

QUALITY OF VOCATIONAL TRAINING THROUGH PRODUCT LIFECYCLE MANAGEMENT INSTRUMENTS

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Abstract:

It appears that, during the process of continuous training, there is a growing need from VET providers of a reliable and easy to use tool ensuring the quality of the services provided. Product life cycle active management, including the use of suitable PLM software, is or may be a tool for monitoring and controlling product portfolio of an educational institution. It can be recommended not only for reasons of quality assurance, but also to facilitate the development of products for greater transparency in strategic business areas, and not least, to maintain competitiveness of VET providers. The Q-PLM project analysed the core of the product life cycle management in other sectors, identified the relevant variables that have an impact on the life cycle of VET provision and, on this basis, developed the beta version of a IT tool (software) for product life cycle management addressed to VET providers, and a user manual for product life cycle management. The Q-PLM software makes possible the identification of the training products lifecycle, the life cycle stages, the key success factors and indicators for the training products lifecycle, separately for each training program and for each college.

Key words: product lifecycle management - PLM, vocational education training -VET, Q-PLM project, Q-PLM software, active management

JEL classification: P46

1. INTRODUCTION

In early October 2013 several countries (Austria, Germany, Belgium, Finland, Slovenia, Ireland, Romania, Spain) formed the working team within a project "Leonardo da Vinci Multilateral Projects for Development of Innovation" identified with the acronym Q-PLM - quality assurance for VET providers using product life cycle management, with the aim of transferring the products life cycle management (PLM), used mainly in industrial areas and IT related fields, in continuous education area in an adapted form. This project was aimed at developing a tool for integrated product life cycle management for providers of vocational training (VET).

The active management of product life cycle, including the use of an appropriate software is a useful tool for monitoring and controlling a product portfolio of an educational institution. An IT tool can be recommended not only for reasons related to quality assurance, but to facilitate the development of products in order to ensure a greater transparency in economic policy and, not least, to remain competitive providers of training programs. There is an increased demand for a practical and coherent monitoring the life cycle of professional development products that take into account many factors and key success indicators that can influence the professional and educational programs.

In order to achieve the goals set by the project, the following objectives were considered:

- ✓ The analysis of the lifecycle management software already on the market;
- ✓ Carrying out a research in order to identify the variables influencing the lifecycle of a VET course;
- ✓ Establishing the indicators for the lifecycle variables of VET products;
- ✓ Drawing up a manual addressed to the active management of the product lifecycle for VET providers;

- ✓ Designing, implementing and testing a software for the active management products lifecycle for VET providers.

1.1. QUALITY OF VOCATIONAL TRAINING

The main issue regarding the VET quality insurance at provider level is that there are many factors and variables influencing the quality of VET offer/service. Measuring such a big number of indicators rises both methodological and resource difficulties. Furthermore, the VET providers and especially the small ones are not investing time and money in order to systematically assess the offers, to analyse the influencing variables for extracting relevant knowledge from the change and improvement mechanisms. In order to create valid variable measurement tools and to analyse their impact over individual VET offers, a profound knowledge of the empirical processes is needed.

At national scale, bigger VET organizations are generally using quality management models, quality manuals, user manuals, standardized processes, internal and external audits, feedback questionnaires, etc. Quality management also includes, recruiting and growing of a competitive staff, quality knowledge management systems, and yearly meetings in order to evaluate the courses, feedback sessions, quality control policies, internal and external evaluations.

During the project lifetime, the partners were asked in order to find out if they are using a certificate (EFQM, ISO) in their companies or if they are using another quality management system. They were also asked if the system is applied to the processes and / or products at national level. After all the data were summarized, we were able to extract the following conclusions:

- ✓ Small partener organizations are not using any certificate;
- ✓ Bigger organizations are using systems that are widely recognized (ISO 9001, ISO 14001, OHSAS 18001, EFQM, QFor) or systems approved at country level (for instance Austria, ÖCERT, TÜV);
- ✓ All partener organizations are using quality manuals, user manuals, as well as integrated management systems and customer (employee) satisfaction;
- ✓ National public organizations coordinating VET activities are focusing mainly on the general framework quality;
- ✓ The following key success factors are used by VET partner organizations when assessing training products: the participation rate, the entry rate, customer satisfaction, cost analysis, staff availability, etc.

The products and the services of VET market are influenced by a number of factors and variables.

The key success factors influencing directly customer satisfaction are the price, the quality, amount of time needed and innovative services. In order to fulfill one or more economic or scholar objectives, a mix of factors is needed.

The project QPLM is based on the idea that all products, including those related to the education and the vocational training have a certain lifecycle and each cycle has to be managed. Consequently, it came up the idea that the lifecycle of VET products has to be managed. Active management of the products lifecycle implies supervision, planning, product adaptation and inovations, thus allowing an approach oriented on lifetime education portfolios market. After much debates 4 major steps of products lifecycle for VET trainig were identified: design/decision, development, delivery and evaluation (Figure no 1).

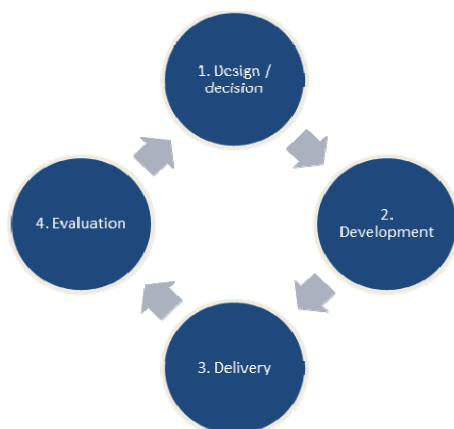


Figure 1. The phases of a VET product lifecycle

The Q-PLM software allows combining the indicators within key success factors and clustering them into smaller groups of important factors which will eventually influence the success or the failure of a VET product.

Within the partnership, the following ten key success factors which can affect VET products lifecycle were identified:

- ✓ VET courses quality;
- ✓ Customer satisfaction;
- ✓ The quality of the employees;
- ✓ Market demand meeting;
- ✓ Cost control;
- ✓ Suitability of the infrastructure and materials;
- ✓ Stakeholder's involvement;
- ✓ Strategic benefits for the supplier;
- ✓ Evaluation mechanisms;
- ✓ Appropriate certification.

Most important, VET quality systems should approach trainees needs. This is why the assessment is mainly focused on learner satisfaction survey on the provision. However, a coherent approach and a tool for monitoring service performance / VET tenders are not in place for most VET providers. Nevertheless, a coherent approach and a tool for monitoring service performance / VET tenders are not in place for most VET providers.

A satisfaction survey of students is an opportunity for VET participants to evaluate learning or training. This helps VET institutions to knowingly make choices about studying or training place. Performance indicator related to the learner satisfaction gives a score at the organization of training on how students rated a particular organization and is based on answers given by students to satisfaction survey.

A learner satisfaction questionnaire is a set of questions to be filled out by the learners of an institute or educational centre to find out the responses of the learners and whether or not they are satisfied with their experience of learning. These questionnaires consist of both subjective and objective questions and in general the questions are precise and to the point.

Quality management systems are integrated into all operational activities, into every step of the product lifecycle, i.e. during market research, product development, product delivery on the market, evaluation and the process of continuous monitoring of price and user satisfaction.

Learner satisfaction and feedback depends on:

- Organisation of the training programme
- Infrastructure and technical equipment
- Learning contents and learning outcomes
- Teaching and training materials
- Satisfaction with the trainers

- Training methods
- Pedagogical competences of trainers
- Successful completion of training
- Investment in participants' motivation

1.2. PRODUCT LIFE CYCLE MANAGEMENT INSTRUMENTS (PLM)

PLM concepts were first introduced where safety and control were of utmost importance, notably the aerospace, medical device, military and nuclear industries. From these industries the discipline of configuration management (CM) originated, which evolved into electronic data management systems (EDMS), which then further evolved to product data management (PDM). Product lifecycle management can be considered the cornerstone of a company and has become a strong presence in industrial production and manufacturing industry, in particular in the following fields:

- Aerospace;
- Defence;
- Automotive;
- Consumer Goods;
- Electronics;
- Energy;
- Engineering;
- Financial;
- Food & Beverages;
- Government;
- Healthcare;
- High Tech Electronics;
- Industrial;
- Medical Devices;
- Tool and machine tool industry;
- Pharmaceutical;
- Textiles;
- Wood.

Up to now, the concept of PLM is unknown in the field of initial or further vocational education, or if known, not used for the management and control of the portfolio of the training programmes even if there is without doubt a strong need at the VET provider level for a coherent and practical instrument to monitor the several variables influencing the performance of a VET service / offer, to assess changes and their impact on the VET offer and to allow an early and immediate reaction to the demands of the rapidly changing VET markets.

PLM software systems enable companies to facilitate the control of product life cycles and to manage the wide range of product data in an efficient way, to coordinate all actors and logistical chains involved, and reconcile the requirements of the product range with the budget. Optimally coordinated processes across multiple locations allow for a quick response to changes in demand in the market. Thus, the right product, at the right time, can be brought to market at the right price.

PLM describes the engineering aspect of a product, from managing descriptions and properties of a product throughout its development and useful life; it refers to the commercial management of life of a product in the business market with respect to costs and sales measures.

Benefits of product lifecycle management are the following ones:

- A framework for product optimization
- Ability to quickly identify potential sales opportunities and revenue contributions

- Improved forecasting to reduce costs
- Improved product quality and reliability
- More accurate and timely possibility to innovate
- Reduced development costs
- Reduced time to market
- Savings through the complete integration of workflows and processes
- Savings through the re-use of already existing data

Active product lifecycle management, including the use of a suitable PLM software, is a tool to monitor and control the product portfolio of an educational institution.

It can be recommended to:

- adapt VET programmes more easily to the requirements of the labour market
- allow early and immediate reaction to the rapidly changing VET market
- assess changes and their impact on the VET offer
- control the product portfolios of VET providers more efficiently
- facilitate the product development for VET providers
- improve quality assurance for VET providers
- maintain the competitiveness of VET providers
- monitor several key success factors and indicators influencing the performance of a VET service / offer
- monitor the lifecycle of VET products
- react better to the pressure of innovation in VET

2. PERSPECTIVES ON THE USE OF THE Q-PLM SOFTWARE BY VET PROVIDERS

PLM-software should be used for the coordination of training programmes in the VET market and for the control of the processes and product portfolios of the training providers, thus making it easier to monitor and better visualize the business processes and the product (Figure no. 2).

PLM - software systems in general enable companies to facilitate the control of product life cycles and to manage the wide range of product data in an efficient way. Optimally coordinated processes across multiple locations allow a quick response to changes in market demand. Thus, the right product, at the right time, can be brought to the market at the right price.

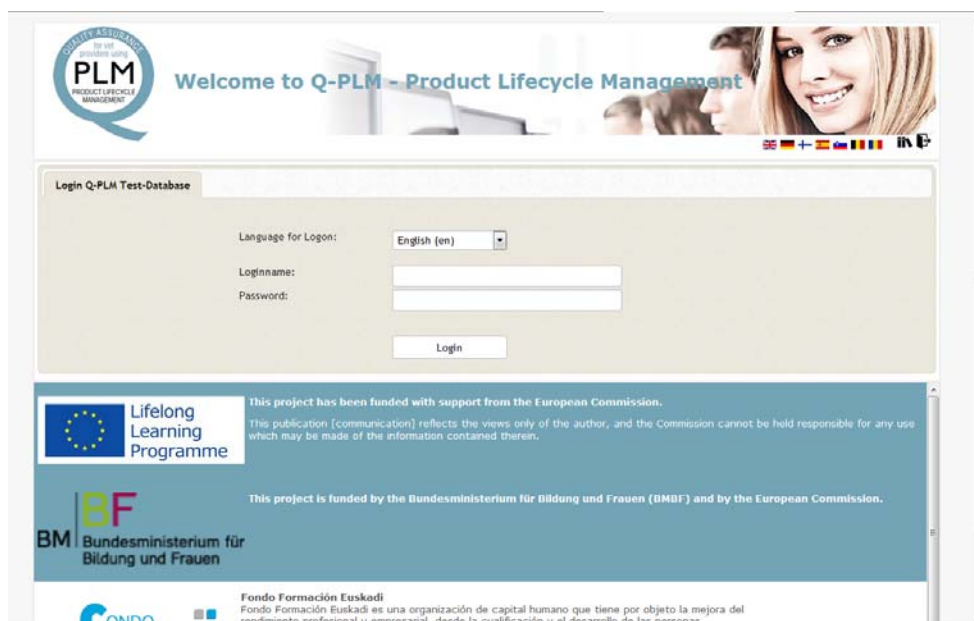


Figure no 2. The main page of the Q-PLM software

3. CONCLUSIONS

Active product lifecycle management, including the use of suitable PLM software, is a tool to monitor and control the product portfolio of an educational institution. It can be recommended not only for reasons of quality assurance, but also for the facilitation of product development, for more transparency in the strategic business areas and, last but not least, for the maintenance of the competitiveness of VET providers. Services and products on the vocational education and training (VET) market are being influenced by a vast number of factors and variables. VET products have a certain product lifecycle, as do all products on the economic market – and PLM is a conceptual approach which takes into consideration the entire lifetime of a product. A PLM software system enables VET providers to facilitate the control of product life cycles and to manage the wide range of product data in an efficient way. Optimally coordinated processes across multiple locations allow a quick response to changes in market demand. Thus, the right product, at the right time, is brought to market at the right price.

The project's main objective was to, in an adapted form, transfer the product lifecycle management that is primarily being used in the industrial and IT area to the field of further education. Active PLM facilitates product control, planning, adaptation and innovation, thus enabling a market-orientated approach of the portfolios in further education. This project foresees the development of an IT-based tool for an integrated product lifecycle management for VET providers.

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