A MODEL OF COOPERATIVE EDUCATION -"GROUP LEADER TRAINING PROGRAM" FOR INDUSTRY EMPLOYEES

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ABSTRACT
Studies on continuous education and alteration are highly significant in order to improve the technical and social abilities of the industry employees. Generally, these kinds of educational facilities are carried on in the range of in-house training. Besides in-house training, it is also possible to improve the abilities of the employees with the projects with the help of the cooperation of the schools and industry.

In this research, the initiation, planning, implementation, development and the evaluation of the "Group Leader Training Program" that has been implemented and developed for the training of group leader candidates of Bosch Bursa Plants, which is one of the leading intuitions of automotive industry, is examined. In this model, which comprises the education of the employees in Uludag University, 325 staff in nine groups has been certificated after completing the program of 280 hours and ten modules and other personal development courses between 2001 and 2008. A remarkable progress has been revealed by the former (old)-new (trained) comparative competence evaluations that have been implemented on the educated group leaders within the project. Continuous education and alteration is crucial for the people who work at the engineering technology area in order to improve their social and technical abilities.

Keywords: Cooperative Education, Continuous Education, In-House Training, Life-long Learning.

INTRODUCTION

Taking into consideration that educational institutions are the sources of meeting the manpower of the industry, different strategies and road maps have been designated to educate the qualified manpower the sector needs. (Tekin et al, 2006). The rapidly changing knowledge and skill requirements in the engineering profession require that engineers educated mainly in the scientific principles of a broad engineering discipline need to develop new skills and acquire more specific knowledge to better equip them for each of the succession of engineering roles that comprise their careers. Satisfying their needs requires the efficient flexible delivery of up-to-date, industry relevant programmes (Ferguson, 2007). Continuous education and alteration is crucial for the people who work in the engineering technology area in order to improve their social and technical abilities in terms of career planning and strengthening the degrees of management. These kinds of training facilities in the world are usually being carried out within the scope of in-house training. Moreover, the cooperation between the university and industry is a highly common practice to transfer the industry's acquisitions to the students.

From its beginnings, cooperative education has evolved into a program offered at the secondary and postsecondary levels in two predominant models. In one model, students alternate a semester of academic coursework with an equal amount of time in paid employment, repeating this cycle several times until graduation. The parallel method splits the day between school and work. Thus, the co-op model includes school-based and work-based learning and, in the best programs, "connecting activities" such as seminars and teacher-coordinator worksite visits. These activities help students explicitly connect work and learning (Kerka, 1999). Positive results may also be gathered when the practice of cooperative education is reversely evaluated rather than its current commonplace implementation, that is, the training of industry employees in the educational institutions. In this type of cooperation, depending on the requirements of the Industry both short-term programs for specific topics and more comprehensive long-term programs may be organized.

Quite interestingly, Taylor has maintained as follows on this issue: "Cooperative education as a strategy for combining classroom learning with workplace training is becoming well known internationally. So too are the concepts of life-long learning and continuous education and in the minds of many authors learning is not confined to what happens in a classroom, neither is it a 'one-off' experience. Cooperative education typically occurs when a learner is placed into the actual working environment. The question arises, what about a working adult entering the academic arena? If this process is formalized could there be a new slant to cooperative education - one of life-long learning and reversal of cooperative education where the world of work sends its adult learner into the education sector? There is some recent research that suggests that there is now a growing trend worldwide - a trend of *reverse cooperative education*" (Taylor, 2002).

STARTING POINT

The first activities regarding the training of Bosch Bursa Diesel Systems employees and group leader (GL) candidates started in 1998. In these activities, especially the principal of the development of a module-based and competence-based program has been adopted. The philosophy of the starting point in the program has been the GL candidates' taking their education that is based on technical knowledge, skills and conducts from the universities and private institution as an addition to their in house training. In the designation of the training modules, the principle of not only the company needs but also the conception of academic understanding of the educationalists has been adopted (Arslan et al, 2003).

In the preparation process, the company coordinators carried out some department meetings and comparative need analyses with the employees, the group leaders and Germany Feuerbach Bosch. As a result of these analyses, the group leaders are supposed to have the characteristics that are shown in Figure 1. The steps that have been prepared to make them acquire these characteristics are determined as follows:

- Need analysis
- Determination of evaluation parameters
- Designation of the implementation plan
- Source planning
- The scheme of responsibility
- Determination of evaluation methods
- The reflection of the results

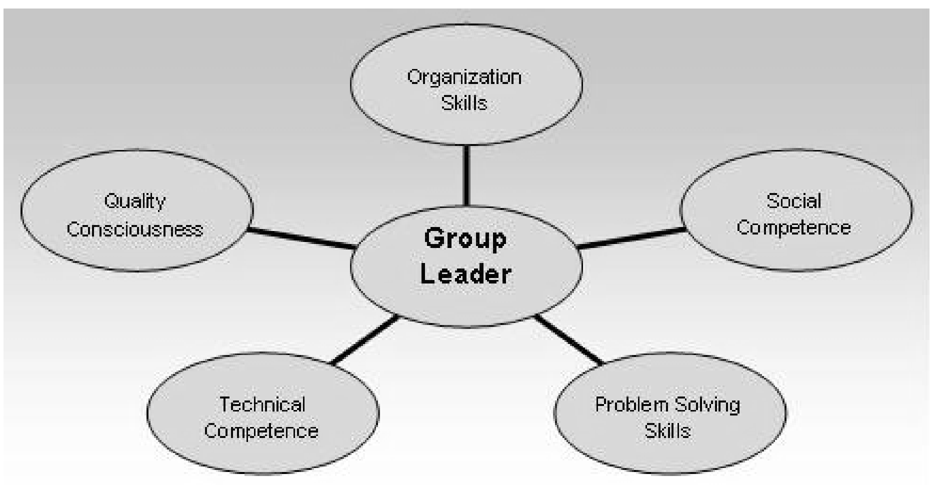


Figure 1. Supposed Characteristics of GL

The project systematic of GL training program (GLTP) that has been formed in order to make the GLs acquire these characteristics is determined as shown in table 2.

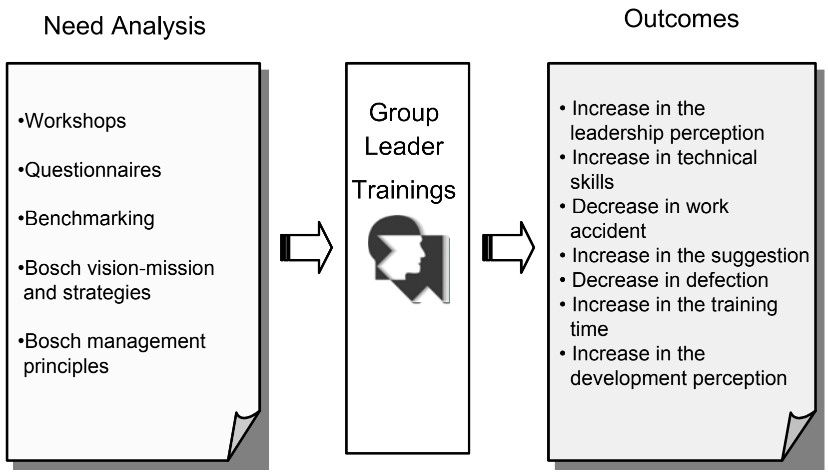


Figure 2. Goals of the GLTP

PLANNING AND IMPLIMENTATION

Determination of Internal Requirements of the GLTP

After the formation of the framework of GL training program, a program development team of 12 people has been formed from The Uludag University Vocational School of Technical Sciences (UUVSTS) and company educational department. Two people from this team have been put in charge of coordination. The program development team has firstly carried out a research in order to determine what the company employees expect from the GL position in terms of technical and social respects. The expectations of both the employees and the coordinators for each department have been recorded in this research. After the research for six months, the characteristics each department expects from the candidates have been stated. This data has been employed in the formation of the modular training program, taking into account of academic criteria by the program development team.

Program development criteria,

Thanks to the data collected from the company, the program development team has determined the necessary criteria for each module, considering the criteria below. These criteria are:

- A structure to meet the basic demands of the company
- Compatibility to continuous development
- Flexible timing and educational structure
- A modular approach

The demands taken from the company units included the dismembered issues and unit related issues that would be given in a short time rather than separate individual modules. Handling over 50 issues, the program development team has initially classified them according to their fields and after the fields have been determined, the process of integration of the issues has started. In the terminal stage, modular structure and course contents have been formed, taking into consideration of the contents of similar courses or the contents of the training in the vocational educational institutions. After the determination of vocational training in this way, management development, training regarding the organization and their contents has been determined. In this stage, the experts both within and outside the company have supported the team.

Modules that are going to be taught in terms are shown in Table 1 and 2. The reason of having two different programs is that people who have an occupational retraining are going to complete two courses but the ones who are working in occupational retraining are only going to complete the second program. In that way, graduates' repeating the same training is obstructed. In Table 3, all the specified trainings, which are needed for managerial and social qualities, are given that all candidates must have who want to be leader in the groups. These trainings are taken from an institution outside the university.

Table 1. Qualification Program (First Certificate Program) 14 Weeks

COURSES	Hours (T+P) / Week	Total
Manufacturing Technology I	2+1	42
Technical Drawings and Standards	1+1	28
Electricity and Electronic Science	1+1	28
Hydraulic- Pneumatic	1+1	28
Computer Numerical Control	1+1	28
Windows, Excel, Word	1+1	28
Material Science	1+1	28
Technical Mathematics	2	28
Measurement Technology	1	14
Industrial Organization and Planning	2	28
TOTAL	20	280

Table 2. Specialist Program (Second Certificate Program) 14 Weeks

COURSES	Hours (T+P) / Week	Total
Manufacturing Technology II	2+1	42
Digital Electronics	1+1	28
Electro Hydraulic and Pneumatic	1+1	28
CNC / Fanuc	1+1	28
Machine Components	1+1	28
Thermal Treatment and Material Inspection	1+1	28
Quality Assurance and Standards	1	14
Programmable Logic Control	1+1	28
General and Technical Communications	2	28
Product Information	1+1	28
TOTAL	20	280
T: Theoretical P: Practical		

Table 3. Consultancy Firm (The improvement of social and method based skills)

COURSES		Total
Mutation Dynamics		16
Communication		16
Co-work and Administration		16
Solving Problems and Presentation Techniques		24
TOTAL		72

Practice

In this modal that comprises the training of the workers in UUVSTS, who have completed their training and taken a certificate, there is the module that constitutes of 10 modules 325 staff and 280 hours among 9 groups between the years 2001 and 2007. These people are still continuing their work as GL. Trainings generally started a 16 o'clock and were continued as 20 hours per week. Training programs were planned as full day or several days a week in accordance to the need and the availability of the management. While some of the implementations of the lessons were done in real business environments in factories, most of them were done in classes and laboratories.

Measurement of Success

The measurements of success of the GL candidates in courses were done as one midterm and one final exam for all lessons. Exams were done as oral, practical or written according to the quality of the lesson. If one participant fails a module he is given the right to another exam in the appointed date. If he fails because of discontinuity he has to attend the next training.

Evaluation

Four different methods are used to increase the efficiency and the contribution of the workers which are:

- Questionnaires that are done at the end of the training both by the school and the factory

- Training evaluation, betterment, suggestion development meetings
- Comparing beginning and end knowledge level
- Evaluations that are done by a perfection measuring system

At the end of the 5 year training many betterment suggestions are taken and applied to the program. The most striking one among them is the revision that is done on the hour and content of the modules. Contents are gone through and betterments are done. At the end of this, the process of the course has been reduced to 240 hours and the theory/ practice ratios have been changed. The improvement of technology and the change within the factory affected this process.

The placement tests that are applied to candidates at the beginning of each training and the grade points average at the end of the training give serious clues about the candidate's success ratio. Educators also see their own deficiencies with this program and they continue their education by eliminating these deficiencies. Such an example is shown in Figure 3.

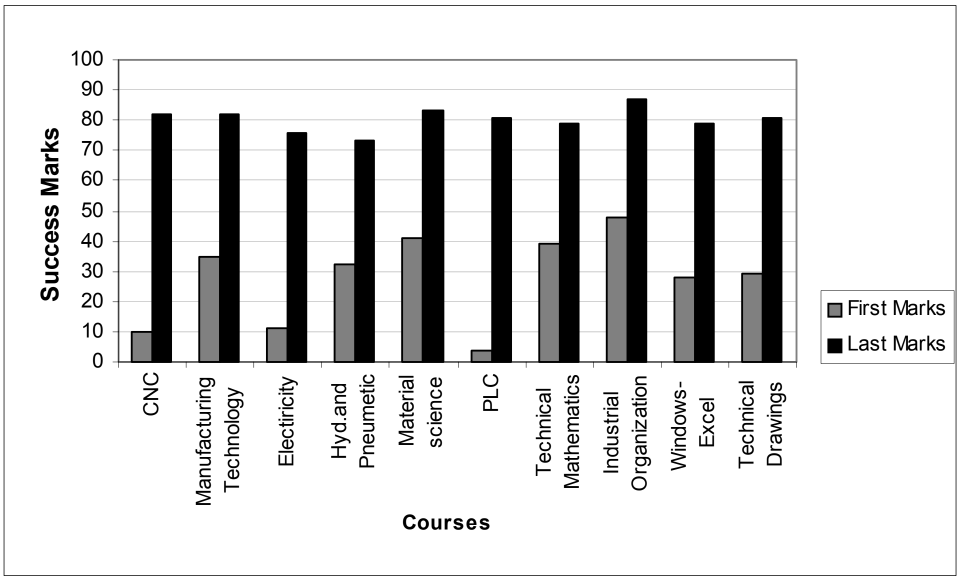
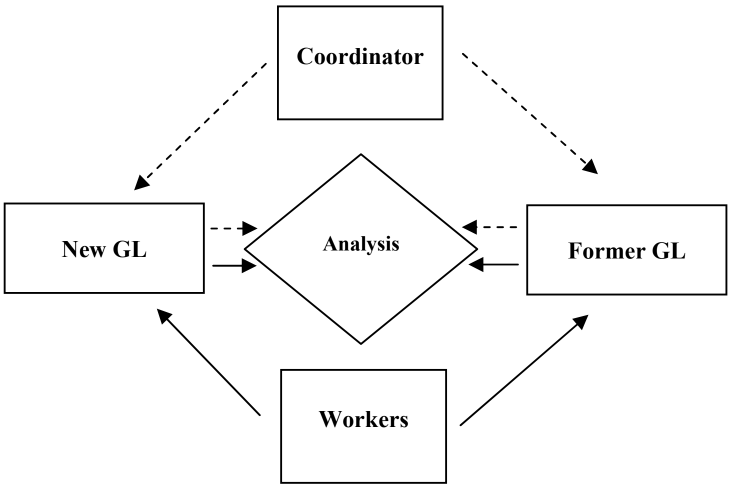


Figure 3. The Marks Before and After Training

Perfection Measurement

The perfection measurement is done as is shown in Figure 4. With the system that has 32 questions which include information, motivation, improvement, personal attitude, teamwork, organisation, management, attitude based on operation and technical knowledge and skill, every GL is being evaluated by employees, coordinators and former GLs. This study was done in 2004 and it was evaluated by 109 former GL, 82 new GL, 171 employees and 20 coordinators.



Analysis method: Questionnaire

Specification of Questionnaire
- All participants were given detailed information about questionnaire
- Anonymous

Important data's:
20 Production coordinators
171 workers
Σ 191 participants
109 former GL,
82 New (Trained) GL

Figure 4. Perfection Measuring Management

At the end of this study, a 0, 14% betterment is seen as it is shown in Figure 5. Though this value may seem to be a minor change it is taken as a serious improvement when GLs working in the factory for about 20 years are being compared to those who are not much experienced but have completed their training successfully. Meanwhile, the perfection analysis including the general analysis which contains the technical perfection is designated to have increased. Together with the betterments that are done, the second measurement results are expected to increase in 2008.

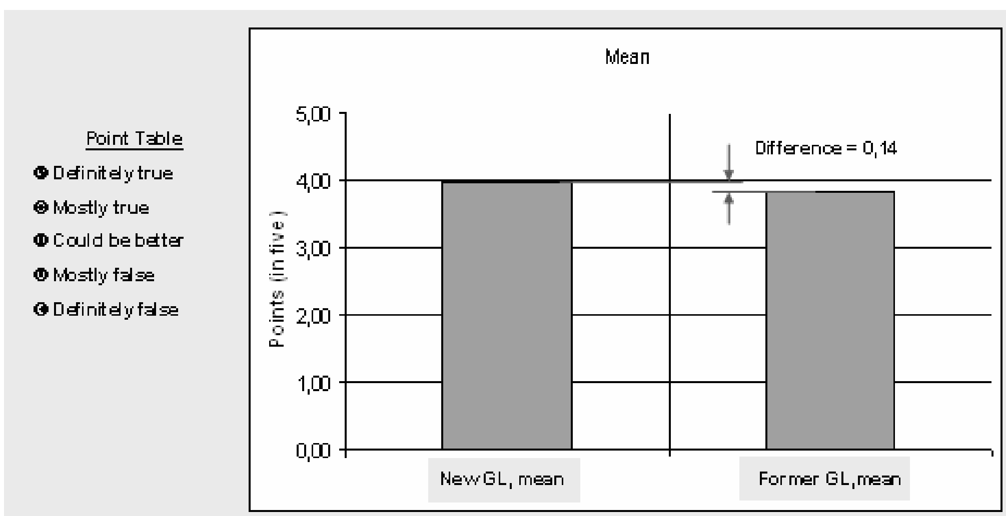


Figure 5. Perfection Measurement Results

CONCLUSION

At the end of the GLTP perfection evaluation the contribution of efficiency, the personal and occupational rises have been stated as a major improvement. One of the most important yields of this training is the contribution of the candidates to questioning, creating solutions and suggestions, and having a dynamic approach to constant improvement.

The success of the GLTP program is taken by the other educations that were needed within the factory. In the year 2008 a new program, which includes Bosch-Rexroth, is put into practice. It especially attracts attention because it aims at occupational perfection and because it gives knowledge and skills that may be useful in the future.

The purpose of such certificate programs is to increase the level of knowledge of workers. Besides, by instructing the participants in accordance with the development of technology, it is aimed to increase the motivation and working performance of workers and to help them improve their productivity. It is obvious that rather than cooperative education, which has from school to industry practice, reverse cooperative education, which has from industry to school practice, and has more effective contributions to the improvement of the sides.

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