

# An e-Learning Self-Assessment Model (e-LSA)

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**Abstract**—An eLearning self-assessment model (e-LSA) was developed to evaluate the quality of eLearning in an organization based on Total Quality Management (TQM) and the European Foundation for Quality Management (EFQM) excellence model. The e-LSA can be used by management team and trainers for self-assessment. The concept and the system were successfully applied in a Belgian Bank.

**Index Terms**—Total quality management, Self assessment, Technology-enhanced learning, eLearning evaluation, EFQM

## I. INTRODUCTION QUALITY OF LEARNING

Qualitative training makes learners capable to function as competent professionals having good knowledge and at the same time living as good human beings in a social environment. ELearning is a good opportunity for companies to up-skill their employees. Learning will contribute to sustainable social and changing economic development [4][6]. Quality of education requires three basic conditions: Ensure real growth in personality and behavior of the learner, alignment with the needs of society and professional environment, and the availability of qualitative resources and professional management skills of the learning institution.

To guarantee successful and high quality learning results and to improve learning outcomes, the eLearning process should be continuously evaluated. Guaranteeing the quality of eLearning process amplifies the need for an effective quality assurance using a measurement model that takes into consideration all eLearning process stakeholders' expectations. Measurements will lead to evaluate and to improve eLearning quality.

Continuous evaluation of the enabling organization of courses, learning processes and using a learning quality system is a necessity to improve the quality of education [17]. In higher educational institutes the quality of learning is not only the students' major concern, but their parents, prospective employer, government, and society, in addition to the academic administrators and teachers [2].

## II. TOTAL QUALITY MANAGEMENT (TQM), EXCELLENCE AND THE EFQM EXCELLENCE MODEL

TQM is the concept of continuous evaluation and improvement of processes, the resulting products or services, but also the people and other resources, and last but not least management [13]. TQM has been a major force that has influenced business

operations and organizational management since the 1970s [8]. The main characteristic of TQM is the coverage of all enterprise wide activities and the expectations of all stakeholders. TQM emphasizes customer focus, continuous improvement, employee empowerment, and data driven decision-making [12].

Regardless of sector, size, structure or maturity, to be successful, organizations need to establish an appropriate management framework. The European Foundation for Quality Management (EFQM) Excellence Model is a guide for organizations in their evolution to TQM by helping them understand the gaps by measuring where they are on the path to excellence, and to guide them afterwards in initiating remedial and stimulating actions.

The fundamental concepts or characteristics of excellence [11] are: results orientation, customer focus, leadership and constancy of purpose, management by processes and facts, people development and involvement, continuous learning, innovation and improvement, partnership development, and public responsibility.

The EFQM model [16] is based on those fundamental concepts or characteristics of excellence, [14]. The EFQM Excellence Model was introduced at the beginning of 1992 as the framework for assessing organizations for the European Quality Award. It is now the most widely used organizational framework in Europe and it has become the basis for the majority of national and regional Quality Awards. This model is a non-prescriptive framework which recognizes that there are many approaches to achieving sustainable excellence. It can be used as a self-assessment model for all kind of organizations, large or small, and in public or private sector. It can also be used as a benchmarking tool and last but not least to achieve a quality certificate [7].

## III. THE EFQM EXCELLENCE MODE AND SELF-ASSESSMENT

The EFQM Excellence Model is a framework including 9 main criteria. Five of these are 'Enablers' and four are 'Results'. The 'Enablers' criteria cover what an organization does. The 'Results' criteria cover what an organization achieves. 'Results' are caused by 'Enablers' and 'Enablers' are improved using feedback from 'Results'.

The Model's 9 boxes represent the main criteria against which to assess an organization's progress

towards excellence [14]. Following are the definitions of the nine main criteria.

1. Leadership: Management can motivate and stimulate the organization on their way to continuous improvement.
2. Policy and Strategy: Policy deployment is necessary to ensure that the strategy is formulated and is known all over the organization.
3. People: EFQM covers aspects of effective human resource development, teamwork, empowerment, rewards and career planning.
4. Partnership and Resources: suppliers and customers are partners with emphasis on mutual beneficial relationships. Development and use of all kind of resources is a main point for attention, and have to be maintained for capability.
5. Processes: the focus of EFQM is on the key processes necessary to realize the products/ services and follows the organization's strategy.
6. Customer Acceptance and Appreciation: taking care for customer satisfaction will keep them on board and will also attract new customers.
7. Functioning of People in the Organization: the quality of the functioning of the people will result from their feeling of being responsible and of having high value for the organization.
8. Position in the Society: the company has to establish its social mission and its impact on wider society by being involved in community activities.
9. Company results: quality of all enablers will guarantee qualitative results, and will deliver a successful organization having good financial company results.

These main criteria will be subdivided in a set of criteria, each composed of a set of sub-criteria. For each sub-criteria a number of questions should be considered in the course of an assessment.

#### IV. QUALITY ASSURANCE AND SELF-ASSESSMENT IN EDUCATION

In universities and higher educational institutes, quality assurance (QA) is part of the Bologna agenda. They are expected to reflect on many issues, particularly on the teaching and learning processes, and on the roles and responsibilities of management, teachers and students. Bologna formulated the enhancement of the quality as a main goal. It implies that the institutions have to implement procedures for quality assurance. In Bologna, we also find guidelines for the implementation of ICT enhanced learning (TEL) and e-learning. Al-Fadhi and Khalfan [1] underline the quality aspects of TEL environments. Also companies are becoming convinced that eLearning or blended learning programs will stand for qualitative learning. They can create added value by decreasing the costs of company-wide training programs and by increasing the flexibility of the organization of learning programs. But the organization of eLearning also requires the appropriate infrastructure and policies to achieve the required quality for the program. E-learning needs

considerable human, financial and technological resources.

Quality assurance is a must and it starts with measuring the quality level. Often quality of the e-learning/e-training organization has been measured using indicators focusing on the technological aspect of the e learning. But this approach is a rather limited view on quality. Fang Zhao suggested a framework providing some aspects of the quality of eLearning [3]. It includes among others course effectiveness, adequacy of access in terms of technological infrastructure, student satisfaction, the interaction with the teacher, educational satisfaction of teaching staff and support services.

In a quality assurance model, the learner can play the role of evaluator about the organization and the process of learning. Teachers and tutors are responsible for the learning content and the learning process. Moreover, management is responsible for the organization of the process, for all resources, including people and learning infrastructure. A quality assurance system will have to include a measurement system covering all the relevant quality criteria. The EFQM model can be used to define the relevant quality criteria [5][10].

#### V. AN EFQM BASED SELF-ASSESSMENT INSTRUMENT

The EFQM model has been adopted here as a self assessment instrument to be applied in the evaluation of the e-learning services organization.

In most EFQM reference work the following definition for self assessment can be found:

“Self-assessment is a comprehensive, systematic and regular review by an organization of its activities and results referenced against the EFQM Excellence Model. The self-assessment process allows the organization to discern clearly its strengths and areas in which improvements can be made and culminates in planned improvement actions that are then monitored for progress.” [9]

Although more types of self assessment methods do exist, the questionnaire approach is one of the least resources intensive techniques and can be completed fast. It is an excellent method for gathering information about the perceptions of people within an organization. As questioning form, some organizations are using simple yes/no questions; others are using slightly more sophisticated versions including a rating scale. Here is chosen for the combination of an evaluation and an expression of relevance /importance of the statements formulated for all quality sub criteria included in the 9 main criteria model. It means that for each statement the respondent will have to answer on 3 questions: Is this criterion relevant? What is the quality of this criterion? And is an improvement needed yes or no? The evaluation measures will be weighted with the relevance to determine the quality value [9].

VI. THE EFQM EXCELLENCE MODEL IN EDUCATION AND THE STAKEHOLDERS

In applying the EFQM model in the organization of learning, a translation of the key terms was set forward. The “people” in the model comprise learners and teachers/tutors. Both are responsible for the learning process and for the overall attainment. In a university or higher educational institute the customers are the learners, the parents, the future professional environment and some representatives of the community. In an eLearning services company, the customers are learners and the management of their companies. In a learning services department of a company the customers are the learners and the management of the other departments.

Learners have a dual role as clients of the educational system and as people while contributing to the life of the educational institute and to the learning process. The government of the country

and the management of the educational institute and other members of organizing and controlling organizations have (overall) responsibility for the quality of education offered by the educational institute.

The initiative to organize the process of measuring and of assessing the quality level can be taken by the teacher/ trainer and/or by the tutor, but also by management responsible for the learning function of the organization.

The set of criteria and the assessors were identified and presented in the EFQM excellence model in education in Figure 1. The learning institute/ (learning department) is responsible for the organization of the eLearning activities. All stakeholders request for services. To become excellent, the learning organization has to balance and satisfy the needs of all relevant stakeholders. The stakeholders are put around the frame. Their requirements are linked with the EFQM main criteria.

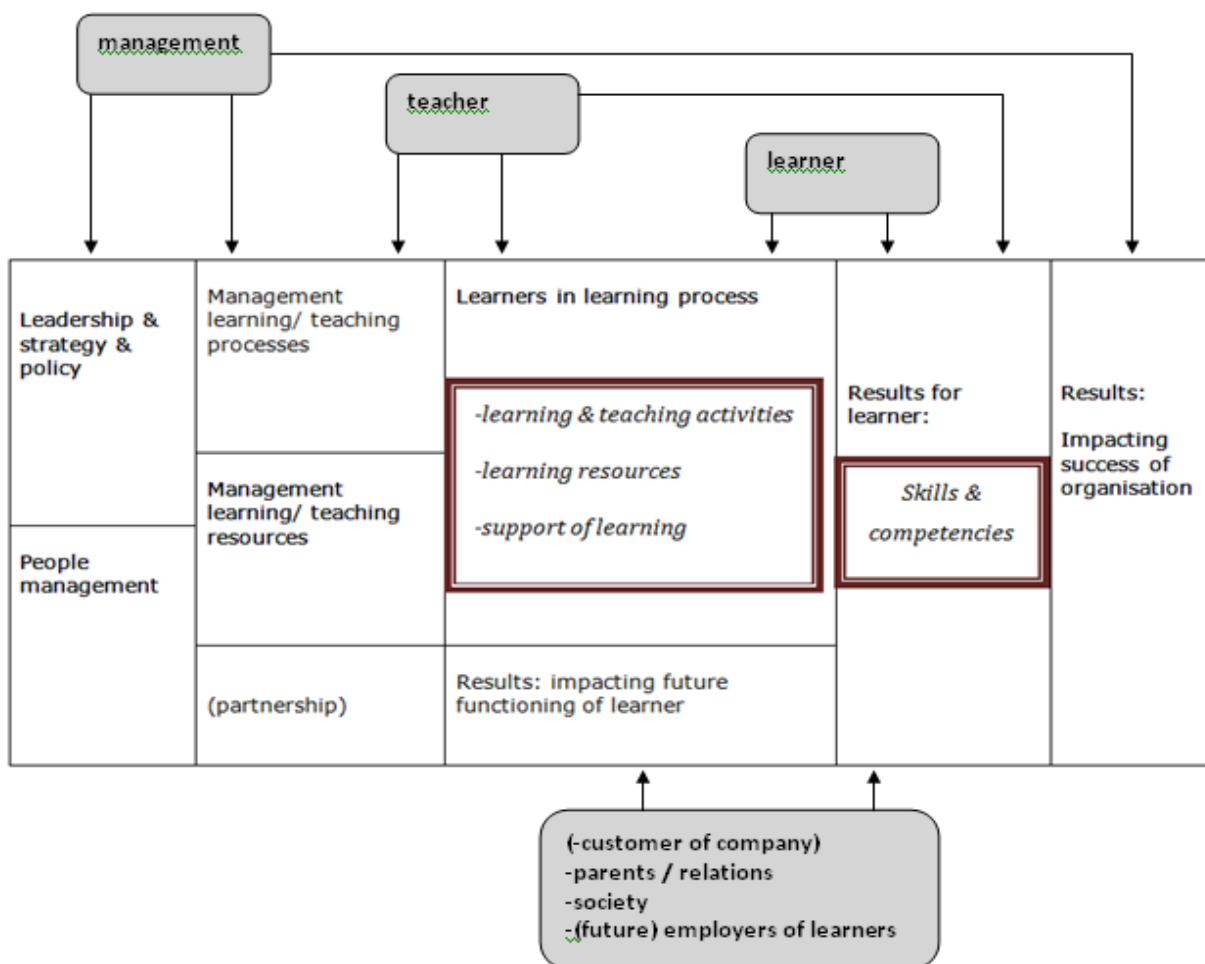


Figure 1. EFQM excellence model in education

The internal stakeholders; management, teachers and learners, will have to participate in the quality evaluation.

The learner, participating in the e-learning course is the main evaluator and will evaluate the learning and teaching activities, the learning resources made available and the resulting knowledge increase.

The teaching team as organizers of the learning process is partner of the learner and wants to improve the learning / teaching activities to optimize the learning results. Management wants to see good results because these are impacting the relation with the external world and the success of the organization.

To organize the self assessment process using a self assessment questionnaire, a model of quality criteria has been developed and presented in an e-learning self assessment model.

**VII. E-LEARNING SELF ASSESSMENT MODEL**

An eLearning self-assessment model has been developed [15][11][18][4].

To measure the overall quality of the learning organisation, a set of main criteria, criteria and sub-criteria are covering the organization wide aspects linked with the organisation of learning. For all sub-criteria a set of measurable indicators have been identified and are formulated as statements. Measuring the overall quality of the learning organisation will be realised by self-assessment by the internal stakeholders, asked to express their agreement with the formulated statements.

The self assessment model is split in two parts, the first model (figure 2) is focusing on course and course learning process and can be used by learners self assessment and the second one (figure 3) relates to management of learning and can be used by management and staff self assessment.

**VIII. E-LEARNING SELF ASSESSMENT QUESTIONNAIRE AND SYSTEMS E-LSA AND E-LISA**

For each assessment model a questionnaire is developed.

For the assessment by the learner e-LSA is developed, including the course and course learning process related criteria. The learners will have to complete the questionnaire at the end of their course.

For the assessment by management and the teaching team e-LISA is developed. It includes the management and organizational related criteria. The internal stakeholders, including management and teaching team who have responsibility in the organization of the learning services will have to complete it.

A generic set of statements/ questions have been developed covering all the sub criteria.

Management and/ or the teaching team can be initiator of the assessment. To create their own questionnaire, they will select a set of main criteria, criteria and questions from the generic set included in the questionnaire. It is possible to add additional questions, to personalize the questionnaire. to create their own questionnaire.

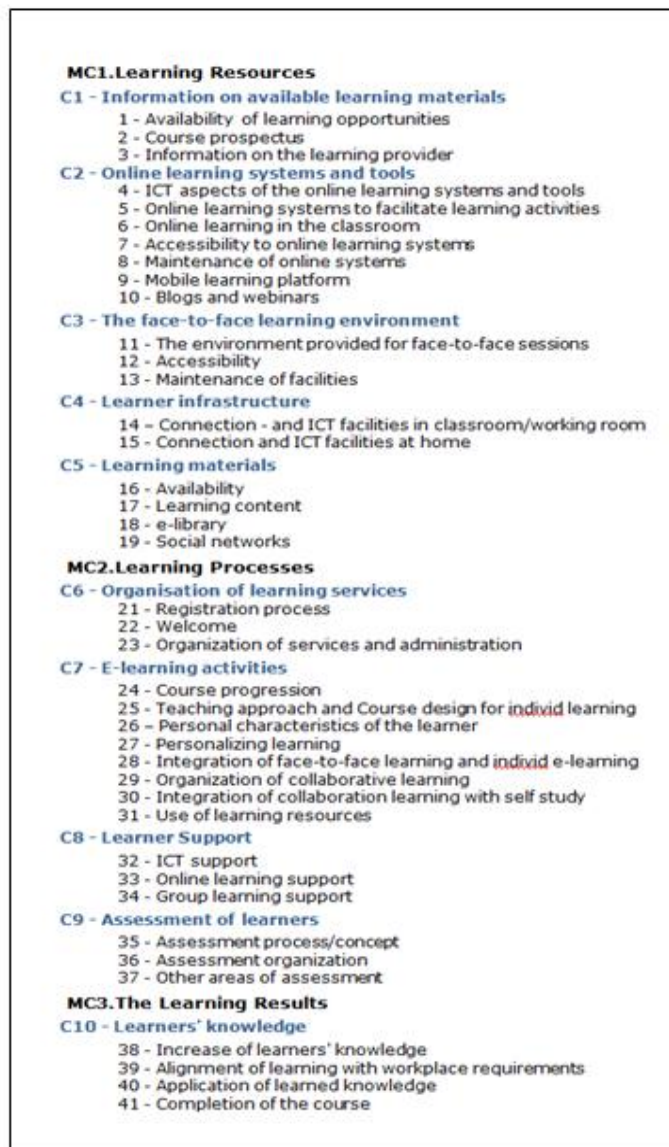


Figure 2. eLearning self-assessment model for self assessment by learners



Figure 3. e-learning management self-assessment model for self assessment by management and teaching team

For each statement/ question the respondent will have to answer on 3 questions: 1. Is this statement

important or relevant? 2. How do you rate the quality / relevance of this statement? 3. And is an improvement needed yes or no? (Figure 3)

3 questions									
Rating: evaluation/ Do you agree				Importance/ relevance				Action to Improve?	
Bad/ disagree	Not good/ disagree	Good/ agree somewhat	Very good/ agree fully	Not at all	somewhat	important	Very important	YES	NO

Figure 4. Three questions for each statement

In the analysis, the evaluation measures will be weighted with the relevance to determine the quality value [9].

The system has an interface for the designer / initiator of the assessment as well as for the learner to complete the questionnaire.

The designer will decide about the organization of the assessment in a class frame (anonymous users) or as an individual learners activity (individual learner). The designer also decides on the timeframe that the questionnaire has to be completed.

At the end the system will deliver the results of the input by the respondents and analysis will be reported as management reports, to be used to identify the strong and weak functioning subcriteria. In a detailed table on question level the reason for that weak result can be identified.

IX. KBC CASE : MEASUREMENT OF QUALITY OF E-LEARNING PORTEFOLIO USING E-LSA

A. KBC e-learning

KBC is a Belgian bank and insurances company which is becoming a global player in the Banking and Insurance sector. Its core markets are in Europe: Belgium, Czech Republic, Hungary, Poland, Slovakia and Bulgaria.

KBC develops its own tools for eLearning and makes use of different advanced multimedia information elements like: eye catchers, symbols, photos, and drawings, content buttons, schemes, screenshots, hyperlinks, demo's, animations, questions and tests, etc. They experienced some advantages in comparison with classroom learning as they can focus on creating task oriented solutions. But the development is also a very time consuming and expensive building process.

B. e-Academy and the purchase of e-learning courses

In the frame of a new initiative e-Academy, KBC decided on the purchase of a port folio of e-learning courses from the vendor Skillsoft. This package of more than 2800 e-learning courses with ICT professional focus are available on 24/7 base, during office time (@office) and in free time (home). Subscription is on "free" base. The covered ICT domains are:

- Software Development
- Internet and Network Technologies
- Operating Systems and Server Technologies
- Enterprise Resource Planning Systems
- IT Business
- Project Effectiveness
- Web Design
- Tools

C. Implementation of e-Academy

- Roll-out (April 2009)  
Courses are implemented for ICT professionals in the KBC sites in Belgium, Central Europe and in India. The announcement was organized as a newsflash and as a banner on KBC ICT Intranet and also via direct mailing (in language of employee). Additional flyers and posters are sent. An always recognizable banner was developed.
- Access for the KBC employees  
The portal to the e-Academy can be find on the home page on KBC ICT Intranet. KBC employees can find information, a catalogue, as Subscription form and also a "Tips & Tricks " e-learning support.
- Learning system  
KBCe-learning courses are installed in the SAP LSO learning management system (LMS). These scorm compliant Skillsoft courses are also integrated in the institutional LMS. The content is hosted by skillsoft.
- Communication with the users about updates. Newsflashes about new offers and about changes can be found on KBC ICT intranet.

D. Problem: low adoption of e-learning by the employees

Training@KBC is responsible for training staff of the Group. But still not all people of KBC make use of them. The implementation of eLearning is not going the way the KBC management has hoped. KBC would like to know the reason for the limited use and what they can do to convince the employees to use eLearning. In a first research KBC wants to measure the quality of these eLearning courses by questioning the staff members that have already taken courses. A survey was developed, including the relevant indicators from e-LSA.

E. Learners self-assessment of e-learning quality

As an approach, KBC management decided on organizing a survey and using a questionnaire. All ICT staff members of Belgium, Central and East Europe, and India, being more than 6 months KBC employee, were invited to complete a questionnaire online. The questionnaire consists of 48 questions . These are structured around 3 main



criteria, each including some criteria and these are composed of some subcriteria. The 3 main criteria are 1. The enabling learning resources, 2. The enabling learning processes and 3. The learning results. For each subcriteria statements/ questions are formulated, and also free comment is possible.

**F. Questionnaire:**

**Learning Resources**

1. Information on available learning opportunities (Learning Programs, Course prospectus, Learning provider, ...)
2. The electronic Learning Environment (Reliable tools, 24/24, 7/7, Login, ...)
3. The online learning environment (Suitable area, Sufficient time, ...)
4. Learning materials (Availability of help and support, Content (up-to-date, relevant, ...))

**Learning Processes**

1. Organisation of Services (Guidance in the choice and selection of a course, Registration Process, Welcome, ...)
2. E-learning Activities (Course Progression, Personalising of the learners's course, ...)
3. Learner Support (ICT Support, Online Support)
4. Assessment organisation (Proof of attendance, certificate, ...)

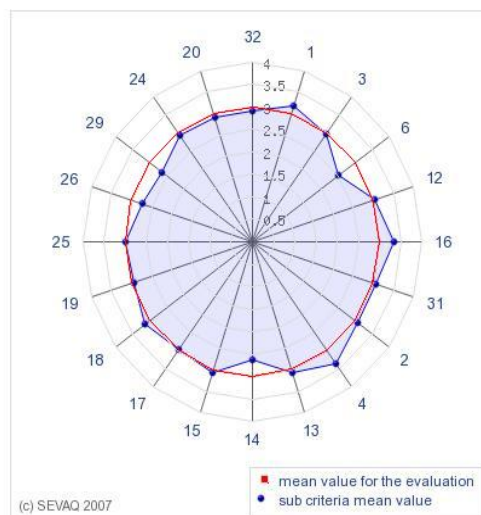
**Learning Results**

1. Knowledge Increase (Knowledge Level on finishing the course)
2. Using what the learner has learned (Using skills learned on the course)

**G. Results of the study**

270 learners were invited to participate. 39,26 % completed the questionnaire online. So the survey resulted in 106 respondents. The answers were produced in tables and were presented graphically.

In figure 7 the subcriteria with higher value are listed, and in figure 8 those with lower than the mean. Another table shows the detailed evaluation on statement/ question level. By the way the critical questions can be identified.



**Mean value for the evaluation = 3**

Figure 6. Weighted mean evaluation per subcriteria and compared against the overall weighted mean evaluation / quality.

Special management reports were produced. In the radar diagram, figuring out the weighted mean evaluation per subcriteria, the good and the bad subcriteria can be identified, by comparing them to the overall weighted mean value (red line).

**H. Critical questions which have to be improved and for which actions are required**

The biggest improvement is needed in the part of the learning processes (64%), and then in the learning results (50%). Improvement of the learning process means that the bank should focus more on methods of teaching.

	Number of learners	Number of answers	What is your evaluation of this topic in your course?				How important is this topic for you in this course?				Is improvement necessary?	
			1	2	3	4	1	2	3	4	Yes	No
			Poor	Fair	Good	Excellent	Not important	Fairly important	Important	Very important		
<b>Learning Resources</b>												
<b>1 - Information on available learning opportunities</b>												
<b>1 - Availability of learning opportunities</b>												
0 - The information provided on the learning programs is relevant to learners' needs	150	106	0	2	85	16	0	11	63	29	38	63
0 - A comprehensive catalogue is available in ICT Net and/or in My Learning Environment, listing all learning programs provided	150	106	0	1	79	22	0	14	67	22	29	72
<b>2 - Course prospectus</b>												
7 - Clear aims and learning objects were given for each course.	150	106	2	6	78	14	2	11	66	22	28	71
8 - Summaries of the content of each course were provided.	150	106	1	3	70	22	1	13	62	21	16	80
9 - A clear overview of the topic of each course was provided.	150	106	1	6	76	17	1	16	66	20	23	78
13 - Information about learning opportunities attracted you to attend a course.	150	106	2	17	60	23	5	25	52	21	33	68

Figure 5. Table of respondent's answer

4	ICT and the learning system	3.35
16	Welcome	3.35
1	Availability of learning opportunities	3.18
18	Course progression	3.13
15	Registration process	3.07
2	Course prospectus	3.07
13	Learning content	3.06
31	Knowledge level on finishing the course	3.05
12	Availability	3.02
25	ICT Support	3.00

Figure 7. Subcriteria with higher quality than the overall weighted mean value

17	Organization services and administration	2.96
3	Information on the learning provider	2.96
24	Use of learning content	2.94
19	Teaching approach/Course design	2.93
32	Using skills learned on the course	2.91
20	Personalizing the learner's e-learning course	2.90
26	Online support	2.73
29	Assessment organization	2.64
14	Guidance in the choice and selection of your course	2.64
6	The physical learning environment provided for online sessions	2.51

Figure 8. Subcriteria with lower quality than the overall weighted mean value

Also the knowledge and skills gained after finishing the course are not satisfying and useful enough for learners in their future career. On the other hand the learning resources have been evaluated as being well prepared. 71% of people evaluated the provided materials and resources positive.

In the radar of Figure 6 we can identify two critical subcriteria:

6: The physical learning environment provided for online sessions

14: Guidance in the choice and selection of a course.

Those 2 subcriteria are analyzed in more details in the following figures.

95,24% of learners answered the question and 55% of them who are asking for improvement claimed that the issue is very important for them.

The physical learning environment	%	Very critical	critical	OK
Suitable area (space; calm; no interfering activities...! Is set aside for individual learning	52,78		X	
Sufficient time is available for e-learning during office time	58,82		X	
e-learning at home is normal practice	25,93			X

Figure 9. Detailed results of questions of subcriteria: the physical learning environment

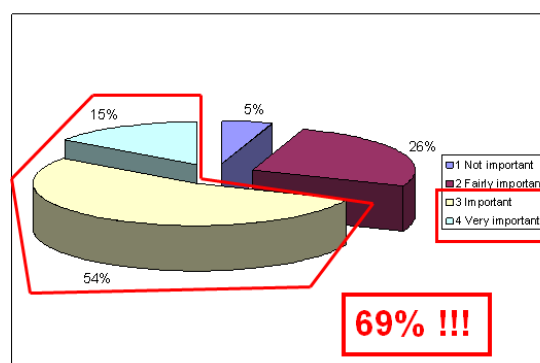
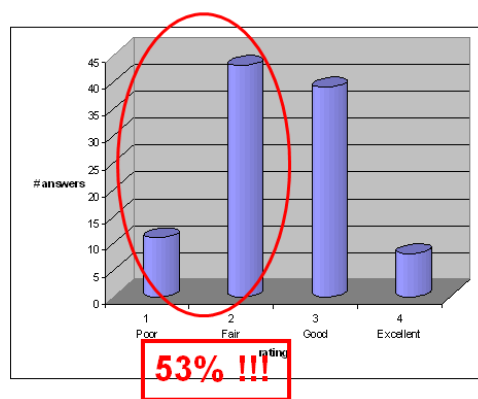


Figure 10. Detailed analysis of question "suitable area for e-learning"

*Decided actions*

In KBC Leuven a new training room was created with 34 full equipped ICT workstations. On simple demand, staff members can work in this very quiet environment where they are not disturbed or interrupted by colleagues. They can ask for some assistance from KBC ICT Training consultants.

In Brussels and in Ghent learning centra are developed. In the CE-countries, still no action was taken.

94,29% learners responded and 49% of them who are asking for improvement claimed that the issue is very important for them. Many people want to attend eLearning courses during the working hours. Unhappily, very often there is no opportunity to do it simply because of lack of available time. Each of learners has his/her own pace of working and gaining knowledge, so it is not possible to organize it during the office hours. Sometimes there is not appropriate equipment available. It is why nowadays employers request for home learning. Those factors could be the reasons of such results. It is worth to consider the extra hours, for example per week, as well as special places, with proper staff, where workers could use eLearning courses during the working hours.

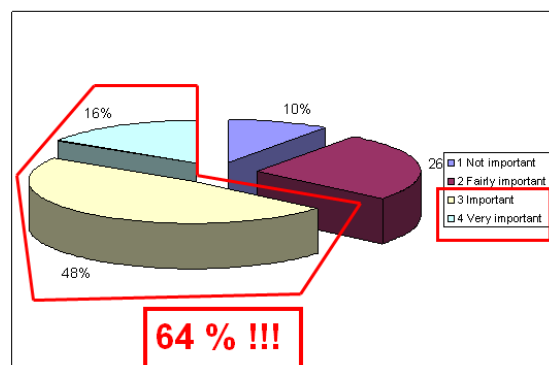
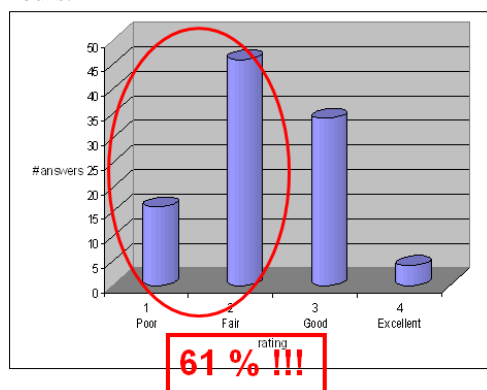


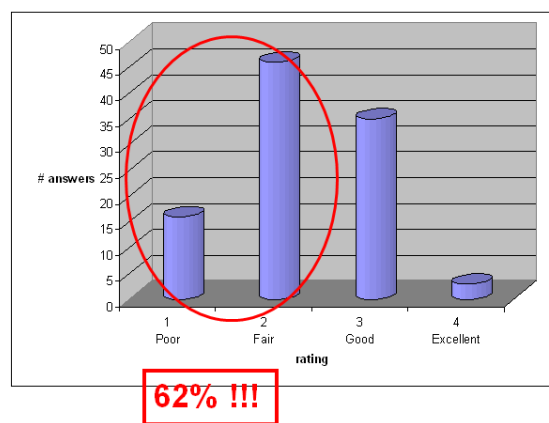
Figure 11. Detailed analysis of question "sufficient time"

*Decided actions*

In KBC Leuven learners can plan for e-learning in the training room and as a consequence the learning time can be planned more efficiently. Job related trainings are incorporated into the personal ICT training plans.. As a consequence, the learning time is more officially planned and is becoming part of the working time.

At this point it is worth to mention just about one question in the second part (learning process), that reached almost 40% (showed in the summary table). It should be taken into consideration, because in the near future it can turn out into critical question like two others mentioned in point 1. In this case we asked if there is guidance to learners in choosing which course to attend. 94,29 % learners answered this question.

As we can see, unfortunately worrying number of learners claims that they were not given fear or excellent guidance in choosing which course to attend. The majority of them state that there were available only poor or fair information about courses. Bank should consider it very precisely and it should focus on providing proper advices to the potential participants.



Is improvement necessary?	
Yes	No
32	65

Figure 12. Detailed results of questions of subcriteria: guidance in the choice and selection of a course

Guidance in the choice and selection of a course	%	Very critical	critical	OK
There is a low threshold to subscribe to the course	18,31			X
You were given guidance in choosing which course to attend	39,58		X	

Figure 13. Detailed analysis of question: guidance in choice which course



*Decided actions*

Two important actions were decided:

1. labeling for KBC compliancy. Experts are checking and guiding the choice. Also the courses are integrated in the learning processes.
2. Personal advise by ICT training consultants will support the learners selection process.

## X. CONCLUSIONS

An eLearning self-assessment model and system is developed to evaluate the quality of eLearning based on EFQM excellence model. The quality assessment model consists of 5 main criteria. For each of the main criteria, a set of criteria and relevant sub-criteria were identified. For each of the sub-criteria statements/ questions are formulated. A generic set of about 300 relevant statements/questions are built in the assessment questionnaire. The initiator of the self assessment can be the management or the teaching team. A customized questionnaire can be built by selecting questions from this generic portfolio of questions, and he can add some relevant additional questions/statements.

For each statement, the learner will have to answer 3 questions: Is this statement relevant? What is the quality of this stated issue? Is an improvement needed yes or no?

e-LSA has been applied in the KBC Bank, for the measurement of the quality of their e-Academy. The conclusions of the survey resulted in decided actions to improve the performance of the e-Academy organization, thanks to the EFQM management reports resulting from the e-LSA system.

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