teachers' understanding of the role of participatory ergonomics principles (SHIP) in learning and the impact caused by non-ergonomic facilities and infrastructure can increase their knowledge in classroom management efforts; and (3) the obstacles faced in disseminating the principles of ergonomics in learning can be used as challenges as well as opportunities in the application of ergonomics in schools.

Suggestions that seem important to be conveyed in this study are: (1) in designing or redesigning study rooms as an effort to improve the quality of learning, it is recommended to always apply the rules of participatory ergonomics (2) the rules of participatory ergonomics must be applied from an early age, so that it does not requires a large amount of money or no money is wasted which only innovative, proactive, and productive teachers can do; and (3) the professionalism of teachers should be equipped with competence in the field of ergonomics so that they are able to manage classes effectively, comfortably, safely, healthily, and efficiently.

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