Comparing Information Literacy Levels of Canadian and German University Students

Maria Henkel(✉), Sven Grafmüller, and Daniel Gros

Heinrich Heine University, 40225 Düsseldorf, Germany
maria.henkel@hhu.de

Abstract. The objective of this study is the assessment and comparison of information literacy among Canadian and German students from informational cities. 892 students from Berlin, Munich, Frankfurt, Montreal, Toronto and Vancouver completed our multiple-choice questionnaire. In most cases, a significant difference between Canadian and German students is confirmed. In both countries surveyed, the majority of students reach only the beginner level.

Keywords: Information literacy · Information literacy assessment
Informational city · Questionnaire · University students
International comparison

1 Introduction

Today, modern information and communication technology (ICT) in omnipresent and increasingly affects our daily lives. Due to its wide distribution, many people have constant access to the great stock of information available on the internet and elsewhere. But to be able to really take advantage of information as a resource, one needs information literacy. By investigating different definitions and models of information literacy, Stock and Stock [1] identify two threads: The first focuses on skills for information retrieval. "It starts with the recognition of an information need, proceeds via the search, retrieval and evaluation of information, and leads finally to the application of information deemed positive." The second puts emphasis on skills for knowledge representation. It includes the "creation of information", "representation and storage of information" and issues of information ethics, law and privacy. No matter what definition of information literacy you look at, it becomes obvious that information literacy is a core competence for both social and economic participation in the information age. This becomes especially clear at urban level in so-called informational world cities. These "prototypical cities of the knowledge society" [2] are characterised by their "space of flows (flows of money, power, and information) [that] tend to override space of places" [2]. Compared to traditional industries, especially the creative industries and the knowledge economy take on greater significance in informational cities, which leads to a so-called job polarisation: Routine tasks that used to be done by employees are now executed by computers with increased regularity, leading

G. Chowdhury et al. (Eds.): iConference 2018, LNCS 10766, pp. 464–475, 2018.
https://doi.org/10.1007/978-3-319-78105-1_51

to the loss of jobs in the middle class. This results not only in "a gap between rich and poor" but also between "educated and uneducated people" [3] – the digital divide. To manage the flows that define informational cities, companies and public authorities, citizens must be able use technologies appropriately to search for, produce and use needed information. Here, information literacy plays a major role and enables people to participate socially and professionally, giving them an advantage at school, at work and in their everyday lives [4]. It must be said, however, that most people today never had any information literacy education. And although the importance of information literacy is widely recognised on an academic level, there is plenty of research showing "evidence that many students are information illiterate when they enter institutions of higher education." [5] Furthermore, "despite clear evidence that sophisticated information literacy skills are beneficial to academic success, students are generally unsophisticated information seekers in academic contexts." [6].

The purpose of this study is not only to assess the status of information literacy among students, but also to attempt an international comparison. By the means of a multiple-choice questionnaire, we assess the level of information literacy among university students of informational cities in Canada and Germany, allowing a comparison between the two countries for the different competence areas of information literacy. After presenting our results, it is necessary to discuss what can be learned from this approach and whether such a comparison can be beneficial to improve information literacy education or if a comparison is even possible.

Different tools to assess the state of information literacy, especially among students, already exist. The *Information Literacy Test* (ILT), developed at James Madison University, is one of them [7]. It is based on and covers four of the five aspects presented in the ALA standards [8]. The actual use of information is excluded, as it cannot be covered in a multiple-choice test. Regarding the total score, the student is classified as "below proficient" ($< 65\%$), "proficient" ($\geq 65\%$) or "advanced" ($\geq 90\%$). Smith et al. used the ILT at high-schools in Canada and revealed that 80 out of 103 students of the 12th grade were classified as "below proficient" [9]. Another method is the *Standardized Assessment of Information Literacy Skills* (SAILS) [10]. SAILS utilises eight skill sets, based on the ALA standards. Beutelspacher [11] developed another assessment tool, a multiple-choice questionnaire available for the following target groups: "7th grade", "10th grade", "high-school graduates and students", "teachers" and "scientists". It is based on 62 indicators for information literacy, divided into seven spheres of competence:

I. to identify an information need
II. to search for and find information
III. to evaluate information
IV. to use information
V. to organise information
VI. to communicate and publish information
VII. responsible handling of information

These indicators which represent a "generic list of skills which should be mastered in order to persist in a knowledge society" [11] were collected by evaluating contemporary definitions, models and standards of information literacy. It is important to

note that Beutelspacher's questionnaire tests skills in information retrieval, similar to the ILT and SAILS, but also includes skills in knowledge representation. This second thread of information literacy has become more and more important and should not be missing in any assessment tool. It is the main reason this tool was chosen for our study.

2 Methods

To test information literacy skills, Beutelspacher's questionnaire version for high-school graduates and students was used. It consists of 41 different multiple-choice questions leading to positive and negative scores. As an example, question 10 of the test is shown below. A complete list of all questions and possible answers can be found in the appendix.

Question 10*: If a search engine retrieves too many web pages, what should you do?*

- Use advanced search.
- Only use one search engine.
- Only look at the first ten search results.
- Use the "help"-function.
- Add further search terms.
- Delete some search terms.
- I don't know.

Checking the answer "I don't know" leads to 0 points. The maximum score is 69 points. Participants are classified as "not information literate" if the total score is below 50% (34.5 points). With a total score of at least 50% they count as a "beginner". The "advanced" level starts at a total score of at least 75% (51.75 points). Our target groups were students attending universities located in informational world cities [2]. We further limited the first round of our survey to two countries: Canada and Germany. In each of those two countries, there are currently 3 cities identified as informational world cities by Mainka [12]: Montreal, Toronto, Vancouver and Berlin, Munich, Frankfurt. There are 14 universities located in those cities. An online survey (English and German) was set up and the link to the questionnaire was distributed among Facebook groups associated with those universities. Literature shows that many students are using Social Networking Sites (SNSs) on a regular basis. Facebook is one of the most popular SNSs [13], especially for students [14, 15]. We identified Facebook groups for this study by searching groups containing the university's name in its group title. Beforehand, the administrators of the groups were asked for permission. The survey link was posted in 128 different Facebook groups. The distribution started in February 2014 and ended in October 2014. Due to the long processing time of the voluntary questionnaire, a low participation rate was expected [16]. A raffle (gift cards) was added to the survey as incentive to raise the participation rate and to finish the questionnaire.

To test Beutelspacher's questionnaire in terms of internal consistency, Cronbach's Alpha (α) was calculated [17]. In addition to that, a t-test shows whether differences between the total score of Canadian and German students are significant.

3 Results

In total, 892 students participated in the survey. 291 Canadian (109 male; 175 female; 7 preferred not to say; average age: 21.3 years) and 601 German students (203 male; 398 female; average age: 23.3 years). 154 of the 291 Canadian students were based in Montreal (52.92%), 74 in Vancouver (25.43%), 63 in Toronto (21.65%). 395 of the German participants were studying in Berlin (65.72%), 151 in Frankfurt (25.12%), 55 in Munich (9.15%). Since Berlin and Montreal offer more universities than the other cities, their strong participation was predictable. Most of the participants were aiming for a bachelor degree or state examination (Canada: 83.85%; Germany 75.04%). 16.15% of the Canadian and 24.96% of the German students were in a master or PhD program at the time of the survey. Over 40 different major subjects were represented. On average, German students scored 48.62 (70.46%) and Canadian students scored 44.63 (64.68%) out of 69 points (maximum score). A significant difference between the two groups was verified ($p < 0.001$). 13.06% of the Canadian and 4.83% of the German students were judged to be "not information literate", while the greatest share of both groups (Canada: 65.64%; Germany: 56.24%) reached the "beginner"-level. Only 21.31% of Canadian and 38.94% of German participants were classified as "advanced". Table 1 in the Appendix lists all items as well as the arithmetic mean of point scores for both countries and the significance value (p) of the t-test. A significant difference ($p < 0.05$) between the results was found in 25 cases. It should be noted that an equal variance is given in items 2, 9, 10, 13, 15, 17, 19, 23, 26, 30, 33c, 37 and 38 only. All other p-values were calculated with the total score of the students.

According to the six spheres of competence tested, it is observed that German participants scored higher in every sphere (Fig. 1). Compared to the other spheres, the

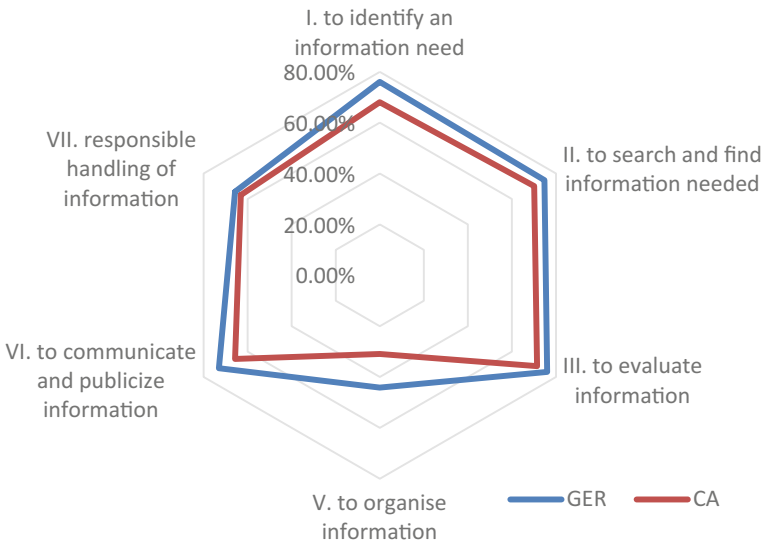

Fig. 1. Average results for each sphere of competence (Canada vs. Germany)

results of both groups in sphere V ("to organise information") are noticeably low. The distribution of information literacy skill level by gender showed that in both countries, male participants had more members in both the "advanced" and the "not information literate" category. On average, however, female participants scored slightly better. When comparing students by desired degree, it stands out that "Bachelor of Science" and "Master of Arts" students had the best results, also, no master student from Canada was classified as "not information literate". This improvement cannot be observed for German students. Here, the best results were achieved by "Master of Arts" and "Bachelor of Arts" students. Comparing Canadian and German students who aim for the same degree, significant differences could be found within the groups "Bachelor of Arts" ($p \leq 0.001$), "Master of Arts" ($p \leq 0.001$) and "Master of Science" ($p = 0.033$). An equal variance is given in each of these groups.

For all test items Cronbach's Alpha (α) was 0.814, which is an indicator for a "good" internal consistency and a "reasonable goal" [18].

4 Discussion

By means of a multiple-choice questionnaire, we are able to take a glimpse at the current status of information literacy among young citizens of informational cities in Canada and Germany. Overall, the results are in conformity with other studies assessing student's information literacy [5, 19], which means that measured information literacy levels were relatively low. The fact that students in a master program achieved noticeably better results than their colleagues aiming for a bachelor degree, indicates that students at least improve their information literacy skills during their academic career. The results of the comparison indicate that there are noticeable differences in the information literacy skills of German and Canadian students. On average, German students obtained a more favourable result in all of the six measured spheres of information literacy competence. For the most part, this proportion can also be seen in the numbers according to city, gender and target degree. It is necessary to investigate why the number of advanced students in Germany is that much higher than in Canada. By taking a closer look at the results of PISA [20], a study measuring, among others, the competences of 15-year-old students on an international scale, Canada's students scored very well when it came to digital skills, while students from Germany showed an average performance. But would a similar study in the field of information literacy show the same results? Furthermore, academic and public libraries in informational cities are supporting schools and universities in promoting information literacy among citizens and students [21] while this is not as common in Germany, where the term "information literacy" is known to few. The question arises, what results a different method of assessment would have yielded.

The use of a questionnaire has the advantage that less time and resources are needed, compared to an interview. Also, no influence by an interviewer's behaviour is possible. Additionally, participants experience written surveys more anonymously [22]. A questionnaire yields objective, reliable and comparable results. Every test person is

given the same questions and answer options, which are explicitly right or wrong. Moreover, the results of this survey can be compared with future surveys of the same kind [11]. While a multiple-choice questionnaire has advantages, it is also limiting the assessment of competences, workflows and other aspects. Especially now, that the definition of information literacy is shifting from a catalogue of standards to a framework of "core ideas" [23], it might not be as easy to create questionnaires, which are able to asses this "new" definition of information literacy. In general, it is difficult to measure information literacy skills in a holistic way, since these are higher-order skills much more complex than assessible by a short questionnaire [24]. Since students were not monitored while filling in the questionnaire it is possible that participants were looking for answers with help of a search engine. Most students filled in the survey in the presumed time which leads us to believe that students were usually not using any help. However, the possibility that a student is guessing or picking any answer randomly is still given.

Although almost 900 students participated in our survey, it is not possible to draw general conclusions yet. A greater number of students — from different major subjects and faculties, and with different degrees — is needed, to get results that are more representative. Also, an equal distribution of participants from each city or university is needed, to draw a more detailed analysis. Up to now, none of these assessment tools have been used on a national range. Luckily, we may soon be able to see results of the *International Computer and Information Literacy Study* (ICILS), a computer-based international assessment and comparison of eighth-grade students' computer and information literacy [25]. These results could provide valuable information, for example on when and how to promote information literacy skills among students. Different institutions could learn from each other. If a real difference existed, what could be reasons for those? Furthermore, results could be analysed regarding correlations with programs offered by universities and libraries to promote information literacy skills. Does the availability of such programs lead to better results?

While comparing results from different countries, this is by no means seen as a competition. It is rather an opportunity to learn about differences and to teach each other. But first, to find out more about the origin of the differences in results, further information is needed. For example, personal interviews at the participating universities, not only with students but also with teaching faculty, could help us to gain further insight. We chose Canada and Germany for this study, because we deemed them to be relatively similar. But when comparing different countries, cultural differences, linguistic peculiarities, distinctions in school systems and infrastructure have to be taken into account as well. These and other factors can turn a simple comparison into a challenge. And if this challenge were mastered, we still had to ask ourselves whether our definition of information literacy is the same of our neighbours. And does it have to be?

Appendix

Table 1. Questionnaire items (1–41), average results (Canada, Germany) and p-value (t-test).

#	Question	Ø CAN	Ø GER	p
1	True or false? The first search result a search engine lists is always the best one. *("True", "False", "I don't know")* 1pt	0.928	0.958	0.077
2	True or false? All search engines give out the same results. *("True", "False", "I don't know")* 1pt	0.928	0.942	0.422
3	When researching a topic that you don't know anything about, what is the best place to start looking? *("In a journal", "In an encyclopaedia or dictionary", "In a library catalogue", "I don't know")* 1pt	0.680	0.760	0.014
4	Which statement is true? *("In an internet research you should check as many web pages as possible", "You should only use a single search engine", "You should compare different websites", "You should only look for information that supports your personal viewpoint", "I don't know")* 2pt	1.478	1.827	<0.001
5	You have performed a search in a library catalogue and were not able to find any documents. What is the most likely reason for this? *("The wrong search terms were used", "All documents on this topic are borrowed at the moment", "The system is defective", "I don't know")* 1pt	0.918	0.968	0.004
6	You must write a paper comparing schools in Germany to ones in Switzerland. Which words would you use in your web research? *("Germany, Switzerland, Europe, Schools", "Europe, Germany, Switzerland", "Schools, Switzerland, Germany", "Schools, Europe", "I don't know")* 1pt	0.986	0.972	0.064
7	*You must discuss a certain topic in a paper. You have already found a book on this topic. Which section of the book will you consult if you wish to find further documents on the same topic? ("Glossary", "Table of contents", "Bibliography", "Index", "I don't know")* 1pt	0.777	0.684	0.003
8	You are looking for information on the social integration of foreigners, but you may not use the word "integration." Which word would you use instead? *("Migration", "Immigration", "Assimilation", "Foreigner", "I don't know")* 1.5pt	1.015	1.273	<0.001
9	Which two terms are synonymous? *("Blue (colour)" – "Blues (music)", "Tree – apple tree", "Eggplant – aubergine", "Dead – alive", "I don't know")* 1pt	0.869	0.887	0.451
10	Which query will retrieve more documents? *("Dog AND cat", "Dog OR cat", "Both queries above will yield the same amount of results", "I don't know")* 1pt	0.601	0.576	0.465

(*continued*)

Table 1. (*continued*)

#	Question	Ø CAN	Ø GER	p
11	You would like to research the following recipe using a search engine: Cookies, either with nuts or with almonds, but definitely without cinnamon. Which of the queries below (including operators) would you use to retrieve the recipe? *("Cookies AND (nuts OR almonds) NOT cinnamon", "(Nuts OR almonds) (AND cookies NOT cinnamon)", "NOT cinnamon AND cookies (nuts OR almonds)", "Cookies AND almonds AND nuts NOT cinnamon", "I don't know")* 2pt	1.505	1.344	0.012
12	Which words are retrieved when you search for Science* in a scientific search engine or in a library catalogue with truncation? *("Science", "Scientific", "Sciences", "Scientist", "Science project", "Conscience", "I don't know")* 3pt	1.399	1.474	0.396
13	If you search for "Shores in Germany" using a search engine, which results will you get? *("All documents containing the word ‚shore'", "All documents containing the word ‚Germany'", "All documents whose full text contains the phrase ‚shores in Germany'", "No documents", "I don't know")* 2pt	1.574	1.544	0.617
14	If a search engine retrieves too many web pages, what should you do? *("Use advanced search", "Only use one search engine", "Only look at the first ten search results", "Use the "help" function", "Add further search terms", "Delete some search terms", "I don't know")* 3pt	1.395	1.118	<0.001
15	If your library does not have a certain book, how can you borrow it anyway? *("Via inter-library loan", "By going to another library", "It's impossible", "I don't know")* 1.5pt	1.246	1.191	0.092
16	Choose a broader term, a narrower term, and a related term (in that order) for the word "tree". *("Spruce, apple, trunk", "Trunk, plant, flower", "Plant, trunk, spruce", "Spruce, flower, spruce", "Plant, spruce, flower", "I don't know")* 1pt	0.426	0.719	<0.001
17	*Which pages are in the Deep Web? ("Pages that can only be found by one search engine", "Government pages", "Pages in special databases", "All pages that can be found by Google", "I don't know")* 1pt	0.519	0.463	0.115
18	What is a meta search engine? *("A search engine that searches for other search engines", "A search engine that searches in social networks", "A search engine that searches through data from search engines", "I don't know")* 2pt	1.155	1.481	<0.001
19	To find the most up to date information, you should check: *"A printed encyclopaedia", "A book", "A newspaper", "The internet", "I don't know")* 2pt	1.543	1.484	0.112
20	Current scientific studies are first published in*: "Books", "Encyclopaedia entries", "Articles in scientific journals", "Conference papers", "I don't know")* 2pt	1.326	1.484	0.001

(*continued*)

Table 1. (*continued*)

#	Question	Ø CAN	Ø GER	p
21	A book's signature in a library is used… *("to contact the author", "to find the book in the library", "to find the book online", "I don't know")* 1pt	0.619	0.842	<0.001
22	Which books are placed side by side in a library? *("Books by the same publisher", "Books with similar content", "Books of the same size", "Books published in the same year", "I don't know")* 1pt	0.890	0.958	0.001
23	How can you tell whether a Wikipedia article is high quality? *("I check whether the article has bibliographical references", "I check the comments on the article's discussion pages", "I check whether the article has a lot of pictures", "I check how long the article is", "I don't know")* 2pt	1.251	1.448	<0.001
24	If you want to use a database, which is the best way to find out what journals it contains? *("To perform a search and look at the results", "You don't need to know this, because all databases cover all journals", "To look on the 'help' page or in the user manual", "I don't know")* 1pt	0.567	0.612	0.190
25	You are looking for information about the effects of air pollution on human health. Which of the listed sources is likely to be the most objective? *("Automobile manufacturers", "Medical research institute", "Environment organization", "Energy supplier", "I don't know")* 2pt	1.498	1.787	<0.001
26	A summary of a scientific article is found: *("In the abstract", "In the bibliography", "In the introduction", "I don't know")* 1pt	0.835	0.839	0.893
27	Which tags (keywords) would you use for the following image of the Brooklyn Bridge if you wanted to upload it to a photo sharing service for other users to find? *("Bridge", "Brooklyn", "Water", "Brooklyn Bridge", "My city", "East River", "House", "New York", "Photo", "Suspension bridge", "Day", "World")* 3pt	1.978	1.715	<0.001
28	When quoting a short sentence by another author in a homework paper, how should you label this sentence? *("Via quotation marks "" ", "Via square brackets []", "Via round brackets ()", "The sentence doesn't have to be labelled", "I don't know")* 1pt	0.921	0.960	0.028
29	When must you identify another author's text in your own work? *("When using an entire sentence word by word", "When using an entire paragraph word by word", "When reproducing a paragraph in your own words", "When translating a sentence from another language", "I don't know")* 4pt	3.021	3.158	0.101
30	Why is there a need for citations? *("To prove your own statements", "To help you out when you can't think of anything", "To not pass off other people's ideas as your own", "I don't know")* 2pt	1.237	1.629	<0.001

(*continued*)

Table 1. (*continued*)

#	Question	Ø CAN	Ø GER	p
31	Which facts must you include when using a quote from a book? *("Author's last name", "Author's year of birth", "Author's place of birth*", "Date of publication", "ISBN", "Title", "Total number of pages", "Illustrator's last name", "Name of publisher", "Publisher's location", "I don't know") 5pt	3.244	4.258	<0.001
32	The following is what type of publication? Knautz, K. (2012). Emotions felt and depicted. Consequences for multimedia retrieval. In D. R. Neal (Ed.), Indexing and Retrieval of Non-Text Information (pp. 343-375). Berlin, Boston, MA: De Gruyter Saur. *("Chapter in a collection", "Monograph", "Chapter in a specialized journal", "Chapter in conference proceeding", "I don't know")* 1pt	0.247	0.611	<0.001
33	Take a look at the following bibliographical reference and then answer questions a-c. Stock, W.G. (2011). Informationelle Städte im 21. Jahrhundert. Information - Wissenschaft und Praxis, 62(2), 71-94.			
33 a	What is the title of the journal? *("Stock, W.G.", "Informationelle Städte im 21. Jahrhundert", "Information – Wissenschaft und Praxis", "I don't know")* 1pt	0.536	0.639	0.004
33 b	How many pages is the article? *("60 pages", "62 pages", "24 pages", "11 pages", "2 pages", "I don't know")* 1pt	0.643	0.755	0.001
33 c	What is the volume of the above-mentioned journal? *("2", "62", "2011", "71–94", "I don't know")* 1pt	0.478	0.463	0.672
34	How do you sort your search results when looking for articles that have attracted the most attention in the scientific community? *("By citation frequency", "By author", "By date of publication", "By the length of the articles", "I don't know")* 1pt	0.770	0.822	0.075
35	What does it mean when an article has passed peer review? *("The article has been checked and corrected by friends and colleagues of the author", "The article has been checked by experts and changes have been suggested", "The article has been edited by the publisher", "I don't know")* 1pt	0.749	0.469	<0.001
36	Which of these terms describes a knowledge organization system? *("Open Access", "World Wide Web", "Classification", "Bibliography", "I don't know")* 1pt	0.436	0.517	0.023
37	Which of these programs are reference management systems? *("Citavi", "Mendeley", "Facebook", "Wikipedia", "Bibsonomy", "Twitter", "Microsoft PowerPoint", "Endnote", "I don't know")* 2pt	0.366	0.730	<0.001
38	What is meant by online netiquette? *("A set of rules for communicating with people online", "This way I allow the site's owner to use my private information", "A seal of quality for secure web pages", "I don't know")* 1pt	0.674	0.647	0.439

(*continued*)

Table 1. (*continued*)

#	Question	Ø CAN	Ø GER	p
39	What does it mean when a piece of information (e.g. an image) is labelled "Public Domain"? *("The author is unknown", "It is forbidden to copy it", "You're allowed to copy it as often as you like", "You can only copy it for private usage", "I don't know")* 1pt	0.753	0.724	0.357
40	What does it mean when the following symbol is attached to an image on the Internet? *("The image may be used without any restrictions", "The image may not be used for commercial purposes", "The image may not be edited", "The image may not be passed on", "If the image is used, the original author's name must be stated", "The image must be passed on under the same conditions", "I don't know")* 3pt	0.828	0.945	0.074
41	Do you think that web pages often appear to be adjusted to your own individual profile (e.g. ads that precisely fit your interests)? *("Yes, I think so", "No, I don't think so", "I don't know")* 1pt	0.821	0.943	<0.001

References

1. Stock, W.G., Stock, M.: Handbook of Information Science. De Gruyer, Berlin (2015)
2. Stock, W.G.: Informational cities: analysis and construction of cities in the knowledge society. J. Am. Soc. Inf. Sci. **62**(5), 963–986 (2011)
3. Dornstädter, R., Finkelmeyer, S., Shanmuganathan, N.: Job-Polarisierung in informationellen Städten. Inf. Wiss. Prax. **62**(2–3), 95–102 (2011)
4. Gust von Loh, S., Stock, W.G.: Informationskompetenz als Schulfach? In: Informationskompetenz in der Schule, pp. 1–20, De Gruyter Saur (2013)
5. Gross, M., Latham, D.: Attaining information literacy: an investigation of the relationship between skill level, self-estimates of skill, and library anxiety. Libr. Inf. Sci. Res. **29**(3), 332–353 (2007)
6. Julien, H., Barker, S.: How high-school students find and evaluate scientific information: a basis for information literacy skills development. Libr. Inf. Sci. Res. **31**(1), 12–17 (2009)
7. Cameron, L., Wise, S.L., Lottridge, S.M.: The development and validation of the information literacy test. Coll. Res. Libr. **68**(3), 229–237 (2007)
8. American Library Association: Information literacy competency standards for higher education. http://www.ala.org/acrl/sites/ala.org.acrl/files/content/standards/standards.pdf. Accessed 17 Sept 2017
9. Smith, J.K.: Information literacy proficiency: assessing the gap in high school students' readiness for undergraduate academic work. Libr. Inf. Sci. Res. **35**(2), 88–96 (2013)
10. Kent State University: Project SAILS Skill Sets. https://www.projectsails.org/SkillSets
11. Beutelspacher, L.: Erfassung von Informationskompetenz mithilfe von Multiple-Choice-Fragebogen. Inf. Wiss. Prax. **65**(6), 341–352 (2014)
12. Mainka, A.: Public libraries in the knowledge society: core services of libraries in informational world cities. Libri **63**(4), 295–319 (2013)

13. Hargittai, E.: Whose space? Differences among users and non-users of social network sites. J. Comput.-Mediat. Commun. **13**(1), 276–297 (2007)
14. Selwyn, N.: Faceworking: exploring students' education-related use of Facebook. Learn. Media Technol. **34**(2), 157–174 (2009)
15. Gray, K., Annabell, L., Kennedy, G.: Medical students' use of Facebook to support learning: insights from four case studies. Med. Teach. **32**(12), 971–976 (2010)
16. Bogen, K.: The effect of questionnaire length on response rates: a review of the literature. In: Proceedings of the Section on Survey Research Methods, Alexandria, VA, pp. 1020–1025. American Statistical Association (1996)
17. Cronbach, L.J.: Coefficient alpha and the internal structure of tests. Psychometrika **16**(3), 297–334 (1951)
18. Gliem, J.A., Gliem, R.R.: Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. In: Midwest Research to Practice Conference in Adult, Continuing, and Community Education, Columbus, OH, pp. 82–88. The Ohio State University (2003)
19. Beutelspacher, L., Dreisiebner, S., Henkel, M.: Informationskompetenz – Forschung in Graz und Düsseldorf. Inf. Wiss. Prax. (in press)
20. PISA (2012). http://www.compareyourcountry.org/pisa-digital?cr=oecd&lg=en&page=1&visited=1. Accessed 17 Sept 2017
21. Henkel, M.: Educators of the information society: information literacy instruction in public and academic libraries of Canada. In: Proceedings of the 78th ASIS&T Annual Meeting, St. Louis, Missouri (2015)
22. Bortz, J., Döring, N.: Forschungsmethoden und Evaluation: Für Human- und Sozialwissenschaftler. Springer, Heidelberg (2006). https://doi.org/10.1007/978-3-540-33306-7
23. American Library Association: Framework for Information Literacy for Higher Education (2015). http://www.ala.org/acrl/standards/ilframework. Accessed 17 Sept 2017
24. Beutelspacher, L., Henkel, M., Schlögl, C.: Evaluating an information literacy assessment instrument. The case of a bachelor course in business administration. In: Proceedings of the 14th International Symposium on Information Science, pp. 482–491. Verlag Werner Hülsbusch, Glückstadt (2015)
25. International Computer and Information Literacy Study. https://icils.acer.org/. Accessed 17 Sept 2017