

## EUROPEAN INFORMATICS SKILLS STRUCTURE (EISS) WAY TO NEW MILLENNIUM FOR MACEDONIAN IT PROFESSIONAL

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**Abstract:** The New Millennium and New Economy require a New Knowledge from current and especially from the New IT Professionals. IT is not anymore an emerging profession. IT is here to stay, to be mature and to improve continuously. Mixture of specialties required for successful IT implementations need many diversified skills and training. European IT professionals associated with their IT Professional Association are trying to introduce the New European Informatics Skills Structure and to make it a standard for academy, industry and professionals. The proposed presentation will describe the elements of proposed “standard” and describe it’s importance for IT professionals in Macedonia and appropriate “call-for-action” initiatives in the academy and in the industry. The round-table discussion with the participants expected to enable and to create a base for future common approach to this issue.

**Keywords:** IT skills, IT education, IT training standardization, EISS, skills structure, IT professional conduct.

### 1. Introduction:

*The European Informatics Skills Structure (EISS)* is a set of skill standards designed to embrace all functional areas of activity undertaken by informatics practitioners and professionals engaged in occupations represented by the Member Societies within the *Council of European Professional Informatics Societies (CEPIS)*.

EISS is being developed within CEPIS by a pan-European Task Force representing twelve countries and supported by European Community funds authorized by the Commission of the European Communities Task Force, Human Resources Education Training and Youth.

## 2. Questions and Answers:

### 2.1 Why is the informatics discipline so important to Europe?

- It is expected that the European Community will both deepen its infrastructures as well as widen its membership. Informatics is seen as an essential enabling resource to support this process, already representing 5% of European GDP and 800,000 informatics professionals among major employers.
- This lack of European competitiveness can only be addressed by a pattern of sustained and focused investment, not least in the technological skills of European people for which there will be an increasing demand.
- This demand will in part be met by education, training and career development, but in part also by increased mobility of skilled people seeking premium financial rewards, challenge and opportunity across organizational and national boundaries within Europe.

### 2.2 What benefits will be provided by the EISS and who will benefit?

- The pervasive nature of informatics and society's increasing dependence on applications made possible by informatics focuses increasing consumer attention on quality, not only on aspects involving ease of use, but also reliability and increasingly public safety. The skills of people within the informatics discipline are critical to achieving public confidence. Failure to meet acceptable standards might also reduce competitiveness in the global context.
- The EISS is a European model of the skills needed to carry out, to acceptable standards, the various functions of informatics practitioners.

This provides

- performance and training/development benchmarks for those who are seeking to become competent, or who wish to maintain levels of competence
- an independent record of achievement in particular skills
- a set of guidelines for those concerned with designing training and development programs, at the workplace or in the educational environment
- the means by which human resources within organizations can be effectively managed.
- Benefits from the use of the model and the standards contained therein will be achieved by

- employers (large and small suppliers and users of informatics products and services) in enabling the development of a skill base that meets Europe wide expectations, in resource planning, and in securing high-quality performance.
- teaching establishments (universities, polytechnics, schools and other institutes) in basing their teaching programs on contemporary, relevant and professional sources.
- individual practitioners, in measuring their own performance and professional development and in ensuring their employer's commitment to these aspects, as enshrined in the Community's Social Charter.
- industry at large, by facilitating mobility of practitioners.
- particular countries in various ways that reflect their state of development of informatics.

### 2.3 How will the EISS assist mobility within Europe?

- The EISS provides a European dictionary of informatics skills to enable employers to define their needs for a position that they may wish to fill, and a potential applicant, regardless of nationality, to describe his/her skills in matching terms in order to be properly considered. Without such a dictionary, neither the nature of the requirement nor evidence of satisfactory capability could be stated effectively.

### 2.4 What are the essential features of the EISS?

- EISS is based on a **matrix model** comprising a horizontal axis of **streams** and **sub-streams** of informatics activity and a vertical axis of ten **levels**, reflecting increasing capability from the lowest level of untrained entry up to and including the highest level of management directly responsible for informatics
- As a general rule, a **maximum of seven and a minimum of three defined levels of skill** capability will feature within a **single stream or sub-stream**.
- Where an intersection occurs between a stream and a level, a **skill cell** is identified within the matrix and this is allocated a **unique reference code**.
- Each identified skill cell is supported by a **Cell Definition**, comprising the following descriptive material:
  - Tasks/Attributes:

- i.e. the nature of the work to be undertaken and the skill competencies required to perform the required standards and outputs of work at that level, i.e. relevant experience and level of skill achieved
  - Entry requirements:
    - i.e. relevant experience and level of skill achieved
  - Training and Development required:
    - i.e. learning activities on or off the job which are required to enhance knowledge skills and experience and provide a platform for progression to the next level in the same or complementary stream.
- Because of the wide variety of systems of organization within which informatics work is undertaken, the EISS does not assume any specific organizational approach. Sensible interpretations of the skill requirements described by the EISS can be applied to a wide variety of different organizational settings - for example, as set out in the Task Force paper "Organization Design for Informatics Management"

### **3. Conclusion**

With wide dissemination the EISS, with regular updating, will contribute to a greater harmony of recognition of essential informatics skill standards, experience and qualifications. This will lead, the Task Force believes, to the adoption and integration of high standards across Europe, without in any way diminishing the rich variety of opportunity for European enterprise and innovation. This will be to the benefit of individual practitioners, employers and society at large in support of the **CEC Professional Qualifications Directive 89/48**.

## **4. APPENDIXES**

### **4.1 Matrix Map**

Service Customer/User Support	12345
Strategy and Planning	678
Internal Quality	345678
Management Informatics Consultancy	5678
Informatics Consultant Analysis	234
Informatics Management	6789
Development Management	45678
Programming	123
Software Engineering	1234567
Development Analysis/Programming	123
Analysis/Design	234
Business Analysis	34567
Hardware Engineering	234
Service Customer/User Support	12345
Service Delivery Management	678
Operations Routine	0123
Operations Command	456
Service Level Management	456
Help Desk	01234
Delivery Network Support	23456
Systems Programming	123456
Analysis/Programming	123
Capacity & Performance	456
Problem Management	456
Asset Control	456
Database	34567
Hardware	34567
Communications	34567
Technical Environment	34567
Support Security & Contingency Planning	34567
Knowledge Engineering	34567
Human/Computer Interface	34567
Graphics	34567
Audit Audit Specialism	678
Research Research Specialism	23456
Boundary-Boundary-Spanning Management	6789
Education & Teaching	23456
Training Education & Training Management	5678
Technical Authorship	1234

## **4.2 EISS streams**

### **4.2.1 Policy and management**

Establishing policies, strategic and tactical plans for the effective use of information systems by an undertaking.

Managing the processes of systems development and service delivery, with their associated financial and human resource activities, to achieve agreed objectives of quality and price-performance.

### **4.2.2 Development**

Determining how information systems can provide for business, technical or organizational needs; specifying appropriate solutions and (with the use of appropriate methods and tools) defining, designing, constructing, testing, delivering and maintaining properly engineered information systems.

### **4.2.3 Service delivery**

Planning, providing and managing the day-to-day routine, and exceptional, information service to meet user/customer needs for quality and function with efficient, economic performance of the installed facilities to agreed service levels.

### **4.2.4 Technical support**

Providing expertise, advice and practical assistance, appropriate to the particular technical specialist field, to the processes of product and systems development and service delivery in such a way that requirements are met for business/functional purposes and health and safety, security and regulatory protection and compliance.

### **4.2.5 Audit**

Assessing the functional and technical quality and accuracy of information systems, products, services and management control processes against accepted practices and acknowledged criteria contained in regulatory, professional and industry-wide statements of standard practice and conduct.

### **4.2.6 Research**

Extending the boundaries and/or body of knowledge and capability of information systems, products and services by innovation, experimentation and evaluation.

### **4.2.7 Boundary-spanning management**

Displaying a blend of skills and knowledge, covering inter-personal relationships and industry-specific functions, relating to both general management activities and specialist information systems management responsibilities such that the contribution of the individual is broader than any single functional area.

#### **4.2.8 Education and training**

Designing, delivering and managing the provision of, teaching/ instructing/ training to all students and practitioners, covering any expertise within the scope of information systems and their application.

#### **4.2.9 Technical authorship**

Designing and generating guidance material intended to facilitate the design, development, operation or use of any information system, product or service.

### **4.3 EISS Levels**

There are ten levels (0 through 9) in the EISS which apply across the framework to all streams. The levels are, in summary:

#### **0 Unskilled Entry**

The base entry level to Informatics for those with minimal entry qualifications, who will often be direct entrants from the secondary education sector. They will undergo a planned program of training in basic informatics processes and functions, and will then acquire experience in routine and predictable tasks within a structured and closely supervised environment.

#### **1 Skilled Entry**

The entry level to a technical role. It will often be the appropriate level for adequately educated trainees but should not be seen as applicable only to new entrants. While the working environment is similar to those of level 0, the skilled entrant is expected already to have a knowledge of fundamentals and therefore to move faster through to level 2.

#### **2 Initially Trained Practitioner**

The lower of two levels for those who have been trained and are familiar with the scope of their tasks but who do not normally carry supervisory or technical project responsibility. They will be familiar with, and use as directed, all applicable standards, tools and methods; they will demonstrate a systematic, disciplined and analytical approach to problem solving; and understand the context of their specific role within Informatics.

#### **3 Trained Practitioner**

The upper of two levels for those who have been trained, are familiar with the scope of their tasks but who do not normally carry supervisory or technical project responsibility. It is distinguished from level 2 by the depth and complexity of the technical knowledge base covered and the extent to which supervision is required. Level 3 implies a high degree of accountability for self-controlled work. It may include a guidance role for less experienced colleagues.

#### **4 Fully Skilled Practitioner**

Normally achieved only after clear evidence is available of full competence in a specialized technical role. At this level full technical accountability is expected for work done and decisions taken. Must be thoroughly familiar with the available tools, methods, procedures and/or equipment associated with the specialization; be able to select among them appropriately and to communicate effectively on their use. The ability to give technical or team leadership should be present as well as a high degree of technical versatility and broad industry knowledge.

#### 5 Experienced Practitioner/Supervisor

The level associated with the mature, relevantly experienced and fully capable Informatics professional. Such a person will be expected to be fully accountable for work quality whether it be as a technical specialist or supervisor. He/she will possess the knowledge and experience to take informed and responsible decisions which are both technically sound and take fully into account the needs of the organization.

#### 6 Specialized Practitioner/Manager (limited scope)

The level at which a fully experienced professional carries full responsibility for defined areas of activity, usually in a specialist consultancy or management capacity. This involves displaying all the skills and competences required at level 5 augmented by the ability to plan and take decisions with more far-reaching consequences in such areas as hardware, software and methods and in managing projects.

#### 7 Senior Specialist/Manager (extended scope)

The lower of two levels where the focus of activity is on either function management (not necessarily related to a purely technical role) or the acceptance of professional responsibility at a senior level calling for wide and deep specialized Informatics knowledge. Level 7 is distinguished from level 8 by the (smaller) scope and budgetary extent of management responsibility or by the (smaller) scope of professional accountability where direct line management is not involved.

#### 8 Principal Specialist/Experienced Manager

The upper of two levels where the focus of activity is on either function management or professional responsibility at a senior level calling for wide and deep specialized Informatics knowledge. Level 8 is distinguished from level 7 by the (larger) scope and budgetary extent of management responsibility or by the (larger) scope of professional accountability where direct line management is not involved.

#### 9 Senior Manager/Director



The level occupied by the most senior of managers actively associated with Informatics in organizations which are heavily dependent on the use of information systems and where large numbers (at least 50) of Informatics practitioners are deployed. A wide and deep practical information systems knowledge base is called for, accompanied by mature management qualities and an understanding of business coupled with an ability to communicate with, and influence, fellow-members of the general management group in the organization.

#### **4.4 Code of professional Conduct**

##### **4.4.1 Foreword**

This code sets out the general principles of professional and ethical conduct which should be in any Code of Conduct adopted by a Member Society of CEPIS.

The principles recognize that activities of a professional nature impose four specific duties on practitioners, i.e. to serve:-

- the public interest
- the employer or client
- the informatics profession
- the professional practitioner.

The above duties imply particular requirements that need to be fulfilled by professional informatics practitioners, as indicated below.

##### **4.4.2 Protection of Public Interest and Legal Compliance**

- safeguarding public health, safety and the environment
- recognition of the rights of third parties, and that the intellectual property rights of others are not prejudiced
- recognition of the rights of individuals and groups to information privacy
- knowledge and understanding of relevant legislation, regulations and standards, and that the work of the professional complies with such requirements
- recognition of basic human rights and the avoidance of actions that have an adverse effect on such rights.

##### **4.4.3 Responsibility to Employers and Clients**

- performance of professional work that meets the requirements of the employer or client, drawing their attention to the consequences of professional judgment being ignored or overruled

- performance of professional work to time and to budget and the early notification to employer or client if such requirements are unlikely to be fulfilled
- not to offer or provide any inducement to a third party in return for the introduction of business from a client unless there is full disclosure of the facts to that client
- non-disclosure of, or non-authorization to disclose, confidential information gained in the course of professional work, except with the prior written permission of the employer or client, or the use of such information for personal gain or that of a third party.

#### **4.4.4 Professional Dignity and Promotion of Professional Aims**

- protection of the reputation of the informatics profession and the improvement of professional standards through personal participation in their development, use and regulation and the avoidance of action which will affect adversely the good standing of the profession
- advancing public knowledge and the appreciation of informatics and countering wherever possible false or misleading statements detrimental to the profession
- encouragement of professional development and support to fellow practitioners and the provision of opportunities supporting the development of new entrants to the profession
- acting with integrity towards fellow practitioners and to members of other professions who may be engaged in related work and the avoidance of any activity which is incompatible with professional status.

#### **4.4.5 Competence, Ethics and Impartiality**

- upgrading personal professional skills and awareness of relevant informatics developments
- avoidance of claims to levels of competence not possessed
- acceptance of professional responsibility for work performed including the work of subordinates and associates under their direction, and not to terminate a professional assignment except for good reason and with reasonable notice
- avoidance of situations giving rise to conflict of interest to practitioners or clients and to make full disclosure to clients, in advance, of any such conflict of interest that may arise.