

BUILDING OF E-MANAGEMENT CONTROL AND EVALUATION SYSTEM FOR AN EDUCATIONAL INSTITUTION: THE UNIVERSITY OF TECHNOLOGY, JAMAICA SOLUTIONS

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The development of an effective, comprehensive, profound and inexpensive e-Management Control and Evaluation System (e-MCES), which includes strategic, academic and financial planning, performance evaluation of all Academic and non-Academic staff is a challenging and time-consuming process. This paper describes some solutions, approaches and proposals of building such systems, which have been taken by the University of Technology, Jamaica (UTech). This system arms Executives and Human Resources (HR) personnel with ongoing, easy access to past performance data and can clearly indicate future milestones, achieving their targets, expectations and compensation rewards for each employee. It is extremely important that staff must be constantly aware of their progress as the expectations for their contributions evolve. From the other side, visibility to staff's accomplishments and areas of weakness should be used by administrators to provide coaching and guidance to their Academic and non-Academic staff. Our web-based, on-demand solutions are comprehensive, easy-to-use and may be affordable to educational institutions of different sizes. The e-MCES allows the institution to respond promptly to real-world challenges and opportunities that might impact upon its short and long-term strategies.

This decision is based on our research and expertise vis-à-vis purchasing an off-the-shelf product. In [1, 2] we have already described some fragments of the e-MCES. However, we feel a responsibility to Academic Society to present solutions we have found during this investigation and to discuss some ideas. We hope this will be helpful to other institutions building similar systems independently or in collaboration with us.

Keywords: e-Management Control and Evaluation System, Balanced Scorecard, Quantifiable Approach, Operational and Strategic Planning, Object-Oriented Approach, V-index

1. INTRODUCTION

Every Educational Institution, like any other organization, exists to serve a purpose. Each component (Divisions, Departments, Faculties, Schools, Units, etc.) exists to carry out some tasks or mission of its own. The understanding of the University's Senior Management Level, Academic and non-Academic staff on what this unique mission or purpose is, provides the essential foundation for having an effective Online Management system which includes the following subsystems [2]:

- Strategic Operational Planning, Management and Control System;
- Performance Based Management System;
- Customer Evaluation System, which consist of (according [3]):
 - Evaluation System by members of staff their colleagues, managers and services;
 - Module/Instructor Evaluation System by students their lectures and modules (subjects).

Following [4] there are five functions for the effective management of an institution/unit:

- Planning is the ongoing process of developing the business' mission and objectives and determining how they will be accomplished.
- Organizing is establishing the internal institutional structure of the institution. The focus is on division, coordination, and control of tasks and the flow of information within the institution.
- Staffing is filling and keeping filled with qualified people all positions in the institution.
- Directing is influencing people's behavior through motivation, communication, group dynamics, leadership and discipline.
- Controlling is a process of establishing performance standards based on the institution/unit's objectives, measuring and reporting actual performance, and taking corrective or preventive action as necessary.

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We provide a quantifiable approach for support of these functions based on Balanced Scorecard performance measurement tool. This will be also very useful for long-term periodic analysis. It means we associate a number as

an appraisal rate of success – whether it is accomplishing some plans or evaluation of the unit/person.

1.1. The Balanced Scorecard in Brief

The Balanced Scorecard offered by Kaplan R. and Norton D. [5] in 1996 is one of the most widely adopted strategic planning tools used by business today. The Harvard Business Review highlighted the Balanced Scorecard as one of the 75 most influential ideas of the 20th century. The Balanced Scorecard deals with four perspectives:

- **Financial Perspective:** Includes measures such as operating income, return on capital investment, and economic value added.
- **Customer Perspective:** Includes measures such as customer satisfaction, customer retention, and market share in target segments.
- **Business Process Perspective:** Includes measures such as cost, throughput, and quality.
- **Learning & Growth Perspective:** Includes measures such as employee satisfaction, employee retention, skill sets, etc.

The Figure 1 shows the logical connection between main components of the Balanced Scorecard (adapted from [5]):

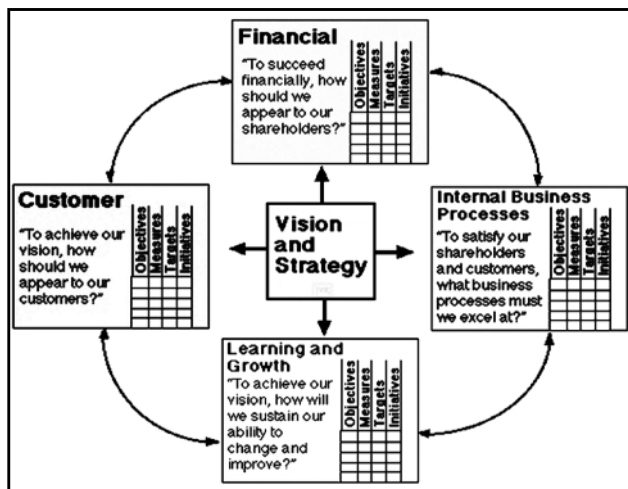


Fig. 1: Main Components of the Balanced Scorecard

We can see that these four realms are not simply a collection of independent perspectives. Rather, there is a logical connection between them - learning and growth lead to better business processes, which in turn lead to increased value to the customer, which finally leads to improved financial performance. Each perspective of the Balanced Scorecard includes objectives, measures of those objectives, target values of those measures, and initiatives, defined as follows:

- **Objectives:** Major objectives to be achieved, for example, profitable growth.
- **Measures:** The observable parameters that will be used to measure progress toward reaching the objective.
- **Targets:** The specific target values for the measures
- **Initiatives:** Action programs to be initiated in order to meet the objective.

Originally the Balanced Scorecard was conceived as an improved performance measurement system. The latest researches have indicated that it could be used as a management system to implement strategy at all levels of the organization by facilitating the following functions:

1. **Clarifying Strategy:** The translation of strategic objectives into quantifiable measures clarifies the management team's understanding of the strategy and helps to develop a coherent consensus.
2. **Communicating Strategic Objectives:** The Balanced Scorecard can serve to translate high level objectives into operational objectives and communicate the strategy effectively throughout the organization.
3. **Planning, Setting Targets, and Aligning Strategic Initiatives:** Ambitious but achievable targets are set for each perspective and initiatives are developed to align efforts to reach the targets.
4. **Strategic Feedback and Learning:** Executives receive feedback on whether the strategy implementation is proceeding according to plan and on whether the strategy itself is successful.

In e-MCES we highly appreciate these four functions, because they play a critical role in Strategic and Operational planning of the educational institution, and based on the appropriate level of the staff performance.

2. "CUSTOM-BUILT" Vs "OFF-THE-SHELF"

No two businesses in the world are exactly the same, each uses a unique set of tools and processes to manage their customers. We need to make sure that the e-MCES can easily adjust and conform to their needs. Before deciding on a final design, we have observed several of the most popular typical solutions in the world. From our point of view, the most popular and successful companies offering solutions approximately satisfying our requirements are - Halogen Software Inc. [6] and SuccessFactors, Inc. [7].

The flagship product of the Halogen Software Inc. is a "Halogen eAppraisal" system, which automates the time-consuming employee appraisal process for different types of organizations (Healthcare, Professional Services,

Financial Services, Manufacturing, etc.), including educational institutions. Having hundreds of customers across the World, this company offers the standard solutions of building online Performance Management Systems with some customization.

The SuccessFactors, Inc. provides a Business Execution Software, which helps to different size companies and achieve real success by ensuring that the organization is aligned, armed and incited to greatness. Centered on two key elements of executional excellence, Business Alignment and People Performance, this software from SuccessFactors delivers real business impact.

We agree that an effective Performance Management System should be based on a Balanced Scorecard, which reflects the balance between short- and long-term objectives. They emphasize that those companies that can translate their strategy into their measurement system are far better able to execute their strategy, because they can communicate their specific objectives and their targets, which are very individual and flexible. From our point of view we must create a freely adjustable system which is independent of other shell-vision system, reflecting:

- An understanding of the organization's vision of the future.
- A holistic model of the strategy, that allows all employees to see how they contribute to organizational success. Without such linkage, individuals and departments can optimize their local performance but not contribute to achieving strategic objectives.
- Change efforts reflected in the scorecard. If the objectives and measurements are identified, successful implementations will be likely to occur. If not, investments and initiatives will be wasted.
- It must be a holistic balance of the institution planning strategy – on the horizontal and vertical prospective. For example: the targets (individual plans) of each member of staff can be considered as a part of the unit's operational plan along with his/her colleagues' targets with the some weights (horizontal alignment). At the same time that individual target can be considered as a part of the operational plan of units above and weighted as a part of the supervisor's operational/strategic plan (vertical alignment). Here we must note that each target has two weights – one for horizontal alignment (the sum of these weights must equal to 100%) and second one - for reflecting a part (in percents) of the objective/target weight from the level above. This fact will be described later in the section 3 of the paper, when we will describe an

algorithm of calculating a Total Accomplishment of the objectives/targets by Unit/Individual.

Cascading institution's corporate goals throughout the organization lets us align our entire workforce to the overall strategy. This ensures that everyone is focused on the institution's business objectives. Unfortunately "Off-the-shelf" solutions of Halogen Software Inc. and SuccessFactors, Inc. do not cover his very important process and do not satisfied to our vision on Strategic/Operational/Targets planning process. This is a one of the extremely important reasons why our University has decided to build the system using our intellectual resources.

Continuing this process to levels above, until we reach the "summit", we will get a holistic model of Institution's Plans, which includes a Strategic Plan of the Institution and number of Operational Plans of all units below. This process will be examined in more details in the section 3 of the paper.

Following these factors, the Steering Committee of the University of Technology, Jamaica has agreed to build an information system to track its progress. We understand that establishing a highly productive and successful system is not an easy or a short task. As a matter of fact, getting a system firmly established will take years, not days or months. Afterward comes the task of maintaining the system, which includes not only System Administration, but much more importantly the continuous updating and adaptation of the system, keeping it relevant to dynamic amendments of the University's Strategic Vision and Goals year by year. Briefly this is the main goal of our research.

3. A HIERARCHICAL STRUCTURE OF THE INSTITUTION OPERATIONAL PLAN, HORIZONTAL AND VERTICAL ALIGNMENTS OF THEIR COMPONENTS

Hereinafter we need to give definitions for some terms.

Definition 3.1: The Object of Responsibility (OOR) is a member of the Academic/non-Academic staff or Unit, which is responsible for accomplishing some objectives/targets.

Examples:

- Prof. Elma White – member of academic staff of some department (OOR as a member of the Academic staff).
- School of Engineering (OOR as a Unit of the Institution).

Definition 3.2: V-index is the Total Accomplishment by the OOR its objectives/targets within the appraisal period. Actually V-index is a number. To understand an idea of V-index we use a fragment of the Institution's Plans hierarchy (example) on Figure 2:

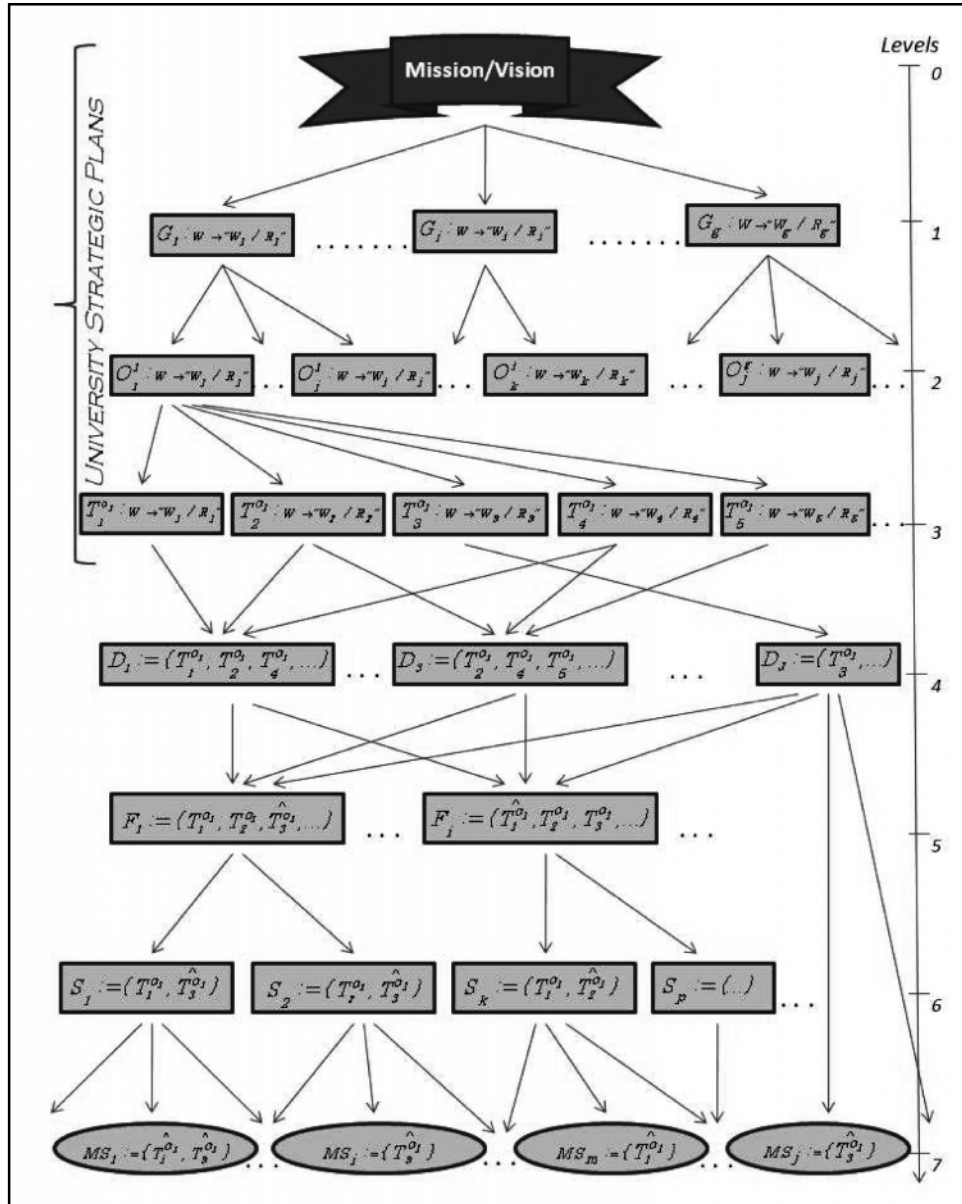


Fig. 2: Schematic Representations of Institute's Goals, Objectives, Targets, and Objects of Responsibility with Associated Targets

Legend for Figure 2:

On the right side of the figure is a scale marked by levels of hierarchy

G_i – i^{th} goal of the University ($i = 1, \dots, g$), where g : number of Goals. $W \rightarrow W_i / R_i$: weight of accomplishing goal # i . W_i : a planning weight from the operational plan of the UTech, R_i : actual value, achieved during appraisal period

O_i^1 – i^{th} UTech objective from 1st goal,

O_j^g – j^{th} UTech objective from g^{th} University goal.

$W \rightarrow W_i / R_i$: weight of accomplishing objective # i . W_i :

planning weight from the operational plan, R_i : actual value achieved during appraisal period.

$T_1^{o_1}, T_2^{o_1}, T_3^{o_1}, T_4^{o_1}, T_5^{o_1}$: a set of UTech's targets. $W \rightarrow W_i / R_i$: weight of accomplishing targets.

W_i : planning weight of the target from the operational plan of UTech, R_i : actual value achieved during appraisal period.

$D_1 := \{T_1^{o_1}, T_2^{o_1}, T_4^{o_1}, \dots\}$: UTech division/unit D_1 , which is responsible for delegating targets $T_1^{o_1}, T_2^{o_1}, T_4^{o_1}$ to Faculties and/or units below.

$D_3 := \{T_2^{O_1}, T_4^{O_1}, T_5^{O_1}, \dots\}$: UTech division/unit D_3 , which is responsible for delegating targets $T_2^{O_1}, T_4^{O_1}, T_5^{O_1}, \dots$ to OOR and units below.

$D_j := \{T_3^{O_1}, \dots\}$: UTech division/unit D_j , which is responsible for delegating targets $T_3^{O_1}, \dots$ to OOR and units below in university's hierarchy.

$F_1 := \{T_1^{O_1}, T_2^{O_1}, T_3^{O_1}\}$: 1st Faculty with responsibilities to complete $T_1^{O_1}, T_2^{O_1}, T_3^{O_1}$ targets.

$S_1 := \{T_1^{O_1}, T_3^{O_1}\}$: 1st school/department in the faculty with responsibilities to complete $T_1^{O_1}, T_3^{O_1}$ targets.

For S_2, S_k, S_p , etc. – the same as previous definitions.

$MS_1 := \{T_1^{O_1}, T_3^{O_1}\}, \dots, MS_i, MS_m, \dots, MS_j$ – are members of Staff (OORs) with responsibilities to accomplish their targets.

For calculating V-index for some particular OORs (on Figure 2 there are rectangles – for Units and ovals – for individual) for the OOR we have used the methods of Linear Algebra (for more details see [8]). Suppose for the current appraisal period the operational plan of some OOR has established n objectives/targets "G₁", "G₂", ..., "G_n". For that set we have a set of weights "w₁", "w₂", ..., "w_n" and a set of real accomplishments of the objectives/targets (O/Ts) "r₁", "r₂", ..., "r_n". Real accomplishment of some objective/target (O/T) is a value which has been achieved during the appraisal period. This value shows which part of the (O/Ts) has been achieved, and is less or equal to 1. We can consider a set of values of the "weight" and "real" attributes as the set of coordinates of the Vector of Goals

$$\overline{VG} = [w_1(G_1), \dots, w_n(G_n)],$$

where n is a number of goals from the operational plan with a rule $\sum_{i=1}^n w_i(G_i) = 1$

and Vector of Real Achievements of Goals (VRAG)

$$\overline{VRAG} = [r_1(G_1), \dots, r_n(G_n)],$$

where $r_i(G_i) \leq 1$

If $r_i(G_i) = 1$, then the ith goal is completed on 100%,

If $r_i(G_i) < 1$, then the ith goal is completed less than 100%, (if it is 0 then it has not been done at all). Following Definition 3.2, inner products of vectors \overline{VG} and \overline{VRAG} gives a value for V-index:

$$V = \langle \overline{VG}, \overline{VRAG} \rangle = \sum_{i=1}^n w_i(G_i)r_i(G_i) \quad [3.1]$$

We consider that value to be a Measure of OOR's Total Accomplishment of his/her/its Operational Plan (OP).

Each educational institution to control their movement to their Vision, following their Mission:

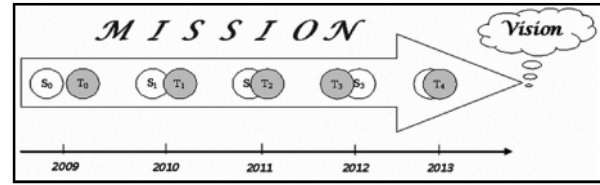


Fig. 3: Achieving Targets by the Educational Institution During 5 Years Strategic Planning

The Operational Plan is a dynamic document and can be updated year by year depending on real world and market demands. We are going to show how to evaluate and measure institution progress and how it fits with the Strategic Plan (SP) targets year by year. From our point of view, measurability is the main essential feature of well-written goals, objectives and targets; they must be quantified. On this Figure 3 an indicator S_i (light circle) identifies a position of the University for comparison with the target position T_i (dark circle). In [8] we propose an algorithm which calculates a distance (which is a real number) between the centers of the circles S_i and T_i , and which we consider to be a measure of the success of the institution on the way to achieving its targets. This number (we assign the Greek letter Ω to it) may be positive, negative, or equal to 0, depending on the real achievements of the University for the appraisal period. At each appraisal period the position of the University may be:

- Circle S_i is to the left of target T_i . In this case the University hasn't achieved all its goals for that period (Academic Years 2009, 2010, 2011, 2013). We have $\Omega < 1$.
- Circle S_i perfectly matches T_i . In this case the University has achieved its goals for the appraisal period. We have $\Omega = 1$.
- Circle S_i is to the right side of T_i . In this case the University has not only achieved its targets, but has obtained higher achievements (Academic Years 2012). We have $\Omega > 1$.

Definition 3.3: Ω is the Total Accomplishment of the educational institution in the process of achieving its targets within the appraisal period.

The number $\Omega_i - 1$, where i indicates appraisal period (2009/2010, 2010/2011, etc.), is indicative of the ability of the institution to achieve and execute its Strategic Plan.

According the definitions 3.1, 3.2 and Figure 2 we can see:

- Vertical Alignment: Any link between nodes at the two neighbored levels (level Up and level Down), which actually delegates/inherits a some piece of plans, which must be done on these levels
- Horizontal Alignment: Any piece of individual OOR's plan.

In our research we accept definitions given by [9]:

- Strategic Planning is a process of developing a mission and long-range objectives and determining in advance how they will be accomplished.
- Operational Planning is process of setting short-range objectives and determining in advance how they will be accomplished.
- Strategy (University Targets) is a plan for pursuing the mission and achieving objectives.
- Mission statement tends to stand for long periods of time.

A mission statement should be examined and debated periodically both by those to whom the organization reports and by those accountable for carrying it out.

A whole hierarchy of missions exists for any given University, and each level in the hierarchy derives its mission from the mission of the parent.

We share the point of view of [10], that strategic planning and operational planning of each Academic and non-Academic Units of the educational institution do not stand in isolation, they are all integral parts of the institution strategic plan, further articulating the strategic objectives for some particular area and cascading down to each Division, Faculty, School/Department, Unit, etc. One of the main goals of our system is an ability to provide Transparency in the viewing of the institution's and staff's achievements on all levels. Everybody must feel that he/she is a member of a single team and be able to see his/her contribution to the overall success in order to understand why goals need to be accomplished. We absolutely agree that if employees are part of the process, they will accept it. If they know there is no employee participation - it doesn't matter how good the plan, it will not work. There will be chaos in the institution.

Each OOR in our system has a set of targets to accomplish for the ongoing appraisal period and a set of targets he/she has accomplished in the previous appraisal period. In the first case the set of targets is a part of the operational plan of entire institution, Faculty, School/Department, etc, whereas in the second case the system stores a set of targets already achieved or not achieved to be used for evaluation. The e-MCES stores that information

(using the relational database system Microsoft SQL Server 2005) and uses a mechanism of analysis and maintenance of that data. Each individual target must have a weight, start date, date of accomplishing (end date), and if that target must be evaluated, a value indicating a percentage of accomplishment. From the personalization of each target piece, it is obvious that the structure of all operational plans of the institution is hierarchical.

4. THE GENERAL CONCEPTS OF THE e-MCES

In our research and development we assume that each educational institution or any other organization has a hierarchical structure. We consider several main entities in our System [11]. They are:

- Persons, who are evaluated by others and be able to evaluate, using some criteria.
- Units (University, Departments, Faculties, Schools, etc.), which must be evaluated using specific criteria.
- Pool of definitions, criterias, weights, targets, objectives (including strategic objectives).

The entities mentioned above, are pretty abstract and in this paper we will keep this abstraction for the following three reasons:

- It is easier to see our approaches and solutions.
- Space limitations of the paper.
- This paper is not a technical documentation of the system.

The main purposes of the system are:

- to provide effective and timely reports for the analytical evaluation processes;
- to provide an easy interface to the information, which allows the management of the system to accept effective decisions and allows each member of staff to observe the achievements of the Institution, the unit to which they belong and their own achievements;
- to provide to the supervisors the ability (within the scope of his/her area of responsibility) to monitor and transparently control accomplishments towards all objectives and targets of units and staff.

The system we have been developing and using in the University is based on an Object-Oriented design and Modeling. We will follow a terminology for this approach.

On an abstract level and using Definition 3.1, we can associate Person and Unit entities as Objects of Responsibility. In process of development of the e-MCES, an OOR can be considered as an Object with abstract

characteristics, including its interface - attributes, properties and behaviors (methods, operations or features):

- Attributes (properties): ID, human, First/Mid/Last name, title, category, active/not active, unit, can/cannot evaluate, able or not to assign for evaluation, Unit ID, etc. The Person and Unit entities have this similar content. The attribute "human" indicates whether this is Person or Unit.
- Methods (for Persons): observe (not update) his/her score, unit's score he/she belongs to, scores of all Units above, including entire score of the Institution, make comments, evaluate a performance of other persons and accomplishing of his/her objectives/targets (if he/she is authorized), give comments, create and maintain his/her objectives/targets, etc.

Objects of Responsibility (Persons and Units) include object-oriented features such as encapsulation, polymorphism, and inheritance. Below are some examples of this.

Encapsulation: We use this feature of OOR, when we need to show the result of an evaluation, hiding an information about ID and the name of appraiser (in the case of peer evaluation or student evaluation of a lecturer, for instance).

Polymorphism: The algorithm for calculating a total accomplishment V-index (see [8]) can be implemented to any OOR of the system – to each person or unit, including total accomplishment of the Institution. During an appraisal period each individual (say individual "i") reports to his/her supervisor on the accomplishment of his/her targets during the appraisal period. Consequently data is entered $\overline{V_{RAG}}$ (see section 3) to the system online after approval by the appraiser (supervisor). The system holds $\overline{V_G}$, which was identified in previous appraisal period. The system automatically calculates a V_i -index for the "i" individual.

The supervisor of the Unit, based on set $\{V_i\}$ is able to get a V_u – an index of accomplishment of his/her Unit's objectives. If that Unit belongs to another Unit on a level of the hierarchy above, the process is repeated for the new level and continues upward, until the system obtains a Total Accomplishment of the Strategic Plans of the Institution. It means the algorithm for calculating a V_i -index is the same for any Unit of the organization and presents the level of accomplishing its targets for each OOR.

Inheritance: The object-oriented paradigm means that methods and/or attributes defined in an object/class can be inherited or reused by another object/class. e-MCES widely uses inheritance for its objects. Several examples:

1. Unit object on the level of the Institution structure above inherits an interface of the Units on level below (School/Department belongs to the Faculty; Faculties belong to Academic division, etc.)
2. Operational plan of the Unit inherits operational plans of Units on level below.
3. Operational plan of the Unit inherits targets of Persons who belong to that Unit.

Delegates: We use a programming language C# for development of most modules of the system. This up-to-date object-oriented programming language provides a wonderful feature – "Delegates". It allows us to develop components that have a higher reusability factor [12]. In objects, which we consider in our research and development, the Delegates feature has a direct practical implementation. Suppose we have a supervisor, who is described in the system as a Person object. Sometimes he/she supervises a large number of employees. At the appraisal period, which is usually one month, the supervisor must evaluate each member of his/her staff. Very often it takes a lot of time to be processed during usual business activity and this reduces the quality of the appraisal process. In the e-MCES we offer a mechanism, which allows for the supervisor to delegate certain of his/her evaluation rights to another member of staff, lower in the hierarchy but with sufficient expertise and experience.

In class constructor the developer just needs to describe the delegate declaration C# statement, which is really a pointer to a method evaluation call, like this

```
public delegate Evaluate(T object);
```

Here the delegate Evaluate is defined as a class-level variable, which takes an object parameter T. This parameter can represent a different type of evaluation object – a different category of staff or units.

5. BUSINESS RULES IN e-MCES

The kernel of the e-MCES is a Performance Based Management subsystem. Following the definition given in [13] "Performance Based Management (PBM) is a systematic approach for performance improvement through an ongoing process of establishing strategic performance objectives; measuring performance; collecting, analyzing, reviewing, and reporting performance data; and using that data to drive performance improvement." The PBM gives many benefits for Academic Institutions, which have been implemented in e-MCES, completely or partially, at the University of Technology, Jamaica:

- It provides a structured approach to focusing on strategic performance objectives.
- It provides a mechanism for accurately reporting performance to upper management and

stakeholders.

- It brings all “interested” parties into the planning and evaluation of performance.
- It provides a mechanism for linking performance to budget expenditure.
- It represents a “fair way” of doing business.
- It provides an excellent framework for accountability.
- It shares responsibility for performance improvement.

The measurement of performance of Units and Staff (Persons) in a PBM System (PBMS) is based on a set of criteria, definitions, scores, rates, and other indicators. It is important to emphasize that this set of indicators is not static

and unchangeable. This set of indicators reflects a current view on the appraisal process in the Institution by senior management. We accept the fact that the evaluation system in the Educational Institution must provide a mechanism allowing the updating of that information depending on the decisions of senior management on how to adapt evaluation criteria to reality. In our research we call this set of indicators and criteria a Pool of Business Rules (PBR). More precisely it consists of a:

- Set of the Core and Functional competency objectives (Appendix A), for different categories. The list of some categories of staff is presented in Appendix B with respective weights (total sum of weights for each category must be equal to 100%)
- Set of definitions for each competency evaluation level is presented in Table 1:

Table 1
Definitions of Competency Evaluation Levels

Ratings	Descriptors
Outstanding - rate 10: ≥ 100 - rate 9: 90-99	Consistently surpasses agreed targets. Consistently exhibits competencies at an exceptional level.
Above Standard - rate 8: 80-89 - rate 7: 70-79	Consistently meets and often surpasses agreed targets. Often exhibits competencies above the required standards.
Meets Standard - rate 6: 60-69 - rate 5: 50-59	Consistently meets agreed targets. Consistently exhibits competencies at required level. Overall performance satisfies job requirements.
Below Standard - rate 4: 40-49 - rate 3: 30-39	Occasionally fails to meet agreed targets and exhibits some competencies at the required level. Needs supervision to improve performance.
Unsatisfactory - rate 2: 20-29 - rate 1: 0-19	Seldom meets agreed targets and exhibits required competencies on an irregular basis. Requires excessive supervision and/or training to satisfy job requirements.

- Set of weights for each objective.
- Set of weights for the total score of each individual (Person) supporting a 360° evaluation for different categories of staff. For example (see [1]) the 360° evaluation of the Senior Academic staff (Head of School/ Department) of a typical School/ Department in the University of Technology, Jamaica is presented in Figure 4.
- Set of objectives for different Units (University, Faculties, Colleges, Schools/Departments, etc.). For example, the set of objectives for evaluation of Corporate Service of the Entire University is presented in Appendix C.

The piece Competency (total) in this Figure 4, representing 20% of the appraisee’s score is composed of five components with the following proportions:

- Self-evaluation 20 %
- Supervisor evaluation 40 %
- Peer evaluation 20 %
- Students’ evaluation 10 %
- Direct Report evaluation 10 %

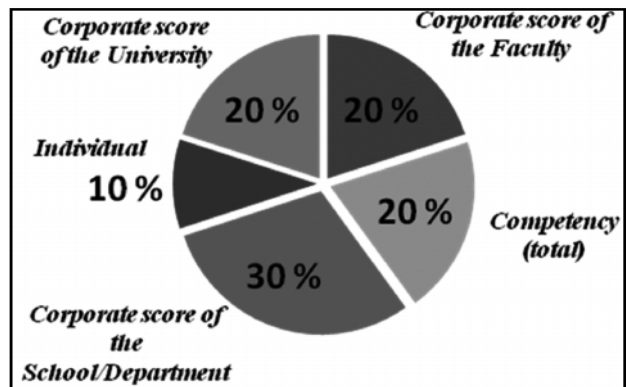


Fig. 4: Distributions of Weights for Different Components of the Total Appraisee’s Score

We accept that all these indicators, weights and definitions are not static. The main idea of the e-MCES is to be adaptable to reality, to the dynamic market demands and flexibility of accepted decisions. At the end of each appraisal period Senior/Middle Management of the Institution as well as each employee will get his/her/its score as a V-index. This number accumulates an evaluation of all

components for each OOR. In [8] we have described the sequence of these indices, which allows for all participants of the system to have a general view over several years of the progress of the Institution and all its Units/Individuals on the way to accomplishing their Strategic/Operational/Individual targets.

The e-MCES must have a robust and flexible mechanism for the correction of elements of the Pool of Business Rules. This mechanism is partially implemented in the System as a Set of Interfaces of Objects (Modules/Classes) of the system, providing principles of independency of these objects of its content. We are in the process of making e-MCES satisfy all principles described in this paper.

6. CONCLUSION

The ideas, solutions, and algorithms as described in this paper are almost fully being developed, tested, and implemented as an original software product in the University of Technology, Jamaica by the University's experts. We hope our experience of building the online management and control and evaluation systems can be useful for other Institutions and organizations. We are open to any discussions, research and collaboration with any Institution/Organization within the scope of problems indicated in this paper.

Appendix A: Core and Competency Objectives for Different Categories of Staff

Core objectives for all categories of staff are same and include:

“Customer Focus”, “Teamwork”, “Integrity”, “Accountability”, “Innovation”.

Functional objectives:

Academic	Administrative
Teaching preparation	Self-Management
Management of Learning Experience	Managing Resources
Appropriate use of Technology	Job Knowledge
Curriculum development and Review	Learning and Development
Research Skills	Leadership
Handling administrative tasks	
Leadership	
Professional Development	
Technical	Ancillary
Technical Knowledge	Initiative
Initiative	Learning & Development
Learning & Development	Quality of Work
Quality of work	Safety Awareness
Safety Awareness	
Leadership	

Appendix B

Distribution of Weights Along Some Categories of the University of Technology, Jamaica Staff (Fragment)

Corporate scores of	President	Vice-presidents	Senior Directors	Directors, Doctors	All managers	Executive Assistants	Faculty office	School/Dept. office	Technical staff	Deputy President	Deans	University Librarian	Head of School/Department	Programme Directors	Professor	Associate Professor	Senior Lecturer	Lecturer/Assistant	Academic staff (not lecturers)
University	80	40	40	40	30	20	20	20	10	60	40	40	20	20	20	20	20	20	40
Faculty					20		20	10			30		20	10	20	20	10	10	
School/Department								10					30	20	20	20	30	30	
Division		40	40	30		10			10	20	10	10							20
Department/Unit						20			20			30							20
Individual				10	30	30	40	40	40				10	30	20	20	20	20	
Competencies	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20

Appendix C

University of Technology Corporate Objectives 2009-2010

Weight University objectives

Objective 1 (Impact): To stimulate growth by assisting local communities to build their capacity

- 2 - 80% External Stakeholder Perception
- 3 - Perception Survey score re leadership of UTech, staff, students and graduates

Objective 2 (Customer): To inspire students to learn and provide them with accessible, quality learning and research programmes for their effective participation in local and international arenas

- 5 - 55% of unemployed graduates employed within 6 months of graduation
- 5 - 65% Student satisfaction rate
- 3 - Enrolment
- 3 - 85% student retention
- 2 - 40% of graduating class getting at least an upper second class award
- 2 - 60% students progressing through programme in prescribed time
- 10 - % Employer Satisfaction (Overall satisfaction score)

Objective 3 (Customer): To utilize strategic collaboration to create new knowledge and applications for the benefit of students, staff, industry and the professors

- 0.5 - One JTC research project
- 2 - Four international research partnerships
- 2.5 - One research contract per Faculty
- 5 - Benchmarking of research activities for the Faculty Graduate School Research Unit
- 5 - Enabling legislation - enacted

Objective 4 (Internal processes): To reorganize the organization's structure for implementing efficient and effective academic and administrative systems

- 5 - Review and revision of Organization Structure completed

Objective 5 (Internal processes): To establish and maintain a learning environment that facilitates delivery of exceptional customer care and service

- 4 - A Full-Time Equivalent (FTE) linked to the planning and resource model instituted
- 6 - 65% Customer service satisfaction score re learning environment
- 4 - Percentage of courses using distance learning technologies
- 4 - At least 95% utilization of space

Objective 6 (Learning & Growing): To recruit, retain and develop competent and innovative staffs who are engaged in a creative and rewarding learning community

- 5 - Staff retention
- 5 - 65% Staff satisfaction
- 3 - At least 30% Academic staff with PhDs
- 3 - All staff with required qualifications for jobs
- 4 - 95% staff achieving 3 or higher in Performance Appraisals

Objective 7 (Fiduciary): To meet the public accountabilities of the University through exemplary governance, attaining financial sustainability and efficiency in resource utilization

- 4 - 60% Non-Government income ratio
- 3 - Current ratio (This is a liquidity ratio and measures the University's ability to meet its short-term obligations).

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