

THE TERM INFORMATICS, ITS MEANING AND UNDERSTANDING BY FUTURE PROFESSIONALS

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Abstract

The paper first deals with the much discussed issue of defining the term informatics. Then it explores how the term information science is understood by the students of the Faculty of Informatics and Statistics, the University of Economics, Prague. It presents the process of examining the meaning associated with the term in their minds using a qualitative methodological procedure called mental mapping (creation of a mental map). Using an analysis of the content of the obtained mental maps it identifies the correspondences and differences in the understanding of the term. The results of the term information science mapping are then compared with the results of the term meaning mapping carried out among future managers and entrepreneurs (students of the Faculty of Business Administration, the University of Economics, Prague). The correspondences and differences between these groups of respondents are identified and the obtained results are commented upon and discussed. As a conclusion the paper provides implications for practical teaching and practical economic.

Keywords: Informatics, an information professional, mental mapping, meaning associated with the term informatics.

1. INTRODUCTION

Nowadays, the term informatics is very frequent, not only in professional language but also in everyday human communication. Although it is used very often, its understanding differs substantially. For example, a Czech dictionary of foreign words defines informatics as the theory of information, or the theory of the creation, transfer and processing of information (ABZ.cz: online dictionary of foreign words). Czech Wikipedia, the Free Encyclopedia, (<http://cs.wikipedia.org/wiki/Informatika>) also defines informatics as a science on information and its processing; however, it also mentions that informatics is today often considered a science on processing information using computers as it is mainly computers what is currently most often used for processing information. However, the original meaning of the term is much broader. Primarily, this field deals with the structure, manipulation, storage, retrieval, dissemination and transfer of information; it also studies the application of information in organizations, its use in communication among human beings, organizations and information systems (ibid.).

The term has a similar (above mentioned) meaning in Czech, Slovak, French (*informatique*) and German (*Informatik*). On the other hand, English distinguishes the following fields within this scientific area (ibid.).

- Information science – deals with the processing of information not only on computers.
- Computer science – studies computing and information processes from the point of view of both hardware and software (Czech uses the term informatics for this meaning even though the term *computer science* would be more suitable).
- Information technology (IT) – examines everything concerning computers from the perspective technology.
- Information theory – a science which combines applied mathematics and electrical engineering to express information quantitatively; it deals with lossless compression (e.g. ZIP), lossy compression (e.g. MP3), and the capacity of transmission channels (e.g. DSL).

The English version of Wikipedia states that the term informatics can be synonymous with the academic field of informatics, information science or computer science (<http://en.wikipedia.org/wiki/Informatics>).

We can see the term informatics is loaded with various meanings in all of these languages. The meaning of informatics is also a much debated issue in the current science. The term has been explored by e.g. Zins (2006), who refers to a large number of other researchers and concludes that there is no homogenous understanding of the term “informatics” (or “information science”) – the concept has various meanings in professional contexts as well. Marco (1996) discusses the term similarly.

The differing meaning and understanding of the term can cause many a problem in personal and especially academic and professional spheres. If mutual understanding is what we seek in our interpersonal communication, then it is vital that the communicators use terms in the same or at least similar way.

In relation to the implementation of a new study field “Cognitive Informatics” at the University of Economics, Prague, we wanted to find out how the future information professionals – the students of Faculty of Informatics and Statistics – understand the term informatics. These students started studying a new optional subject “Cognitive Psychology and Creativity in Informatics” which has been included in this new field of study.

2. THE METHOD FOR THE EXAMINATION OF THE MEANING OF THE TERM INFORMATICS

To find out the meaning of the term informatics in the minds of respondents, we used a qualitative research procedure referred to as mental mapping or the creation of a mental map.

Whereas quantitative methods for exploration of social phenomena are based on quantitative mapping of the occurrence of some signs which have to be pre-defined, the aim of qualitative research methods is to gain information on the explored phenomenon; therefore, the research method is organized so that the

respondents reply and react according to what they themselves consider relevant in that situation (Lukášová and Franková, 2007).

The outcome of mental mapping is a creation of a mental map, which is a spatial structure of a mind process motivated by a central topic on which the respondent's mind focuses and from which associations develop (Franková, 2006).

The creativity expert Tony Buzan is considered to be the author of the concept of mind maps (Žák, 2004). The conception he is a defendant of is based on the construct of multiple intelligences by Howard Gardner, who introduced their broad model in 1983 (<http://ei.czechian.net/webs/intel/gardner.php>); the multiple intelligences also include spatial intelligence (Smékal, 2002).

However, the use of spatial structures, models and images for the formation and expression of thinking and mind processes and systems has been known for many years (Franková, 2006). E.g. Guilford introduced his theory of "three faces of intellect" in 1959 (Guilford, 1975), and his idea about the three dimensions of intellectual factors has led to the cubic model of the intellect structure (Guilford, 1967, 1975) which is more than well-known today. De Bono in his book published first in 1981 uses spatial models to outline various mind strategies (De Bono, 1981), and he does similar in his book published first in 1987, where he deals with the development of lateral thinking supporting creativity (De Bono, 1987). The technique of creating spatial images and models is also recommended as very useful for the training and development of thinking, memory and creativity by Birkenbihl (1996), O'Keefe (1996), Ritter and Brassard, (1998) and Bender (2002): the last mentioned even uses a mind map as an introduction to each of the chapters of his book *Leadership from Within*, which deals with the concept of leadership and the possible ways of its development.

Nowadays, various methods for mapping and their different aims and results of their use both for individuals and for teams and organizations are being published and widely discussed (Buzan, 2007; Buzan and Buzan, 2008; Driessen, Huijsen, Grootveld, 2007; Franková, Hubinková and Wertag, 2007; Franková, Wertag and Bertič, 2007; Garavan and Deegan, 1995; Hellström and Husted, 2004; Liebowitz, 2005; Koh and Tan, 2006; Mind maps chart the way to business efficiency, 1998; van den Berg and Popescu, 2005; Wexler, 2001; Zampetakis, Tsironis and Moustakis, 2007, etc.). The publications of these and other researchers prove that an appropriate mapping method used in correspondence with the demanded aim brings valuable information for the development of an individual, a team or an organization. Therefore, the research into the mapping methods and collecting experience in this field can be considered useful for all the explored levels (individual, team, organization).

As far as the creation of an individual mental map is concerned, this is a graphic picture created by the respondent on the basis of his or her own mind process and in the correspondence with the process

(Lukášová and Franková, 2007, being printed). It usually has these basic characteristics (Franková, 2006; Lukášová and Franková, 2007):

- A central topic (an issue), which is located in the centre of the picture and starts the entire process of mapping.
- First level associations, which are “radiated” from the centre by means of “branches”.
- The first level associations (and branches) are connected into the second and other level associations (and branches); details are “radiated” from the centre outwards.
- A branch contains a key word or a key image located on the assigned line or its ending.
- The branches with the key words and the key images form an interconnected nodal structure of the entire picture.

“This procedure gives rise to an original model capturing the structure of the respondent’s mind processes initiated by the provided instruction, or central topic. The model provides an overall view of the topic (issue) and at the same time it concentrates a large amount of data in one place which allows for their analysis and comparison with mental maps created by other respondents” (Lukášová and Franková, 2007, being printed).

As has been mentioned, the presented qualitative study uses mental mapping for the purpose of exploring the meaning of the term informatics in the respondents’ minds. The respondents had had no experience of mental mapping therefore the basics of mental mapping were shortly presented to them and the creation of the map was demonstrated. Each of the respondents then on the basis of the key instruction created an individual mental map capturing the meaning levels associated with the term informatics in the respondent’s mind.

3. THE RESULTS OF THE EXAMINATION OF THE MEANING OF THE TERM INFORMATICS

The mental mapping method was employed when the students of Faculty of Informatics and Statistics, Prague, began studying the “Cognitive Psychology and Creativity in Informatics” subject. 11 mental maps were obtained from them (seven men and four women).

As the qualitative methodology considers every, even unique, reply important, Tab.1 presents all first level associations acquired from the 11 analyzed mental maps (first level associations are the associations which are most closely connected with the term). These associations are classified according to identified meaning categories. Tab. 2 presents the numbers of first level associations in individual meaning categories.

TABLE. 1 - FIRST LEVEL ASSOCIATIONS CLASSIFIED ACCORDING TO IDENTIFIED MEANING CATEGORIES

Identified categories	First level associations
Computer/computers	<ul style="list-style-type: none"> • computer/computers = 9 • computer in the common room = 1 • abacus = 1 • SW company = 1 • SW = 1 • HW = 1 • programming = 1 • virus = 1
Information professional/ information professionals	<ul style="list-style-type: none"> • information professional = 3 • depressive people = 1 • jokes on information professionals = 1 • IT people = 1
Cognition	<ul style="list-style-type: none"> • cognition = 2
Communication	<ul style="list-style-type: none"> • communication = 2
Information/knowledge	<ul style="list-style-type: none"> • information = 9 • information and knowledge = 1 • knowledge, understanding = 1 • knowledge = 1 • graphs and charts, tables = 1 • data = 2 • numbers = 1
Disinformation	<ul style="list-style-type: none"> • disinformation = 1
Information theory/science	<ul style="list-style-type: none"> • information theory = 1 • science = 2
BI/intelligence	<ul style="list-style-type: none"> • BI = 1 • intelligence = 1
Systems/information systems	<ul style="list-style-type: none"> • information systems = 1 • systems = 1 • informatization = 1
Technologies	<ul style="list-style-type: none"> • technologies = 2
Teachers	<ul style="list-style-type: none"> • informatics teacher from secondary school = 1 • class teacher from secondary school = 1 • teacher (specific names) = 2
Internet/networks	<ul style="list-style-type: none"> • Internet = 3 • network administration = 1 • connection, Internet = 1 • networks = 1
Studying/school	<ul style="list-style-type: none"> • University of Economics = 4 • cognitive informatics = 1 • school = 4 • studying = 2 • Faculty of Informatics and Statistics = 1 • field of study = 1 • boring lectures at University of Economics = 1 • writing seminar papers = 1 • presentations = 1 • lectures = 1 • exam = 1 • university = 1 • 2nd term = 1 • projects - group = 1 • subject = 1 • information centre = 1
Improving work, making it more efficient	<ul style="list-style-type: none"> • improving work, making it more efficient = 1
Working positions	<ul style="list-style-type: none"> • programmer = 1 • system programmer = 1 • analyst = 1
Complicatedness	<ul style="list-style-type: none"> • complicated things = 1 • complicatedness = 1
Work	<ul style="list-style-type: none"> • work = 1
Entertainment, leisure	<ul style="list-style-type: none"> • entertainment = 1 • joy = 1 • leisure time = 1

Identified categories	First level associations
Health	<ul style="list-style-type: none"> tired eyes = 1
Future	<ul style="list-style-type: none"> future = 2
Counting, mathematics	<ul style="list-style-type: none"> counting = 1 mathematics = 1
21 st century	<ul style="list-style-type: none"> 21st century = 1
Uncategorized replies	<ul style="list-style-type: none"> telos = 1 virtual world = 1 searching = 1 helping people = 1 speed = 1 logics = 1 mobile phone = 1 money = 1 magazine = 1 friends = 1 German person = 1 letter l = 1 life style = 1 English = 1 holiday = 1 Dad = 1 problems = 1 boring = 1 examples = 1

TABLE 2 - NUMBER OF FIRST LEVEL ASSOCIATION IN THE IDENTIFIED MEANING CATEGORIES

Identified categories	Number of first level associations
Studying/school	26
Information/knowledge	16
Computer/computers	16
Internet/networks	6
Information professional/ information professionals	6
Teachers	4
Entertainment/leisure	3
Systems/information systems	3
Information theory/science	3
Working positions	3
Cognition	2
Communication	2
Technologies	2
Complicatedness	2
Counting/mathematics	2
Future	2
Disinformation	1
Work	1
Money	1
Improving work, making it more efficient	1
Health	1
Uncategorized replies of various content	18

The summary of the first level associations and their categorization shows that the term informatics is in the respondents' minds most closely connected with the University of Economics, where they study, with the study itself and with school duties and experience. Further, it is connected with information and knowledge, and computers – computers themselves and also hardware and software. On the basis of the obtained and

analysed results, we can conclude that respondents understand the meaning of the term informatics in a specific way affected to a considerable degree by the specifics of their field of study (see also the comparison of the results with another group of respondents below).

4. THE UNDERSTANDING OF THE TERM INFORMATICS BY FUTURE INFORMATION PROFESSIONALS, FUTURE MANAGERS AND FUTURE ENTREPRENEURS - COMPARISON

As we also had the opportunity to map the understanding of the term informatics by future managers and entrepreneurs – current students of the Faculty of Business Administration, the University of Economics, Prague (Franková, 2009) – we are presenting the comparison of the results of both groups of respondents in Tab. 3¹. We obtained 11 mental maps from the students of the Faculty of Business Administration, Prague (respondents were four male students and seven female students).

As Tab. 3 shows, the meaning of the term informatics in the minds of the respondents is connected with three categories of first level associations mainly – the study and school, computers, and information and knowledge. As far as future information professionals are concerned, the dominant category is studying and school (26 first level associations), followed by the category of computers (16 first level associations), and information/knowledge (16 first level associations). As far as future managers and entrepreneurs are concerned, the dominant category is computers (26 first level associations), followed by the category of studying and school (14 first level associations), and the category of information/knowledge (8 first level associations).

On the basis of the comparison of the results in the two groups of respondents, we can assume that the differences in the understanding of the term informatics are caused by the differences in the fields of study at the different faculties, where the respondents study. We have mentioned above that future information professionals understand the meaning of the term informatics in a specific way affected to a considerable degree by the specifics of their field of study, which is also confirmed by the larger meaning range of the first level associations obtained from this group of respondents and the greater importance of the category of information/knowledge. In contrast, the group of future managers and entrepreneurs understands the meaning of the term informatics in a narrower sense (the category of computers is dominant), which corresponds with the usage of the term in common speech and the current tendencies presented and discussed in professional literature.

¹ There are some new meaning categories in Tab. 3 (vis-à-vis Tab. 2) as these are based on the agreement of associations in both groups of respondents.

TABLE 3 - THE UNDERSTANDING OF THE TERM INFORMATICS BY FUTURE INFORMATION PROFESSIONALS AS COMPARED WITH THE UNDERSTANDING OF THE TERM BY FUTURE MANAGERS AND ENTREPRENEURS

Identified categories	Number of first level associations of future information professionals	Number of first level associations of future managers and entrepreneurs
Studying/school	26	14
Information/knowledge	16	8
Computer/computers	16	26
Internet/networks	6	3
Information professional/ information professionals	6	6
Teachers	4	3
Entertainment/leisure	3	3
Systems/information systems	3	1
Working positions	3	2
Cognition	2	-
Communication	2	-
Technologies	2	2
Complicatedness	2	2
Counting/mathematics	2	1
Future	2	1
Information theory/science	3	1
BI/intelligence	2	1
21 st century	1	1
Disinformation	1	-
Work	1	1
Improving work, making it more efficient	1	-
Health	1	1
Life style	1	1
Money/well-paid job	1	1
Dad	1	1
Boring	1	1
Problems	1	1
Examples	1	1
Mobile phone	1	1
Uncategorized replies of various content	12	6

5. CONCLUSIONS

The paper deals with the term informatics and its understanding by future information professionals. The meaning of the term in the respondents' minds is explored using a qualitative procedure referred to as mental mapping. The analysis of the obtained mind maps identifies the agreements and the differences in the understanding of the term by future information professionals and compares them with the results of mental mapping of the term meaning in the minds of future managers and entrepreneurs.

The results of the used qualitative procedure show that the future information professionals (in comparison with the future managers and entrepreneurs) understand the term in a wider range of meaning. They seem to be better informed about the meaning of the term, which was clearly proved during the process of mental mapping. In contrast, the mental mapping process in the group of future managers and entrepreneurs

showed that these respondents understand the term informatics in a narrower sense – the first level associations are dominated by the category of computers. This corresponds with the usage of the term in common language and the current tendencies presented and discussed in professional literature; however, the differences in the understanding of this frequent term can cause difficulties during their studies, e.g. when they choose a field of study or a subject on the basis of their expectations associated with their meaning of the term, and subsequently, lose motivation because the content of the subject is different from what they expected due to their narrowed understanding of the term in the subject name. Furthermore, in their economic practice, both material and immaterial losses can be brought about by the narrowed understanding of the term informatics.

Therefore, it is recommendable to bear this potential difficulty in mind and to inform the students in time so that they can choose their field of study and their subjects more relevantly, and so that their interpersonal communication during their studies and during their professional practice is more effective.

Figure 1 and 2 represent fictitious mental maps capturing the obtained results.

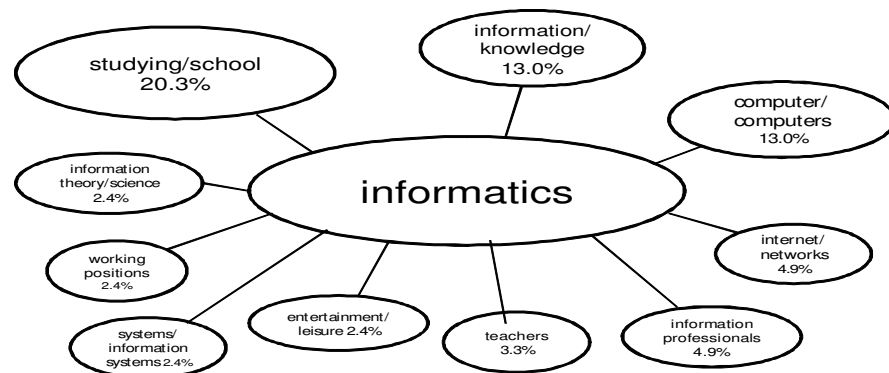


FIGURE 1 - THE FIRST LEVEL ASSOCIATIONS IN THE GROUP OF FUTURE INFORMATION PROFESSIONALS

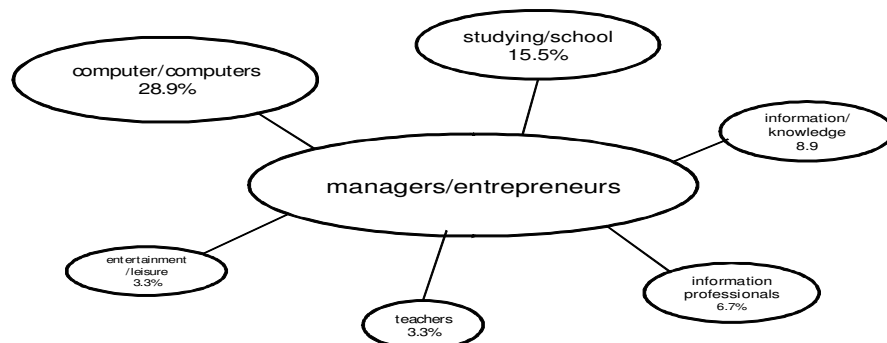


FIGURE 2 - THE FIRST LEVEL ASSOCIATIONS IN THE GROUP OF FUTURE MANAGERS AND ENTREPRENEURS

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