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ICT use in school: vision and performance measures

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Key words: *ICT vision, performance measure, EFQM excellence model, PI*

Abstract:

The implementation of ICT in schools requires a vision on ICT use in school, the formulation of clear strategic goals, and the planning and organisation of the use of ICT in school.

The pursued goals are those points we want to reach for the learner by setting up ICT use in school. At the same time the pursued goals are the results of using ICT as expected by the stakeholders, being the learner, the teacher, the ICT coordinator, and on an indirect way the parents, the environment and the funding government.

We created a checklist around the following three main criteria ICT vision, enabling school organisation and processes and results. Those has been split again in five criteria, the vision for ICT use in school, secondary processes, resources and partners, primary processes and results. The checklist can be used by the school board as a self evaluation instrument.

1 Introduction

School management must have a vision on ICT use, taking into account the new developments in ICT, and must formulate a strategy to achieve the ICT vision. It appeared to be that in Flanders the government has a clear vision and strongly supports ICT use in schools. In the annual report from the Educational Inspectorate we can read that the biggest challenge for the schools is not the acquisition of HW, but the integration of ICT in the learning process. It stands for the third phase of the evolution of ICT use in schools.

The school strives to excellent performance. The main focus is here on the learner. How can he benefit from the use of ICT in the learning activities.

Schools can use performance models and a selfassessment instrument based on one of them. A school needs a specific school performance measurement model /framework. It can be based on the EFQM excellence model. The management team of the school together with the teachers, the ICT co-ordinator and some learners will evaluate the ICT use and decisions about improvements will be taken based on it.

2 Vision on the role of ICT in school

2.1 The Government has a vision and strongly supports ICT use in schools

The Government is strongly supporting developments in ICT in schools through the provision of resources and guidance. It is, however, up to schools to develop a vision for ICT that is right for them and that will meet their projected needs and aspirations.

The Flanders government has launched the infrastructure projects *PC/PK project*, the *I-line* of Belgacom and the *AAL project*.

Some other initiatives are *REN* (regional networks of expertise) project organising training of the teachers in using ICT in education, and the funding of an additional staffmember as an

ICT co-ordinator. The government is *co-funding* the participation of the schools in European projects. [1, 2, 3, 4, 5]

Klascement and *Anywise.net* and *digikids* and *klikvast* are educational portalsites for teachers, of which the development and the maintenance is done by teachers. [4] Those are independent, non-commercial and free platforms where teachers and students can interchange learning materials and links. Software packages can be downloaded too. In discussion fora students and teachers can interchange information, experiences and ideas. By the way the schools, teachers, parents and learners are motivated to collaborate and are stimulated to use ICT in a pedagogical way. How can ICT put into educational practice is the subject of a yearly organised conference.[6, 7, 8] On digikids portal some competition is organised between schools. It is also an e-shop for the purchase of software at reduced prices for schools. [9, 3] Klikvast informs the teachers and the parents about how to protect the children against the dangers of the internet, chatting, cyber-pestering and how to organise a secure internet class in the school.

The European Schoolnet is integrating all local ICT school networks in one European network.[10]

2.2 Schools are on the way to the third phase: ICT integration in the learning process

In the annual report “Onderwijsspiegel” from the Educational Inspectorate we can read that the biggest challenge for the schools is the integration of ICT in the learning process. It stands for the third phase of the evolution of ICT use in schools.

The schools have finished the phases one and two. In the first phase teachers have learnt the basic principles of using computers. In the second phase applications of ICT have been introduced and the Internet has been made available for learners and teachers. Teachers have started to use powerpoint presentations in the classroom.

In the third phase ICT is becoming somewhat part of the learning activities. F.e. the teacher can formulate a problem and the learners will use the Internet to find the learning materials and additional information about the topic. Learners have to report about the results of their teamwork and will present it to the other learners. Part of the subject matter of teaching can be delivered as e-learning courses and the learner can achieve it individually.

Some schools are already evolving to a new learning model where learner and learning team are central. However, it has become a challenge for all occupied with the organization of education and training to re-engineer the learning process and to implement advanced ICT in order to enhance learning through technology.

Collaboration of a team of students is being viewed as co-operating on an assignment and/or joining discussions about relevant or current topics. On a second level the learners will deliver additional content him/herself and share it with other learners in their team.

Synchronous communication could be conducted via the chat facility and conference systems, and asynchronous communication may be facilitated through the discussion groups and via email

The school management can play an important role in motivating and steering their teachers to the third phase. The availability of the ICT infrastructure is a condition but it does not automatically result in advanced use of ICT by the teachers in the learning activities. The school needs a management with vision that defines an effective ICT integration plan.[13]

2.3 A school's vision for ICT in school

Shaping the vision means finding an answer on the question: “What kind of school do we want to be? And how does ICT fit into our vision?”

ICT supports both 'formal' and 'informal' learning, so that all can share not only in the learning experience but also increasingly personalised learning.

Realising the vision means the integration of the vision into the School Improvement/ Development Plan and to consider how the needed investment will be secured. ICT is a major investment for the school and requires long-term planning and regular monitoring and review. A school's vision for ICT should be driven by the potential to improve teaching, learning and achievement rather than by the technology itself. The question to ask is not 'What resources do we have?' but 'How do we use our resources effectively to enhance the education of our pupils?'

3 Strategic goals and performance excellence of a school

3.1 Strategic goals

The pursued objectives can be formulated as answers on the desired results of different stakeholders. The direct benefiting stakeholders from the school are the learner, the teacher, the ICT co-ordinator and the school directorate. The indirect ones are the parents, the society and the government. The main focus is here on the learner. How can he benefit from the use of ICT in the learning activities.

We define a number of goals as institution wide ones and a number of learning specific goals.

GOALS	STAKEHOLDERS					
	direct			indirect		
	learner	teacher	ICT-co-ordinator	parents	society	Govern-ment
<i>Institution wide goals</i>						
1.be prepared to enter in the information society	X			X	X	X
2.to create a rich and effective learning environment	X	X	X			
3.advanced and innovative education model	X	X	X			
...						
<i>Learning specific goals</i>						
1.learner friendly learning process	X					
2.motivate the learner	X					
3.improve the learning results	X			X	X	X

Figure 1:strategic goals

By focusing on the learning process of the learner, we still have some effects on the other stakeholders in an indirect way. Although in a more general model we could focus also direct on the other stakeholders and formulate other goals. F.e. it is important that the school takes care for the teachers being the staffmembers of the school. So being well educated in the use

of ICT and by the way being prepared to integrate ICT in the learning activities is a strategic goal.

3.2 Performance excellence and performance management

Performance management should be a main concern of every school. Organizations are seeking new, integrated systems that enable rapid changes through early identification of opportunities and problems, tracking of progress against plans, flexible allocation of resources to achieve goals, and consistent operations. Performance Management pinpoints the need to integrate strategy and key indicators of performance into management processes, and to exploit technology to improve monitoring, management reporting, and decisionmaking. Performance refers to output results and outcomes obtained from processes, products, and services.

The fundamental concepts or characteristics of excellence 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 characteristics of excellence have links to different evaluation areas and also to each other. Customer focus in vocational education and training f.e. requires identification of the needs of customers, such as students and the world of work, development of products and services based on these, and monitoring and analysis of customer results achieved. Results should be used as a basis to improve operations and set new objectives.

Regardless of sector, size, structure or maturity, to be successful, organizations need to establish an appropriate management framework. A Performance Excellence Model will help organizations in measuring where they are on the path to excellence, and will help them understand the gaps and then stimulate the development of solutions.

3.3 Performance models

A Performance Excellence Model has to be based on the fundamental concepts or characteristics of excellence and will help organizations in measuring where they are on the path to excellence, and will help them understand the gaps and then stimulate solutions.

A performance model is based on the premise that excellent results with respect to performance, customers, people and society are achieved through leadership driving policy and strategy, that is delivered through people, partnerships and resources, and processes. In the famous “Plan, Do, Check, Act” or PDCA cycle of W.E.Deming, the basic model of the continuous improvement strategy, CHECK is one of the critical steps. Most of the performance models have built in a check or control function, and that is often done via self assessment. A number of models have been developed that can be applied in schools. Three wellknown models are the balanced scorecard (BSC), the Baldrige model and the EFQM excellence model. [14, 15, 16]

Balanced scorecard (BSC)

Management is steering the organisation based on measurements of a limited set of performance indicators (PI). The indicators have been selected starting from the critical success factors (CSF) of the organisation. The critical aspects of the organisation will be controlled on this way. All CSF's and PI's are structured in a BSC composed of 4 domains.

Baldrige educational criteria for performance excellence framework

This model focuses on all aspects influencing the results of the organisation, being the market, the products, the services, Financial aspects, human resources and organisation

characteristics. This model is suitable to do a self evaluation of the organisation by the management team. A questionnaire will be built covering the 6 process criteria and 1 result criteria of the model.

Based on a total weighted evaluation score, improvement actions will be planned.

EFQM excellence and Total Quality Management (TQM) model

EFQM helps organisations to determine at what point they find themselves on their way towards excellence. Any organisation that looks to future and work towards excellence should necessarily identify their strengths and areas in which improvements can be made.

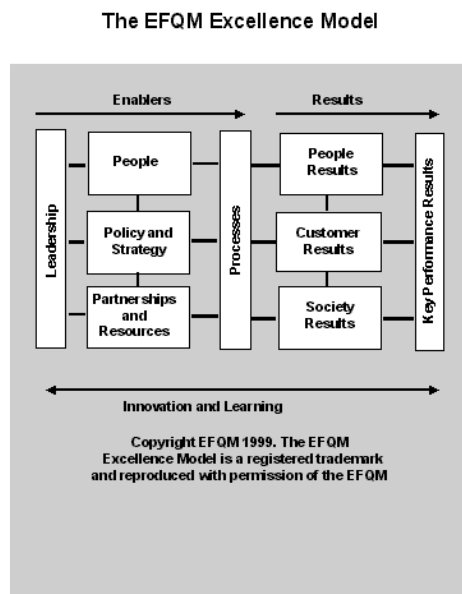


Figure 2: EFQM excellence model

With this analysis, improvement plans are launched and monitored for progress. This cyclical revision of the organisation evaluating and taking action repeatedly is what the European Foundation of Quality management designates as the **self-assessment process**.

The EFQM model centres its attention on nine criteria, 5 enablers and 4 results. The enabler criteria analyse what an organisation does, how it carries out its key activities. The results criteria cover what an organisation achieves.

3.4 EFQM excellence model used as a self assessment instrument.

The EFQM Excellence Model is a practical model to help organizations in measuring where they are on the path to excellence, helping them understand the gaps and then stimulating solutions. It can be used as a framework for *self-assessment* that enables an organization to identify its strengths and areas for improvement and the extent to which its operations and results are in line with the characteristics of an excellent organization. It compares the individual results of all criteria with the overall resulting mean value. Sometimes it is possible to compare the results with preset norm values.

We adopted the EFQM *self assessment* method to measure the performance.

We adopted the questionnaire approach. For all criteria we formulated one or more statements and asked the learner to give his opinion upon the importance or relevance of the criteria and at the same time give a score for the performance of it. The overall performance score is the mean value of the individual performance scores measured for the individual criteria.

Performance can be improved by focusing on those criteria with a value less than the overall mean value.

3.5 Performance measures and measurement

In research the following factors were identified as being good predictors of performance attainment: strategy towards corporate and social responsibility, employee loyalty, staff responsiveness, customer satisfaction as well as market share, cash flow and costs. Predictors for good practice adoption include benchmarking, skill and job training, customer orientation, problem solving, and waste elimination.

Performance refers to output results and their outcomes obtained from processes, products, and services. Performance can be expressed in non-financial and financial terms.

The challenge for organisations today is how to match and align performance measures with business strategy, how to deploy the measures so that the results are used and acted upon.

Performance measurement is one of the cornerstones of business excellence. Business excellence models encourage the use of performance measures. All measures need to be chosen to support the attainment of specific performance or behaviour identified by the organisation's leaders as important or necessary to work towards the organisational goals. This being the case, there must be clearly defined goals/objectives and strategies chosen to reach them before measures can be chosen to support their attainment. Business excellence models are used to categorise the measures into the generic business drivers of an organisation.

Performance measurement is fundamental to organisational improvement. The importance of performance measurement has increased with the realisation that to be successful in the long-term requires meeting (and therefore measuring performance against) all stakeholders' needs.

4 A school performance measurement model /framework based on the EFQM excellence model

4.1 The school performance measurement model /framework

Performance measurement is fundamental to organisational improvement of a school.

Continuous improvement is set forward. To be successful it is required to meet (and therefore to measure performance against) all stakeholders' needs including learners, teachers, ICT co-ordinators, parents, the society and government. [17]

We adapted the EFQM performance model and customised it to the school situation. We modelled the set of performance indicators to be applied in measuring the performance.

First we identified a set of institution wide and some learning specific goals, starting from the desired results by the stakeholders. Based on it we structured our school performance measurement model, composed of the main criteria ICT vision, enabling school organisation and management and the results.

The ICT vision main criterium is split in the block „having a vision“ and in a second block strategy to achieve the vision.

We structured the enabling school organisation and processes main criterium in 3 main blocks, the secondary processes, the resources and partners and the primary processes.

The secondary processes have to support the realisation of the primary processes.

In the secondary processes domain we identified all processes linked with school organisation and management, and all processes linked with the tasks of the teachers and the ICT co-ordinators in the learning process. The Directorat must have a vision on future developments of ICT and the role of it in education. It is also very important to be open for innovations and new challenges. Teachers and ICT-co-ordinators have to be motivated in the use of ICT in learning and supplementary training for them must be organised.

In ICT infrastructure must be invested. It may not be limited to HW but learning systems have to be implemented too. Participation in projects must be a priority to realise partnership with other schools and to become fundings to realise innovative initiatives.

In the primary processes focus must be on curriculum development taking into account that the learners have to be prepared for functioning afterwards in future education or job. The integration of ICT in the learning process needs attention and last but not least an effective and attractive learning model has to be conceived.

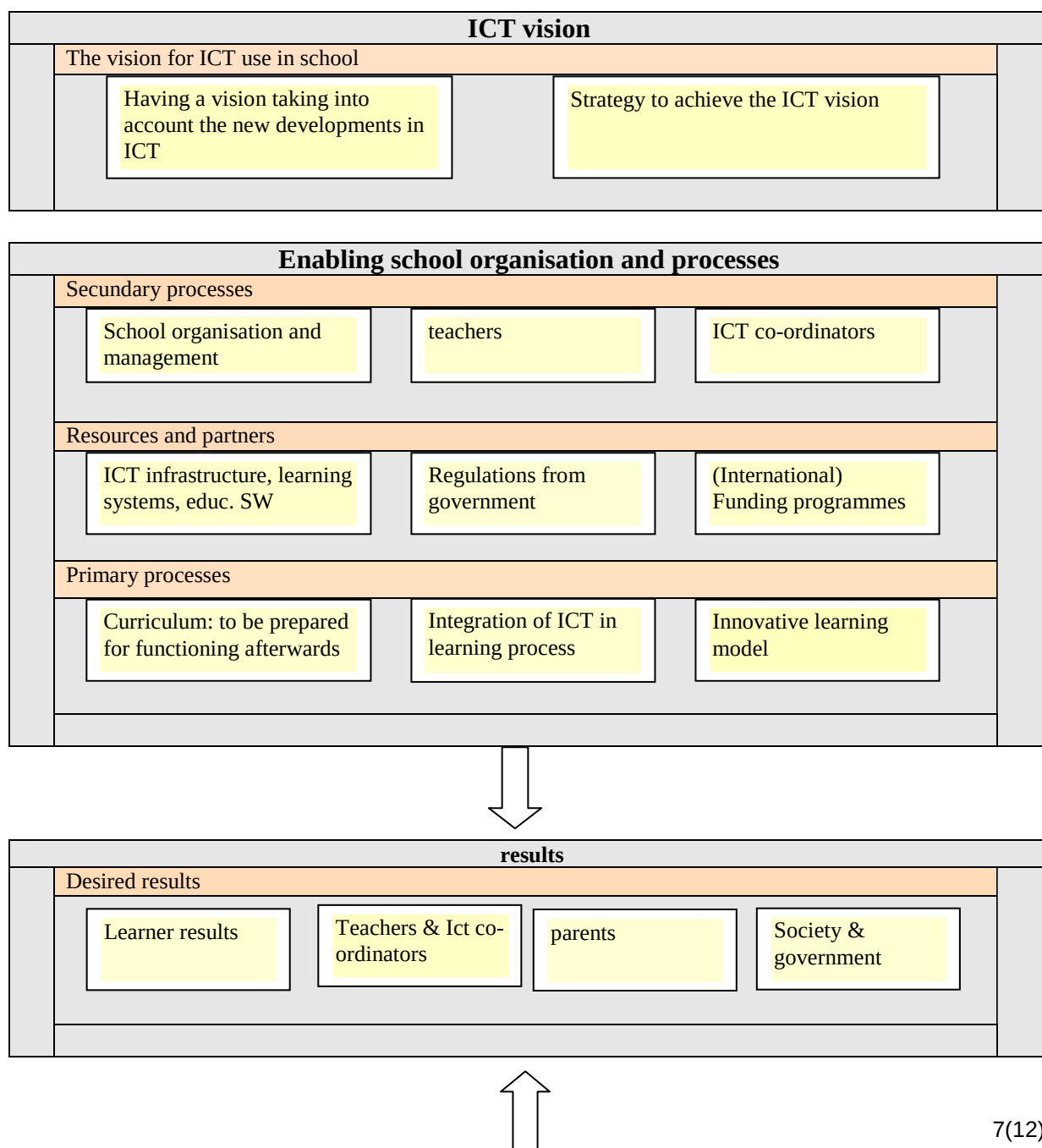
The desired results criteria can be structured into the criteria learner, teachers and ICT co-ordinators, parents, society and governments.

The desired results for the learner are the knowledge increase, using skills learned, using ICT, apprentice of communication skills, being motivated to learn

Teachers and ICT co-ordinators want to see the effect of training and the satisfaction of the learner and their parents and the appreciation from the school management

The parents want to see that their children will become prepared for functioning afterwards.

The society and the government want to see young people functioning well in their job and becoming stable adult people in the community.



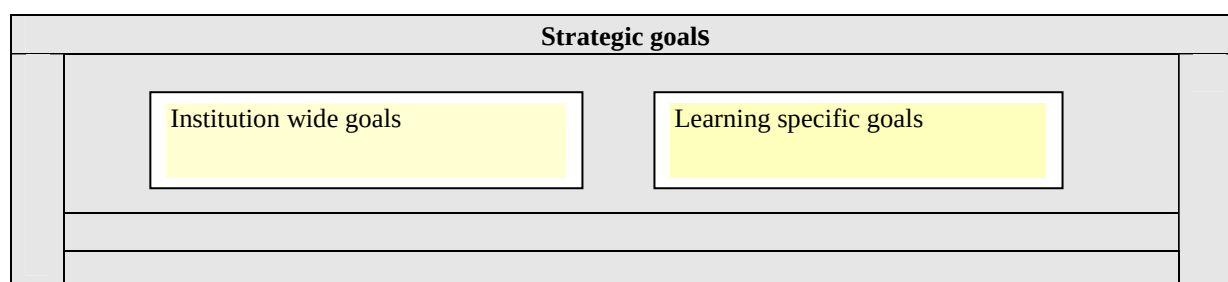


Figure 3: The school performance measurement model /framework

4.2 Identification of performance measures or the performance indicators

We identified a set of performance indicators.

The blocks of the framework are the main criteria of the model. The cells within the blocks are the performance indicators or the criteria of our model. For all criteria we formulate statements/ questions.

1. The vision for ICT use in school		
	1.1. Having a vision	
		A clear vision for ICT includes all members of the school
		The vision is focused on ICT use in learning and teaching
	1.2.strategy to achieve the ICT vision	
		A strategy sets out priorities for realising the vision
		School focuses on both, the overall planning and the day-to-day operations
2.Secondary processes		
	2.1.School organisation and management	
		School management has a vision on future developments of ICT and the role of it in education.
		School management is open for innovations and new challenges
		School management shares the vision with their staff
		ICT planning and budget
	2.2.teachers	
		Teachers are sensitive for innovations in education
		Teachers are motivated to integrate the use ICT in their courses
		Teachers are well educated to implement innovations and use of ICT in their courses
	2.3.ICT co-ordinators	
		ICT co-ordinator is well educated to implement innovations and use of ICT in their courses
		ICT co-ordinator is managing the ICT infrastructure on a professional way
		ICT co-ordinator spends enough time to

		support the teachers in using ICT in learning
3.Resources		
	3.1.ICT infrastructure composed of learning systems and software packages for education	
		ICT infrastructure in classes
		ICT infrastructure for individual teachers
		Search for information can be done in an effective way
		Communication worldwide is possible
		Support of teamwork and virtual teams
		Learning materials are accessible in a learning system
		Learning materials can be downloaded for personal and local use
	3.2.government regulations	
		Appropriate funding from government to build the basic ICT infrastructure
		Supporting actions on point of training facilities
		Supporting actions on point of propagation of advances in ICT use in education
	3.3.funding programmes	
		Information and support about participation in international programmes is accessible
4.primary processes		
	4.1. curriculum development taking into account the future functioning of the learners	
		Practice in using multimedia facilities
		Learning Independently
		Reporting results using ICT tools
	4.2. integration of ICT in the learning process	
		Finding additional information on the topics of the course
		Sharing learning results with teammembers
	4.3. achievement of an effective and attractive learning model	
		Supervised and guided self-paced learning
5.Desired results		
	5.1.results for the learner	
		knowledge increase
		using skills learned, ,
		using ICT,
		apprentice of communication skills
	5.2.results for the teacher and ICT co-ordinator	
		Networking with colleagues from other schools
	5.3.results for the parents	
	5.4.results for the society and the government	

Figure 4: The school performance measures

5 The evaluation process and the decision to plan for actions to improve the performance based on management reports

In Performance Management (PM) focus is on the need to integrate strategy and key indicators of performance into management processes. Performance indicators have been identified and are playing an important role in management reporting about the enterprise wide performance. Once the performance indicators have been measured, and the measurements have been analysed decisions can be made on point of needed improvements. Performance can be improved by increasing that mean score resulting from the increase of the individual scores. But it is important to focus on those criteria with a value less than the overall mean value.

5.1 Evaluation session

The management team is evaluating the enterprise wide performance. The EFQM model is helping the organisation do this by measuring where they are on the path to excellence, helping them understand the gaps and then stimulating solutions.

For the self-assessment we adopted the questionnaire approach. For all criteria we formulated one or more statements and asked the learner to give his opinion about the importance or relevance of the criteria and at the same time give a score for the quality of it. The overall performance score is the mean value of the individual quality scores measured for the individual criteria.

5.2 Reports from the evaluation session

A radar diagram has been created showing the total weighted mean evaluation on detailed statement level and the weighted mean evaluation of criteria level is shown in the same figure.

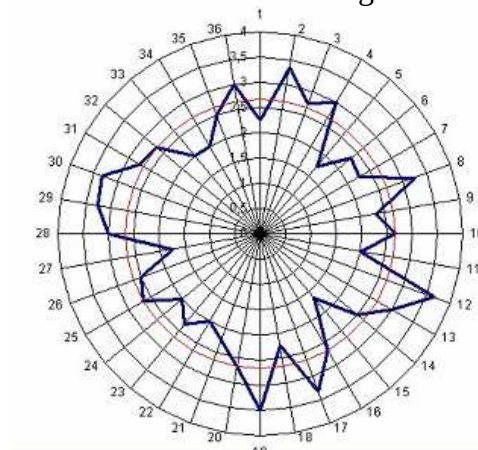


Figure 5: weighted mean evaluation

5.3 TABLE of critical statements

This table is delivering a summary of critical statements belonging to the criteria by presenting the evaluation and the relevance/ importance in one diagram. Those statements which are quoted as important and having received a bad evaluation are critical. (red part of the figure)

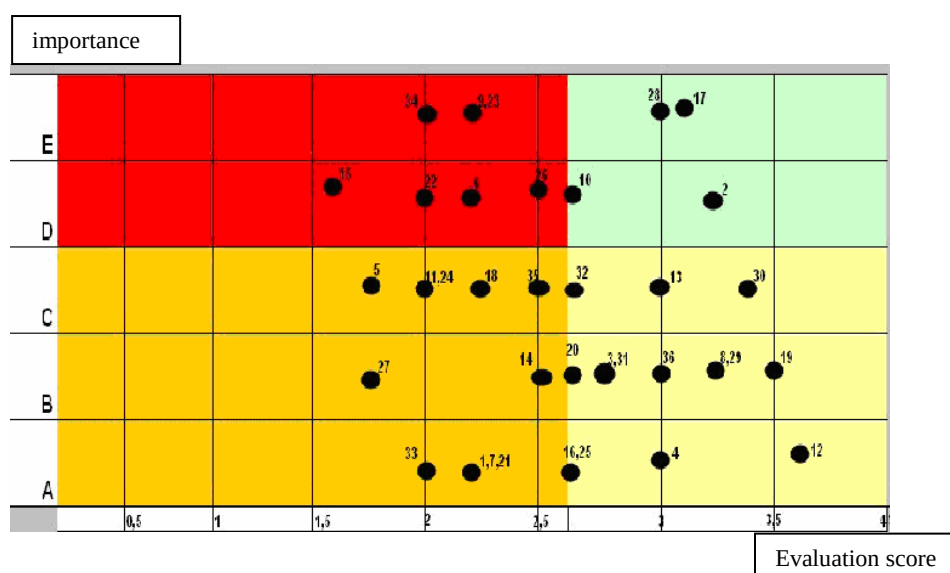


Figure 6: critical statements

5.4 The evaluation process and the decision to plan actions to improve the performance

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. Is ICT already been implemented and what about the results of it?

We start with the RADAR diagram. We compare the scores of the individual criteria with the overall mean score. We can identify the criteria with lower scores. We go to the Figure 6 to identify the critical statements corresponding to the low scored criteria we identified in the radar. We go to the table and see which statements for those criteria with low score are very critical.

At the end a list of criteria to be improved has to be created in descending order of priority to be improved. The information about being critical of the statements has to be used to define the needed actions.

6 Conclusion

The biggest challenge for the schools is not the acquisition of HW, but the integration of ICT in the learning process. It stands for the third phase of the evolution of ICT use in schools. A number of strategic goals have been identified some as institution wide ones and some as learning specific ones. They must be seen as answers on the desired results of different stakeholders. The direct benefiting stakeholders from the school are the learner, the teacher, the ICT co-ordinator and the school directorate. The indirect ones are the parents, the society and the government. The main focus is here on the learner. How can he benefit from the use of ICT in the learning activities.

The EFQM model can be used as a framework for *self-assessment* that enables an organization to identify its strengths and areas for improvement. It is customised here to the school situation. A set of performance indicators has been modelled and can be applied in measuring the performance. A set of performance indicators has been identified too. Once the performance indicators have been measured in the school, and the measurements have been analyzed, decisions can be made on point of the needed improvements.

An answer can be given on the question if ICT is already implemented and what is the performance of it?

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