Safety Training

Subjects: Health Care Sciences & Services
Contributor: Patrycja Kabiesz

The purpose of safety training in acquiring knowledge about safety at work is to obtain information about the hazards present in the workplace and the necessary measures worn or kept by employees to protect him/her from one or more hazards associated with the presence of dangerous or harmful factors in the work environment (types of PPE).

Keywords: safety training ; didactics ; self-education ; safety culture ; modern technology ; web applications ; e-learning ; Moodle platform

1. Introduction

Safety at work is a topic of great importance and interest to both businesses and researchers [1]. Every day, people die as a result of occupational accidents or work-related diseases—more than 2.78 million deaths per year. Additionally, there are some 374 million non-fatal work-related injuries each year, resulting in more than 4 days of absences from work. The human cost of this daily adversity is vast, and the economic burden of poor occupational safety and health practices is estimated at 3.94 percent of global Gross Domestic Product each year [2]. According to Eurostat (2019a), most fatal occupational accidents occur in the construction, transport and storage, manufacturing and agriculture, and forestry and fishing sectors. In contrast, the highest number of non-fatal occupational accidents occurs in manufacturing, wholesale and retail trade, construction, and health care and social assistance [3]. Because of the high number of occupational accidents, it is necessary to improve the level of safety by creating awareness among workers. The SARS-CoV-2 coronavirus crisis has highlighted the critical importance of health, including health and safety in the workplace. The European Commission has developed a new strategic framework on occupational safety and health (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions on an EU Strategic Framework on Health and Safety at Work 2021–2027) [4]. This initiative builds on the previous EU Strategic Framework 2014–2020 and aims to maintain and raise health and safety standards for European Union workers. This strategic framework is particularly relevant during this extraordinary period and contains information about new risks that arise from new ways of working, new technologies and digitalization, and the COVID-19 pandemic. In addition, the framework encourages European Union member states to promote occupational safety activities, including worker training. Undoubtedly, occupational safety training raises awareness and improves workers' competence, which is recognized as an effective way to reduce occupational accidents and improve workers' health [5].

Improving occupational safety training in the manufacturing industry is very important due to the high number of occupational accidents and the increasing hiring of foreign workers, which creates problems related to language barriers and job instability.

2. Effectiveness of Safety Training

Training is a planned process of changing the action/behavior of a specific group of employees built by filling the competence deficit in terms of attitudes, knowledge and skills of people, ultimately giving identifiable business benefits to the company [6][7]. There are three main goals of training: the acquisition of knowledge, skills and attitudes. The first objective refers to the acquisition of new knowledge and the expansion of existing knowledge in trainees, and the knowledge gain can be measured by a pre-training and post-training test. The second objective refers to the acquisition of skills or the improvement of existing skills, which can be seen through the change in a person's behavior after training. Finally, the third objective refers to attitude, which is what the participant feels after the training, including motivation and self-efficacy [8][9]. **Figure 1** shows the main objectives of training.

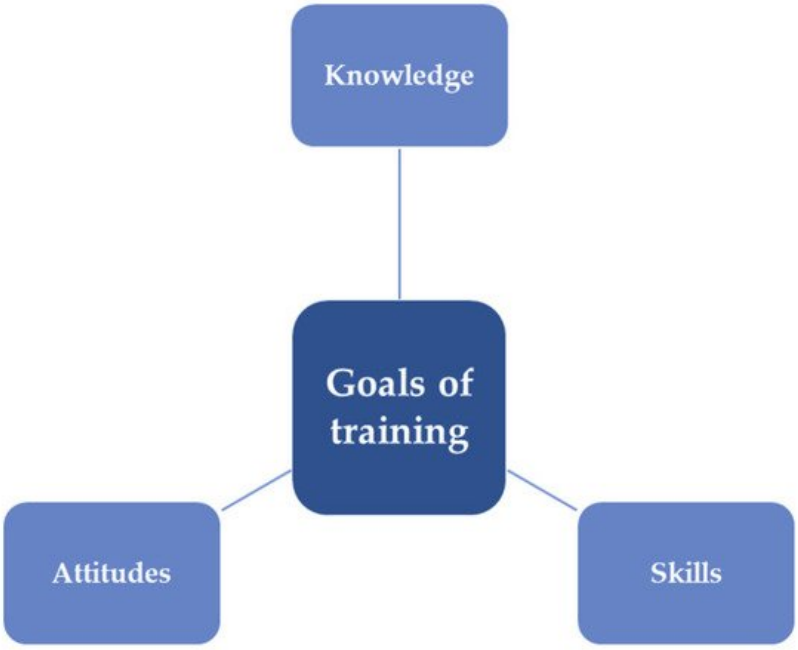

Figure 1. Goals of training.

Training is effective when it is transferred to the work environment by implementing improvements and improvement activities. Additionally, when the employee improves knowledge, skills after training and changes in attitudes in the work environment are evident [10][11]. In order to measure the effectiveness of training, Blume et al. recommended conducting training evaluation not only immediately after the training but also after a longer period of time [10]. Kirkpatrick and Kirkpatrick recommended four levels of training evaluation [12]: (a) level one: reaction, (b) level two: teaching, (c) level three: behavior, (d) level four: results, which report on the achievement of organizational goals. The first level of reaction of the participants after the training allows measuring the level of customer satisfaction, in order to get information about the attractiveness of the training. You should design the form in such a way that you encourage the post-training person to present honest feedback and suggestions in writing and get a 100 percent return of completed surveys. The second level evaluates the change in the participant's attitude as a result of the training; there is an increase in the level of knowledge as well as an increase in the level of skills. The goal is achieved when the current attitude of the employee is changed, and the level of his/her knowledge is increased. In the third level there is a change in behavior as a result of participation in training. For such a change to occur, the following conditions must be met: the person must want to change, know what and how to do, work in a favorable atmosphere, and be rewarded for each positive change. Finally, the last level, four, is the result that brings effects and profits to the company as a result of the participation of an employee or group of employees in a training program. The results can vary depending on the type of training. In the case of health and safety, they are illustrated by a reduction in occupational accidents and diseases and a smoother flow of information between departments within the company. In addition, results can be seen through increased productivity and increased sales levels, which generates profits. It can be concluded that all occupational safety training should include three main goals: gaining occupational safety knowledge, occupational safety behavior, and safety attitudes [13][14]. This is a holistic approach to evaluating the effectiveness of occupational safety training, which is consistent with the methodology of Kirkpatrick and Blume et al. (**Figure 2**).

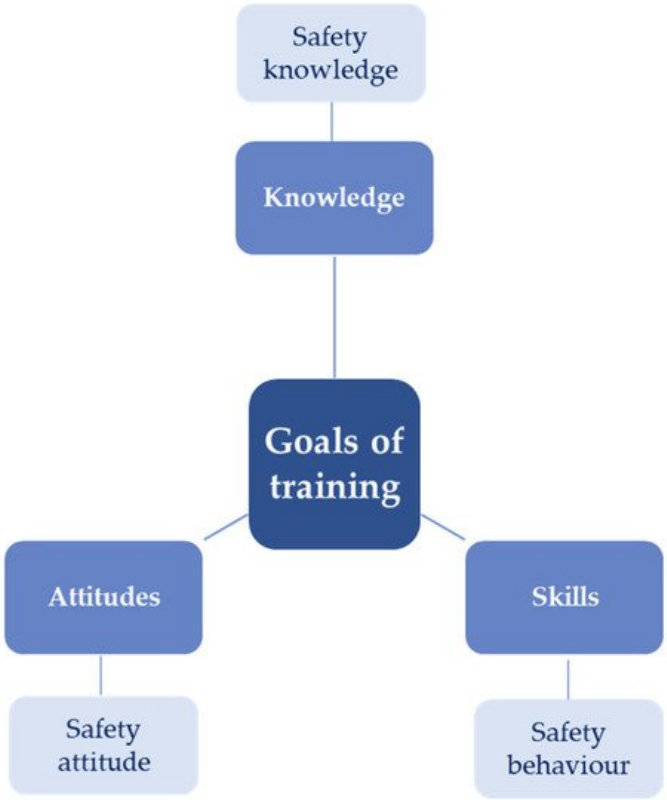

Figure 2. Goals of safety training.

Firstly, the purpose of safety training in acquiring knowledge about safety at work is to obtain information about the hazards present in the workplace and the necessary measures worn or kept by employees to protect him/her from one or more hazards associated with the presence of dangerous or harmful factors in the work environment (types of PPE) [15]. Moreover, during the training, the employee is acquainted with the rules of safe and hygienic work in a given establishment as well as with the work regulations, how to provide first aid, or how to proceed in case of fire (safety procedures, hazard identification) [14]. Secondly, the purpose of safety training is to shape safe behaviors, which are characterized by acting safely under risk conditions, either on a mandatory basis (safety compliance of all employees in the company) or on a voluntary basis (participation in safety) [16]. Thirdly, the training objective of safety attitudes refers to the way of behavior, patterns, aesthetic, and moral criteria adopted in a given collective [17]. Moreover, it is characterized by the involvement of employees in the formation of safety culture [18]. The effectiveness of the conducted training is influenced by the selection of an appropriate training method [19][20].

3. Type of Safety Training

Innovative teaching methods use motivational and activation techniques for trainees that develop skills in critical analysis of facts and creative problem solving [21][22]. Conducting trainings in such a way increases their effectiveness, as employees more quickly assimilate the knowledge and practiced skills transferred to them. The selection of training methods and resources depends on the objectives and subject matter of the training, as well as on the preferences and tastes of the trainer [23][24]. The most common methods used during safety training include [25][26][27][28][29]: (a) on-the-job training, the discovery of new capabilities of the participant, directions for the development of their competencies, setting and achieving goals, which supports the implementation of the employee to their new tasks and responsibilities in the workplace; (b) lectures consisting mainly as an oral transmission of information, useful for the transmission of new information; (c) demonstration, the demonstration or showing how to perform correctly; (d) stories and analogies, used to tell about incidents, analyze these situations and accidental events and potential accidental events in order to change the mindset of the trainees to avoid such situations again; (e) interactive lecture, when the trainer gives instructions and creates questions in order for the trainees to arrive at a certain knowledge and solution to the event or problem presented; (f) case study, when the trainer solves a specific event or situation in a planned form; (g) role-playing, the reenactment of various social interactions in order to prepare the audience so that when a real situation occurs, their reaction will be correct; (h) training games, an activating method conducted by a trainer in order to involve the participants to work out, on their own, a correct pattern of actions; (i) experiment, a very little used method in safety training consisting of achieving a very specific goal.

It is worth noting that the year 2020 (COVID-19 pandemic) proved to be a particular challenge for training professionals, as they had to find a way to transfer knowledge remotely but effectively. New methods and forms of further education and training of employees have emerged [30][31][32][33][34][35]. E-learning is a form of online training where the materials covering the scope of the training are sent to the participants. This model of training guarantees great flexibility and allows full individuality of the training in different times of access, creating flexibility and the possibility of operation of the workplace without temporary exclusion of the group of employees affected by the training. B-learning is a type of training which combines the two techniques of traditional training and e-learning. It is a particularly innovative model which is currently gaining in popularity by providing access to training materials and contact with the trainer. Webcast is a technique used by the safety department in most large corporations. It is a multimedia transmission combined with the possibility of commenting, thereby providing information for a large number of listeners. Multimedia safety kiosk is the latest development in the field of safety training. Such a device is an innovative tool for safety services, and consists of a touch screen and properly prepared application that can be modified according to changing needs. Virtual reality (VR) is used to gain experience while moving in a virtual world, in dangerous or potentially dangerous situations. Free applications can be used to create interactive quizzes to be completed live during training using a smartphone. Free applications can also be used to create evaluation questionnaires on the training, to quickly survey the training received, triggered by QR codes.

A broader definition of the term e-learning includes different forms of e-education, namely academic e-learning, school-based e-learning and corporate e-learning [36][37][38]. The school-based variety can be interpreted as a typically didactic or partially educational process, typical of primary or secondary education levels. Academic e-learning refers to higher education or training provided through university classes but using different tools, methods, means and techniques. In contrast, corporate e-learning is focused mainly on practical objectives related to improving company competitiveness, and the way of learning via the Internet can be detached from the educational institution and run spontaneously, so it could be described as non-institutional self-learning. It mainly boils down to using experience, skills, and expertise, benefiting from the knowledge of collaboration in meeting both similar and complementary needs.

The COVID-19 pandemic prompted governments, employers, employees and the general public to confront the unprecedented challenges posed by the virus and the many impacts it had on the world of work. After surveying 100 Polish manufacturing companies, as many as 80 percent of companies during the COVID-19 pandemic implemented online training via, e.g., Skype and Zoom.eu. Only two enterprises (i.e., 2 percent) conducted OHS training using the b-learning method. The remaining companies (18 percent) continued to provide training in the traditional, stationary way. Therefore, the article presents a proposal of modern solutions and methods and techniques for conducting OHS training in the remote form using the Moodle platform. The created course is a comprehensive set of teaching materials, providing high-level content and a very interesting form of learning. The proposed form of classes includes both contact with the instructor and self-education. The participant has access to lectures, presentations, quizzes, games, forum, tests and many other forms of activities. The created course was implemented during safety trainings conducted in a selected production company. At its end, an evaluation of the course was carried out and the collected opinions of the trainees allowed for the formulation of interesting conclusions.

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