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Informatics for noninformatics majors

Stanislaw Waligorski
Institute of Informatics, Warsaw University, 002097 Warsaw
Banacha 2, Poland, e-mail: waligor@mimuw.edu.pl

Abstract

This paper gives a brief overview over education of informatics majors as implemented in Poland. The relationship between this education and that of informatics for noninformatics majors is discussed. Several problems and limitations are indicated which deserve attention. Various aspects of the situation of informatics education in society are also taken into consideration.

Keywords

Informatics, higher vocational education, professional training, continuing education, noninformatics majors, professional profiles

1 INTRODUCTION

As was the case in the past with other new and quickly developing important phenomena, the rapid development of informatics and of communication technologies has raised a great deal of vivid interest in society and amongst people. This also holds for informatics education, which can be seen as a gateway to a newly developing science and to new jobs and careers.

How does the general public perceive and appreciate this new situation?

- People with adequate informatics skills have no problem with finding jobs which suit them personally.
- More and more job opportunities connected with the new technology are opening and there is a common belief that this trend will last, at least in the nearest future.
- The jobs are considered to be (and often are) well-paid and are believed to offer good professional perspectives.

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- The offers of noninformatics jobs of many kinds that existed before are now accompanied by requests or requirements with respect to the 'ability to use computers with specific office software for word processing etc.', or even the 'ability to work with databases', to quote the modest ones.
- Such job opportunities may gradually become less accessible for those who can not use at least elementary tools of modern communication and management technology.

This creates a growing pressure on the whole educational systems of many countries (Van Weert and Tinsley, 1994). Schools which include computing into their curricula, are more competitive and have better chances to get adequate funding for further investment and development. The darker side of the picture is that many schools which can not attract good and fully qualified teachers may tend to hire someone anyway. Sometimes this results in full satisfaction of the community served by such a school, but in the worst case the results are regrettable. Such problems and temptations may plague every level and kind of education.

Dealing with such dilemmas is a bit easier when there is a good system of qualification standards. Its most important virtue is that it may serve as guidance for planners. Compared with that, its power in a prohibitive sense may be of less importance. Personally I believe that such systems or regulations must incorporate positive actions, such as the creating and supporting of solutions that may be examples for others.

2 EDUCATION OF INFORMATICS PROFESSIONALS

At the beginning of the nineties new curricula for vocational tertiary informatics education were introduced in Poland (Waligorski *et al.*, 1992). Below follows a list of the courses offered with short comments added.

1. mathematics (mainly mathematics of computation);
2. introduction to informatics (mainly introduction to algorithms and related topics);
3. programming (methods of structured and object oriented programming, Pascal and C++);
4. computer hardware (how to use hardware in a clever way, including networks);
5. operating systems (how to use these systems in a clever way);
6. business applications (including management and accounting);
7. databases (relational databases, SQL);
8. information systems (life cycle, CASE-tools, system analysis, design of small systems);
9. software systems (selected application software).

On the whole these schools for vocational tertiary education provide the maximum amount of informatics knowledge and skills that can be achieved in two years in any pre-university form of education in Poland. In general in these schools you will

not find teaching of just theory, nor teaching just by demonstration which keeps students passive. The graduates will in general have hands-on experience in all areas of the curriculum. There is, however, no room in such a short curriculum for details. Graduates who enter the curriculum from secondary school with a sufficient level of knowledge and skills, usually are able to finish the two-year course without great difficulty and can then be considered as really competent starting professionals.

This curriculum was received very well and with great interest. Sometimes the reaction was even too good. A very reputable school decided to open an informatics department and ran it very well. Because of this it received very good publicity and it was a real success. All graduates of the first two-year course got immediately after their graduation employment at a nearby bank. But so did also their best teachers. The informatics department of the school survived this operation only with great difficulty.

Fortunately this school was not the only one in the country. The number of such departments in vocational schools skyrocketed during the last few years. It seems that now a point of saturation has been reached: the situation has become more stable and there are no more such stories to tell. Things seem to be running well, although it is very hard work and qualified people are needed. Many of these are young and proud of what they are doing. The weakest organizations, perhaps run by novices, have disappeared because of lack of teachers and students, but this is quite natural. The best schools are examples for others and in this way a new standard has been (hopefully) set.

A couple of years ago new versions of the curriculum for the education of informatics majors have been introduced. After that many schools and continuous education centres broadened their activities and provided informatics education of majors as well. Since everything happens within a framework defined by the same curriculum, the general picture is quite uniform.

Students, however, may have various motivations for following this education. Those who already achieved a certain amount of informatics skills as a result of 'on the job' training, now may try to improve these further and at the end of the process graduate with a certificate of technician in informatics. Others may wish to change their former profession to informatics and obtain the same certificate. The less the informatics knowledge at the beginning, the more difficulties are encountered before graduation. On the other hand we all are surrounded now by products of informatics and therefore the amount of informatics knowledge of interested persons is very rarely nil. In any case strong motivation, perseverance and ability to learn are of great help.

3 INFORMATICS EDUCATION OF NONINFORMATICS MAJORS

For those who do not need to graduate in informatics and have or will have another profession there are various intermediate forms, but this is quite another story

(Syslo, 1996). Generally speaking every profession needs both an amount of general informatics knowledge and certain specific informatics tools suited to its particular needs. Another important issue is that students for other professions prefer to be instructed by tutors who - of course - know the basics of informatics but - importantly - combine this with the ability to use the terminology of the students' (prospective) profession and to present examples taken from connected areas of application. Otherwise the content of instruction may unnecessarily be received as too abstract or too difficult.

The variety of noninformatics majors in question is too big to discuss in general, so let us take just one more example. Let us assume that we are talking about professionals from many areas, who have achieved certain positions and do not intend to change their professions. They do not have much time for any form of education except for 'on the job' training. Because of their positions they might prefer to attend 'seminars' rather than classes. The environment of such activities and the naming may matter. After getting familiar with new methods and achieving new skills which they see as necessary and/or interesting, they will want to maintain contacts with professionals in similar situations who deal with similar professional problems. They will also welcome opportunities for updating skills once acquired and for hearing about new problems and new achievements in the area of their interest.

This example shows that it may be worth to consider more complex models of organization which may be received more favourably by the people in question. Experience shows that these forms do not need to be more expensive than the most standard and uniform solutions. Such other forms of organization may develop a spirit of cooperation, foster the creation of informal groups of common professional interest and encourage informal exchange of knowledge and professional information.

4 NONINFORMATICS MAJORS IN THE EDUCATIONAL SYSTEM

Let us finally change our point of view and look at any nation-wide educational system as a whole. Key persons in education and training of any specialists are teachers. They also must be educated and trained. And education also needs managers, coordinators, organizers, members of consulting services etc.

Simple calculation shows that in the period of time we have had for the introduction of modern informatics into the educational system of our countries, in many cases there has been no possibility to provide sufficient informatics education and training for so many teachers, managers and other personnel, as was needed (Dalek, 1992). Naturally the top people will come from various professions and very often professional informaticians will be the minority. There is no doubt that many noninformatics majors will strongly influence further developments in the application of this new technology in education. This is only one of many reasons why informatics education and training of noninformatics majors is so important.

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7 BIOGRAPHY

Stanislaw Waligorski is professor of informatics at Warsaw University. He earned his Master's degree in Communication Engineering in 1959, his Doctorate in Mathematics in 1964 and his professorship in 1975. From 1959 to 1968 he worked as a computer designer and research programmer. From 1968 on he was with the Institute of Informatics of Warsaw University. From 1974 to 1977 he acted as head of the Department of Informatics of the Ministry of Science and cooperated in the creation of departments of informatics at selected universities in Poland. Since that time he has taken part in several projects connected with informatics education. He is member of the IFIP TC-3 Committee for Education, president of the Polish Olympiad in Informatics and member of the International Committee of the International Olympiad in Informatics.