

## **Knowledge and information management behaviour in the light of empirical studies among students\***

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### **Abstract:**

The results of empirical studies in the field of *Personal Knowledge and Information Management* (PKIM) will be presented. PKIM is a humanistic and integrated approach of three concepts: Personal Information Management (PIM), Personal Knowledge Management (PKM) and Information Literacy (IL). Following the presentation at QQML 2012 (Limerick, Ireland) of the theoretical basis and the results of the first part of PKIM studies, its second part is described in this paper. The subject of these studies are PKIM behaviour, which is a type of knowledge and information behaviour; and related attitudes, skills and feelings of individuals. Qualitative and quantitative methods were used. The respondents' group consisted of 510 Information Science and Library Studies students from nine universities throughout Poland.

**Keywords:** information behaviour, knowledge behaviour, knowledge management, information management, information collection, information literacy, students

### **1. Background**

Knowledge and Information Behaviour can be defined, using Wilson's definition of information behaviour (2000), as the totality of human behaviour in relation to sources and channels of knowledge and information (K&I), including active and passive K&I seeking and use. We need, seek and use K&I in all spheres of our life, both private and professional. A person's knowledge structure is changed to a new modified structure by passing through the so called 'information behaviour wheel' (Godbold, 2006), which consists of a variety of information activities, e.g. seeking, searching, spreading, creating.

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These activities belong to the management of personal K&I, and are the components of knowledge and information life cycle: from gathering, through selecting, organising, to using and creating new knowledge and information. Skills and competences of individuals play a crucial role in this cycle, in the whole process of management of personal K&I.

The concept called Personal Knowledge and Information Management (PKIM) is devoted to individuals' competences connected with K&I management (Świgoń, 2012). The aim of PKIM is improved functioning of individuals in turbulent and competitive environments, in professional as well as everyday life. The basis of PKIM is, on the one hand, individual assets of knowledge and information; on the other hand, competences in building information and knowledge collections, along with their use, in other words learning and creating new information and knowledge.

PKIM stems from the overlapping areas of interests of three other concepts: Personal Information Management (PIM), Personal Knowledge Management (PKM) and Information Literacy (IL). IL is well known in library and information science, while PKM and PIM in management science and organization science, which is the reason of the interdisciplinary and multidisciplinary character of the PKIM concept.

Moreover, in the subject literature two main perspectives influence each other: 1) humanistic, connected with human resources management, self-development and 2) technological, related to knowledge and information management systems, computer applications and software. PKIM is a humanistic and integrated approach to three abovementioned concepts (PIM, PKM and IL).

PKIM behaviour is a type of K&I behaviour. As was mentioned at the beginning of this paper, K&I behaviour covers active and passive K&I seeking and use. Management is an activity by definition. Therefore PKIM behaviour consists of a variety of activities a person performs in order to manage knowledge and information, that is to gather K&I, organise, select, share and create new K&I. PKIM related skills, attitudes, habits and feelings are connected with the aforementioned activities.

It seems that future PKIM research may have a very broad scope and a large multidisciplinary potential. The PKIM pioneering studies (Świgoń, 2012) were general in nature and gave only a preliminary look at this complex and prospective subject.

The PKIM empirical studies, started in Poland (Świgoń, 2012, 2013) and recently conducted in Germany (Świgoń and Weber, 2013), highlight the humanistic perspective by focusing on students' activities and attitudes regarding K&I management in the context of learning and studying. The part of PKIM studies, carried out among Polish students, is presented in this article.

## **2. PKIM research methodology**

The empirical studies in the PKIM area consisted of two parts, with varying objectives and methods. The aim of the first part of the studies was to attempt a deep insight into opinions of students, as an example of individuals engaged in management of K&I in the context of learning, about the meanings, role and

factors influencing K&I management. In this initial part of the PKIM research, which was qualitative in nature, an unstructured questionnaire was used. The findings of this (see Świgoń, 2013; Świgoń and Weber, 2013) proved that students perceive knowledge and information as well as knowledge management and information management as strongly interrelated terms and areas of interests. Although the students identified certain differences, particularly with regard to knowledge vs. information or knowledge management vs. information management, interconnections seem to be more important. Moreover, students saw K&I management as the possession and development of specific skills and abilities useful in academic and private life. These skills are not only the information skills, but knowledge skills as well, because they involve creative thinking, reflection, and creation of new K&I.

The aim of the second part of the PKIM studies, presented below, was an identification of students' PKIM behaviour, that is activities, skills, attitudes, habits and feelings associated with management of personal K&I. Another objective of the second part, but not described in this article, was the development and validation of the PKIM self-assessment scale, an instrument which may prove useful in future comparative studies in the scope of K&I behaviour, skills and attitudes (Świgoń, 2013a).

According to the analysis of the subject literature and the theoretical basis of PKIM concept (Świgoń, 2012), a process of management of personal K&I covers the following categories (types of activities and related attitudes, skills and habits):

- 1) knowledge and information gathering,
- 2) knowledge and information organising,
- 3) knowledge and information selecting,
- 4) knowledge and information sharing and
- 5) knowledge and information creating.

A personal K&I base of the surveyed students means a scientific knowledge and information associated with the studying discipline as well as practical knowledge and information associated with the studying process.

A structured questionnaire was used in this quantitative-qualitative part of the studies. It was designed on the basis of an analysis of the literature, discussions with experts and on results of a pilot study among Polish students. The questionnaire consisted of 30 statements categorised into the abovementioned five categories (six in each section). The respondents indicated their agreement/disagreement with each statement via the 5-point Likert scale, from 1 – strongly disagree to 5 – strongly agree.

The respondents' group in the part of the studies presented below, consisted of 510 students of Information Science and Library Studies (ISLS) majors and related specializations (Information Management Studies, Communication and Information Resource Management, Information Science and Bibliology) from 9 major universities in Poland. The whole group of respondents was 20% of all ISLS students in Poland in 2011. Respondents were divided into groups in terms of: gender (86 were male and 424 female), academic status (294 were Bachelor's students and 216 were Master's students) and major (402) vs.

specialization (108). The abovementioned 9 state universities are located throughout the whole country: 53 respondents were from University of Warmia and Mazury in Olsztyn (UWM); 49 – from Nicolaus Copernicus University (UMK); 55 – Adam Mickiewicz University (UAM); 49 – University of Silesia in Katowice (UŚ); 80 University of Wrocław (UWr); 59 – Warsaw University (UW); 42 – Maria Curie-Skłodowska University (UMCS); 50 – University of Łódź (UŁ); 73 – Jagiellonian University in Krakow (UJ).

In analysis of data gathered in this study, two statistical methods: analysis of variance (ANOVA) and a chi-square test ( $\chi^2$ ) were used.

### 3. PKIM studies results

According to abovementioned components of the process of personal K&I management, the respective sections of statements in the questionnaire were labelled as follows: 1) K&I gathering and searching; 2) K&I organising, keeping and securing; 3) K&I selecting and evaluating; 4) K&I spreading and sharing; 5) K&I creating, analysing and presenting. The summary of the PKIM empirical studies results among ISLS students in Poland, in terms of average scores and percentage of respondents agreeing or disagreeing with each of the 30 statements, is presented in Table 1.

The average score (M) stems from five possible answers (from 1 to 5). Whereas the results regarding percentage of respondents (%) are described in a draft version. In other words, a cumulative number of agreeing answers (both: '4 - I agree' and '5 - I absolutely agree') as well as disagreeing ('1 - I strongly disagree' and '2 - I disagree') were noted; and the percentage of the answers '3 - do not know' was not presented in Table 1. More detailed results (see Świgoń, 2012) are described below, which only regard cases with statistically significant ( $p < 0.001$ ) differences in subgroups of respondents (gender, university, academic status and major vs. specialization).

**Table 1. PKIM behaviours of students (n=510)**

Statement	M 1-5	Agree %	Dis- agree %
<b>K&amp;I gathering, searching</b>			
1 I cope well with gathering information on subjects that interest me.	4.21	90.98	2.74
2 I know a variety of information resources and I can use them, I am familiar with them.	4.04	83.92	3.53
3 I know the deep Web and how to use this kind of resource.	3.30	47.06	20.78
4 I make lecture notes systematically.	3.86	70.79	15.49
5 When I search for information, I try to find the people (teachers, experts, colleagues) who have knowledge in this field.	3.29	50.00	28.43
6 I prefer learning from experts, professionals than reading the scientific literature.	3.38	51.18	29.80
<b>K&amp;I organising, keeping, securing</b>			
1 I am trying to order, classify and sort gathered information to be able to find it later easily.	4.00	77.84	9.60
2 Usually I keep encountered information that I do not need now but might be useful in the future.	3.75	70.39	17.45

3	I keep information in both electronic (hard disk, USB drive) and paper forms (notes, binders).	4.34	89.22	6.27
4	I keep information only in electronic form, without any paper copies, hand notes etc.	1.55	6.08	90.98
5	I try to note spoken information that is interesting for me in order to keep it and add to my collection.	3.64	67.45	17.06
6	I care about making copies of kept materials and saving them.	3.05	45.29	41.96
<b>K&amp;I selecting, evaluating</b>				
1	I know how to evaluate information on the Internet and I am able to select valuable information and webpages.	3.92	76.47	5.10
2	In case of large search results (thousand of links) I have no problems with selecting high quality materials.	2.40	19.02	64.51
3	Even if I use peer-reviewed journals and books, I have problems selecting the articles and publications that are the most important for the subject I am working on.	2.30	15.30	66.86
4	Sometimes I browse documents that I am keeping (both in electronic and paper form) and I throw away unnecessary and redundant materials.	3.64	69.61	19.02
5	I never browse materials I have kept for the future unless I need them currently.	2.43	23.53	60.19
6	I think that knowledge and skills I am gaining during my studies will be useful in my private and professional life.	3.74	65.49	10.98
<b>K&amp;I spreading, sharing</b>				
1	I like sharing my lecture notes and other materials (photocopies, data) with other students.	4.13	85.10	7.65
2	I like sharing knowledge (spoken information) related to studying with other students.	4.32	90.20	3.13
3	Other students share their notes with me in case of my absence from classes.	4.10	82.16	6.66
4	Other students share their knowledge (spoken information about our studies) with me.	4.08	81.38	5.10
5	Generally speaking, I am pleased with the ways and methods of teaching and knowledge sharing of my teachers and lecturers.	3.44	56.86	18.24
6	Our academic teachers are available and advise us cordially.	3.61	63.16	10.98
<b>K&amp;I creating, analysing and presenting</b>				
1	I like preparing new subjects (writing tasks, speeches etc.) for classes.	2.75	30.79	47.26
2	I have no problems with preparing new subjects that are new to me, with deep analysis of the scientific subject literature.	3.43	54.90	17.26
3	I have no problems with searching for and forming new problem statements (analysis of literature, research questions, hypotheses) e.g. for Bachelor or Master's thesis.	2.92	28.23	31.77
4	Conducting empirical studies (surveys, experiments) on my own would not be a problem for me, if that was necessary for my Bachelor/Master's thesis.	3.39	51.96	19.61
5	I am familiar with basic office applications (Microsoft Office, OpenOffice) needed for typesetting a paper (computer presentation, essay, bachelor/master's thesis).	4.41	90.59	4.51
6	I like public speaking (speaking on classes, conferences).	2.49	26.08	57.25

The first section of the questionnaire was related to knowledge and information (K&I) *gathering, searching, seeking* in the context of studying. Almost all students perceived their skills in this scope as very high and appropriate (averages over 4 points in 1-5 scale). Such self-assessment is obvious with

regard to the subject of their study in ISLS majors and related specialisations. A minority of students, about 3%, claimed that they did not cope well with gathering information and were not familiar with a variety of information resources. The acknowledgment with the term *deep web* was surprisingly low (3.3), with less than half of respondents noting their familiarity with this kind of resource. In the light of this survey, it is not clear, if students really do not know about the invisible Web, or whether are only unfamiliar with this name. Every third student answered “don’t know”. The next statement was associated with codifying knowledge, that is students making notes during classes and lectures. Making notes is a very common habit of K&I gathering, 70% students do it systematically. Students largely display a positive attitude towards looking for human K&I resources, rather than solely literature and documental sources. In other words, this attitude shows an important role of tacit form of K&I, which can be transferred through discussions in contrast to explicit knowledge represented by scientific literature. According to respondents answers, 51% of students prefer learning from experts to reading the literature.

The second part of the questionnaire was devoted to K&I *keeping, organising, ordering, and securing*. The explicit form of K&I as well as tacit were taken into consideration in the proposed statements. The majority of students agreed that they were trying to order, classify and sort the gathered and encountered information, even if they did not need it at that moment. Over 70% of students were engaged in building personal K&I collections. Almost all those surveyed noted that they keep information in both forms: paper and electronic. Moreover, only 6% respondents kept information only in electronic form, which may seem surprisingly when we consider the growing popularity of electronic books and information resources. On the other hand, activities associated with transforming hand notes and paper copies (very common in the studying process) into electronic form is considered time wasting. Another issue is noting articulated tacit knowledge, spoken information. Such spoken information and knowledge transformed into a written form can be added to a personal K&I collection. That was a practice of 67% of respondents. The last statement in this group dealt with securing information through making extra copies. That 42% students do not have a habit of making copies, is potentially concerning. It is possible that they have never experienced a loss of data or documents, and simply are not aware of possible negative effects.

The next section of survey consisted of statements relating to *selection* issues. In general, the wide availability of information, especially in electronic form, necessitates evaluation to prevent information overload. ISLS students were well prepared for the evaluation information on the Internet. 76% respondents claimed that they possess appropriate skills, and only 5% disagreed with this statement. However, only 19% indicated that they have no problems with selecting high quality materials in cases of large search results (thousand of links), and for the majority (64%) of students it is a considerable barrier. Moreover, 15% students encountered a difficulty with selection materials for the subject they are working on, even if they use peer-reviewed journals and books. There is no doubt that students feel not only an information overload in general,

but an overload of scientific K&I as well. Regarding K&I personal collections, 69% students have a positive attitude or habit of browsing and throwing away unnecessary and redundant materials. Only 23% asserted that they never browse their collections unless they need something at that time. The last statement in this section of the questionnaire was connected with an assessment of the gaining of knowledge and skills throughout the study program. Generally, Polish ISLS students from 9 big state universities were glad and appreciated a usefulness (in private and professional lives) of subject knowledge and various skills possessed, thanks to their studies. Approximately 11% of the surveyed participants held the opposite view. Deeper analysis of this findings would be very interesting, but it was not an objective of the described research.

The fourth part of questionnaire was devoted to K&I *spreading and sharing*. It contained statements relating to both main chain links of this process: students and their teachers. As can be seen in Table 1, averages scores regarding K&I sharing between students were distinctly higher than between students and teachers. A majority of the survey participants (85-90%) liked sharing notes and spoken information, scientific and practical knowledge – with other students. Simultaneously they (about 80% students) encountered no difficulties while receiving information, for instance in case of their absence from classes. Less students, that is 56%, were pleased with the ways and methods of teaching and knowledge sharing of their teachers and lecturers. However, 18% students were not satisfied with knowledge transfer from teachers to students. 63% surveyed students admitted that their teachers were available and willing to advise, but 10% held the opposite view.

The last section of statements was related to K&I *creating, analysing and presenting*. In general, almost all averages scores in this section were low. Three of them were lower than 3 points. Only 30% students noted that they like preparing new subjects for classes in terms of writing tasks, speeches and others, while 47% did not like such tasks. Only 26% admitted that they like public speaking, that is speaking in classes, conferences; 57% disagreed with the statement. Only 28% indicated that they have no problems with searching for and forming new problem statements e.g. for Bachelor or Master's thesis. Higher averages (circa 3.4) were connected with research work, students' self-assessment of skills and competences needed for analysing the scientific literature and conducting empirical studies (surveys, experiments). About a half of respondents would not have problems in these areas. However, 17-19% admitted that such research work would cause difficulties. Only a familiarity of students with basic office applications used for typesetting attained high average score (4.4).

Differences between answers in subgroups of respondents (gender, university, status and major vs. specializations) were tested via two methods: ANOVA and  $\chi^2$ . Statistically significant differences ( $p < 0.001$ ) were observed, using *both* methods, especially regarding **academic status** and the fifth component of PKIM, which was K&I *creating, analysing and presenting*. Master's students noted a higher average of self-confidence than Bachelor's students in:

- preparing new subjects and deep analysis of the scientific literature (M=3.65; B=3.27; F=21.79); ( $\chi^2=21.32$ );
- searching for and forming new problem statements (M=3.15; B=2.76; F=19.67); ( $\chi^2=25.30$ );
- conducting empirical studies on their own (M=3.60; B=3.24; F=15.37); ( $\chi^2=19.99$ );
- public speaking (M=2.76; B=2.29; F=18.11); ( $\chi^2=21.20$ ).

There is no doubt that Masters students are better prepared than Bachelors for creating new K&I, meaning conducting research work including theoretical and empirical studies, as well as presenting the findings during for example conferences.

Moreover, Master's students coped better than Bachelors with evaluation of information on the Internet and selection of valuable information and web pages (section: K&I *selecting and evaluating*; M=4.09; B=3.79; F=18.05); ( $\chi^2=23.59$ ); and cared more about making copies of kept materials (section: K&I *organising, keeping and securing*; M=3.35; B=2.83; F=19.36); ( $\chi^2=26.16$ ).

Considering the **university** of the respondents, there were three differences observed. Two were connected with K&I *gathering and searching*. The familiarity with the information resources was the highest among students at UAM (4.41) and the lowest at UMK (3.85; F=4.11); ( $\chi^2=62.88$ ); Whereas the familiarity with deep Web was the highest at UJ (4.06) and the lowest at UŁ (2.68; F=10.06); ( $\chi^2=111.62$ ); The last difference occurred in the K&I *selecting and evaluating* section; the highest assessment of the usefulness of knowledge and skills gaining during studies was related to UMCS students (4.14) and the lowest to UŚ students (3.36; F=4.26); ( $\chi^2=63.90$ ).

On account of **gender** of respondents only one statistically significant ( $p<0.001$ ) difference was noted (section K&I *gathering and searching*). More women (75%) than men (47%) made lecture notes systematically ( $\chi^2 = 50.87$ ), and their average agreement with this statement was higher (3.99) than men (3.19; F=38.57); ( $\chi^2=50.86$ ).

Likewise, with regard to **major vs. specialization**, only one difference was observed (section K&I *creating, analysing and presenting*). Students of ISLS specializations were more confident (3.75) than those of major (3.35; F=16.89) about preparing new subjects and deep analysis of the scientific subject literature; and often agreed with this statement (73% vs. 50%;  $\chi^2 = 19.08$ ).

Additional differences between answers in subgroups of respondents were revealed using one of two methods: ANOVA or chi-square test ( $p<0.001$ ). They are listed below.

With regard to **gender**, two such differences were observed:

- average score regarding keeping materials only in electronic form was higher among men than women (M=1.83; W=1.49; F=11.45),
- as well as the average score regarding liking public speaking (M=2.97; W=2.39; F=15.83).



Likewise, two additional differences were noted concerning **major vs. specialization:**

- students of ISLS specializations cared more about making copies of kept materials (3.41) than those of major (2.95;  $F=10.30$ );
- students of specializations were more pleased about the ways and methods of teaching and knowledge sharing of teachers and lecturers (3.73) than those of major (3.36;  $F=12.16$ ).

Considering **academic status:**

- familiarity with a variety of information resources was greater among Master's than Bachelor's students ( $M=4.16$ ;  $B=3.95$ ;  $F=11.28$ );
- Master's students, when searching for information, try to find the people who have knowledge in this field more often than Bachelor's do ( $M=3.48$ ;  $B=3.15$ ;  $F=10.30$ );
- Bachelor's students more often tried to note spoken information in order to add it to their collection than Master's students ( $M=3.77$ ;  $B=3.46$ ;  $F=10.26$ );
- regarding preferring learning from experts to reading the scientific literature, twice more Bachelor's students (14,9%) indicated answer '5-strongly agree' than Master's (7%;  $\chi^2 = 20.91$ ).

On account of **university** the following differences were observed:

- the highest confidence of the ability to evaluate information on the Internet and to select valuable information and web pages was related to UAM students (4.21) and the lowest to UMCS students (3.47;  $F=3.33$ );
- the highest assessment of the satisfaction with the ways and methods of teaching was indicated among UAM students (3.89) and the lowest among UWr students (3.08;  $F=4.36$ ).

#### **4. Conclusions**

The pioneering studies in the scope of Personal Knowledge and Information Management behaviour and related attitudes, skills and feelings of students have been presented in this article. The following components of the process of PKIM were distinguished: K&I gathering and searching; organising, keeping and securing; selecting and evaluating; spreading and sharing; creating, analysing and presenting.

In general, Information Science and Library Studies (ISLS) students were self-confident in the area of information skills or information literacy, in particular in K&I *gathering*, *searching* and *organising*. However, *selecting* and *evaluating* of information was problematic for the surveyed students. Moreover, this problem was connected not only with the large search results in the Internet, but with the peer-reviewed journals and books as well. In other words, today's students of humanistic and social sciences experience an overload of scientific information, which implicates a difficulty in evaluating the importance and relevance of publications. Regarding K&I *organising and keeping*, ISLS students keep information in both forms: electronic and paper; only a minority of respondents used a solely electronic form of information collection.

A potential point of concern is that respondents were not confident in the area of knowledge skills, which means K&I *creating and analysing*. Approximately

every fifth student experienced problems with preparing new subjects and with deep analysis of the scientific subject literature. Likewise, every fifth student expected difficulties in conducting empirical studies necessary for a Master's or Bachelor's thesis. Every third respondent had problems with searching for and forming new problem statements, meaning difficulties in the analysis of literature, formulating research questions and hypotheses. Additionally, every second respondent did not like preparing new subjects (writing tasks, speeches etc) or public speaking (on classes, conference).

Due to the conducted studies the students' satisfaction from ISLS studies can be determined. In the light of their answers this satisfaction level was barely moderate (circa 3.5). 18% surveyed students were not pleased with the ways and methods of teaching and knowledge sharing of their lecturers. On the other hand, 65% respondents agreed that knowledge and skills they gained during the studies could be useful in private and professional life. An interesting finding was observed, that a half of the respondents preferred learning from professionals to reading the scientific literature. It seems that ISLS students need more classes with experts, practitioners – not only theoreticians. More practical classes at ISLS majors and related specialisations are necessary, e.g. practises in firms and companies. That curricula programs of a variety of majors (not only ISLS) in Poland need modification and adaptation to the European Qualifications Framework (EQF), is currently the subject of the national conferences and seminars (*Reforms...*).

It is worth to repeating that PKIM research can be a contribution to the theory of some disciplines, e.g.: Information Science – due to an example of K&I behaviour studies and confirmation of the need of redefinition Information Science into Knowledge Science; and Education – by emphasising the role of information literacy, K&I competences and confirming the need of modification of curricula programs at state universities.

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