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Design of evaluation instruments by competences for operative personnel of an autoparts Company

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Abstract

The article briefly describes the process of designing and applying competency assessment tools for an auto Parts Company, starting from the matrix of competencies defined and approved previously with the organization. The results of stage II, of the pilot project of Competency Certification for operational personnel for grinding line CNC are presented. It is worth mentioning that the first stage was already presented in the previous edition of the CICA 2016 congress.

Objective: Develop and apply evaluation instruments for the scheme of certification of labor competencies to operational personnel in an auto parts company.

Methodology: Analysis of the labor competence, of the units of competence, design of evaluation instruments in the three knowledges: Knowing to do, to know, to know to be. Application and analysis of results of the evaluation to deliver the project.

Contribution: The results of stage 2 of the pilot project made it possible to make the diagnosis of the level of labor competencies to personnel considered as experts in the management of Línea de rectificado CNC, and through them identify opportunities for improvement to standardize and improve the manufacturing process, to meet specifications Quality and competitiveness. As well as increasing the competence of the operative personnel that will allow to improve indicators of Volume, Cost, Quality and Industrial Safety

Evaluation by labor competencies, evaluation instruments

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1. Introduction

Currently the evaluation for labor competencies plays a very important role, since it is through this process that organizations have the possibility to ensure that their staff is trained to perform the tasks required in their jobs. Hence the importance that an auto parts company is in an evaluation process to technical staff and in the future it is expected to have a program to obtain labor certification for its operational staff, so it made an agreement with the Technological University of Huejotzingo to develop the pilot project of Certification of operators in a CNC grinding line.

In Pérez, De Ita. Velázquez and Fernández (2016), the first stage of the project is described, which defined the competence that the operators must have for the preparation, operation and execution of the model change in the CNC Grinding Line, as well as the management of the production process, derived from these results were proposed certification levels by competencies, as well as the proposal of a training plan.

This second stage consisted of developing evaluation instruments by competences of the process of operation of the CNC grinding line in the three areas of knowledge: Knowing how to do, knowing, knowing how to be. This allowed us to identify the level of competence in which the expert technicians who currently operate the machine are.

As mentioned in Pérez, De Ita. Velázquez and Fernández (2016), the objective of the project developed with the company is mainly that the operating personnel execute their production activities according to an individual work role, with the level of competence required, so that they are capable of making decisions and propose solutions to the problems of day-to-day production."

It is important to clarify that due to confidentiality issues the name of the company will not be mentioned throughout the article, and the results that are exposed are a brief extract of those delivered to the company, however you have the authorization to carry out the same.

1.1 Justification

Stage II is part of a large pilot project that will allow the company to replicate it in other work stations of the plant and achieve that the company generated an evaluation scheme for labor competencies and provide incentives to personnel that contribute to the achievement of their organizational objectives . Therefore, the design, as well as the application of evaluation instruments carried out in stage II, to the expert personnel in the short-term CNC grinding line is: Identify the current level of competence acquired with the scheme proposed in stage 1 of the project and readjust the training plan proposed in it.

Long-term: The standardization and improvement of manufacturing processes, to comply with strict quality controls for competitiveness

The acquisition of the competence of the operating personnel will improve indicators of Volume, Cost, Quality and Industrial Safety.

1.2 Problem

Currently the company has an evaluation scheme for knowledge on the management of technical documentation that applies to different production lines and in some cases knowledge of the process. This prevents the objective evaluation of a competence in its three levels of action: know-how (technical / practical application), knowledge (theoretical) and knowledge to be (teamwork, communication, respect, etc.).

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The results of stage I have been described briefly in the previous paragraphs and it is from them that the main problem now lies in defining the types of evaluation instruments that should be designed and applied to two protagonists of the process, who are considered As experts, since it is still a pilot project, the above will allow to identify the level of competence that they have reached in the operation of the machine, the management of the process and the release of the product. With the results, the company will have an overview of the strengths and weaknesses to start the training stage and in the future apply the evaluations to the rest of the CNC grinding line personnel.

So this article describes the background of the evaluation by competencies and its current importance in companies. And the development process in the methodology applied in this second stage of the pilot project of the CNC grinding line, as well as a brief description of the results obtained.

1.3 Objectives

1.3.1 General Objective

Design and apply evaluation tools by competencies to operational personnel of the CNC grinding line for the pilot project of certification of labor competencies in an autoparts company.

1.3.2 Specific Objectives

- Analysis of the competency matrix
- Selection and design of evaluation instruments
- Application of the instruments by competences
- Analysis of the results of the evaluation.
- Delivery of results and project validation by the company

2. Theoretical framework

2.1. Evaluation by labor competences

Before entering the evaluation process by competences, it is important to return to some definitions of competences: in Flores (2007); Echeverría, (2002), mentions that professional competence is the sum of four components; the subjects know (technical competence), know how to do (methodological competence), know how to be (personal competence) and know how to be (participative competence).

For Flores (2007), Identifying specific competencies in a job is a fundamental stage for human resources management; which is fundamental for the description of the jobs of a company. The description of the competency profile of the job is a common reference to perform the competency assessment.

The Council for Standardization and Certification of Labor Competence (CONOCER) of Mexico defines a competence as the productive capacity of an individual, who is defined and measured in terms of performance in a specific work context, not only knowledge, skills, attitudes; these are necessary but not sufficient by themselves for effective performance. "The standard of competence: are the knowledge, skills, skills and attitudes required, for a person to perform any productive, social or government activity, with a high performance level, defined by the sectors themselves". (KNOW, 2009)

However, the competences must be evaluated to determine the level of competence reached. The Association to Improve the Transparency of Qualifications in Spain (EVA, 2008), mentions that in the current environment organizations are more interested in the know-how demonstrated in the development of work activities.

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So for a management of the skills required in the work instruments of identification, evaluation and recognition of them are required, considering that the design of these is limited to the validity of the organizations, the above by the specific needs of each organization. For the EVA (2008), the evaluation means "checking the competences of a person with respect to a given referential. That is to say what, how and for what is going to be measured. They must identify: the method and tools to be used, designate the protagonists, specify the effects of the evaluation and agree on "rules of the game".

In Alles (2007), a management model based on competencies is based on three subsystems: selection, so that, starting with the start-up, people with the desired competencies can enter; performance evaluation, to know the degrees of competences of each member of the organization; and the fundamental, the development of them.

2.2 Evaluation process

In agreement with CINTERFOR (2009), in the document Methodology for the evaluation by labor competences, the evaluation by competitions like tool for the certification; is a process that allows the collection of evidence about the work performance of the person evaluated, according to the specifications established in technical standards of Labor Competence (NTCL), and through this will determine the level of competence that has the evaluated in the performance of a certain job function.

Additionally, in the labor competency evaluation manual of the National Council for Standardization and Certification of labor competencies (CONOCER, 2007) 5 stages are mentioned in the evaluation process:

Stage	Description
Determine evaluation techniques and instruments on job competency of candidates based on Labor Competency Technical Standards (NTCL).	In this stage you should: • Identify evaluation contents of the UCL • Select evaluation techniques and instruments for the identified contents.
Determine labor competency assessment plans (CL)	• Structuring evaluation plans. Presentation and agreement of evaluation plans with the candidates.
Integrate evidence portfolios of candidates for CL certification	• Application of evaluation instruments. • Verification of the authenticity of historical evidence. • Organization of the documentation contained in the evidence portfolio.
Issuing judgments of the CL to candidates for labor competency certification.	It is a procedure to obtain the result of the evaluation based on: • The comparison between the collected evidence and the corresponding UCL. • The preparation of the evaluation card.
Guide candidates in relation to the result of their evaluation of labor competencies	Point out the procedures for: • Guide the candidate based on the result of his evaluation. • Prepare the orientation report.

Table 1 Stages of the evaluation process
Source: Conocer. (2007)

Background of the Grinding Line project CNC stage II.

The auto parts company with which the researchers of the Technological University of Huejotzingo (UTH), developed the pilot project during stage I, consisted in determining the competence that the operators of the CNC grinding machine should achieve. Based on the results obtained from the analysis and standardization of the operations, the competence matrix was generated, in which a competence and two competence units were determined, as well as 14 capacities; each one with its corresponding performance criteria.

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The results can be consulted in Perez, De Ita, Velázquez and Fernández. (2016). It is important to emphasize that reasons of confidentiality the results can not be exposed in full.

Methodology

The process of execution of the project is summarized in figure 1. Which is closely related to the stages of the process of evaluation of CONOCER, however the results and feedback to the evaluated personnel was carried out by company personnel.

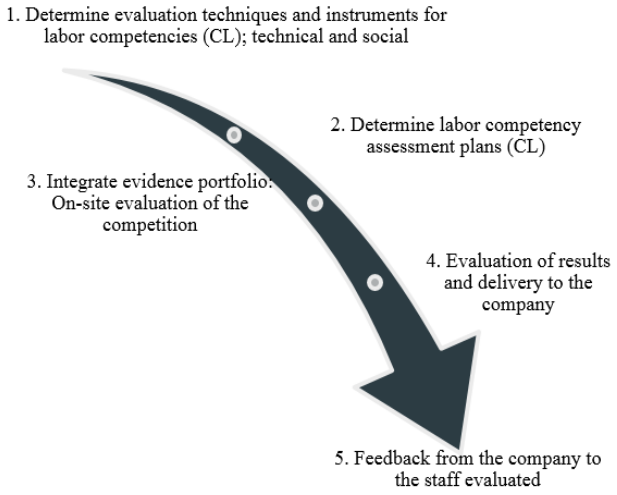

Figure 1 Process of project execution
Source. Own elaboration, from CONOCER. (2007)

Problem

Identify evaluation contents of the labor competency units to select the evaluation techniques and instruments according to the defined competence: Manage online production to ensure the quality of the process and the product in the set-up for the operation and contribute to the competitiveness of the company.

Investigation questions

What is the competition to evaluate?
What are the units of competencies to evaluate?
What assessment instruments should be applied?
What needs for technical training is required to ensure the delivery of quality products?

Instruments

Technical documentation of the machine and the process, formats for the design of evaluation instruments: questionnaires, observation guides, checklists and results summary formats.

Project execution process

Once the execution plan of stage 2 of the project was approved, the group of researchers of the UTH, began with its execution, according to the stages described in the figure 1.

Stage 1. Determine the evaluation techniques and instruments to determine the level of labor competency (CL) achieved: Basic, Operational and autonomous, as well as the necessary social competences.

The previously approved competence was analyzed, as well as the two units of competence and the 14 capacities as well as their corresponding performance criteria, the previous allowed the grouping of the levels of competence for each of these, result of stage1.

The two units of competence are: the execution of the change of model and the execution of the product in compliance with the requirements of the client. Additionally, the social competences that the company promotes must be considered: team work, decision making, among others.

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Etapa 2. Determine the evaluation plan. It consisted in defining: what, how, where, who would be the operators evaluated, with what instruments would be evaluated which process, who would carry out the evaluation of the candidates based on the selected techniques and instruments. The above was previously validated with the company.

Stage 3. Integrate evidence portfolio: Evidence was collected to issue the evaluation judgment. The UTH researchers recorded the information in the evaluation instruments based on performance and products. Ensuring that at the time of the evaluation the required instruments will be available. Considering the sequence of the activities to be developed (what) and the form of development (how) and informing the evaluated the process to which he would be subjected, in such a way that his performance was the daily one in his working day.

Stage 4. Evaluation of results and delivery to the company, with the corresponding evaluations of each technician, the reagents were identified with the information corresponding to each performance criterion, as well as the evidence of knowledge. Registering the number of reagents assigned to each performance criterion and the evidence of knowledge of each one of the evaluation contents to determine the competence reached.

Stage 5. Feedback from the company to the evaluated personnel. This phase of the project was assumed by the company, because they consider the feedback from their area managers as a process of continuous improvement.

4. Results.

Below is an extract of the results obtained:

Stage 1. Determination of instruments according to the units of competences, capacities and performance criteria. Table 2 summarizes the type of instruments developed according to the required characteristics.

Unit of competence	Capacities	Performance criteria	Evaluation instruments designed
Execute model change of considerations for the process and product, to reduce variation and comply with the production plan.	Prepare tooling change	Select and value tooling, gages according to the model	Observation guide, and knowledge evaluation, check lists. General data to include: performance criteria, types of evidence name of the evaluator, name of the evaluated.

Table 2 Example of unit of competence analysis to select evaluation instrument.
Source: Adaptation based on results stage 1 of the pilot project

Stage 2. Determine evaluation plan

As a summary of this stage it can be mentioned that the company approved the evaluation plan and determined who should be evaluated, the UTH researchers defined who would apply the instruments according to the activities that make up the sequence of operations of the evaluated process

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It was defined: The process that would be evaluated, data of technical personnel and evaluators. The activity to be developed (what), the form of development (how), the evaluation technique and instruments (with what), the place of the evaluation (where), dates of evaluation according to the plan, names and signatures of the evaluated and the candidate.

Stage 3. Integrate evidence portfolio

As a summary, it is mentioned that the model change competency unit is: the place of evaluation was at the plant, during the work schedule of the candidate evaluated, on the dates agreed with the company and with the labor performance observation guides. in the execution of the change of model, according to the capacities and performance criteria that the evaluated technician had to show.

For example, for the performance criteria in Table 1, the criteria evaluated consider knowledge and management of Master and gages for measurement according to the control plan, (includes the interpretation of the control plan, characteristics to be measured, etc.) availability of the main disk (the location and assembly of prisms). Additionally, knowledge assessment tools for control plan, tolerances, among others, were carried out. The same happened for the 14 evaluated capacities. At the end of the UTH team compiled the information obtained, made the report of the evaluations of labor, social and relevant knowledge, to concentrate all the results and issue the opinion.

Stage 4. Evaluation of results and delivery to the company

As an example, an extract of the results obtained by one of the technicians evaluated is presented. We considered 58 items evaluated in the preparation, execution of the change of model, as well as the management of the production.

Obtaining correctly 55, with which it reached a level of autonomous competence. Must take care of the following aspects: The measuring instrument must be in operating conditions; with updated calibration dates, validate safety conditions of the equipment to mobilize the tooling of the machine and ensure the gages before the production process.

Stage 5. Feedback from the company to the evaluated personnel

This stage the company considered that it was their responsibility to inform the people evaluated, since they can provide a more direct feedback on the areas of opportunity to improve. To finish with the results obtained, the restructuring of the courses for basic, operative and autonomous level was continued. To date the Technological University of Huejotzingo continues to work with the company to train new staff.

5. Conclusions

The evaluation by labor competences is a tendency that the companies are assuming to assure that their personnel is competent in the performance of their activities allowing to assure the quality of the products and services that it provides.

Therefore the work developed with the company; allowed to meet the objectives set. The UTH team designed evaluation instruments for the personnel that operates the CNC grinding line, of competence level: Basic, Operative and autonomous.

The results for diagnostic purposes allowed identifying training needs in some theoretical aspects such as the interpretation of plans, the management of computer systems of the company, general issues such as control of inventories and knowledge of travel cards for each process, among others.

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At the end of the project, the company considered that the number of reagents was sufficient, with an adequate level of depth depending on what was required to evaluate, and it is considered relevant to validate the evaluation instruments before their application to standardize the technical language.

Finally, derived from the grouping of knowledge in the matrix of competences and the results of this second stage, the adequacy of the training project for all the operative personnel of the company arose, in which at the date in which this report is presented they have participated in the design and delivery of specialized courses for active personnel, as well as new teachers from UTH careers related to the company process.

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Finally, all staff and students of the Technological University of Huejotzingo, who have participated directly and indirectly in the project to meet the objective.

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