Chapter 13
Usability on Standard Work Visuals in Manufacturing

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ABSTRACT

This chapter presents a proposed checklist to determine the usability levels of standard work visuals (SWVs) used in manufacturing processes. The checklist considers attributes in terms of easy to use and methods facilitating their design. It is because there were not enough studies that address both attributes of use and methods to design visuals. Specifically, flow diagrams, procedures lesson, and one-point lessons as visuals are studied in this chapter. The theoretical departure covered diverse areas, and activity theory served as conceptual framework. So, the overall purpose of this chapter is to (1) explore the defined specifications for design visuals, (2) propose a checklist to determine the levels of usability, and (3) evaluate the visuals utilized in two manufacturing companies serving as cases of study. Finally, the results have permitted the convenience of using the proposed checklist for checking the design and utilization of the visuals in manufacturing processes to be proven.

INTRODUCTION

The visuals are widely used in the manufacturing industry. Therefore, signs, labels, cards, posters, graphics, quick lessons, banners, displays or other means of information are commonly placed in the physical work areas (Brady, 2012). With their use, engineers and managers intend to create safe and efficient workplaces seeking the reduction and at best, the elimination of constant training and supervision. Apart
from the expected benefits, the use of these pursues other assets in terms of productivity and safety. They assume that if employees have available the information required or needed at a given time in their work areas, they can perform your activities efficiently, effectively and safely (Greif, 1991). So, the types of visuals used in manufacturing are named visuals, work visuals, or standard work visuals (visuals, WVs or SWVs -used interchangeably-).

Particularly, the visuals have been developed by lean practitioners as communication aids and are used to help on driving operations and processes in real time (Parry & Turner, 2006). Those visuals serve to support the consolidation of standards and to point out abnormalities in the production areas. It is common that personnel or individuals deal with visuals aimed to reinforce and guarantee the operational standard work by implicitly exhibiting efficient work methods. The practice on designing visuals seeks to eliminate or reduce variations resulting in defects, which increase quality problems. This is stressed by some studies that have discussed the importance of visualization and visual means in the manufacturing sector (Bevilacqua, et al., 2013; Steenkamp, et al., 2017; Tjell, & Bosch-Sijtsema, 2015). For example, work visuals have been used in manufacturing processes in the industrial sectors considered of low propensity to error, such as the medical, aeronautical, among others sectors. These visuals are primarily thought to exhibit the efficient work process underscoring expected activities from individuals.

Then, this opened new areas of study giving importance to use of visuals in context. According to Tjell, & Bosch-Sijtsema (2015), Visual Management (VM), as area of interest, has emerged during the past decades within manufacturing and service organizations, as a system that through visualization enables the employees to better understand their role and contribution in relation to both their own organizational values and customer needs. For instance, 5S, Standard Work (SW), and Total Productive Maintenance (TPM) are three concepts extracted from the Lean Manufacturing (LM) that are commonly applied to capture the relation between the organizations and their customers into the form of work visuals. The origin of the link formed between the uses of visuals in LM is named Visual Factory (VF). In order to remind this, it is usual that flow diagrams, procedures, and lessons of a point are collocated into the work areas to achieve it. So, these visuals are seen as a product to reinforce that relationship and should be designed with this aim.

In the current literature, there were found some suggestions to design those visuals (Niebel, Freivalds & Osuna, 2004; Niebel & Benjamin, 1996). Nevertheless, there are not enough studies that enlist specifications for designing SWVs and how to address those specifications in a holistic approach considering the expected activities from individuals. So, in order to fill this gap of knowledge, it is important to capture the relationship between the organization and customers through the development of work efficiently, effectively and safely. Additionally, the consideration of the individuals, who are the organizational elements, that creates value in this relationship.

So, the overall purpose of this chapter is to (a) explore the defined specifications for designing visuals, (b) propose a checklist to determine the level of usability of the visuals; and, (c) evaluate the visuals of two manufacturing companies serving as cases of study. Initially, it presents a theoretical departure covering LM and VF, usability and AT areas. After, some methodologies are explored continuing with the methodology that serves to put the basis to develop the checklist. Then, the proposed checklist is presented. It is followed by the cases of study showing the evaluation of the level of usability of work visuals used in two manufacturing organizations. Finally, conclusion, recommendations and the future direction of research are displayed.
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