Concepts of aging at work from an activity-centered ergonomics point of view

Gabriela Salomé Nunes¹, João Alberto Camarotto¹

¹Department of Production Engineering, São Carlos, São Paulo, Brazil

Global aging is a current and recognized phenomenon. From a social point of view, it can be considered one of the megatrends of this century, and it can be already observed in certain regions, such as Europe, the continent with the highest proportion of older people (SHARE, 2012). In some countries, such as Brazil, this phenomenon can be observed by comparing the current population pyramid (also called age pyramid) with the population projection for the next 30 years, which shows a tendency to structural inversion, so that in 2040, the number of people aged 60 and 64 is expected to exceed the number of children and adolescents under the age of 14 (IBGE- Brazilian Institute of Geography and Statistics).

This inverted population pyramid raises the issue of the relationship between aging and work activity, an association that has been made by the most varied areas of knowledge including social, health and economic sciences. Although each area has its peculiarities related to this topic, they have a common characteristic: the studies conducted over the past decade have focused primarily on the losses resulting from the aging process disregarding the positive effects that this process can have on the occupational activity. Among the many studies published during this period of time are: FOLKARD (2008), who addressed the issue of safety related to shift work activities that are performed by older workers due to age-related changes in sleep; KOOJI et. al (2008), who carried out a literature review in order to understand the factors affecting motivation for older workers to work; and BERECKI-GISOLF et. al (2012), who assessed the impact of the aging workforce and the return to work process.

It is well known that aging at work brings about physical and psychological changes (RHODES, 1993), especially in the cases of very old age, and it can also be perceived during different time periods of active working life (LAVILLE & VOLKOFF, 2007). Workers performing the same activities for an extended period of time also improve their skills and gain experience (FALZON, 2007), which has been considered as one of the positive aspects of the relationship between aging and work and can influence individual performance (ILMARINEN, 2001). It is important to note that although the relationship between age and years of work experience may cause negative changes in physical and basic cognitive processes, positive effects can also be observed.

The analysis of an activity refers to the observation and reflection of work in comparison with its other elements, including personal dimension. The strategies used by workers to accomplish tasks by bridging the gap between prescribed work and real work establish the difference between task and activity; important concept of this method and that can show the knowledge mobilized during the action (GUÉRIN, 2001).

Therefore, considering the contributions of activity-centered ergonomics and the importance of the positive aspects associated with aging and work, a review of the main approaches and a case study were carried out aiming at understanding how aging at work can contribute to skill acquisition evidencing knowledge mobilization and demystifying the negative relationship between chronological and occupational aging.

Knowing the benefits of this relationship can contribute to the introduction of measures that recognize the value of experienced workers and guide these professionals to assist apprentices in skill acquisition.

Practitioner Summary

In the section 1 it's present the theoretical grounds used for conducting the case study. In section 2 the methods and collection procedures used will be described. The section 3 presents the collected results and finally, in Section 4 the conclusion of the work.

Keywords: aging; work; activity-centered ergonomics.
1. Introduction

The current phenomenon of global aging has generated concern about its impact on the work activity and the importance is related to the changes that accompany this process. This is a phenomenon that occurs throughout life so that every worker can be regarded as a person aging stage (ILMARINEN, 2001).

It is important to consider the changes resulting from this process can occur in two ways: on the decline capacity and the arrangements of construction experience, characterizing what is considered aging at work; or transformations that can facilitate or hinder the realization of labor activity, characterizing the aging in relation to work. The problem occurs when there is an imbalance between the functional capacity of individuals and the requirements of the action (LAVILLE; VOLKOFF, 2007).

According DEJOURS, DESSORS and DESRLAUX (1993) work can be a deterioration factor but can also be set up in an equalizer and development. The possibility of the second hypothesis is linked to a job that allows each individual to combine the physical needs to the desire to perform the task (DEJOURS; DESSORS; DESRLAUX, 1993). So we can also mention that this process generates evolution of workers’ skills and increases the experience (LAVILLE; VOLKOFF, 2007) which has been touted as one of the positive aspects of the relationship between aging and work, therefore, can influence the performance of worker (ILMARINEN, 2001).

Thus, performing the same activity for a long period generates a control process for balance between the factors and the development decline and both interact with the activity performed may enhance the deterioration process and enrich the experience or not, according to the characteristics of work (LAVILLE; VOLKOFF, 2007). This adjustment allows operators to adjust the mode of carrying out the activity is based on its experience and resources available, allowing adapt the way of doing the job and also aiming to preserve their health (LAVILLE; VOLKOFF, 2007).

Considering the lack of studies aimed at understanding the adjustments arising from the aging on labor activity and the lack of discussions about the acquisition of skills that accompany this process, it was considered important to explore the interaction between aging and applied work activity to perform an activity in a real environment through a case study. The main objective of the study is to identify how the aging process is related to the work activity of the productive sector operators through the understanding of the regulatory adjustments resulting from the physical, cognitive and experience factor based on the ergonomics point of view activity.

2. Method and Data Collection

In order to understand the relationship between aging and work in a real environment, we conducted a case study, explanatory and longitudinal character to a single sector of a Brazilian industry aeronautical industry that manufactures aircraft of different sizes, models and capacities to meet different markets. This research was carried out during the years 2014 and 2015.
Participants were five male operators, structural assembly platers, with a mean age of 31 years as shown in the following table. Was selected operators with different times in carrying out the structural assembly in order to understand differences in the experience factor.

<table>
<thead>
<tr>
<th>Variable</th>
<th>P1</th>
<th>P2</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
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<tbody>
<tr>
<td>Age</td>
<td>36</td>
<td>35</td>
<td>34</td>
<td>31</td>
<td>19</td>
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<tr>
<td>Experience of time in current position</td>
<td>8 years</td>
<td>12 years and 4 month</td>
<td>3 month</td>
<td>1 year and 6 months</td>
<td>4 month</td>
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The data collection took place through six industry visits comprising the steps of: Knowledge of the technical work process; Conducting interviews and; Description of work operations by monitoring activities carried out by them. For all interviews was used an initial list of questions so that new issues could arise.

During the individual interviews, the operators were asked to complete the questionnaire WAI (Ability Index for Work), produced by a Finnish group through research that were based on studies conducted in Finland, for a decade (TUOMI et al., 2005) designed to assess the ability to work from the perception of the operator itself (MARTINEZ; LATORRE; FISCHER, 2009). This questionnaire has internal validity and has been translated and validated for the Brazilian population (MARTINEZ; LATORRE; FISCHER, 2009).

The questionnaire was requested due to the fact that work ability be an important indicator to encompass aspects of physical health, psychosocial well-being, individual competence and working conditions being considered as one of the bases for the welfare (ILMARINEN, 2006).

In conjunction with the interviews, we used the method of analysis of the activity that is the observation and reflection of the activity in comparison with the other elements of the work, considering it to the personal and social dimension. This approach presents itself as an effective method of demonstrating the link between age and work experience through the analysis of observable behaviors of experienced operators on the variability, especially when compared to operating modes adopted by learners operators in a structural assembly sector.

3. Results

The data show that operators had a similar ages except A3 (youngest operator area), however, differences were observed in relation to the working time in carrying out the structural assembly. Thus, it can be considered that the differences relate to factors not experience aging.

When asked about the production process operators had similar answers, but differences in the forms of verbalization of information could be observed. Veterans operators have some difficulty initially verbalize the activities carried out as apprentices participants responded promptly and described the process with a greater detail.
“It is a complex assembly, because it is practically responsible for the flight of the aircraft. Its complicated to explain. I drilling, riveting, adjustment, in short, do everything.” (P1)

“Structural assembly is manufacturing the wing to mount the complete structure of aircraft ranging from wiring, electrical part, involves everything. You bore, adjust parts, depending on the area you’re sealing you do too, (...) you perform many functions, but all within the structure in the case.” (A1)

It is believed that this difference is due to the fact that the most experienced operators to work for a long period in this assembly, have already incorporated this knowledge so that they have become tacit information, difficult to verbalize, as defined by POLANYI (1983). However, apprentices operators, still in the training phase, have outlined knowledge, but have not yet been incorporated due to low experience in this activity.

Differences were observed when questioned about the level of difficulty of the activities. The activity of drilling and expand, identified as simpler by experienced operators, has been cited as the most difficult for the novice operators due to overwhelming demand attention it requires.

“Nothing is simple to do, does not have what you do that is not a detail, part of drilling is very detailed, you have to be very concentrated to do, even more attention. Have to pay attention to not make mistakes, because depending on if you kill a hole, you lose a wing that.” (A1)

When asked about the use of tools, differences were also observed, as the justification of the veterans operators refers will safety and health protection, while the justification of the three apprentices refers to the preservation of tools. Another interesting fact in the words of one of the veterans operators was that currently do not notice difficulties in using any of the tools, but at first had and that this difficulty was also related product protection will subsequently came to dominate their use:

“Galifon because if you slip up on the finger is gone. (P1)

“It’s a difficult question, I do not know. It’s 12 years working with these tools, for me is all normal. In the beginning was the hammer because otherwise could mark the part.” (P2)

Four of the five study participants said they did not observe influence of age on completing the work but consider that younger operators have advantages in performing high physical demand tasks.

" The difference is not related to age" (P2)
“I do not see any difference, unless entered a man of 50 years to work, he may have difficulty by his age, you know the old comes.” (A2)

Operators were asked at various times about the influence of age on the day of work activity, however, at no time considered the chronological age as a factor related to competence, citing several times that the experience and individual characteristics have greater influence on worker skills that the age factor. However, experience can be mentioned that an important factor considered as being inversely proportional to the time of completion of the task.

“When person is very young you see the difference you know, because as you run, the person who has experience ends up being faster, but not that it (younger person) will not do.” (A2)

Beginners said never able to choose how to conduct their activities while the sponsors said they can often make this choice. It is believed that this difference occurs due to the existence / absence of strategies already incorporated by veteran operators as apprentices operators are still learning the ropes transmitted to them. This shows that the knowledge of performing an activity allows for increased call leeway that allows operators to use their knowledge and experience to set the embodiment of the activity, increases the space of regulation. It should be remembered that the regulation consists in adjusting the mode of carrying out the activity based not only on experience but also on the resources available in addition to seeking the preservation of health (LAVILLE; VOLKOFF, 2007).

Individual characteristics are important determinants are in the WAI score. It was possible to observe a score difference between apprentices and veterans which generated differences from the index rating. During the interviews, the veterans operators proved to be discouraged because of the physical stress caused by work and in relation to growth prospects in the company, which has been translated into a capacity for work described as moderate to good according to the classification of the questionnaire while three apprentices had their capacity for work classified as great.

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<tr>
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<td>Own prognosis of the ability to work in two years</td>
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<td>Mental resources</td>
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<td>Final score</td>
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Classification: Moderate, Good, Great

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The monitoring of activities carried out by operators occurred in a period of 5 hours. Operators working in a wing already closed willing in the hangar. Laterally to the segment had a bench with various tools and drawings for the operators to undertake the reading before beginning assembly. It was observed that operators communicate all the time. The veteran operator determined the activities that should be carried out and monitored by novice operator and explained all the steps to take while younger watched carefully.

COLONIA-WILLNER (1998) states that the ability of older operators has to deal with complex problems characterize a crucial benefit the maintenance of these operators work environment, this can be observed in the productive sector through the calm and security with the veteran operator defined what should be done. The same was evidenced by the speech of the operators apprentices who said more experienced operators have greater stability to handle the occurrence of errors during the performance of activities, while beginners tend to get upset and to punish yourself mentally.

4. Conclusion

Considering the aging factor we mention that, for structural assembly of aircraft, according to the information brought by operators, there is a prevalence of developmental factors in relation to the decline factors in the existing regulation between aging and experience.

In summary, comparison of responses obtained through individual interviews allowed to observe the concern of veterans operators in relation to their health and the organization of their work while the interview with learners operators underlined the concern in meeting the organization's objectives and expectations and the search for the acquisition of knowledge and competence.

In addition, we observed that the veteran operator seeking always set any embodiment of the activity before starting it while the apprentice operator presented hurry to present the results.

As a work of limitations can point out the absence of direct measurements that characterize the variables age, experience and competence. In addition, for extrapolation of the data found, it would be necessary to interview a larger number of operators in order to use data classification by groups (veterans and apprentices) and also compare gender differences (male and female).

References


