

ACTIVITY BASED TRAINING EMPLOYED IN QUALITY ASSURANCE TRAINING

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ABSTRACT

This paper presents the employment of the Activity Based Training at the “Petru Maior” University of Târgu Mureș. The draft of the training activities in each of the 10 modules in the Quality Audit process is illustrated. It is an achievement of the project entitled “Disseminating Open and Innovative Tools and Services for Vocational Education and Training in Quality Assurance” (acronym Do-IT) financed by European Commission.

Keywords: vocational education and training, activity based training, quality assurance, quality audit

1. Introduction

The project *Disseminating Open and Innovative Tools and Services for VET in Quality Assurance* (Do-IT) is promoted by Sør-Trøndelag University College in Trondheim Norway (HiST) in partnership with “Petru Maior” University of Târgu-Mures Romania (UPM) [6].

Do-IT is aiming at disseminating and raising the awareness of a brand new integrated blended ABT learning environment offering flexible and sound pedagogical delivery of level specific manufacturing industry production process training to VET schools and SME training organizations in Romania and Norway. Do-IT disseminates new methods for delivering in-company skills upgrading processes that significantly reduces the costs related to competence and knowledge transfer, and enhances production competence and know-how transfer to VET schools. This includes:

- Educate VET QA instructors as Activity Based Training learning environment advisers,
- Disseminate an innovative transfer system for in-company QA training of personnel, delivered on a just-in-time basis without distance limitations with inclusion of iPod Touch student response system.

The new learning environment and the ABT model close the traditional gap between VET training and the industrial production process workflow. The

methods are generic, whereby they are applicable to European wide mechanical industry sectors (fabrication industries, VET schools and SME's). They facilitate an innovative solution for cost- and time effective transfer of industrial production process know-how and technology knowledge to SME at a just-in-time basis.

2. The Active Learning Process

In recent years it seems that new digital media have virtually disseminated the culture of young adults. In a recent report from the MacArthur foundation it is pointed out that “Social network sites, online games, video sharing sites and gadgets such as iPods and mobile phones are now fixtures of youth culture. Availability of new media has accelerated over the last years, and we have seen an enormous increase in media use, both in terms of variation and in total quantity. New media seem to have changed the way young adults think, especially as the new generation is also highly media competent. Whereas in previous generations focus and concentration was the highway to learning, multitasking and simultaneous flow of information is the reality for the younger generation of today. Social availability and companionship the whole day via mobile phones and the Internet have in many instances replaced solitude.

The challenge for educational institutions seems to be how to utilize new media and mobile technology solutions that meet the demands of the young media competent generation, where creation of knowledge and understanding more or less is a continuous process that is constructed and reconstructed frequently due to rapid new technological achievements [1]. Using instructional technology simply to use technology in the classroom without any instructional purpose or linkage to modern-day use of technology does not improve the classroom experience for media competent students. Indeed, to rely on a traditional Cartesian view of knowledge creation where pieces of information are being transferred more or less one by one, are going to be challenging for many educational institutions. Learning in modern educational institutions is an interactive process-taking place within a community of students where many of the relations are mediated through media technologies like MSN, Skype, YouTube, Face book, etc. Thus, mobile computing technology and its educational implementation need to take as its stepping stone the ICT uses that the students are already involved in. Use of activity-based training seems to be such a promising approach mixing pedagogy with use and inclusion of modern ICT solutions.

3. Activity Based Training

Activity based training is a concept suitable to apply in quality assurance VET [5]. In order to define activity based training let us see some key concepts for training:

1. **Learning-by-doing** refers to the capability of people to improve their ability in execution of tasks by repeating the same type of action very regularly.
2. **Adult Learning** comprises some principles regarding learning: students are motivated as they experience needs and interests that learning will satisfy/learning needs to be relevant; their orientation to learning is more practical, the reaches source for learning is experience/practice, they are self-directing, differences between people increase with age .
3. **Problem-based Learning** - has some specific characteristics: it is based on challenging problems facing in the job of a group of students; it has a reasonable level of complexity so there are a range of issues that must be resolved in order to address the central problem; reflects the functional expertise of the students; it enables them to apply their knowledge to solve matters that are directly related to their jobs.

In theory Activity Based Training ABT, has a

lot in common with Learning by doing, Problem based learning, but when it comes to the practical implementation there are differences in the methodology.

The core idea behind ABT is that student should produce something. This something can be a variety of things, from services in a hotel to a physical product like furniture. The production process must be clearly defined so that each step in the process represents an added value to the process itself. The production process consists of a number of defined production steps, each adding a value to the product. These steps can be described with a scope, purpose and a time schedule.

However the start point for any production is that it contains an order, defined as a set of documents clearly describing the product which shall be produced. For example the following documents should be attached to the order: Design drawings, Work drawings, Welding drawings, Assembly drawings, Functional description of the product, Delivery requirements including requirement for documentation, List of raw materials, Quality Requirements (including reference to relevant standards), Delivery schedule for the product, Personnel requirements (requirements for knowledge and competence, certification and so forth), Requirement for Control documentation and traceability, etc.

Also other activities can be defined in detail for each production step. The teacher may also add information in detail for these steps or, the students may have as a special task, to describe the process in detail.

To be able to actively participate in collaborative creation of knowledge objects, students are expected to take control of their learning, to go beyond individual efforts, and to engage in productive collaboration with peers.

The idea of collaboration is central and a key element in ABT. Collaborative learning will stimulate the ability to cooperate in order to full-fill the activities that is a part of the production process. The collaboration efforts may in many cases be more important than the results itself.

The collaborative learning can be stimulated through the learning process by establishing a group of students that shall work together as a work groups. Each class will then consist of two or more work groups. These work groups will work in parallel with the same product through the production process.

At the end of each activity these work groups are going to exchange their product at that stage. This means that for every activity in the production process the work groups are starting with a product from

another work group, they will add a certain value to this product during the activity and at the end they deliver the product to another work group. Through this product exchange they will experience the dependencies of other groups to perform their task in order to be able to full-fill their own task. This is a very important element of the ABT, because this is quite similar with the normal production in real life.

The product exchange is a way of letting the students be aware of their dependencies of other groups in order to full-fill their own tasks. It also will make them aware of that they have to deliver the correct quality as defined in the order. If the quality is not acceptable or the delivery time or scope of delivery is not correct, negative consequences will occur.

ABT may be used in any vocational training. Since the idea is not targeting special products then it can be used with products that may be available through cooperation with local industrial companies or other sources. Through such cooperation additional practical knowledge and competence can be accessed during education and training.

As we have seen the ABT methodology follows the production process. The theoretical course content should then follow the same process. We strongly believe that in order to get the best results the theory should be delivered and accessed when it is needed. Many of the available course books must then be restructured in order to follow the production process as well.

4. The ABT Methodology for VET in Quality Audit Processes

The Activity Based Training (ABT) methodology uses an alternative pedagogical approach to education and training of personnel in industry. The fundamental principle is that educational content shall be available and delivered through activity based learning methods when they are needed. The students enter new training activities by following a sequential structure, ensuring that theoretical content is directly relevant for the subsequent practical tasks in the industrial verification and control process, thus highlighting the importance of the theory when this is relevant for the subsequent practical tasks. It is foreseen that various technologies for delivery of learning material, may be mixed and used for transfer of content, thus promoting use of a more flexible, engaging and motivating blended educational training environment. The educational material is delivered as learning objects in various multimedia formats.

The core idea behind the ABT is that the student shall produce a product during the training

course. This product can be anything that is related to an industrial fabrication process. During the course it will be produced by going through a sequential production process that consists of a number of steps that can be identified and be treated as standalone training elements. It should be noticed that local industry needs can be used to define the products, or local community needs for products could be utilized in the training process. For instance, a school could cooperate with local industries as subcontractors if the production is relevant for their education and training. Usually, the ABT course is organized in a number of work orders [3].

Thus, the next key element is the work order. The work order is created on the basis of an industrial order or contract, which in detail describe the product and the delivery condition. A work order is the basis for the education and training schedules, and for the planning of the training activities. For an ABT course the work order needs to contain a minimum of relevant documents like:

- Delivery plan
- Drawings
- Welding Drawings
- Part lists and material lists
- Assembly descriptions
- Reference to International standards
- Reference to contract requirements
- Control documents
- Non-conformance documents.

Figure 1 displays the sequential structure of an ABT course.

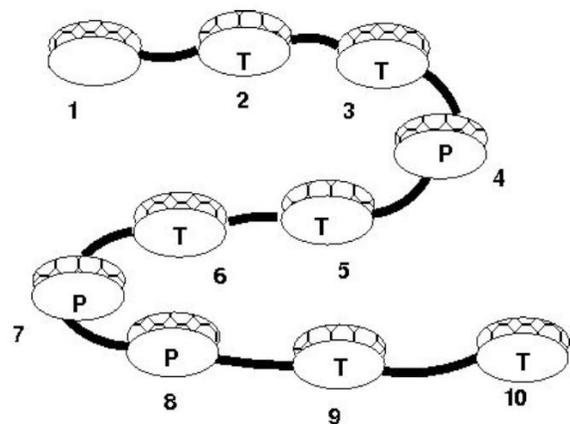


Fig. 1. The key structure of a work order involves a sequential number of training activities organized in modules (1-10 in this example) consisting of theory (T) and practice (P).

Table 1 outlines a high level description of the training activities in each of the 10 modules in the Quality Audit process.

Table 1
Training activities in quality audit using ABT

Module no	Quality Audit process - ABT activities
1. Introduction in the QA course	Introduction to the QA course, scope of the education in quality
2. Contracting the audit	Delivery of contractual documents including criteria of audit
3. Establishing the audit team	Nomination of chief auditor, selection of auditors
4. Analysis of documentation	Analysis of Quality Manual, System Procedures, Operational Procedures
5. Elaboration of documents for audit	Creating the Audit plan, Audit Questioner, Nonconformities Report, Audit Report
6. Planning the audit	Elaboration and delivery of audit plan – agreements between auditors and auditate organization
7. Making audit	Examination of organization, filling questioner audit
8. Report elaboration	Filling the audit report and delivery to the audited organisation
9. Corrections	Establish corrections, corrective actions
10. Follow corrections	Evaluation of corrections efficiency

It should be noticed that this sequence is generic and not related to any specific product. As a consequence, it may be adapted for use in any country where an industrial production environment is used as a model for training activities [4].

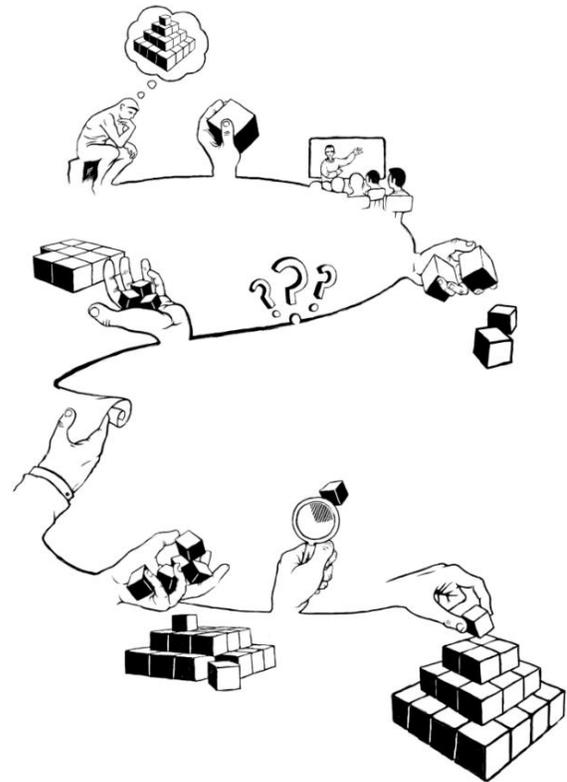


Fig. 2. Implementing a quality management system in an organization through ABT

In figure 2, we considered the idea of establishing, documenting, implementing, maintaining and improving a quality management system in an organization, according to the principles and concepts from ISO 9001 standard.

The system is like a pyramid in imagination of a quality manager. He has to build the system piece by piece in any compartment, by employing process approach and facilities of a transversal management – the quality management. The ideas have to be explained to people by training. They are provided with objectives in an implementation plan. Then piece by piece is built in each department by keeping in mind that processes are related and outgoing elements provided by a process are ingoing elements in other processes. Many questions arise in system development. The implementation plan is often watched, to be followed but also to be corrected where needed. System assembly starts when procedures are elaborated in all the departments by interconnecting them. At the top is Quality Manual and above are organizational objectives and quality policy, the last pieces in the top of the pyramid which is the quality management system.

The various documents available in the work package can therefore be tailored to the actual

industrial application, which is relevant for the VET school, This helps ensuring effective use of previous knowledge Furthermore, according to contemporary models of learning, and individuals understand and remember new material best when they elaborate on that material in some manner. Elaboration can take the form of adding details to the information, clarifying an idea, explaining the relationship between two or more of the new concepts, making inferences, visualizing an image of some aspect of the material, applying an analogy relating the new ideas to familiar things, or in some other way associating the new material with voting sessions by use of ABT methods.

5. Conclusions

A very modern pedagogical methodology we recommend for training in quality assurance is activity based training for teaching in the occupations of quality managers, quality professionals, quality auditors [2].
[7].

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