REVISTA ROMÂNĂ DE BIBLIOTECONOMIE ŞI ŞTIINŢA INFORMĂRII

ROMANIAN JOURNAL OF LIBRARY AND INFORMATION SCIENCE

Vol. 13, Iss. 3
2017

CONTENTS

Revista Română de Biblioteconomie şi Ştiinţa Informării/
Romanian Journal of Library and Information Science (RRBSI)
13(3), 2017

Quarterly journal edited by the Romanian Library Association
http://www.rrbsi.ro
ISSN 2559-5490, ISSN-L 1841-1940
Editors: Angela Repanovici, PhD, Professor, "Transilvania" University of Brasov
Robert Coravu, PhD, Lecturer, University of Bucharest

RRBSI is indexed in EBSCO Library & Information Science Source (starting with iss. 4, 2010), Central and Eastern European Online Library (CEEOL) and the European Reference Index for the Humanities and the Social Sciences (ERIH PLUS)

Media and Health Information Literacy among Senior Citizens in Iceland

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Competency in media and health information literacy (MHIL) is important as a tool for lifelong learning, which provides people with opportunities to make informed decisions about healthy living. In order to improve knowledge about how senior citizens lifelong learning can be supported, the study investigated various aspects of MHIL among seniors: motivation, information seeking behaviour and evaluation of information in the Media, from Health specialists and on the Internet. A random sample was used and data collected in 2012. Participants were categorized into two groups, 60 to 67 years and 68 years or older. Data analysis was performed with ANOVA (one-way). The findings suggest that the age groups have more in common than what differentiates them. They are equally motivated, have the same preferences for information seeking and information channels, and hold the same beliefs about information quality. The main differences were that the younger group sought information somewhat more frequently, and the older group was more critical of information quality.

Keywords: *lifelong learning; media and health information literacy; senior citizens; Iceland*

1. Introduction

The proportion of senior citizens in the world population is growing rapidly. It is expected that from 2013 to 2050 the number of people aged 60 years and older will more than double globally (United Nations, 2013). In Western countries the predictions are slightly lower, with the proportion of senior citizens forecasted to double, from 11% in 2006 to 22% in 2050 (World Health Organization, 2007, p. 3).

This major demographic shift poses challenges and a need to prepare for the increasing number of senior citizens. It is important to advance their prospects of enjoying independence for as long as possible and to ensure their wellness and quality of life. It involves promoting their possibilities to manage their everyday life affairs, as well as their opportunities to participate in the community and continue to contribute to it. Inspiring them to stay healthy for as long as possible is essential, for both the individuals and society, as it is likely to support their independence.

1.1. Lifelong learning about healthy lifestyle

It is of major importance for seniors to take an active part in health promotion and to practice a healthy lifestyle. As a prerequisite, it is not only necessary for them to possess knowledge about healthy behaviour, they need to maintain their understanding of healthy living by adding new information to their current level of knowledge.

The term health literacy is important in this context. According to World Health Organization (1998), health literacy stands for „the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health (p. 10).“ In addition, the Medical Library Association's (MLA) has

defined health information literacy as "the set of abilities needed to: recognize a health information need; identify likely information sources and use them to retrieve relevant information; assess the quality of the information and its applicability to a specific situation; and analyze, understand, and use the information to make good health decisions" (Niemelä et al., 2012; Schardt, 2011). These concepts are closely related to a joint definition by UNESCO and IFLA (International Federation of Library and Information Association) of Media and Information Literacy, which allows individuals to "…access, retrieve, understand, evaluate and use, create, as well as share information and media content in all formats…" (UNESCO, 2014). The term Media and Health Information Literacy (MHIL) is used in this paper, as it combines the concepts discussed above.

Competency in MHIL is important as a tool for lifelong learning, which provides people with better opportunities to make informed health decisions. Furthermore, there are indications about a positive connection between healthy behaviour and MHIL (Enwald et al., 2016, p. 352; Pálsdóttir, 2008). Possessing these competences can provide senior citizens with more confidence and strengths that may support them at remaining healthy, independent and active members of society. It is, therefore, important that libraries and information specialists take a leadership role at enhancing their MHIL and thereby their opportunities for healthy living.

The key elements of MHIL is that people possess the motivation and the personal skills that allow them to acquire information and draw knowledge from it (National Institutes of Health, 2016; World Health Organization, 1998). The need to pay more attention to motivation, especially how interest in a topic may act as a driving force that inspires people to seek health information, has been stressed in several studies (Pálsdóttir, 2008; Savolainen, 2015, p. 616).

Access to quality information appropriate to seniors needs, which can be sought through the preferred information channels, is furthermore of significance for their lifelong learning. Information seeking has commonly been described as a goal-driven and purposeful activity (see, for example Johnson and Meischke, 1993, p. 343-344; Wilson, 2000, p. 49). However, it has been pointed out that the nature of information seeking behaviour is more complex than this, and that people often happen to come across information without having intended to seek it. This has been variously termed as opportunistic acquisition of information (Erdelez, 1997, p. 218-219), serendipity (Foster and Ford, 2003, p. 338; Toms, 2000), non-directed monitoring and information seeking by proxy (McKenzie, 2003, 26), or passive attention (Wilson, 2000, p. 53). In two separate population surveys in Iceland (2002 and 2007), Pálsdóttir (2010, p. 240) studied the relation between purposive seeking of health information and opportunistic discovery. The results support that finding information unexpectedly is an integral feature of information seeking behaviour, and that people find information by chance more often than they seek it on purpose. Together these two styles formed a pattern of information seeking behaviour, showing that those seeking health information more often on purpose also find it more often by chance, and vice versa.

Another important factor of MHIL is the evaluation of information quality. It has, for example, been noted that attitude towards information sources, such as the ideas that people have about reliability and usefulness, may influence the use (Buttriss, 1997, p. 1987). Findings from several studies indicate that people tend to rate the reliability of information on the internet lower than information in other channels (Hesse et al., 2005, p. 2620; Pálsdóttir, 2011; Soederberg Miller and Bell, 2012, p. 534). Because health information is increasingly being disseminated digitally this is of concern, particularly for senior citizens who have been later to adopt the use of internet sources than those who are younger (Smith, 2014; Pálsdóttir, 2011; Statistics Iceland, 2012). It is therefore vital to enhance their MHIL by guiding them as to where quality health information can be accessed on the internet, as well as how the quality of the information can be evaluated. Otherwise, they may be cut off from using digital information to make rational decisions about their health related behaviour.

1.2. Aim and research questions

The aim of the current study is to investigated certain aspects of MHIL among Icelanders who are 60 years or older with the purpose of improving knowledge about seniors can be supported at lifelong learning about healthy lifestyle.

The possibilities of senior citizens to improve their knowledge in order to make informed choices that promote health and wellbeing is a crucial issue. It may have impact on their wider prospects for remaining strongly connected to the community and on their quality of life. Yet, a number of questions about their skills at MHIL remain unanswered. Identifying some of the factors related to this may open opportunities to support and strengthen their skills. Subsequently, the capacity of seniors to seek information and knowledge can be enhanced.

It has been traditional in western countries to use the retirement age to define senior citizens (Thane, 1989, p. 94). In Iceland elderly is defined by law as people who have reached the age of 67 (Lög um málefni aldraðra nr. 125/1999), when it is usual for people to retire. This has, however, been criticised for not taking into consideration the heterogeneity of senior citizens. It has been pointed out that people's chronological age is less important than their physical, cognitive and social capabilities (Ries and Pöthiga, 1984, p. 112). In Iceland it is customary and preferred by older adults to use the term senior citizens and therefore it is used in this study. Furthermore, in accordance with the viewpoints that there is no clearly defined age when people become seniors, the associations for senior citizens in Iceland admit those who have reached the age of 60 to become members.

Classifying all seniors together in one age category may obscure differences among them, while comparing sub-groups can generate differences and similarities between them. In view of the above, it was decided that people who have reached the age of 60 should be included in the study, and that those who are at the age 60 to 67 years, a group who is approaching retirement, should be compared with people aged 68 years or older, who have reached the retirement age. In addition, it was decided to examine the effects of sex and education on their MHIL.

The focus of recent studies has mainly been on how seniors have adopted to the digitalization of health information. Although this is an important aspect, the information environment that people live in is more divers and complex. It includes not only digital information but rather information in various formats, which can be accessed in different ways. The present study aims at gaining a more holistic picture by examining senior citizens MHIL within a broad network of information sources and channels, which can be accessed by different means of information seeking methods. The paper will seek answers to the following questions:

1. Do the age groups 60-67 years old and 68 years or older differ in:
   a) Motivation to seek knowledge about healthy lifestyle?
   b) Information seeking behaviour?
   c) Evaluation of information?
2. Do the age groups 60 to 67 years old and 68 years or older differ in their motivation, information seeking and evaluation of information, by sex and/or education?

2. Methods

The data were gathered in spring 2012, using an internet and a telephone survey from two random samples of 600 people each, aged 18 years and older from the whole country. The datasets were merged, allowing answers from all individuals belonging to each set of data. The total response rate was 58.4%. The current study involves only participants who are 60 years and older. A total of 176 people participated in the study, 86 women and 90 men. Participants aged 60 to 67 years were 87 while 89 participants were 68 years or older.

2.1 Measurements and data analysis

The following measurements were used in the study:

(1) Socio-demographic information included traditional background variables: sex, age, education, marital status, residence and income. Based on previous analysis the variables sex and education are used in the current study. Education was measured as the highest level of education completed. Three levels were distinguished: 1) primary education, those who have finished compulsory education; 2) secondary education, those who have completed vocational training or secondary school; 3) university education.

(2) Age groups. To assess how MHIL relates to age, the participants were divided into two groups, people aged 60 to 67 years and those who are 68 years and older.

(3) Motivation was assessed by asking two questions: 'How interested are you in information about health and lifestyle'?, and 'Do you talk about health and lifestyle with others'? Both questions contained a 5-point response scale (5: Very interested/Very often – 1: No interest at all/Never).

(4) Information seeking. Based on a review of the literature, it is assumed that information seeking can be broadly divided into two information-seeking styles. Purposive information seeking was examined by asking: 'Have you sought information about health and lifestyle in any of the following sources'? Opportunistic discovery of information was examined by asking: “Have you come across information about health and lifestyle in any of the following sources although you were not seeking the information”? A list of 25 information sources was presented at each question. A five-point response scale was used (5: Very often – 1: Never).

(5) Quality of information. This was examined by two questions: 'How useful do you find information about health and lifestyle in the following sources'?, and 'How reliable do you find information about health and lifestyle in the following sources'? The questions had a five-point response scale (5: Very useful/reliable - 1: Don't know). The same list of information sources was presented at both questions as at the questions about information seeking.

Factor analysis was used to extract latent factors on the questions about purposive seeking, opportunistic discovery of information and evaluation of usefulness and reliability of information, in the data. The Principal Component Factoring method of extraction was employed to examine the factor structure of each question. In all cases, the criteria for factor loadings were set above 0.3, and oblique rotation (Oblimin) was adopted in all the analyses. For all the analyses, multiple criteria, based on eigenvalue > 1.00, a screen test and conceptual interpretability of the factor structure, suggested that extracting three factors would be adequate. The factors were named: Media, Health specialists and Internet. The Media contains information in television, radio and printed newspapers, Health specialists contains information in print from health specialists, as well as discussions with specialists of the health professions. The Internet contains all digital information, including websites by the health care system or health specialists and information in social media.

The factors explained 72.3% of the total variance in the data for purposive information seeking, 72.0% for opportunistic discovery of information, 74.6% for usability and 69.5% for reliability of information. The scales were checked for internal reliability and Cronbach’s alpha ranged from 0.87 to 0.90 for purposive seeking, 0.90 to 0.95 for opportunistic discovery of information, from 0.87 to 0.92 for usefulness of information and for reliability of information from 0.86 to 0.91.

ANOVA (one-way) was performed to examine difference across the age groups, as well as the effects of sex and education, and how it interacts on the age groups motivation, information seeking and evaluation of information.

3. Results

Results about the motivation for seeking knowledge about healthy lifestyle are presented first. After that, results about information seeking behaviour in the channels Media, Health specialists and Internet, will be introduced. Finally, results about the evaluation of the usefulness and reliability of information in the same channels will be presented. All results are presented as mean figures.

3.1. Motivation to seek knowledge about healthy lifestyle

Motivation to seek knowledge about healthy living was measured by two variables, participants' interest in information about the topic and how often they discussed it with others.

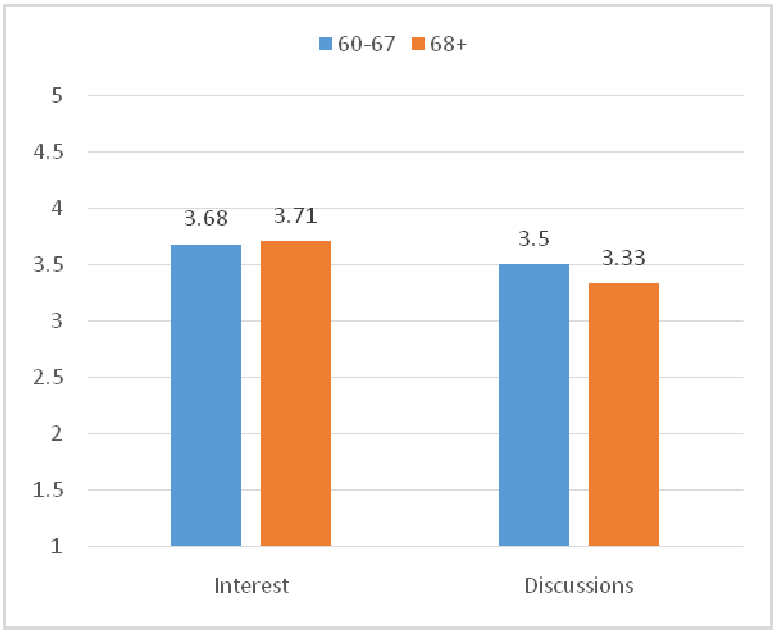

Figure 1. *Motivation to seek knowledge about healthy lifestyle – Difference by age*

As can be seen from Figure 1 motivation is very similar across the age groups and above medium (3). When the participants interest for information about healthy living F(1,190=0,97; p=0,793) and how often they discussed the topic with others F(1,189=1,55; p=0,215) was examined, no significant difference was found across the age groups.

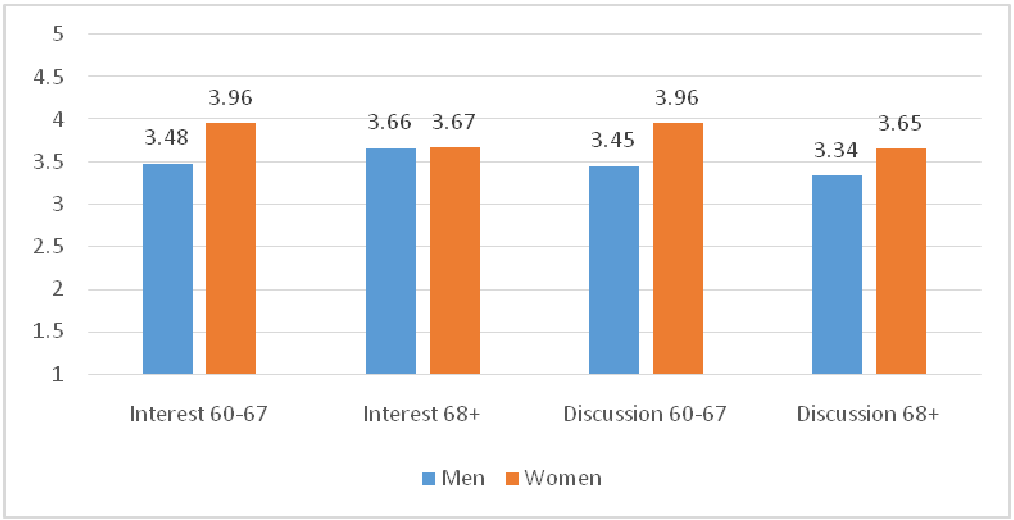

Figure 2. *Motivation to seek knowledge about healthy lifestyle – Difference by sex and age*

Figure 2 shows that women in the younger age group were somewhat more interested in information than men, however, the difference was not significant F(1,95=0,01; p=0,934). In the age group 68 years and older there was not a difference by sex F(1,92=0,27; p=0,605). Furthermore, women in both the younger F(1,94=3,08; p=0,083) and the older group F(1,92=1,14; p=0,288) discussed the topic of healthy living more frequently than men, but the difference was not significant.

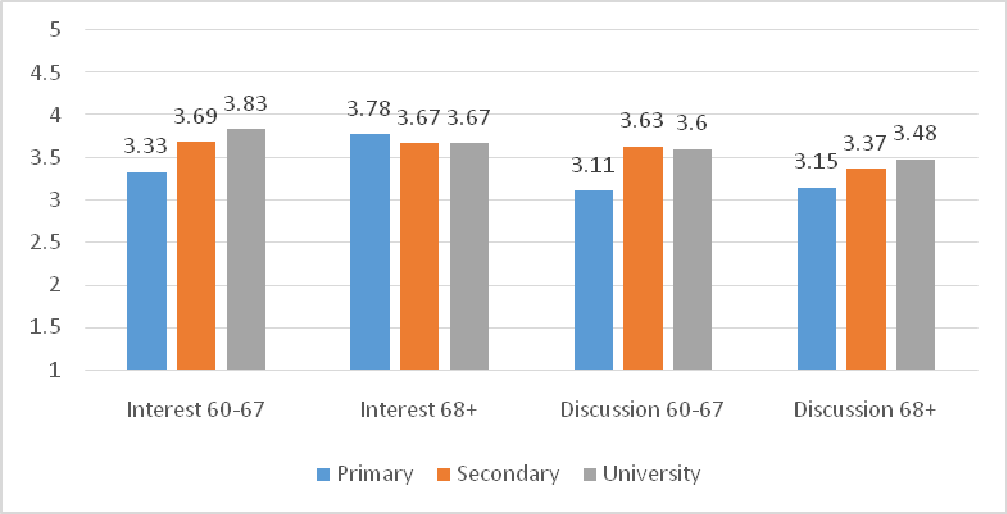

Figure 3. *Motivation to seek knowledge about healthy lifestyle – Difference by education and age*

Participants with primary education in the younger group were least interested in information about healthy lifestyle while those with university education were most interested. However, the difference was not significant, F(2,86=2,48; p=0,089). In the older group, the mean figures were almost identical for each educational group and no significant difference was detected F (2,88=0,14; p=0,872). Results about discussions revealed that, in both the younger F(2,85=2,26; p=0,11) and the older group F(2,88=0,7; p=0,498), participants with primary education talked less often with others about this topic than those with secondary and university education, but the difference was not significant (see Figure 3).

3.2. Information seeking

Information seeking was investigated by examining both purposive seeking and opportunistic discovery of information, in the channels Media, Health specialists and Internet. Results about difference by age groups for each information seeking style will be introduced first. This will be followed by results about the effects of sex and education on purposive seeking and after that on opportunistic discovery.

As Figure 4 shows, both age groups sought information on purpose and discovered it opportunistically most often in Media and least often on the Internet. A comparison, revealed that information were discovered opportunistically more often than it was sought on purpose, in all information channels. The only exception was information seeking on the Internet by the older age group.

In addition, those aged 68 years and older sought information somewhat less often than those who are aged 60 to 67 years, in all channels. Nevertheless, the difference across the age groups for purposive seeking was very small and not significant (Media F(1,170=0,65; p=0,42), Health specialists F(1,178=0,89; p=0,347), Internet F(1,179=1,74; p=0,189). Likewise, results about opportunistic information discovery in the Media revealed that the difference across the age groups was small and not significant F(1,169=1,55; p=0,215). However, the younger age group

discovered information significantly more often than the older group from Health specialists F (1,169=6,27; p=0,013) and on the Internet F(1,162=6,94; p=0,009).

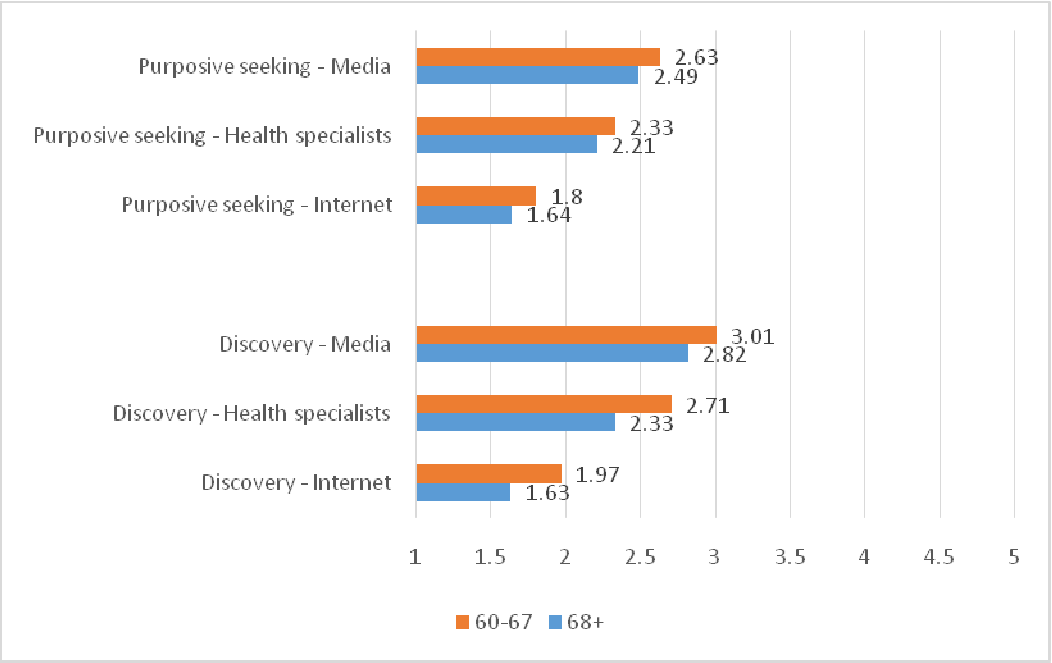

Figure 4. *Information seeking – Difference by age*

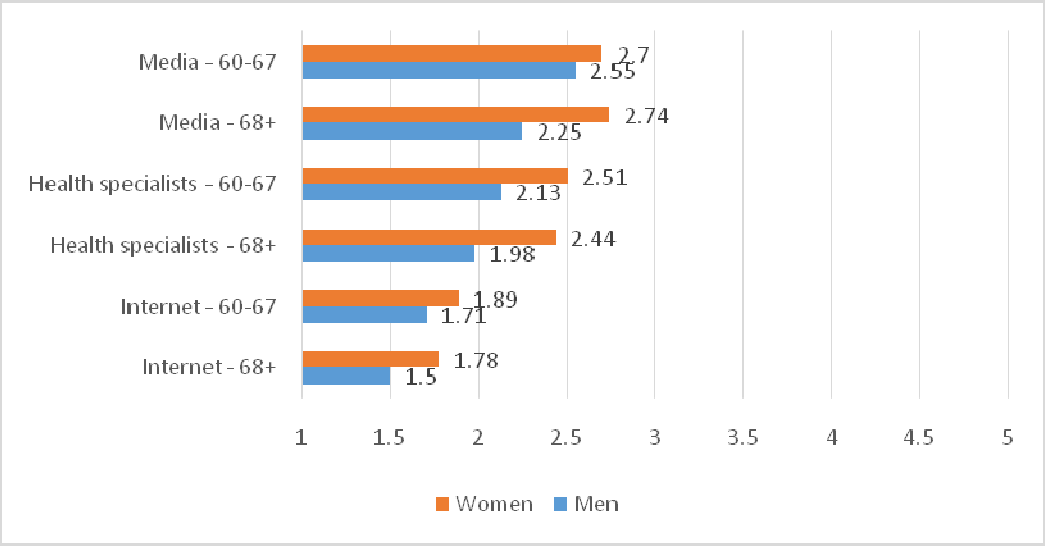

Figure 5. *Purposive information seeking – Difference by sex and age*

Figure 5 shows that women in both age groups sought information on purpose more frequently than men. In the younger group women sought information significantly more often than men from Health specialists F(1,89=4,465; p=0,037). The difference by sex was not significant for Media F(1,85=0,444; p=0,507) and the Internet F(1,90=1,037; p=0,311). In the older age group, women sought information significantly more often then men in Media F(1,85=4,459; p=0,038) and from Health specialists F(1,89=2,797; p=0,015), while the difference for the Internet F (1,89=2,797; p=0,098) was not significant.

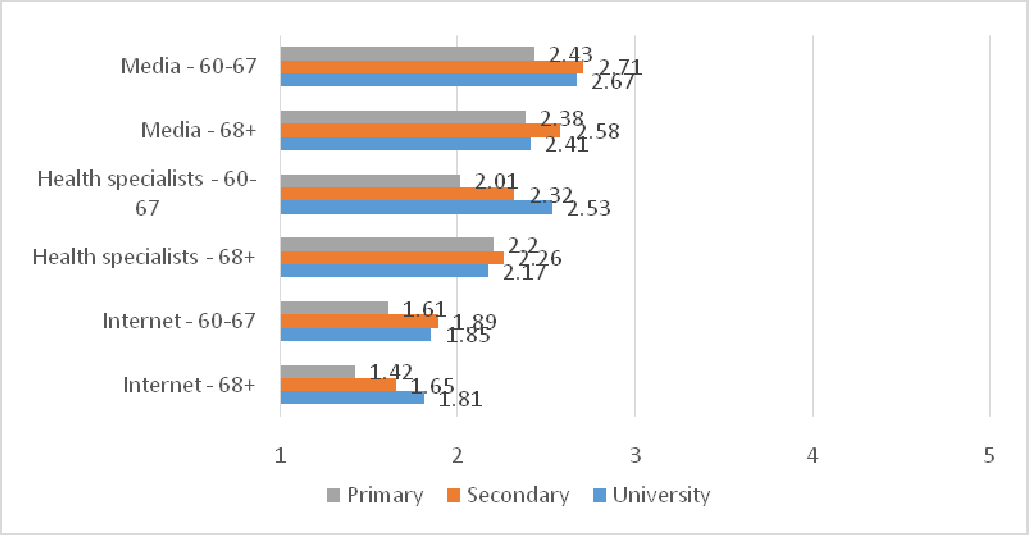

Figure 6. *Purposive information seeking – Difference by education and age*

An examination of how education and age interacted on purposive seeking revealed slight differences by educational groups (Figure 6). Those who have primary education tend to seek information less often than those who have secondary and university education, particularly on the Internet. However, no significant difference was found in the younger group, Media F(2,77=0,366; p=0,695), Health specialists F(2,82=1,985; p=0,144), Internet F(2,82=0,613; p=0,544), nor in the older group, Media F(2,83=0,290; p=0,749, Health specialists F(2,87=0,070; p=0,933), Internet F (2,87=1,299; p=0,278).

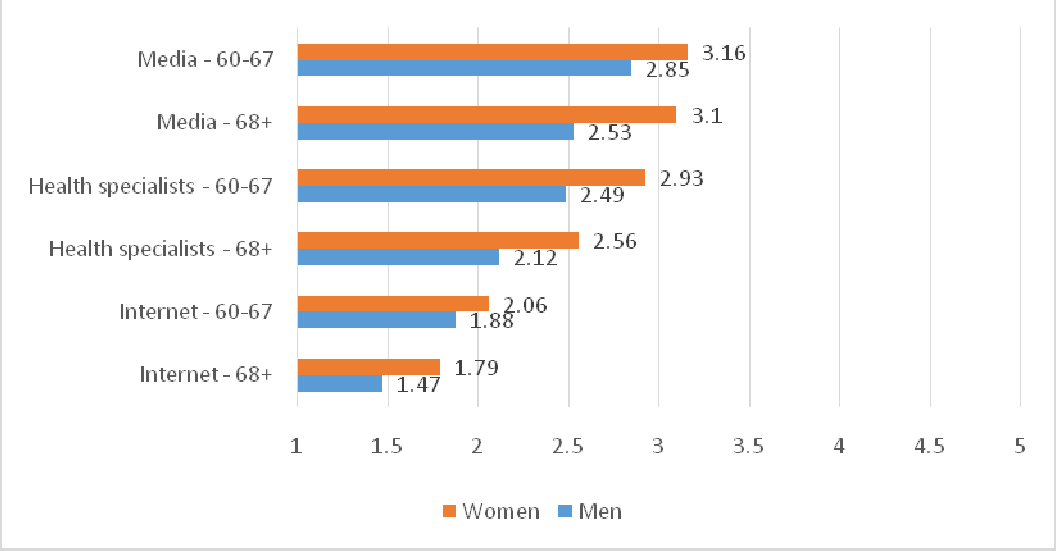

Figure 7. *Opportunistic discovery of information – Difference by sex and age*

Figure 7 shows that women discovered information opportunistically more frequently than men. Women in the younger group discovered information significantly more often from Health specialists F(1,84=4,494; p=0,037) but difference by sex was not significant for Media F (1,88=1,894; p=0,172) and the Internet F(1,86=0,766; p=0,384). In the older group, women discovered information significantly more often than men in Media F(1,81=7,747; p=0,007) and from Health specialists F(1,78=3,839; p=0,017), while the difference for the Internet was not significant F(1,83=3,823; p=0,054).

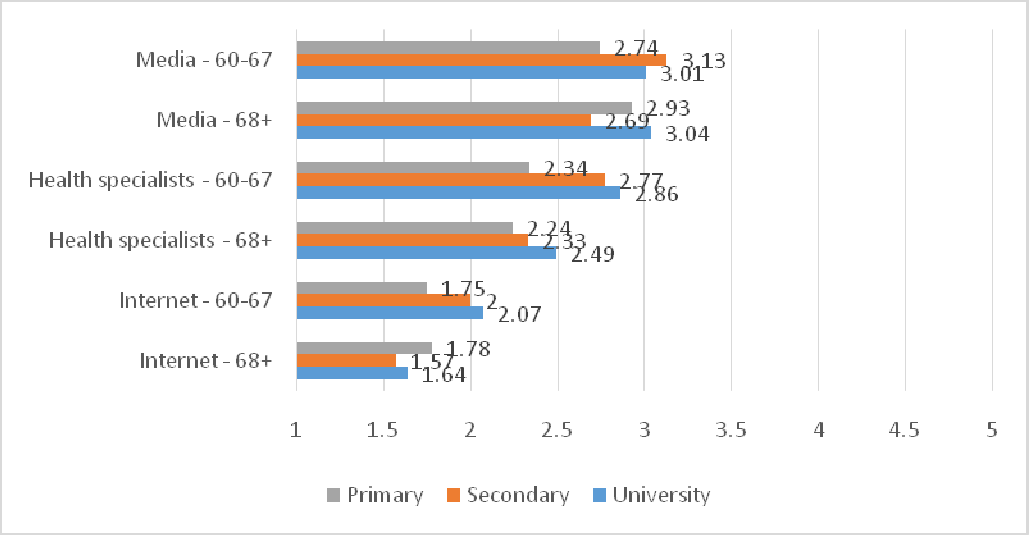

Figure 8. *Opportunistic discovery of information – Difference by education and age*

Although participants with primary education tend to discover information less often that those who are more educated, no significant results were revealed for the younger group, Media F (2,82=0,695; p=0,502), Health specialists F(2,79=1,692; p=0,191), Internet F(2,80=0,582; p=0,561), nor for the older group, Media F(2,79=0,965; p=0,385), Health specialists F (2,77=0,441; p=0,645), Internet F(2,81=0,511; p=0,602) (Figure 8).

3.3. Evaluation of the quality of information

Evaluation of the quality of information was examined by asking about the usefulness and the reliability of the information. Results will be presented in the same sequence as for information seeking.

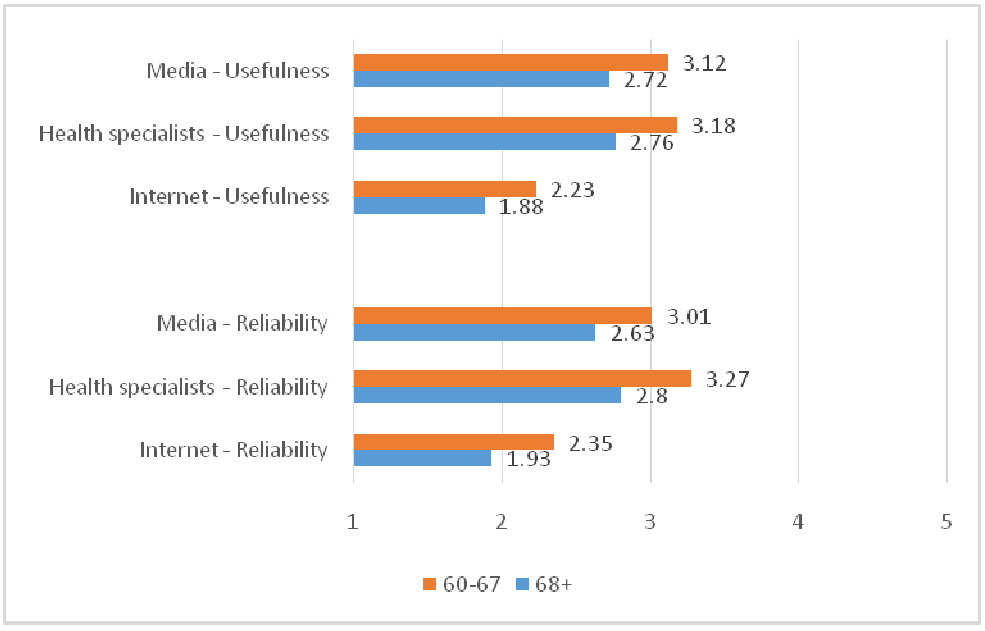

Figure 9. *Usefulness and reliability of information – Difference by age*

As can be seen in Figure 9, both age groups considered information on the Internet to be less useful and less reliable than information in Media and from Health specialist. The younger age group considered the usefulness of information in Media F(1,176=6,29; p=0,013), from Health specialists F(1,172=6,18; p=0,014), and on the Internet F(1,167=4,37; p=0,038), to be significantly

higher than the older group. Likewise, the younger group considered the reliability of information in Media F(1,168=5,47; p=0,021), from Health specialists F(1,168=7,49; p=0,007), and on the Internet F(1,168=8,87; p=0,003), to be significantly higher than the older age group.

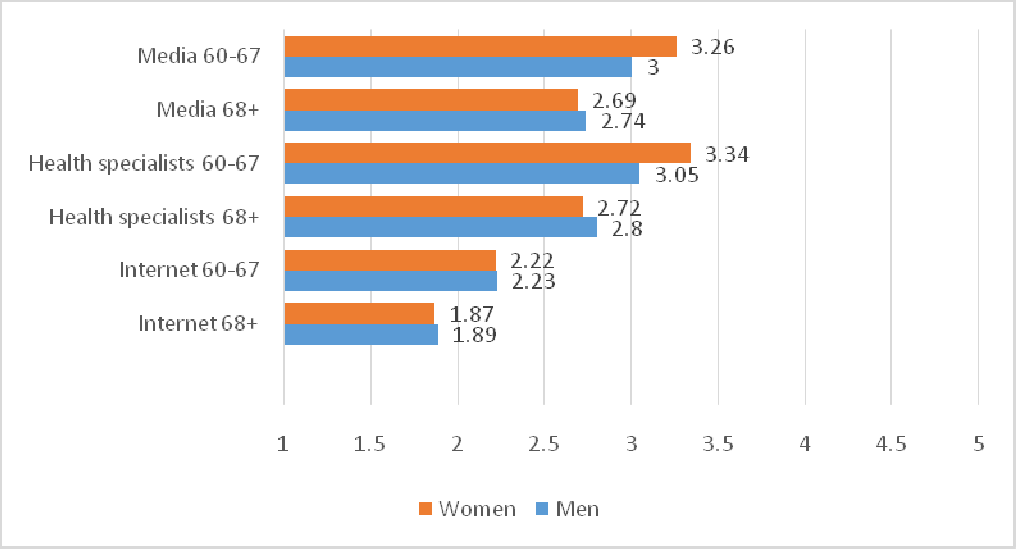

Figure 10. *Usefulness of information – Difference by sex and age*

Figure 10 shows that apart from women in the younger age group, who considered information in Media and from Health specialists to be somewhat more useful than men, the evaluation of the channels was identical for men and women. In both the younger and older group respectively, there was no significant difference for evaluation of information in Media, F(1,87=1,32; p=0,254); F(1,87=0,04; p=0,84), from Health specialists F(1,84=1,49; p=0,225); F(1,86=0,11; p=0,736), and on the Internet F(1,79=0; p=0,969); F(1,86=0,01; p=0,908).

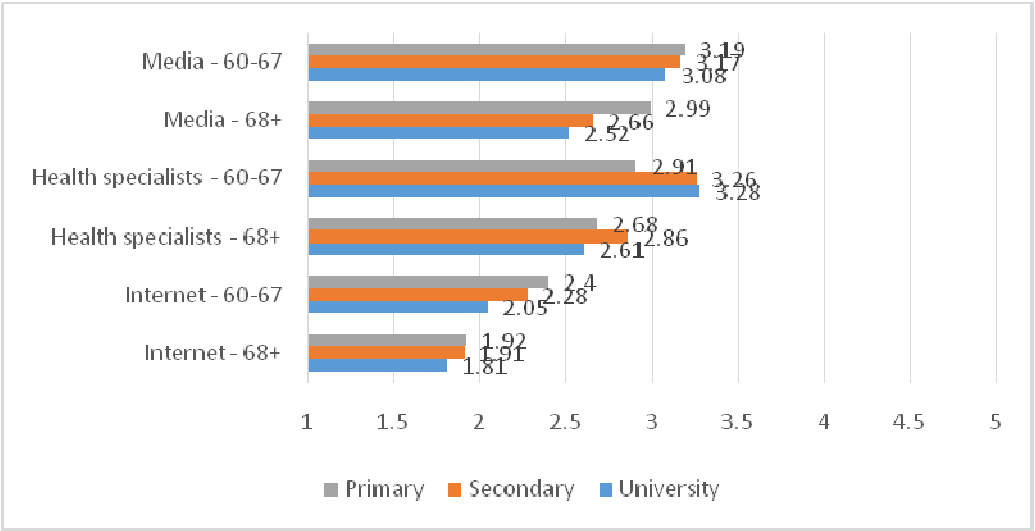

Figure 11. *Usefulness of information – Difference by education and age*

Figure 11, shows that all educational groups, in both age groups, consider information on the Internet to be least useful. Furthermore, those who have university education, in both age groups, consider information in all channels to be somewhat less useful than those who have primary and secondary education. However, in both the younger and older group respectively, the difference was not significant for Media, F(2,80=0,09; p=0,916); F(2,85=1,16; p=0,319), Health specialists, F (2,77=0,67; p=0,515); F(2,84=0,4; p=0,674), and the Internet, F(2,72=0,53; p=0,593); F (2,84=0,08; p=0,926).

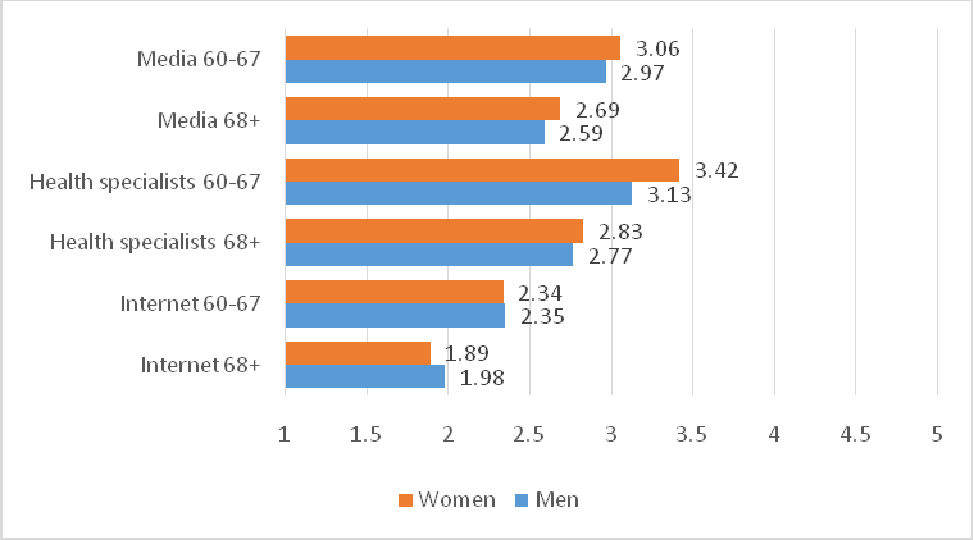

Figure 12. *Reliability of information – Difference by sex and age*

As can be seen in Figure 12, the evaluation of the reliability of information is in most cases almost identical for men and women. Furthermore, in both age groups, men and women considered information on the Internet to be least reliable, and information from Health specialists to be somewhat more reliable than information in Media. In both the younger and the older group respectively, there was no significant difference by sex for evaluation of the reliability of information in Media, F(1,80=0,15; p=0,695); F(1,86=0,2; p=0,654), from Health specialists, F (1,81=1,41; p=0,239); F(1,85=0,06; p=0,814), and on the Internet, F(1,80=0; p=0,955); F (1,86=0,3; p=0,584).

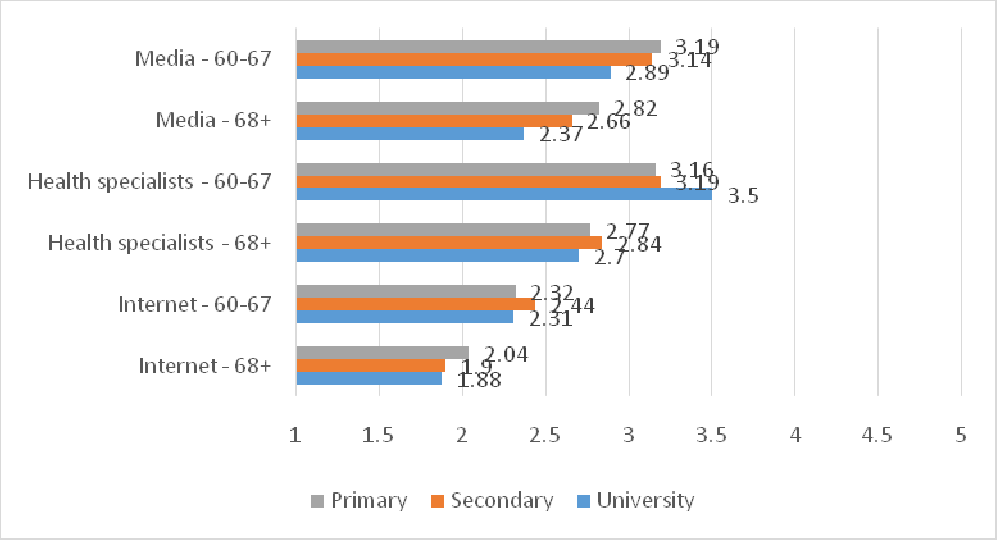

Figure 13. *Reliability of information – Difference by education and age*

Figure 13 shows that those who had university education, in both the younger, F(2,80=0,09; p=0,916), and the older group, F(2,85=1,16; p=0,319), evaluated information in Media as somewhat less reliable than those who had secondary and university education, although the difference was not significant. In the younger group, F(2,77=0,67; p=0,515), participants with university education considered information from Health specialists to be somewhat more reliable than participants with primary and secondary education, while in the older group the evaluation was almost identical by educational groups, F(2,84=0,4; p=0,674). For neither age group the difference was significant. For the Internet, the evaluation was almost identical and no significant difference found across educational groups, in both the younger F(2,72=0,53; p=0,593) and the

older group F(2,84=0,08; p=0,926).

What all educational groups had in common, in both the younger and the older age group, was that information on the Internet were considered less reliable than information from Health specialists and in Media. Furthermore, participants with university education in both age groups found information from Health specialists to be somewhat more reliable than information in Media.

4. Discussion

Senior citizens form the fastest growing group both in western societies and many other parts of the world (United Nations, 2013). It is vital to optimise their opportunities to remain in control of their lives, as independent and active participants of the community. Otherwise, they may be faced with social exclusion (Walsh, Scharf and Keating, 2016, p. 1-3) and as a consequence a diminished quality of life. Enhancing their prospects of enjoying good health for as long as possible not only supports their chances of maintaining autonomy and wellness but can also help reduce prejudice against seniors.

The current study examined various aspects of MHIL among Icelanders aged 60 years or older. Instead of classifying all seniors in one age category, as quantitative studies often do, the study aimed at investigating similarities and differences among them. This was done by comparing results about two age groups, people 60 to 67 years old and those who are 68 years or older. In addition, the study explored the effects of sex and education for each group.

Motivation to acquire knowledge about healthy living is one of the key elements of MHIL (UNESCO, 2014; World Health Organization, 1998). In particular, interest in healthy behaviour has been recognized as an important factor (Eriksson-Backa, Ek, Niemelä and Huotari, 2012, p. 88). Although the age groups were found to be similarly motivated, results about sex and education revealed some differences. In the younger group, men and people with primary education were somewhat less interested. In both age groups, men were inclined to discuss the topic less frequently than women and those with primary education less often than people with more education. None of these differences were statistically significant but the findings nevertheless stress the importance of giving special attention to men and people with the lowest level of education.

The findings about information seeking revealed both similarities and differences across the age groups. Contradictory to what studies have sometimes reported, that seniors differ in source preference by age (Suri, Chang and Foo, 2014, p. 130), both groups sought information most often in the Media and least often on the Internet. In addition, both age groups favoured the same way of information seeking, as they discovered information opportunistically more often than they sought it on purpose. Results about the frequency of information seeking, on the other hand, showed some dissimilarities across the age groups. The main difference was that the younger group discovered information from Health specialists and on the Internet significantly more frequently than the older group. Results about purposive seeking, however, revealed that the younger group sought information only slightly more often in all information channels than the older group. Although this is similar to findings from other studies (Suri, Chang and Foo, 2014, p. 130), it needs to be kept in mind that the difference for purposive seeking across the age groups was very small and not significant.

Previous studies have reported women to be more likely to seek information about health than men (Pálsdóttir, 2008; Suri, Chang and Foo, 2014, p. 130). The results are in line with this, as women sought information more frequently than men. Nevertheless, significant difference was not detected for all channels. It has also been noted that the more educated people are, the more likely they are to engage in purposive health information seeking (O'Keefe, Boyd and Brown, 1998, p. 33; Pálsdóttir, 2008). Although the results here show that participants with primary education tend

to seek information somewhat less often that those who are more educated, no significant difference was revealed across the age groups.

Evaluation of the quality of information is an important aspect of MHIL. In the past years the discussion has centred on the Internet, with health specialists raising concerns (Bedell et al., 2004, p. 692; Cline and Haynes, 2001, p. 682). Prior studies show that people consider information on the Internet to be less important than information by health specialists (Marshall and Williams, 2006, p. 150; Pálsdóttir, 2011). However, findings also indicate that the perceived importance of online health information is growing, particularly in countries that have high Internet usage (Kummervold et al., 2008; Pálsdóttir, 2011).

Relatively little is though known about how senior citizens evaluate health information in different information sources or channels. The results of the study show that the older age group was significantly more critical of information in all channels than those who are younger. What the age groups, however, had in common was that they found information on the Internet to be less useful and reliable, than information in Media and from Health specialist. An examination of the effects of sex and education further supported this finding, as men and women in both age groups, as well as all educational groups in both age groups, considered information on the Internet to be least useful and least reliable.

The overall study is limited by a rather low response rate of 58.4%. This is considered satisfactory in a survey but nevertheless raises the question, whether or not those who answered are giving a biased picture of those who did not respond. Nevertheless, the study results may provide valuable information about the MHIL of the senior citizens.

5. Conclusion

It is of major significance to support and enhance senior citizens possibilities to remain healthy and active members of society, for as long as possible. A necessary prerequisite for this is that they maintain their understanding of healthy living. Competency in MHIL is important as a tool for lifelong learning, as it provides people with better opportunities to make informed health decisions. The MHIL calls for a dynamic and multi-level information behaviours. As seniors move through their life course they are constantly required to adjust to and learn about recent advances in their information environment. Otherwise they are faced with constrained opportunities at developing their knowledge and the risk of old-age exclusion.

Studies have sometimes described older people as being less competent and active at gathering new knowledge than those who are younger. Furthermore, aspects of MHIL are often examined by using a relatively small set of information sources, in the past years mainly digital sources, where senior citizens are assessed against the younger age groups. By comparing two groups of seniors who are relatively close in age, and by investigating their information seeking behaviour and judgement of information quality within a broad network of information sources in different channels, the current study sought to provide a more holistic picture of their MHIL skills.

Taken together, the results suggest that senior citizens at the age 68 years and older have more in common with those who belong to the age group 60 to 67 years, than what separates them. Both age groups were equally motivated towards health information seeking. Likewise, both groups had the same preferences for ways of information seeking and information channels, as well as holding the same beliefs about the quality of information in the different channels. The main differences was that the younger group sought information somewhat more frequently than the older, however, the dissimilarities were small and only significant for opportunistic discovery of information. In addition, the older group was more critical in the evaluation of information in all channels than the younger group.

By concentrating on the senior citizens strengths at MHIL, rather than their perceived weaknesses,

health authorities, libraries and information professionals together may be better equipped at enhancing their possibilities to enjoy good health, independence and quality of life.

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Evaluation of Research Activities of Universities of Ukraine and Belarus: a Set of Bibliometric Indicators and Its Implementation

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Monitoring bibliometric indicators of university rankings is considered as a subject of a university library activity. In order to fulfil comparative assessment of research activities of the universities of Ukraine and Belarus the authors introduced a set of bibliometric indicators. A comparative assessment of the research activities of corresponding universities was fulfilled; the data on the leading universities are presented. The sensitivity of the one of the indicators to rapid changes of the research activity of universities and the fact that the other one is normalized across the fields of science condition advantage of the proposed set over the one that was used in practice of the corresponding national rankings.

Keywords: *research organization; research activity assessment; bibliometric evaluation; citedness; citations; number of publications; university rankings*

1. Bibliometric indicators of university rankings

The use of bibliometric data for developing rankings of activities of not only "purely" academic organizations but also of the universities and other institutions of higher education is reviewed in a special section of the *Scientometrics Manual* (Akoev et al., 2014). As it is noted therein, "in international university rankings such as Academic Ranking of World Universities […],[…] THE WUR and QS World University Ranking, the indicators related to publication activity contain from 20% to 60% of the final measured score that proves the importance of scientific publications for the evaluation of the university - both its educational and academic, as well as international component" (Akoev et al., 2014). Moreover, the Leiden Ranking is being constituted of the indicators that are exclusively various data on the citedness of publications created at a university and various bibliometric data on such publications themselves. It is also stated that a whole range of possible bibliometric indicators, "starting with mere number of publications and finishing with a number of normalized indicators of citedness" are used "for the correct account of the impacts of specific universities" of natural-scientific and technical profile (Akoev et al., 2014). It is but natural because "there are appealing issues in bibliometrics, among them […] the multicriterion evaluation of actors, especially universities" (Zitt, 2005).

2. Bibliometric monitoring of university research activity as an objective of a university library

Monitoring bibliometric indicators of university rankings and even inventing such indicators might be recognized as an objective of a university library because very similar indicators are used in more traditional professional operations of libraries of this kind. Such a viewpoint seems to be even more justified if there is not any special unit for assessment of university research activity. Therefore, the practice of bibliometric assessment of university research activity by university libraries is quite typical for a number of the Eastern European countries.

In the opinion of the authors of the present paper (who all were affiliated with university libraries themselves when the paper was in preparation) such an activity is fairly inherent for university libraries and other academic libraries not only because of their familiarity with bibliometrics. Since a library is a significant structural division of a university, it must play an increasingly important role in the activities of a modern university by performing some functions that were previously uncharacteristic for libraries at all. We believe that only if university libraries *variously* facilitate universities in addressing the main challenges that universities face, they really demonstrate their relevance in a modern society. One of such challenges is improving a university's position in the world rankings, and the Scientific Library of the Belarusian National Technical University has a certain experience in facilitating such an improving (Skalaban, 2013), while the Academic Library of the National University of "Kyiv-Mohyla Academy" does its best to stimulate scientific publication activity of the university staff (Nazarovets, 2016). So, as for creating or amending bibliometric sets of indicators that reflect effectiveness of research activity of a university, this seems to be an even more obvious objective for a competent university or academic librarian. Also, our university libraries – both Ukrainian and Belarusian gained an experience to fulfill bibliometric studies of the efficiency of research activities of our universities (Borisova, 2016; Skalaban, Yurik & Lazarev, 2017).

3. Bibliometric Rankings of Universities of Ukraine and Belarus

Bearing the above-stated in mind, one might agree that it is quite natural to compare the scientific performance of universities of the countries of the former Soviet Union by bibliometric indicators. An example of such practice is the Ukrainian "Ranking of Universities according to the Scopus Indicators" [1]. Another example is the "Ranking of Educational Institutions of the Republic of Belarus and of Scientific-and-Research Institutions of the Educational Institutions by H-Index, SCOPUS Database" that was being prepared in 2012- 2016 at the Central Scientific Library of the National Academy of Sciences of Belarus (CSL) and was updated on the library website [2]. Creating their own bibliometric rankings was caused both by the interest to bibliometrics as an evaluation tool and by insufficient presence of Belarusian and Ukrainian universities in the world most popular rankings. Thus, e.g., in September 2016 only two Belarusian universities, viz. Belarusian State University and Belarusian National Technical University were presented in the QS Ranking [3]. A representatives of a lot of countries, indeed, might feel that their universities are insufficiently presented in the main world ranking systems because "although most systems claim to produce rankings of *world* universities, the analysis of *geographical coverage* reveals substantial differences between the systems as regards the distribution of covered institutions among geographical regions. It follows that the systems define the 'world' in different manners, and that - compared to the joint distribution of the five systems combined - each system has a proper orientation or bias, namely *U-Multirank* towards Europe, *ARWU* towards North America, *Leiden ranking* towards emerging Asian countries, and *QS* and *THE* towards Anglo-Saxon countries" (Moed, 2017).

As it was stated above, the corresponding Belarusian bibliometric ranking has been designed and

was being maintained by staff members of an academic library, viz. of the CSL. In the ranking having been compiled by the CSL since 2012 to 2016 the indicators were: the number of publications of the organization, as reflected in Scopus database; the number of citations recorded in the Scopus database to the publications of the organization; the H-index. The H-index rating was clearly considered as the main one (that was reflected not only in the very title of the ranking, but also in the paper devoted to the ranking (Berezkina, Sikorskaya & Khrenova, 2013). However, by its very nature, the H-index "cannot diminish over time, […] and a scientist might have many years to stay retired and not to write scientific works, while his H-index would not be less than it was at the height of his career" (Akoev et al., 2014). Similarly, a university might occupy a high place in a ranking due to its past scientific advances. "Therefore, in order to obtain a more meaningful measure one should use a publication window as in case with any bibliometric magnitude […]. For example, all the articles published […] over a five-year period may be considered, and citations obtained by these articles may be taken into account" (Akoev et al., 2014). The problems of efficacy of university research that is "driven by assessment and performance targets" (as a consequence of the general problems of "top-down planning and reduced local autonomy for departments") that universities faced in recent decades require rapid assessments of the current state of research activities, but not the cumulative assessment of all achievements that ever occurred (Martin, 2016).

Another restriction of the H-index is the absence of normalization at the disciplinary field level. As it is stated in Scientometrics Manual, "comparison of the absolute values of the index among scientists working in different fields of science is impossible as it is not a field normalized indicator" (Akoev et al., 2014). As Ton van Raan stated, "because the H-index does not take into account the often large differences in citation density between, and even within, fields of science, this indicator is in many situations not appropriate for the assessment of research performance" (Raan, 2013). Therefore it is not by all means reasonable to apply the H-index to researches being fulfilled in various fields and, since that, - at various institutions. But a user of the Ukrainian and Belarusian Rankings would unconditionally compare, say, a food university with a medical university regardless the difference in publication and citation practice in the corresponding disciplinary fields.

Moskaleva (2013) states that bibliometric indicators "applicability depends on the size of the compared samples. If we compare bibliometric indicators of the two organizations working in the same field about the same time period and also comparable in accordance with the number of scientists working at them, then any of these indicators can show the superiority of one of the organizations or their equality. However, if one of the organizations exists for 20 years and the other - for 5, or if they carry out research in different scientific fields, or differ in the number of scientists, none of the indicators directly may not be used, the normalization of differences both in the science fields and in the number of authors [...] is required" (Moskaleva, 2013). After all, in order to make decisions in an organization management one commonly uses fresh data for equal periods of an organization activity, and the very concept of "efficiency" involves consideration of costs, including the salaries of the staff that are obviously different as the staffs of different organization are different in quantity. It is therefore considered that "the size of the organization almost everywhere is taken into account by normalization of differences among the number of faculty staff or academic staff" (Akoev et al., 2014). Thus, bibliometric evaluation of the scientific performance of the organization should be normalized across the fields of science, to relate to the recent period of time and to be normalized at the number of staff level. It is absolutely obvious, and we pay so much attention to these aspects only due to the fact that the above-mentioned conditions were not met in designing the Ukrainian and Belarusian Rankings that both consist of the same indicators: the number of publications of the organization, as reflected in Scopus database; the number of references recorded in the Scopus database to publications of the organization; the H-index. The rankings compilers used the latter as the indicator in accordance to

the descending magnitude of which the universities are placed in a ranking list.

4. Searched and found indicators to be used for bibliometric university rankings of Ukraine and Belarus instead of the discarded ones

So, which bibliometric indicators should be chosen for the assessment of research efficiency of universities (or any research organizations) as the appropriate ones? "World practice is to use typically two indicators for evaluation a scientist, viz. the total number of citations to his publications and the average number of citations to his publication", - writes I.V. Marshakova-Shaikevich (2013). As for her own practice, I.V. Marshakova-Shaikevich reports the results of "the research activity of universities of Russia in 2006-2010" on the basis of a number of indicators, three out of them being considered as the most important, viz. the total number of their publications, 2006-2010, as reflected by the InCites™ in the Web of Science™ database; the total number of citations registered in the Web of Science™ to the publications of 2006-2010 and the average number of citations to a document (out of sample of publications of 2006-2010) according to the Web of Science™. These three indicators, in our opinion, should be considered mandatory for the evaluation of efficiency of research activity of an organization because the total number of citations to the publications created at an organization indicates the documented total use of the documentary flow, created at an organization over a period of time, and, indirectly, indicates the value of the cited documentary flow (as *value* is a property of an object that is being cognized through the satisfaction of the desires of human beings that is conditional, in general, on the use of an object); the average number of citations to a publication indicates the use and value of an average publication from the documentary flow and the number of publications themselves indicates *ipso facto* the productivity of the researchers of the institution (Lazarev, 2017). It should be reminded that, if the correlation of the concepts of the value of scientific documents and of scientific performance of an institution, at which they were created, seems to be unquestionable, the relevance of the concepts of productivity of researchers of an organization to efficiency of research activity of the latter is much more contentious. However, when such databases as Web of Science™ and Scopus (practicing very rigid selection of periodicals, articles from which are reflected by them), are used for productivity evaluation, the productivity is considered to be highly selective as relates to articles published in the "highest quality" sources. Thus the productivity data occurred to be selective and just relative; but essentially this is not a disadvantage but rather an advantage, because with this approach, to some extent, the quality of the publications themselves is taken into account: the presence of publication in these databases testified that it has exceeded a certain threshold of the quality of periodicals in which they were published.

As for citations, it is interesting to know both the total number of citations to the publications of an organization and the amount of citations to its average publication. But when evaluating *different* organizations, if it is not possible to carry out data normalization at the differences in the number of their employees, the amount of citations to an *average* publication acquires a key importance as "balancing" the inequality of quantity of received citations that is caused by differences in publication practice determined by a varieties of quantities of contributors working at different organizations. (However, normalization at the differences among the fields of science will not be achieved in this case).

Therefore, out of the three above-stated useful indicators, only the third one occurs to be of *key* significance, viz. the average number of citations to one article, while the first and second ones being rather the "raw material" for its formation. In the paper by Marshakova-Shaikevich (2013) these three indicators were obtained from the Web of Science™; they also can be obtained from the Scopus database.

We believe it is appropriate also to use data on the number of publications of a university authors

relating to the 10% most cited ones out of total amount of publications of the same year and of the same research field *as one more indicator of key significance*: we consider them as reflecting the presence of outstandingly excellent researches at a university. In the paper by Bornmann et al. (2015) the presence of the top-cited papers is considered to be a significant separate indicator of "scientific excellence".

The number of publications of a university that belong to the 10% most cited ones, might be obtained by using the SciVal integrated modular platform that analyzes the activities of research organizations based on data from the Scopus. These data are normalized at the level of the fields of science; that is, using these data, along with previous ones, we meet another above-mentioned requirement to a correct bibliometric evaluation of efficiency of research activities of an organization.

For our study the data taken from Scopus (according the state of affairs by September 30, 2016) were used. Taken into account were the indicators of those universities of Belarus and Ukraine that had at least 20 documents included in Scopus during 2011-2015. Thus, we tried to assess the research activities at universities for a specific period, close to the current one, but not their activities since their foundation. The data on the first 10 Belarusian and Ukrainian universities are discussed below.

5. Results and discussion

Table 1 (*see page 80*) represents data on the "top ten" Ukrainian universities in line with the values of the chosen indicators; they are placed in order of descending values of the "number of publications belonging to the 10% most cited publications of same subjects".

As compared with the data of the "official" Ukrainian Ranking [4], the ranks of the majority of the "top ten" Ukrainian universities remained the same. However, there are some significant differences. Due to the use of the described indicators the Sumy State University and Tavrida National V.I. Vernadsky University entered the "top ten" of the universities of Ukraine. This may indicate the intensification of research activities of scientists of these universities in 2011-2015, which was not recorded in the evaluation attempts of the Ukrainian Ranking that were undertaken without regard to the chronological framework and to the presence of outstandingly valuable research results obtained by scientists of these universities.

Despite the small number of publications of scientists of the Odessa I.I. Mechnikov National University, in average, each publication created by its authors was cited three times, and this is the best result among the Ukrainian "top ten" universities. In its turn, a large number of publications of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" were cited less often, that can be interpreted as an evidence of need for better representation of the results of researches of the National Technical University scientists. A similar remark seems to be true in respect of the publication activity of scientists of Lviv Polytechnic National University "Lviv Polytechnic".

University	The number of publications in the 10% most cited publications of same subjects (according to SciVal), value/ rank	The average citedness of an article, value/rank	Number of citations, 2011-2015	Number of publications (articles, reviews), 2011 - 2015
Taras Shevchenko National University of Kyiv	297/1	2,56/3	9003	3518
V. N. Karazin Kharkiv National University	99/2	2,29/4	3855	1685
Ivan Franko National University of Lviv	85/3	2,24/6	3040	1353
Odessa I.I. Mechnikov National University	54/4	3,18/1	1727	543
Lviv Polytechnic National University "Lviv Polytechnic"	44/5	1,46/10	1109	757
Sumy State University	40/6	2,28/5	1420	622
National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"	35/7	1,65/9	1667	1011
National Technical University "Kharkiv Polytechnic Institute"	35/7	1,8/8	909	504
Yuriy Fedkovych Chernivtsi National University	32/9	2,64/2	1397	530
Tavrida National V.I. Vernadsky University	19/10	1,93/7	808	419

Table 1. *Ten Ukrainian universities according to the magnitudes of indicators adopted in the study and calculated with the aid of the Scopus data*

Table 2 represents corresponding data on the "top ten" Belarusian universities; they are also placed in order of descending values of the "number of publications belonging to the 10% most cited publications of same subjects". (It should be noted that in fact the Table 2 features the 11 universities, as the "top ten universities" determined in accordance with the "number of publications belonging to the 10% most cited publications of same subjects" and in accordance with the "average citation of one article" do not coincide with each other; the variance is one university.)

In general, positions taken by the most of the universities also did not differ much with the ones stated in the "official" Belarusian Ranking [5] - even taking into account the fact that in the cited Ranking the three-fold reflection of the Belarusian State University took place: as a separate university and as its two affiliated research institutions. However, there are significant differences also in respect of the two universities: the Gomel State Medical University and the Grodno State Medical University have been ranked in our "top ten", but not in the Ranking. Moreover, the

Gomel State Medical University, that occupied only the 16th place in the rank list developed in accordance with the Hirsch index (the 14th one if we consider the three-fold reflection in the ranking of the Belarusian State University), ranked in our list the *first* place by the average citedness per one article of 2011-2015! The magnitudes of the indicators of Table 2 that are attributed to these two universities are indicative of the intensification of research activities of scientists working at them in a recent time period and demonstrate the inadequacy of the H-index to assess the current state of scientific activities of an organization.

University	**The number of publications in the 10% most cited publications of same subjects (according to SciVal), value/rank**	**The average citedness of an article, value/rank**	**Number of citations, 2011-2015**	**Number of publications (articles, reviews), 2011-2015**
Belarusian State University	128/1	2,42/6	3475	1435
Belarusian National Technical University	26/2	2,69/3	652	242
Belarusian State University of Informatics and Radioelectronics	11/3	1,81/9	429	236
Gomel State Medical University	7/4	4,47/1	206	46
Grodno State Medical University	7/4	1,91/8	213	111
Belarusian State Technological University	7/4	1,15	204	176
Belarusian State Medical University	6/7	2,57/4	193	75
F. Skorina Gomel State University	6/7	1,70/10	318	186
Brest State University named after A.S.Pushkin	4/9	3,89/2	113	29
Sukhoi State Technical University of Gomel	3/10	2,08/7	104	50
Yanka Kupala State University of Grodno	1	2,45/5	228	93

Table 2. *Eleven Belarusian universities according to the magnitudes of indicators adopted in the study and calculated with the aid of the Scopus data*

Let us notice that the Belarusian State University that was the recognized leader according to the Belarusian Ranking data took only the 6th place according to the magnitude of the average citedness per one article, although the workers of this university published in 2011-2015 the largest amount of articles and reviews (as reflected in the Scopus database). The first and second rank according to the magnitude of the average citedness per one article were respectively received by the Gomel State Medical University and the Brest State University named after A. S. Pushkin, that had published, respectively, 5 and 8 times smaller amount of articles and reviews (as reflected in the Scopus database) than the Belarusian National Technical University that had received the

3rd rank according to the magnitude of the average citedness per one article. These data demonstrate that a large number of publications even in prestigious periodicals do not in the least guarantee a good level of their citedness.

It should be noted that the main obstacle to the carrying out any scientometric analysis of activity of the academic establishments of Belarus and Ukraine is the poor quality of the data presented in the affiliation profiles - both in the databases of the Web of Science™ platform and of the Scopus. For example, the analytical tool SciVal that uses the Scopus data recognizes institutions only of the primary affiliations as fixed in Scopus. If, however, some publications indicated a version of the affiliation title, that differs from its one fixed in the profile, such publications would form a "pseudo-profile" of the Scopus data and, accordingly, such records would not be reflected in the genuine profile of the institution and will not be taken into account when constructing the rankings.

In the prestigious rankings of world universities, such as the Academic Ranking of World Universities, THE WUR, QS World University Rankings, bibliometrics is used together with other indications (survey of experts, the number of teaching staff, level of funding, etc.), presenting a university administrators with enough information on the state of research activities at their institutions along with the other one. The technique that the authors propose in this paper is based solely on the selected bibliometric indicators, which is insufficient for a comprehensive analysis of universities. However, this indicator is believed to meet the requirements of the monitoring the research activities of them.

6. Conclusion

Thus, in order to ensure monitoring of the efficiency of research activities of universities of natural -scientific and technical profiles of the Eastern European countries and taking into account their incomplete representation in the leading international rankings we suggested to use of a set of bibliometric indicators, different from that was used in the "Rankings of Educational Institutions of the Republic of Belarus and of Scientific-and-Research Institutions of the Universities by H-Index, SCOPUS Database" and from that also being used in the "Rankings of Universities according to the Scopus indicators"; the average level of citations to one article published by a university authors during the last five years and the number of publications of the 10% most cited publications of same subjects being believed to be the key indicators. The suggested set of the indicators was tested by experience of ranking of universities of Ukraine and Belarus with the aid of it. It was demonstrated that the sensitivity of the one of used indicators to rapid changes of the scientific activity of universities and the fact that the second one is normalized across fields of science ensure the advantage to their application over the use of the familiar Ukrainian and Belarusian bibliometric rankings.

Notes

[1] Available at http://osvita.ua/vnz/rating/51053/.

[2] Available at http://csl.bas-net.by/Web/Pages/Periodicals/pdf/scopus-vuz.pdf.

[3] Available at http://www.bsu.by/main.aspx?guid=146761.

[4] See Note 1.

[5] See Note 2.

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Book Review

Tratat de biblioteconomie
[Library Science Treatise]

Tratat de biblioteconomie. Coord. gen.: Mircea Regneală. Bucureşti: Asociaţia Bibliotecarilor din România, 2013-2017. ISBN 978-606-93535-0-9

Vol. 1: *Biblioteconomie generală* [Fundamentals of Library Science]. Coord.: Mircea Regneală. 2013. 473 p.

Vol. 2. *Managementul colecţiilor şi serviciilor de bibliotecă* [Management of Library Collections and Services]. Coord.: Mircea Regneală. Part. 1: 2014. 621 p.; Part 2: 2016, 587 p.

Vol. 3. *Direcţii moderne în biblioteconomia contemporană* [Modern Trends in Contemporary Library Science]. Coord: Mircea Regneală, Ionel Enache. 2017. 582 p.

The works of synthesis are essential for a field of activity in a continuous change, as the library science of today. Some years ago, professor Mircea Regneală started to coordinate the elaboration of *Tratat de biblioteconomie* (Library Science Treatise), edited under the care of the Romanian Library Association. The three volumes of the *Treatise* were published between 2013 and 2017. It is for the first time in the Romanian LIS literature when such an amount of specialized information is brought together, in a single source: this is the first library science treatise published in our country, therefore it has become shortly a reference for all Romanian librarians and information science specialists. It is also worth mentioning this is not a definitive edition, meaning this work will continue to be improved.

In the *Foreword* of the first volume, Mircea Regneală emphasizes the idea that elaborating such a fundamental work was a matter of course, after more than twenty years of continuous development of Romanian library science. The *Treatise* involved an important number of authors with expertise in the field. The editor underlines that library science could not be studied without taking into consideration the emergence of writing and books that stimulated the foundation of libraries. Librarians as professionals were trained rather late, in the middle of the 19th century. Before that moment, people who worked in libraries were either men of letters or had other professions. In this perspective, the first volume is divided in three parts. Chapter 1 is a compendium about writing and the history of books and libraries worldwide and in the country. The second chapter presents general notions connected with library science and its development, personalities in the field, and international organizations. In the last chapter, the evolution of Romanian library science from the beginning to the end of World War II, during the communist era (from the point of view of library-related legislation) and the post-communist era (legislation, education, LIS literature, library associations) is covered.

Each section of the work is followed by a bibliography including important titles of books and articles used and recommended by authors. Library science terminology is explained in detail, so the *Treatise* is useful for a large category of librarians, either at the beginning of their career or in need of up-to-date information. There are a lot of examples of good practice worldwide,

illustrating fundamental changes in the field. One can better understand the modern librarian's role in empowering users to find and select information, especially in the electronic environment. There are also presented in detail some important works, published starting with the end of the 19th century, underlining the idea of development in mentalities connected to libraries and library science.

The first part of the second volume was published in 2014. The main topics here are cataloguing (the most consistent chapter), the role of modern libraries, with emphasis on their mission in the contemporary society, library automation, as the most important change in the middle of the 20th century, and the contemporary collection development process, including all types of documents, either traditional or modern. International up-to-date standards are discussed, mentioning in detail all operating procedures.

In the second part of the second volume (2016), topics as document processing, bibliographic control standards, catalogue systems in different types of libraries, preservation and restoration, circulation department, information products and services, library users, evaluation and statistics in the library are approached.

The third volume of the *Treatise*, recently published, deals with the subjects as library management, information and documentation policies, marketing, library services, means of promoting libraries, digital library, library 2.0, bibliometrics and scientometrics.

All three volumes of the *Treatise* form a very consistent information source, useful in all types of libraries. Thus, Romanian Library Association made a praiseworthy endeavour in order to provide our LIS professionals with up-to-date information helping them to gain new knowledge and to improve their activities.

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