

THE TRAINING PROCESS QUALITY BEFORE INTRODUCING CNC TECHNOLOGY

Zoran M. Milojevic¹⁾

Abstract: *It is getting quite obvious that the expectations concerning the question of quality improvement of education will become one of the top priorities. Development of information technology and technique in general induces to a large extent the advancement of quality of education and it contributes significantly to its acceleration as well as to new teaching and learning modes. It is generally estimated that there is a great interest for the training. However, experience and the estimated effectiveness of training have proved that it is necessary to fulfill some postulates in order to gain expected results. The quality of the training process and the estimated effectiveness of the performed training before the introduction of CNC technology into the very process of training and the quality of performed training while using CNC technology are completely different which points to one important condition that must be accomplished during performing of training; in these cases training process must be done on the equipment - resources analogous to real condition, or better to say to the goals set for training.*

Key words: *Quality of education, technological advancement, efficiency and effectiveness of training development of training quality, quality of training, training management.*

1. INTRODUCTION

A certain epoch and its civilizational level could be recognized by the way of acquiring and transferring knowledge, by the system of social values and it was always correlated to the development level of science technology and social conscience. So in a few decades a society transformed – changed its world view, its basic values and its social structure, which entailed tendencies to finding new methods of acquiring knowledge and significant improvement of quality of the things mentioned above. Investing into education definitely presents the largest and the safest investment for the future because productivity of knowledge is crucial for economic and social achievements. As the traditional education had its results, what is today implied by the word knowledge, is certainly highly specialized. Nowadays we emphasise the development of personal and team advancement quality aiming to adapt to this new world and to new challenges more easily and quickly. References related to the area of training affirm that companies using it are aware of its importance in their development.

2. THE STUDY OF TRAINING FOR CNC TECHNOLOGIES

As the beginning of this century managers of some companies noticed the regularities among of

surplus values which appeared as the result of short or long-term training. Trainings were supported by workers and their associations because they were aware of the importance of these training for their positions and progress. Trainings are mostly used for advancing of craftsmanship skills. However deficit of these skills as the consequence of technological progress made us conclude that taking into account their efficiency training should be directed towards the foundation of an effective organization. The orientation was accepted by trade unions as well as by managements of companies for the purpose of mutual positive results.

Examples from developed west European countries, the USA and Japan are often quoted in order to show the positive effect of large investments into trainings and their quality which provoked greater interest for the area of management training development.

There is an interesting fact that in 1922 John Patterson, the creator of the company for production of cash registers NCR (National Cash Register) was so determined to improve the organization he had founded that he made the first “Manual instructions in sales” and he started the word’s course training in sales.

Many years later Tom Watson the founder of IBM was sure that yearly investments of the company into education, training and inward communication would increase the internal financial growth rate. Each of the IBM managers

1) Zoran M. Milojevic, Polytechnic school Kragujevac, mail: zacman@ptt.rs

was provided with 40 hours of training - even customers were invited to participate in the training. The other example is the worldwide known Motorola company which demanded from each department to set aside minimally 1.5% of the income of each employee. Bally, S. from this company says: "It's not something that is debatable...it is the result of profit. We never consider it as costs. The company is proud of providing more than 3 million days of training per year for more than 90 000 employees all over the world." According to their point of view the profit resulting from this programme can be displayed in billions of dollars.

What really is encouraging is the fact that in modern literature the attitude that employees are equal partners in achieving success and that their progress is important for organization prevails. Besides, positive changes upgrade and raise the level of group standards and culture with people. A successful training amplifies communication and team work and this again increases achievements of groups and teams within an organization. A training itself transfers many messages and if there is a message to be singled out as a special one, this is it: "People are really worthy here."

According to the reports related to management strategy of human resources from 10 most developed European countries it is stated that there is a great interest for trainings.

In Europe the need for training is evaluated in different ways. The picture is colorful.

Without deeper analyzing of funds spent on trainings in Europe it is worth mentioning that Sweden and partly France have more than a quarter of organizations spending more than 4% of incomes comparing to yearly workers earnings. France seems to be the most entirely aware of the organizational importance of investing into trainings. It can be explained by legislative measures which oblige companies to spend 1.2% of yearly incomes on trainings. Otherwise they are due to pay large taxes.

It is very difficult to determine the effects of training on making surplus value in a company. Some time ago short-signed techno-managers wanted to see the income of the training right away. All around the world it has been confirmed that trainings are of some importance but still there is no efficient way of measuring the exact part that trainings have in increased efficiency of a company and it is even less possible to measure their influence on increased profit.

What we can do is to estimate the effect the training has had on the person who attended it: if he /she has increased his/her knowledge related to the job he/she is performing; if he/she is doing his

job more effectively, how the efficiency of performed training is graded.

It is possible to indicate some simpler operations; for instance, using of equipment, but it is more complicated to measure the progress of mental processes and understanding of the connections of working process and organizations. Changes in managing skills are especially sensitive; they take time, persistence and by all means a lot of efforts. But once when effects are visible, benefits of educational investments appear to be huge. The organizations with high performance level demand that the programmes of training and advancing should be more flexible because they know that the effect they have on quality, innovation and productivity is cumulative.

The approach and establishing of training in a company is generally a complex question. It depends upon the development of the social value system, the way of thinking, political orientations of governments, employers, workers, and their associations, socially-economic movements by domestic and international scene. Only in that context we can answer some questions:

- *if training needs to be directed to certain social groups (the young, the unemployed, women, chosen personal...);*

- *what the impact of new technology will be on education of employees;*

- *who is responsible for financing the training (employer, employee or both);*

- *if the training will be of a narrower or wider range;*

- *who will be responsible for creating plans of professional education and qualifying (managing team, advisors, academies etc.) and whose responsibility it will be if the training results are poor*

These couples of questions have already shown us that trainings are based on economic, social, cultural and other values and experiences of individuals, organizations or nations.

Nevertheless, the aim of training is to introduce a change, and often its goal is to disturb these values or to offer new experiences which negate previous ones. Therefore, training and development of all social levels come across conflict situations.

In the documents of UNESCO (United Nations Educational Scientific and Cultural Organization) particular attention is given to education. In the modern world professional education is more severely the object of critics and the demands for increased efficiency shortened length of time and decreased expenses are getting excessive. On the other hand the requests are absolutely clear: Educational institutions "should produce skilled workers" qualified to perform,

right after schooling, all kinds of jobs they have been trained for. At the same time employees are requested to keep their working abilities on long term basis willing to be retrained and to innovate their knowledge.

Today changes are faster and greater than ever and challenges placed before individuals, and society in general are huge; the need for adjusting the existing and creating new solutions is becoming the imperative of further progress and human survival. These tendencies can be found in all aspects of a society or social life as well as in education itself. Educational theory is gaining more knowledge about the influence of training on organizational development. Training courses are of great importance, and it is unthinkable to leave employees to develop and evaluate their working skills and abilities themselves, but it must be the responsibility of well organized management training. In other words education includes organized and proved instructions projected in such a way to combine knowledge, skills and understanding value for all activities of life.

In addition the idea of developing depth and width of knowledge and understanding as well as finding, identifying and organizing personal life goals is mutual for numerous educational theories. In the previously mentioned documents there is a distinctive difference between EDUCATION and TRAINING which is often directed towards developing of narrowly focused competences and skills which will be applied in performing a determined task. Companies and organizations are to provide trainings for increasing skills and abilities of their employees in solving problems and to recognize their needs to adjust to rapid changes which are required by their specific

position within the company. Generally speaking, decisions referring to trainings – who is going to participate, what they are going to study and how – are made by an organization rather than by an individual who the training is organized for. Training goals are organizational goals (for example, increased performance and efficiency) rather than personal aims of trained personnel. This distinction between education and training is obvious in all accessible professional literature.

3. THE ANALYSIS OF TRAINING EFFICIENCY FOR CNC TECHNOLOGIES

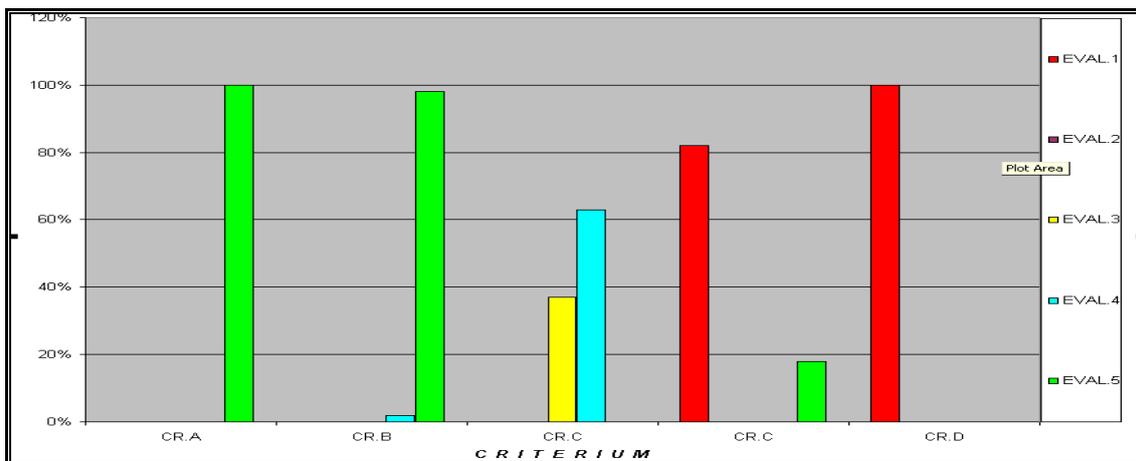
A/ The results of the training held before the use of CNC equipment

1. Presence : 26 candidates attended the training
2. The resources used : video presentation
3. Important questions on the questionnaire:
 - a. evaluate visual presentation:
 - b. evaluate the lecturer:
 - c. evaluate complete quality of training:
 - d. do you consider it necessary to attend the training course again:
 - e. remarks :

Questionnaire results:

excellent -----100%
 excellent ----- 98.36%
 very well-----63%, Well----37%
 unsatisfactory -----82%

96% of the present candidates said that there was a deficiency of practical training and making of at least one piece on CNC machines



Picture 1- Results of evaluation without use CNC

B/ The results of the training held during the use of CNC technology

1. The seat of training course: a specialized chamber in Polytechnic school in Kragujevac
2. Available resources : EMCO CNC Equipment (Mill 55, Turn 55, Control units sinumeric 810d/840d, video presentation, 11 computers network, 10 EMCO dissemblers Win NC 32 software, 3D simulations)

3. Training level: beginners
4. Training duration: 24 hours
5. Lecturer: Zoran M. Milojević
6. Expectations of attendants: They mostly expected to gain practical knowledge and skills for programming and operating CNC equipment
7. Number of attendants: 13
8. Evaluation questionnaire

Evaluation Questionnaire

Basic training : Programming and operating CNC EMCO equipment

*I need to ask honorable colleagues to express their opinion about the following aspects of seminar using *X**

No	Aspect	Evaluation				
		1	2	3	4	5
1.	Evaluate complete quality of seminar					
2.	Evaluate visual presentation of the material					
3.	Evaluate the practical part of lecture and work on CNC equipment					
4.	Taking into account your initial knowledge how would you evaluate yourself in learning the information about the material					
5.	Evaluate the lecturer's displaying					
6.	Is it necessary to have a higher level training – advanced training	Yes		No		

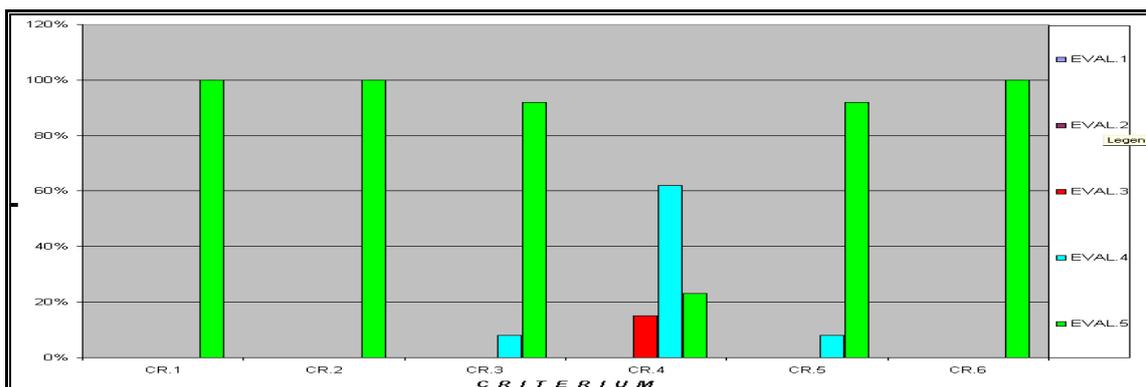
Kragujevac

Thank you!

Lecturer: Zoran M. Milojević

9. The Results of evaluation:

The results of evaluation					
Criterium	Evaluation				
	1	2	3	4	5
1	0	0	0	0	15/100%
2	0	0	0	0	13/100%
3	0	0	0	1/7.69%	12/92.3%
4	0	0	2/15.38%	8/61.5%	3/23%
5	0	0	0	1/7.69%	12/92.3%
6/yes	0	0	0	0	13/100%



Picture 2- Results of evaluation with the use CNC

4. SUMMARY

Numerous details related to the needs of training of an individual and groups of training needed in order to satisfy the needs of a company or organization must be analysed to be able to make a conclusion about the priorities and needs of training. This is the primary source of planning the training which is usually done a year in advance. It is also the basis for modifying of already existing training programmes, specifications for new programmes in the needed level and range.

When this procedure is not followed, there isn't

usually any other reliable source of information about the training needs. Only impressions with no arguments aren't often valid.

The complexity of the process of projecting the needs for training can be expressed through differences between spontaneous discovering the needs and systematic projecting of training needs. Although we often insist on training of employees as systematic and continuous process it must satisfy immediate needs. For example, if for certain political reasons, a new market is opened, a fast reaction is expected and quick preparation of people for that area or employing those who are able to adapt to the existing situation. It means an instantaneous response, otherwise those more skilled and qualified will establish themselves on the new markets. It's irrational to miss the need because, for example, learning of the certain foreign language can be included in a yearly training plan.

Basic phases in projecting the training needs are:

- stating the needs for training
- discovering the source of information of the needed training
- choosing the criteria for evaluating and ranking the needs

- researching momentary needs of training
- selecting the needs and their articulation
- including the needs into curriculum
- monitoring, analysing and evaluating the efficiency and effectiveness of the performed training

Final evaluation:

If we analyse criteria set in evaluation questionnaire and especially the criterium number 3 (evaluate, practical part of learner and work on CNC equipment) were 92.3% chose the highest mark and criterium number 6 (Is it necessary to have a higher level training-advanced training) where 100% of attendants chose positive : yes, and taking into account that during the training without using CNC technology there was no wish to repeat it, and that basic and only remark was the impossibility of practical use of CNC equipment, we concluded that for the qualitative execution of training process it was necessary to execute it on CNC equipment whose technical capacity was such to enable practical creation of real picture of production conditions.

REFERENCES:

- [1] Milosavljevic G., (2002): „Projektovanje obuke“, Ministry of eduk. of republik of Serbia
- [2] Stefanovic M., Arsovski, S., Arsovski Z., (2007): „Improvement of Quality of Education Using e-Learning Environment“, International Journal for Quality Research, p. 33-40.
- [3] Nilsson C., (2003): „How to Manage Training“, New York
- [4] Ministry of eduk. of republik of Serbia (2004), „Education Quality for all“, p. 99-106
- [5] Arsovski Z., (2007): "Approach to Quality Assurance in Higher Education", International Journal for Quality Research, p. 49-55

- [6] Majernik M., Bodida M., Bosak M., Chovancoba J., (2007): "Quality in Environmental Education at Faculty of Mechanical Engineering Techn. University of Kosice"
- [7] Knezevic G. (2001): "10 years reform Educate. In Europe Country" Ministry of eduk.of republik of Serbia, p. 72-78.
- [8] Ministry of eduk. of republik of Serbia,(2003): "Exporiences for former Yugoslav republics in vocational education reforms", Belgrade.
- [9] Andevski M., (2006): "Europen Dimensions of Reforms in the Educational System", University of Novi Sad, p.186-194
- [10] Djukic M., (2006): "Evolution strategies in the system of distance Education", University of Novi Sad, p.206-210.
- [11] Ministry of eduk. of republik of Serbia (2000): „Education of teacher", issn 0354-379x, p.68-124.