INTRODUCTION

Acquiring basic skills is a crucial factor for our society due to the rapidly changing environment. Recognizing the importance of acquiring skills, the European Council defined a ‘new basic skills’ set. A framework proposed that covers what an active citizen must know (knowledge), can do (skills) and act (attitudes). This framework is based on the following competences: communication in the mother tongue, communication in foreign languages, mathematical-science and technology competence, digital competence, learning to learn, social and civic competences, sense of initiative and entrepreneurship, cultural awareness and expression.

These competences are equally important and must be enhanced by educational systems. This fact poses challenges for assessment of these skills in an accurate and measurable way. Nowadays there is a shift on Computer Based Assessment (CBA) or Computer Adaptive Testing (CAT) (Scheuermann & Pereira, 2008; Scheuermann & Björnsson, 2009). These systems are actually software tools for administering eTests in order to assess candidates through the responses that have been recorded electronically. Some of the most obvious ad-
The advantages of a CBA could be the unbiased test administration and scoring, the ability to apply testing methodologies, the suitability for large-scale assessment etc (Asuni, 2008).

Computer skills assessment is carried out globally following automated or semi-automated methods for assessment. Some commercial projects in this field are: European Computer Driving License (ECDL), Microsoft User Specialist (MOUS), Internet and Computing Core Certification (IC3), etc. Certification of knowledge and skills could be a complex task when the following parameters are involved: (a) large scale assessment (b) simultaneous consideration of many people (c) geographical dispersion (d) delivering many equivalent tests (e) different cognitive subjects.

Teachers need to acquire technology and digital skills in order to be able to follow the rapid changes in society. During the last years a national project has been carried out in Greece concerning the certification of teachers in elementary and secondary education in basic computer skills. During this project (2003-2009) almost 90,000 teachers participated and certified through a Computer Based Assessment system (CBA) that has been developed by the Computer Technology Institute & Press – Diophantus (Androulakis et al., 2006). Most of the participants followed a dedicated training program on using computers (48 hours) covering five cognitive objects: (a) Theory-MS Windows, (b) Word Processing, (c) Spreadsheets, (d) Internet & email, (e) Management Presentations (Papadakis & Chatziperis, 2000).

The data gathered (2003-2009) is considered interesting for educational policy makers and need to be analyzed because:

- Different types of participants are involved (elementary teachers, mathematicians, philologists, literature teachers, physicists, etc.);
- Certifications are carried out in a national level (large scale);
- Five cognitive objects are involved (theory-MS windows, word processing, spreadsheets, internet-email, presentation);
- Time (date and time, items’ response time, etc) and spatial (prefecture, city, etc) data have been recorded.

**TEACHERS’ CERTIFICATION ON BASIC COMPUTER SKILLS**

**Syllabus**

Syllabus is found in the core of each assessment. By this term we mean a well defined structure that clearly identifies what the candidates must know (knowledge), can do (skills) and how to act (attitudes) according to basic computer skills. The syllabus was based on relevant training of teachers and structured into four levels (cognitive, unities, subunities, topics).

**Cognitive Objects:** The first level covers five cognitive objects (1) Theory-MS Windows, (2) Word Processing, (3) Spreadsheets, (4) Internet-email and (5) Presentations. Each cognitive object contributes a different number of items to the examination.

**Unity:** The second level explores each cognitive object by defining some general unities based on teachers’ training. For example, the unities for cognitive object 3-spreadsheets are: (3.1) Interface (MS Excel) (3.2) Processing (data and objects) (3.3) Format (3.4) Graphs (3.5) Formulas and Functions (3.6) Advanced Data Processing.

**Subunities:** The third level explores each unity. For example, unity 3.5-Formulas and Functions are described by the following subsections: (3.5.1) Simple Formulas (3.5.2) Functions (3.5.3) Macros (3.5.4) Troubleshooting and Testing Formulas.

**Topics:** The last level of syllabus includes all the primitive concepts that compose a subunity. For example, some of the topics that describe the subunity about Simple Formulas are: (3.5.1.1) Numerical Expressions (3.5.1.2) References (3.5.1.3) Other Expressions (e.g. string, logical etc).