

# ON PROFESSIONALISM<sup>1</sup>

## A personal view

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## 1. INTRODUCTION

Professionalism in information technology and informatics is a long standing issue that has not been resolved to this day and is not likely to be decided upon any time soon. However, as IT and those that are active in the field have gained an extreme importance in the last three decades it is important that a necessary attention is dedicated to those that have chosen it for their profession and capital source for their living. Likewise, IT has thoroughly changed our lives and has introduced new paradigms which is to do with user aspects of IT. Last but not least, it has become an area of extensive academic theoretic and applied research. A short outline the history of IT without an ambition to describe it exhaustively and in detail therefore seems appropriate. The overview shows three eras of development. To each one of them some occupational profiles can be assigned such as to characterize most typical jobs associated with computers and their deployment in science, business and everyday life.

### 1.1 A Brief History of Computing

#### 1.1.1 The Dawn

The first epoch is the time of late forties and early fifties when first programmable computers have been built. The computers of the time were one-of-a-kind machines and nothing like serial production regardless how small series could be, can be associated with their assembly. Similarly is true of their operation. Scientists and engineers that have built them were at the same time the persons to program and maintain them. Operating systems, programming languages and data management utilities were light years away. The usage was limited to typically scientific calculations in physics and mathematics of the kind that was too exhaustive to be performed by hand even using the mechanical calculators that were available at the time. Typical example of such calculations is average free path of a neutron in a particular material, or finding an extremely large prime number. Needless to say, the interest for deployment of such calculations rested mainly upon academia, somewhat upon some governments, but next to none in businesses and surely none in the population at large.

Users were at the same time programmers and at that time we cannot speak of specific computer and information technology related professions. There were no specific educational possibilities for those that were occupied with and around computers. Similarly we cannot speak of special computer and information technology related jobs, professions or occupations. To come to a solution, the analysis, the programming (of the application program as well as the rudimentary operating system, all of which has been performed in binary code) has been done by the user of the solution.

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<sup>1</sup> The views and opinions expressed and presented in this article are not necessarily identical with official standpoints of SSI, CEPIS, or IFIP.

### 1.1.2 The Adolescence

Next era is that of commonly available general purpose computers which have only later became known as mainframe computers. This was the time of large computer systems where typical applications were massive batch data processing. The potential of the computer has been already recognized and appreciated in business. Because of their price were computers the privilege of big and rich, both countries and companies, but their potential has been recognized as a strong advantage for those who could use them. This aspect has been even emphasized with the advent of minicomputers and extensive development of communications and related progress that they have made possible. The programs were already not just solving some particular isolated issue but have substituted complete business operations such as inventory control, accounting, payroll, invoicing and the like.

This is also the period of a clearly cut jobs and occupations that had to do with use of computers: system analysts, programmers – both application and systems, systems operators, and a variety of supporting jobs that were necessary to keep the computer system running and to be able to use the results of data processing. Information sciences start to emerge as a science in its own right and not any more as a part of computer science. The first college and university courses and computer related studies become available which designate the advent of computer related jobs – at that time already dubbed information technology – specialized jobs. The output of regular educational system in any developed country was far off the mark set by needs of both users and industry, so various shortcuts started to be used in order to compensate for the shortage of computer related skills. This is probably also the time when information technology professionals start to be an issue.

Industry provided quite some qualified people that were acceptable by businesses regardless of their lack of formal qualifications which at that time still were not in large supply. Partly was that compensated by experience and partly by skills that such people have developed at their work. Although all of this was not altogether satisfactory for employers they have had no real choice and had to more or less put up with the situation (and employees). At this time the question starts to be asked, namely, how will the demand for information technology people be compensated for? The question was all the more important as more and more regular operations of businesses were transferred to computers and carried out by them. Just one of consequences of such development were so called “job killer applications”. This was, and still is, a name for complete business processes that were relocated to computers and jobs and people that have been performing them were substituted by such programs<sup>2</sup>. But much more disquieting, although understandably much less advertised, are “killer applications”. This is a name for vital programs, such that human lives depend upon, that have been found to contain flaws such that in reality lives could be spent if the flaws were not discovered and corrected. Such applications were obviously the problem of the companies that provided such solutions by procurement, by contract or otherwise and they felt more or less left at the mercy of their program developers, whether having formal qualifications or not.

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<sup>2</sup> However, in parallel to job killer applications the necessity to deploy computers has given birth to new jobs such that the balance is positive in that the number of new jobs – and workplaces generated outnumber those that die out. This is probably the reason why information society is not opposed with the vigor that could have been seen at the advent of industrial society.

Information technology industry has taken care of the imbalance of demand and supply of information technology people in that it organized “in-house” training for the jobs that it needed. Users on the other hand were more or less left to their own devices where large companies have been able to follow the example of IT industry – also in terms of salaries - and the smaller ones were trying to find their way out as best as they could. This is also the time when the issue of professionalism in information technology related jobs becomes a general concern.

### 1.1.3 The Maturity

Third era is the era that is characterized with general use of workstations and personal computers in businesses and at home, with extensive use of communications and networks, and computerized solutions that have become indispensable in all parts of modern society – in business, in government, in civil society, and at home. The situation regarding the previous phase of development has not changed for the better regarding the demand and supply of information technology people. If changed at all, it has changed for the worse in that the demand is exceeding the supply much more than before and the issue of professionalism is even more severe than before. The situation has not improved by users becoming more skilled in use of computers than before. Quite to the contrary; whereas general programs for improving users’ skills are popular and flourishing<sup>3</sup> the professional programs are in more or less the position of before: the industry takes care of itself, universities provide only a fraction of the number of graduates that are looked after, and user companies are solving their problems as best as they can. Needless to say such situation is a fertile ground for self-declared specialists the real value of which is often proved only after they succeed - or fail – a project.

The issue of professionalism in information technology occupations seems to have reached its peak at this time and needs to be addressed properly so as to offer if not a solution, then at least to provide an orientation for how to touch the problem in the future.

## 2. PRACTITIONERS OR PROFESSIONALS?

### 2.1 Word Play

To start with, let us clarify the entity that we are dealing with. In British tradition and in British influenced countries the word practitioner is commonly used. In continental Europe the same profile is generally known as professional. Without an ambition to change the tradition or attitude let us see what lies behind the word. The word practitioner (comes from practice, derived from late Latin *practicus*, Greek *praktikos* <- *prassein*, to do) is someone who regularly performs any profession, especially widely used and understood in medicine. It looks like the practitioner has come from there and as the word has been known and the persons respected, it has been readily adopted for the new field of activity. The word professional (noun, comes from profess, from Latin *professus* <- *profiteri* <- *profateri*, to confess) is derived from profession, a word with many meanings, a relevant one being a vow binding oneself to a state or being a member of a religious order. Professional is someone pertaining to a profession, especially as opposed to an amateur. It is obvious that each word

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<sup>3</sup> E.g. European/International Computer Driving License; EqualSkills; eCitizen.

has a particular deeper meaning: a practitioner is anybody that does something whereas a professional is belonging to what he believes to be his calling. It would then seem that for the purpose also in information technology related issue, professional is the expression to be used when discussing the attitude one has towards what he is doing. A pragmatic definition of a professional would be the following one: A professional is a person who knows and understands theoretical foundation of his particular field of endeavor. A practitioner (as opposed to a professional) is a person who does what he has learnt not necessarily knowing and understanding the theory behind the work. The word professional then seems to be more appropriate also in relation with information technology people. If at start of general use of computers they might have been regarded as practitioners, today, given the development of computer and information sciences, this is true no more.

## 2.2 Characteristics of Professionalism

### 2.2.1 Knowledge

Behind every seriously practiced profession there sits a body of knowledge. This is true of classical vocations (philosophy, religion, justice, medicine) as well as of modern professions (physics, mathematics, various engineering disciplines, biology etc.). The body of knowledge is normally delivered to candidates during the process of education. Education is an institutionalized and formalized process of providing the candidates with the relevant scientific information fitting the level, age, and study program. It is therefore important to make a distinction between education and training. Whereas education provides for understanding of scientific basis of a profession, the object of training is to qualify a person for performing a specific job or function. A simplification could be made such that the result of an education process is a professional as opposed to the result of training where the outcome is a practitioner.

### 2.2.2 Experience

It is an old wisdom that the knowledge must be made operational through practical results<sup>4</sup>. This normally comes about with practice. A professional cannot be regarded as such if he has only command over theory but cannot deploy the knowledge so as to come to a useful product. That is commonly acknowledged truth but less commonly agreed upon is how to acquire the necessary experience. Sure enough it comes with work but no less certain is that the process takes time and effort and that eventually someone needs to invest. A long standing dilemma is whether the necessary experience should be provided during the education process or afterwards. There is not a clear cut answer to this question and it is not likely to be expected any time soon, if at all. The needs of labor market are very different. In general, large companies prefer a solid theoretical background of potential employees as they are able to organize the necessary training and practice. Small businesses on the other hand are looking after the people that they can put in place the next day they are hired or, better even, the same day. However, to resolve this dilemma is not a purpose of this paper; the point is that experience constitutes a vital component of a professional. Another important subject closely related with experience are references. Those that employ services of a professional will normally expect an evidence of practical abilities and achievements so as to be sure that the

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<sup>4</sup> Theoria sine praxi sicut currus sine axi.

expected result will likely follow. Relevant references are normally required in the process of making the right choice of a candidate for the job.

Inexperienced staff is a liability. A very illustrative proof of the fact is a survey carried out by Italian computer society. The results have been published under the title *Cost of Ignorance* [1]. An impressive information is that due to inexperienced employees using workstations, the country suffers a yearly loss of order of magnitude of billions of euro. A similar survey carried out independently by another entity in a Nordic country has delivered comparable results. Unfortunately, it is not known that a similar survey has been carried out to explore what are the dangers – both in terms of cost and inadequate solutions including killer applications - of employing inexperienced or unqualified developers of computer programs. Nevertheless it is a safe guess that the cost of incompetence exceeds the cost of ignorance by orders of magnitude.

### 2.2.3 Ethics

Traditional vocations have developed their codes of ethics where probably the oldest and the most well-known is the Hippocrates' oath that physicians take. The consequences of such oath are manifold. First, by solemnly and ceremonially saying it the one identifies oneself with the business that he will perform. Secondly, as it is normally delivered during a public ceremony it stands for a publicly declared statement of belief which someone with moral standards cannot deny either publicly or privately. Next, which is important in the world of today that is getting more and more regulated, it means a personal norm that is even above the law: not everything that is legal is ethical. This aspect is very important as professionals are expected to act in the best interest of those that hire or employ them. This issue goes at the same time somewhat beyond professionalism as such as professional ethics is normally codified and adopted by organizations rather than individuals. Nevertheless it is expected that professionals will be members of an organization that has adopted such code. Being a member of such organization<sup>5</sup> binds one to abide to the code or bear certain consequences.

### 2.2.4 Certification

A successful education process normally ends with awarding a person with a diploma which is undoubtedly a kind of certificate. It warrants that the person has met all necessary conditions required to finish a certain study program and consequently proves that the person has mastered the necessary knowledge. The diploma says nothing of the person's ability to make the knowledge operational, of the person's experience, and even much less of one's ethics. Many professions and institutions have therefore devised various possibilities to verify the knowledge, and ways to certify that one is able to perform the profession according to the standards. Probably most known classical professions to do so are physicians and lawyers but also modern occupations are following their example – architects, civil engineers, and many others. The bottom line is to make sure of the ability to make the knowledge operational in the best interest of those that will benefit of the professionals' services. There are also certificates that do not require a previous formal education but are indispensable to be allowed to do certain things. The paradigmatic example is driving license. The issue goes even so far that

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<sup>5</sup> Normally but not necessarily an entity of civil society.

not only professionals but also users are more and more inclined to opt for certificates if available. A well known such example is ECDL/ICDL<sup>6</sup>.

The result is that additionally to the institutionalized educational system diplomas, various kinds of certificates are issued by various authorities. Those are normally public authorities, chambers, and professional associations. The practice and tradition vary among countries but the tendency towards certificates additionally to diplomas is rather strong although also depending on a particular country culture and tradition.

### 3. WHERE DO WE STAND?

#### 3.1 Shortage of IT Professionals

Presently the situation is such that IT professionals are a reality recognized by all – themselves of course, industry, and users. Regardless of the fact that users can perform more and more computer related work that require less and less support from IT professionals the latter are in short supply and are likely to be so in the future. Even though recently established service centers and software development companies outside Europe and USA can offer some relief they will not be able to compensate for all needs for various reasons: operational, cultural, time zone, and similar. There is a great disproportion between supply and demand of skilled IT professionals. Universities deliver less than 10% of the estimated manpower needed and the disproportion is not likely to improve regardless of the massive change in European education system induced by the Bologna process. To the contrary, there are indications that the process will not increase the yearly yield of university educated persons<sup>7</sup>. The trend cannot be reversed fast if at all even at incredibly high rate of establishing new universities in all European countries. The net result is that self-declared IT professionals thrive and that only in retrospect the validity of their declared abilities can be proved or disproved. So what can be done?

#### 3.2 Deploy Other Possibilities

The answer to the question above is a definitive yes. A possibility is to deploy non-institutional<sup>8</sup> providers of necessary training. One such effort has been made by CEPIS<sup>9</sup>. It has been established in 1989

- to represent European it professionals' community – to be *the* voice of European IT professional
- to define proper user and it professionals skills and competences
- to develop applicable certification schemes and products for both
- to take an active part in European developments

CEPIS has been rather successful in achieving the first aim. Regarding the second one it has done much for users' skills. The number of ECDL skills cards – over 9 million to date -

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<sup>6</sup> European/International Computer Driving License (visit [www.ecdl.com](http://www.ecdl.com))

<sup>7</sup> There is such estimate at least for Slovenia.

<sup>8</sup> In this article as such are meant organisations that are not a part of national educational system.

<sup>9</sup> Council of European Professional Information Societies (visit [www.cepis.org](http://www.cepis.org)).

speaks for itself. ECDL Foundation has been successful to make ECDL a European standard and, indeed, a European global export product.

Less success has been related to professional skills. The first try – EPICS<sup>10</sup> – has been a step in the learning process. EUCIP<sup>11</sup> as the next evolutionary stage is a consistent and ripe product aimed at bridging the gap between the demand and supply of IT professionals in Europe. The support that has been provided to EUCIP by the ECDL Foundation has been an important step forward but the results are not nearly as enthusiastic as with ECDL. Considering the estimated shortage of IT professionals in the order of magnitude of million (in Europe only) it is hard to understand why there is not more demand to introduce EUCIP.

Looking at the situation the bottom line is that not even a fraction of the potential of EUCIP has been utilized. I will not go into the EUCIP program itself as it has been developed by most competent experts so there is no need to doubt its content and quality. Which is possible is that the common effort so far seems not to have been oriented towards the right customer. What could possibly provide for an exit from the present situation would be

- to identify EUCIP as a source of income of a license holders,
- to aim the effort at a suitable target population and
- to identify the appropriate population and raise its awareness of importance of IT professionals' skills

According to experience of AICA the major income cannot be expected from training and certification but from the services that can be offered in parallel to that. Regarding the target population the objective should not be individuals but organisations. There are at least two such groups. One group are major providers of IT services such as large multinational companies and strong national IT services providers. The other group are those that have large IT departments for their own needs such as banks, insurance companies, big national and multinational corporations (automotive, construction, food industry), and governments<sup>12</sup>.

There are other aspirations to bridge the gap between the demand and supply. I will not go into various industrial training programs but will mention one more possibility that has been developed by IFIP<sup>13</sup> - IP3<sup>14</sup>. Whereas EUCIP is a regular training program IP3 is a certification scheme and so they are not competitive but rather complementary although EUCIP does offer a certificate. The main difference is in that IP3 offers a certificate to a license holder as opposed to EUCIP where the certificate is a document awarded to an individual as a proof that he has accomplished the necessary training process and has successfully passed tests. There is a small overlap between both in that an organization cannot award individual certificates without itself having been previously certified to do so but this will be undoubtedly sorted out in time.

#### 4. CONCLUSIONS

To summarize, the need for IT professionals is not seen to be decreasing. Quite opposite, even in the present global economic situation it is seen that they are looked after regardless in more

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<sup>10</sup> European Professionals Informatics Competence Services, introduced in 2001

<sup>11</sup> European Certification of Informatics Professionals (visit <http://en.wikipedia.org/wiki/EUCIP>)

<sup>12</sup> The passage is taken and modified from a proposal by the author (internal CEPIS document, 2008).

<sup>13</sup> International Federation for Information Processing

<sup>14</sup> International Professional Practice Partnership

or less massive lay-offs in various countries and industries. Universities do not deliver not nearly enough qualified and certified IT professionals so other possibilities must be explored. Industry, i.e. company certificates are available but not generally as they are mostly at disposal of their employees. It should be also mentioned that the universities hardly pay any attention to professional ethics. If they do it is mostly an individual teaches that offers the students also this aspect of their future profession rather than a systematic effort of the school reflected in the curriculum.

If commercial companies do not generally offer their training and certification they are not to blame for that as their mission is not to act for public benefit; if that happens it is in most cases only a collateral benefit. The entities that can be counted upon are those from civil society domain – non-governmental organizations such as CEPIS and IFIP to mention just two but there are many others<sup>15</sup>. What could be recommended is that governments recognize such complementary possibilities that are likely to ease the situation, and support them to the benefit of all concerned. One such possibility of practical support at virtually no extra cost for the budget would be to introduce such programs into appropriate curricula.

The demand for trained and certified IT professionals will continue to be high for the reasons mentioned in the introductory part of this paper. The prevailing are probably two. One is keeping the cost of development of IT solutions down, and the other is keeping the risk of faulty solutions down. The latter can have even more serious financial consequences as the former and is therefore even more important.

Also important is that all concerned understand the difference between training and certification. The two are not one and the same and it should be clear that a professional must be able to produce a kind of generally recognized certificate if he is to be considered and treated as such.

## 5. REFERENCES AND SOURCES

[1] [http://www.mondodigitale.net/Rivista/03\\_numero\\_due/Camussone\\_p.3-14.pdf](http://www.mondodigitale.net/Rivista/03_numero_due/Camussone_p.3-14.pdf)

[2] [www.cepis.org](http://www.cepis.org)

[3] <http://en.wikipedia.org/wiki/EUCIP>

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<sup>15</sup> Such as IEEE and ACM.