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Managerial Approach to Increasing Information Literacy

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***Abstract*—Human intelligence and literacy represent significant and decisive parts in one´s life. Currently, they may also be reflected in possessing PC skills, particularly as necessary requirements linked to using information technology systems become greater and more differentiated. This notion is related to specific computer literacy issues addressed in the paper. Its theoretical part is concerned with abilities of gaining knowledge in information science and technology systems. In practical part discusses implementation of activities within a selected university, where the main aim consists in utilizing machine-readable information sources. Correspondingly a questionnaire survey was conducted in order to examine opinions of users regarding their overall satisfaction with education activities and services of a selected academic library as well.**

Keywords—information education, information literacy, digital literacy, information science and technology systems

I. INTRODUCTION

The last ten years have shown that it is necessary to work with information as best as possible. However, this aspect has always been stressed and become a natural implicit and explicit education goal as well [1]. The ability to work with computer and information technology systems have become one of the most significant areas related to general intelligence and literacy, while the terms information and computer intelligence have become most frequently applied to literacy terms, and the terms digital, technological and internet intelligence and literacy have enriched that term set in a great deal as well.

Students' functions in education have changed in the direction of greater openness to technical innovation, and students at the secondary education level receive them as a commonplace and with obligingness. Modern teaching techniques, particularly computers, create a richer sensory space for receiving and processing information by students. In the process of pedagogical interaction and communication, technology has increasingly acted as a mediator between teachers and students, but it should never replace human contact or weaken social bonds [2], [3]–[6].

The fact that people hear more about the need of education in information technology systems closely corresponds with system developments themselves. The technical and technological growth of information technology systems applied to teaching and learning process creates an integral part of many learning activities with a high didactic value, which support students´ interest and activities related to their further education and development. On the other hand, teachers and school equipment ensured by adequate IT systems determine didactic efficiency of modern information technology systems. A contribution of IT systems encourages teachers to change their teaching and learning approach and apply them in their looking for new methods and organization forms of learning and teaching [7]; [8]. A set of changes achieved within IT areas is considered to be stronger and greater than the changes in information media achieved in the history of humanity [9]. However, working with texts having semantic contents plays role of principal importance as well.

We live in the age of information presented to the user in different forms and via various approaches, methods and techniques [10]–[12]. There may be applied texts, static or dynamic images, sonic or multimedia documents. On the other hand, those types of information may be combined and applied within one machine readable record or document. As a result of that, two principal questions may be postulated: "How can such document content be understood and interpreted in relation to the document users or readers' requirement or requirements?", "What approaches, methods and techniques should be applied to these purposes?" When looking for answers to the above-mentioned questions, we can consult materials closely related to computational linguistics, visual literacy and content analysis of text [13] or images from semantics point where algorithms based on fuzzy set apparatus play a role of great importance [14].

Modern media technology, most notably represented by computers, multimedia systems and the Internet [15]–[19], occupy an increasingly important place in the instrumentarium of teachers' educational methods. It is therefore essential that the modern school teachers are able to handle these resources and incorporate them thoughtfully into other strategies, methods, techniques and resources. In the process of pedagogical interaction and communication, technology plays a greater a role of a mediator between teachers and students [20].

At present, a literate person has many advantages in the existing information society and only citizens, firms, companies and institutions who provide education and training services are aware of that fact as well. As a result of that, different forms of education in information science and technology create an integral part of courses taught at universities, while existing trends are being respected a lot in there. On one hand, university libraries provide services for university students and teachers; yet, they provide labour opportunities for IT experts as well.

IT experts or librarians that possess IT skills and provide library and IT services for university students and teachers play a role of principle importance in their IT literacy development. To be more specific, they provide consulting services within retrieval and material preparation, while working with daily newspaper materials, references to other information resources, adequate web sites or pages as well [21], [22].

As stated in the actual research results, most public libraries in the Czech Republic provide IT education services or activities that have been here since the 1970s. A specific part of the paper, which deals with practical aspects of IT education, is closely related to mapping of impact on educational activities provided within the University of South-Bohemia, utilization of machine readable information resources and content investigation regarding educational activities of academic library as well.

II. Information Literacy

There are more definitions and/or explanations of the term Information Literacy, where the first of them was postulated by Paul Zurkowski. He considered men or women to be equipped with adequate IT literacy and able to utilize information resources when looking for solutions to their problems in their working activities, while being able to learn a wide scale of IT techniques and tools as well as primary information resources [23]. On the other hand, an Information Literacy definition was given by Presidential Committee on Information Literacy, as follows: "People equipped with IT literacy are able to find a way of how to learn and to study". (The Presidential Committee on Information Literacy creates an integral part of American Library Association). They know how to learn and to study, because they are able to search, find and utilize information so that the other people are able to learn with the use of them. Those groups of people are being prepared to accept lifelong education needs, because they are able to find that set of information necessary for making an appropriate decision or finding solution of any pre-defined problem [24].

However, there are further definitions of Information Literacy as well, although there might be several differences among them. Still, all of them are based on the idea that the only primary literacy (reading, writing and counting capability) is not sufficient for any modern man or woman. He/she has to be able to find a right way or direction within huge information and information resource set and this aim is not reachable without the knowledge of information technology. It means that anybody has to know the procedure of information acquisition and subsequent processing in order to utilize it for his/her own needs.

A. Information and Communication Technology Systems Versus Digital Technology Systems – Is there any Difference between them?

When considering education context, information and communication technology systems might be discussed with respect to two directions. On one hand, those systems can be considered to be information medium and on the other hand, technology systems may play a constructive role. This means that the information and communication technology systems (hereinafter known as IKT systems) are considered to be a huge set of means and facilities, procedures and knowledge applied to information processing and communication purposes. However, these considerations are closely related to education context. When regarding specialized areas of education related to information and communication technology systems, we have to think about computing and communication means and facilities, different procedures and information resources that play a role of supporting tools for teaching and learning together with a set of cognitional processes and further learning and teaching activities. However, the entire educational process has two complementary sides: informative, which is concerned with acquisition of information and skills, and inference, which is concerned with new knowledge discovery and generation. In spite of that, both of the above-mentioned sides play a role of the same importance, with the inference side being undervalued in many cases. Therefore, a large number of authors are talking about digital technology systems instead of information and communication technology systems in order to stress a need of equilibrium between information and inference aspects, when involving them into learning and teaching activities [25].

The IKT system competences are being understood as the competences needed for an appropriate productive and secure utilization of digital technologies, which play a role of significant supporting tool for learning and teaching activities and activities related to new knowledge discovery. With respect to the above-mentioned issues, we may recommend to use the term digital literacy. The term of *digital literacy* is being explained and interpreted as set of theoretical knowledge and practical skills needed for an appropriate, safety and production utilization of digital technologies for providing of learning and teaching and everyday life activities [25], [26].

The above-mentioned capabilities might be classified as follows:

- A meaningful utilization of different digital tools for our own needs, cognitive purposes, self-representation and the complex personal development.
- An efficient solution of problems and tasks with the use of digital technology systems.
- A qualified selection and utilization of a suitable digital technology in order to find a set of required information and apply it for creative and further development purposes, for making critical evaluation and analysis of information gained based on retrieval related to adequate digital information resources as well.

III. Education in Information Science and Technology Systems

A necessity of education and literacy in information science and technology systems within university libraries in the Czech Republic has represented a topic discussed and developed in a long-term. A number of appropriate theoretical and conceptual documents are being created, and they deal with problems of education in information and communication technology systems. On one hand, there are organized conferences and seminars directed to that type of education as a whole or its selected aspects. On the other hand, there are adequate projects whose aim is an information

literacy improvement of university students in the Czech Republic [27].

When considering information science and technology and library science, information technology education represents a complex process involving acquisition of knowledge and skills in disciplines, dealing with information collection, processing, storage and delivery [28].

Our environment is changing rapidly and huge sets of information are being created, while an orientation in those sets becomes more and more complicated. As a result of that, a need of information resource utilization together with appropriate knowledge and skills in information retrieval and evaluation for various daily situations becomes more and more important. However, a need to respect copyright information ethic principles plays a role of great importance as well [29], [30].

Universities represent very significant initiators within information technology education in the Czech Republic, where university libraries also play a role of mediators among students and information technology education systems [29], [30].

IV. Content Research Related to Academic Library Services Using the Template

Content research related to academic library services was carried out in November 2013 and the object to be investigated was the University of South Bohemia in Ceske Budejovice - Academic Library (hereinafter known as Academic Library of USB). The research was done within a subject denoted as Education Management of Supplementary Pedagogic Studies at VŠTE [31].

The author was the lead consultant and lecturer of Pedagogical studies. Similar research will be open in the future.

The Research Aim

The research aim was to judge opinions related to Academic Library of USB users concerned with information and technology education activities.

The Research Subject

The research subject included availability and utilization of machine readable information resources and library educational activities.

Research Sample

A number of research participants was 2,671, where 2,264 respondents were students, 271 respondents were university teachers and Academic library employees, 78 respondents were other USB (the University of South Bohemia) employees and 134 respondents represented members of the general public.

Research Result Summary

There are postulated partial research results.

Machine Readable Information Resources

A set of respondent opinions related to utilization of machine readable information resources is shown in Table 1. It indicates that students who created the main group of respondents prefer utilization of accessible machine readable resources within their studying. Several comments created by respondents contained information related to databases or on-line magazines that they are missing.

TABLE I. UTLIZATION OF MACHINE READABLE INFORMATION RESOURCES

Utilization of machine readable information resources		
Variant	**Absolute frequency**	**Relative frequency**
I use them	1,080	40.43%
I don't use them and I don't need them	560	20.97%
I am not able to work with them	520	19.47%
I have no idea about their existence	300	11.23%
I don't use them because of other reasons	121	4.53%
I have no accesses to these resources.	90	3.37%
Number of respondents (total)	**2,671**	**100%**

Source: Authors

Education Activities within Information Science and Technology Systems

A set of respondent opinions related to educational activities of information science and technology systems provided by academic library are given in Table 2.

TABLE II. INTEREST OF RESPONDENTS RELATED TO EDUCATIONAL ACTIVITIES OF INFORMATION SCIENCE AND TECHNOLOGY SYSTEMS PROVIDED BY ACADEMIC LIBRARY

Education Activities within Information Science and Technology Systems		
Variant	**Absolute frequency**	**Relative frequency**
Acquisition of documents from libraries in the Czech Republic and from abroad	915	34.26%
Work with machine readable	560	23.21%
Work with machine readable information resources	620	19.47%
Diploma thesis (retrieval of information resources, citations)	600	22.46%
Citation and publishing analysis (impact factor, h-index etc..)	239	8.95%
Academic library services	153	5.73%
Retrieval of the library on line catalogue	110	4.12%
No one	25	0.94%
Others	9	0.34%
Number of respondents (total)	**2,671**	**100%**

Source: Authors

The above research results indicate that users prefer acquisition of documents from libraries in the Czech Republic and libraries from abroad and working with machine readable information resources, particularly databases. However, there are small numbers of respondents who do not use any possibilities of education in information science and technology systems.

V. DISCUSSION

As may be seen in Table 1, 40, 43 percent (i.e. 1,080 to 2,671 respondents) utilize machine readable information resources. "I am not able to work with machine readable information resources" was an answer of 520 (i.e. 20 percent of) respondents. On the other hand, only 3, 37 percent (90) of respondents stated that they do not have access to information they need.

When looking at Table 2, it may be observed that 34, 26 percent (i.e. 915 to 2,671 respondents) prefer acquisition of documents from libraries in the Czech Republic and libraries from abroad, while 23, 21 percent of respondents prefer working with machine readable information resources (databases). See Table 2 for more details.

VI. CONCLUSION

The research subject was closely related to availability and utilization of machine readable information resources and education services provided by academic library. The research was conducted with the use of machine readable questionnaires', while the respondents received an e-mail message prior to filling the questionnaire with the use of an appropriate application program Vyplnto. The research results might be considered to be an inspiration and promotion improvement related to information science and technology systems as well as preparing courses in these fields of study for undergraduates and graduates.

VII. FINAL STATEMENT

It is necessary to extend availability of information science and technology education services offered by academic libraries and other educational institutions in order to achieve a higher level of information science and technology literacy. Anybody wishing to develop his/her theoretical knowledge and practical skills in his/her branch of specialization has to learn to work with machine readable information resources and databases. This is the only way of how to achieve success at work and in private life.

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