Development of a competency framework for health information specialists in the Netherlands

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Abstract

Competency frameworks are essential for identifying job-specific skills, highlighting training needs, and enabling skill development. Therefore, the Dutch Association for Biomedical Information Professionals (KNVI-BMI) created a framework for health information specialists. Competencies were defined as the integration of knowledge, skills, and attributes required for effective job performance. The framework was developed through literature review, job postings analyses, and consensus meetings to select and categorize relevant competencies. An expert opinion survey validated the preliminary framework. The final framework includes nine domains: 1) healthcare environment, 2) information and literature services, 3) management of information resources, 4) information systems, technology, and applications, 5) didactics and teaching of information literacy, 6) research methodology, 7) research data management, 8) leadership and management, and 9) professionalism.

Key words: *medical libraries; professional competence; librarians; professional role; library science/standards.*

Background

Developing yourself is crucial for job satisfaction and job retention. The IFLA Guidelines for Continuing Professional Development: Principles and Best Practices state that "The individual library and information professional is primarily responsible for pursuing ongoing learning that constantly improves knowledge and skills" (1). In 2022 the Dutch Association for Biomedical Information Professionals (KNVI-BMI) appointed a working group with the task of setting up a competency framework for Dutch health information specialists. This framework will give insight into the competencies you need as a health information specialist in the Netherlands. A competency is defined as a combination of knowledge, skills and attributes you need to perform a job effectively.

The need for a competency framework emerged partly because library training programs are no longer offered in the Netherlands. For people new to the information specialist profession without a library background, it can be unclear what skills and competencies are needed for the job. The framework will offer this group insight into the competencies necessary for their job. Another reason the KNVI-BMI wanted a competency framework was to reshape the professional development activities that it organises. Furthermore, the KNVI-BMI viewed a competency framework as a valuable tool for individual information specialists to assess their own competencies and identify areas for personal development. Lastly, such a framework can provide a basis for discussions with managers, who frequently lack a background in library education.

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Method

There were five methodological parts to the project: establishment of a project group; literature review; job postings textual analyses; framework development and consensus building; expert opinion validation survey. The dataset and supplementary materials are openly available on OSF (https://doi.org/10.17605/OSF.IO/XMVPN).

Establishing a project group

A diverse project group was assembled at the beginning of the project. The experts in the project came from diverse fields, including academic and non-academic teaching hospitals (top clinical) as well as regional hospitals, but also research and mental health care institutes. There was also great diversity in age, work experience, and educational background. To give a voice to all the different health information specialists in the Netherlands, this diversity was important.

Literature review

We were already familiar with the competency frameworks of ALA (2), MLA (3) and ALIA-HLA (4). As these frameworks are rarely published in literature databases, we also asked on the EAHIL discussion list for other competency frameworks of sister organisations abroad.

The literature databases Medline (Ovid), Scopus and LISTA (Ebsco) were then searched for competency frameworks and competencies described in the literature. The full search strategies can be found on osf.io (https://osf.io/3682z), but schematically they are as follows: (medical librarian OR information specialists OR medical library journals) AND (competence OR skill). The search in LISTA was carried out on 02-11-2022, the searches in Medline and Scopus on 03-11-2022. The references were deduplicated in EndNote according to the steps described by Bramer *et al.* (5).

The unique references were independently screened for eligibility by two reviewers using Rayyan. Disagreements were resolved by a third reviewer. Articles were included if they described a competency, competency framework, or skills for information specialists / librarians in a medical, biomedical, or healthcare context. Articles published before 2000 were excluded. The included articles were then subjected to forward and backward snowballing using Citationchaser (6). In addition, a manual search of the journals of EAHIL, ALIA-HLA was performed, as these were not indexed in the databases searched.

Data were extracted from the included articles using a pre-prepared data extraction form. This included questions about the country of the study, the sample size, the type of profession and the competencies, skills and knowledge mentioned.

Job postings textual analyses

In order to gain insight into the competency requirements in job postings, we manually searched various job postings websites, including Nationale Vacaturebank, Indeed.nl, regional hospital websites, mental health care websites, and academic medical center websites. We also included vacancies posted on the email list of the KNVI-BMI.

Vacancies posted from 2018 to September 2022 were included. The textual content of these vacancies were pooled and a word and phrase count, and correlation analyses were performed using the Voyant tool (https://voyant-tools.org/).

Framework development and consensus

The initial drafting was done in two face-to-face meetings using the job postings' textual analyses, competencies from international publications, and additional literature that mentioned any competencies or skills. This was followed by several rounds of redrafting through online meetings and emails to arrive at the first version of the framework.

Validation survey

This first version of the framework was then incorporated into a survey and sent to Dutch information specialists via the email list of the KNVI-BMI. Respondents could rate each competency on a 10-point Likert scale. In addition, it was possible to give feedback per domain and on the whole framework via open-ended responses.

The survey results were exported as a csv file and analysed using R (https://osf.io/abt58). Means and standard deviations scores were calculated for the scores per competency, and the means per domain. In addition, differences in scores for work experience and work location were calculated using a Kruskal-Wallis test. A p-value < 0.05 was considered statistically significant, indicating that at least one group had a significantly different score compared to the other groups.

For work location, only the locations with at least 5 responses were included in the analyses. The results of the mean scores per competency and the extracted comments were then used in a discussion among the experts in the project group to revise the first version of the framework. This resulted in the final version of the framework.

Results

Results of the search

Our search identified 4107 references, and no additional records were found by backwards and forwards snowballing. After removing duplicates, 3212 references were screened for titles and abstracts, leaving 409 references for full text screening. Of these, 50 references were then included and data extracted.

Job postings analyses

A total of 30 job postings were collected for the word count and correlation analysis. The analyses of the job postings identified several frequently occurring words and phrases. The most common words observed were: "knowledge", "library", "experience", "education", and "medical and/or scientific literature search". The correlation analysis provided further insights into how these terms were used in context. The term "knowledge" was frequently associated with phrases such as "knowledge of Medline/Embase,", "knowledge of resources" and "knowledge of information/search queries". This indicates a strong emphasis on knowledge of specific databases and search strategies. Although less frequent, phrases like data management and open science were also observed.

Survey analysis

84 information specialists from different institutions in the Netherlands responded to the survey (see *Table 1*) (https://osf.io/gfn6v).

Characteristic	All participants (n = 84)
Gender, n (%)	
Male	19 (22.6%)
Female	58 (69.0%)
Other	3 (3.6%)
Unknown	4 (4.8%)
Age, mean (SD)	51.8 (12.7)
Education, n (%)	
Secondary Vocational Education and Training (VET)	3 (3.6%)
Higher professional education	39 (46.4%)
University bachelor's degree	2 (2.4%)
University master's degree	31 (36.9%)
Doctor of Philosophy (PhD)	9 (10.7%)
Work location, n (%)	
Academics	17 (20.2%)
University of applies sciences	5 (6.0%)
Non-academic teaching hospitals	31 (36.9%)
Regional hospitals	4 (4.8%)
Research institutes	8 (9.5%)
Mental healthcare	17 (20.2%)
Other	2 (2.4%)
Work experience, n (%)	
<1 year	3 (3.6%)
1 till 5 years	15 (17.8%)
6 till 10 years	3 (3.6%)
> 10 years	63 (75%)

Table 1. *Participant characteristics.*

None of the domains had a mean score below 5 (see *Table 2*). However, the Research Data Management (RDM) domain had a remarkably lower score compared to the other domains. Within this domain, the only competence with a mean score below 5.5 can be found (*see Table 1S available online as Supplementary Material*). This was the competence "Provides support or actively participates in determining and implementing policies related to RDM" (mean: 5.3; SD: 2.22). Although there were no significant differences (p = 0.12) between the work location groups, this competence scored relatively high for professionals working at universities of applied sciences (mean: 6.8; SD: 1.92) and knowledge institutions (mean: 6.3; SD: 2.60) compared to the mental health sector (mean: 4.5; SD: 2.15) and academics (mean: 4.6; SD: 2.37).

Domain	Mean score (SD)
Healthcare environment	7.7 (1.3)
Information and literature services	7.9 (1.7)
Management of information resources	7.9 (1.9)
Information systems, technology, and applications	7.9 (1.7)
Didactics and teaching of information literacy	7.7 (1.5)
Research methodology	7.6 (1.6)
Research data management	5.8 (2.2)
Leadership and management	7.1 (1.8)
Professionalism	8.4 (1.3)

Table 2. *Mean scores and standard deviations from 10-point likert scale per domain.*

In the survey, significant differences were observed in 26 out of the 61 competencies when comparing responses from individuals at different work locations (see *Table 2S available online as Supplementary Material).* Among these, only two competencies showed a difference between mean scores below 5.5 and above 5.5. This was for the competency "Provides support for the use of (institutional) data repositories" (domain: RDM), where the lowest scores were found in the mental healthcare setting (mean: 4.8; SD: 2.19) and academic sectors (mean: 5.4; SD: 2.12) , and the highest in the knowledge institutions (mean: 7.5; SD: 1.60) and applied sciences (mean: 7.4; SD: 1.82) sectors. The other competency, "Creates budgets and has financial insight" (domain: Leadership and Management), received insufficient scores from the academic centres (mean: 4.7; SD: 2.64), while other workplaces scored sufficiently, with non-academic teaching hospitals achieving the highest mean score (mean: 7.3; SD: 1.49).

The competency framework

Despite the relatively low scores for the RDM domain, it was retained in the final competency framework version. This decision was made because RDM is a relatively new and emerging domain, and the competency framework should be future-proof. Additionally, the competencies within this domain that scored insufficiently were not removed, as the framework must be representative of all information specialists in the Netherlands. For certain workplaces, such as applied sciences and knowledge institutions, this competency remains relevant.

Based on the comments made in the survey, the project group reviewed each competency. It became clear that some competencies needed to be split into two, some were duplicated, and some simply needed to be reworded to make them more explicit. In addition, the competencies per domain where ranked based on the mean scores of the survey. This resulted in the final competency framework which exists of nine domains; 1) healthcare environment, 2) information- and literature services, 3) management of information resources, 4) information systems technology and applications, 5) didactics and teaching of information literacy, 6) research methodology, 7) research data management, 8) leadership and management, 9) professionalism (https://osf.io/9qrbh).

Discussion and conclusion

This study provides a comprehensive overview of competencies across nine competency domains for health information specialists in the Netherlands, ensuring relevance and applicability to the current and future landscape. We were able to do this by assessing textual content of job postings, conducting an extensive literature review and an expert survey. We identified and described competencies that are particularly pertinent to Dutch health information specialists.

Our findings indicate having competencies and knowledge in a wide range of competencies is required for the health information specialist in the Netherlands. Although, variability in the importance placed on different competencies depends on the institutional setting of the respondents. For instance, the Research Data Management (RDM) domain was deemed more relevant by professionals in applied sciences and knowledge institutions compared to those in the mental health sector and academic medical settings. A plausible explanation is that larger organizations and institutions in the Netherlands often have dedicated "Research Data Management" departments, leading to lower perceived importance of these competencies compared to other domains. Notably, for 26 out of the 61 competencies surveyed, significant differences were observed based on work location. For example, the competency "Provides support for the use of (institutional) data repositories" was rated higher in knowledge institutions and applied sciences sectors, while "Creates budgets and has financial insight" received the highest scores from top clinical hospitals. A limitation of the survey analysis is that non-academic teaching hospitals and mental health institutes are probably overrepresented. However, we do not know the exact number of information specialists in the different types of institutes and therefore it remains unclear how indicative the cohort is. Despite being created for the Dutch organizations, our competency framework may have broader applicability beyond the Netherlands, potentially serving as a model for health information specialists globally.

In comparing the current competency framework for health information specialists in the Netherlands to the 2017 competency profile published by the Medical Library Association (MLA) in the United States (5), several similarities and differences emerge. Both profiles underscore the importance of understanding the healthcare environment, including its specific jargon, organizational knowledge, policies, laws, regulations, and trends. One of the core competencies in both profiles is the domain of "Information and Literature Services". This domain encompasses sub-domains such as expertise in searching and conducting literature research, participating in systematic reviews and guidelines, knowledge of copyright, licensing, intellectual property, and bibliometrics. These core competencies remain consistent despite technological advancements and geographical differences.

However, there are notable differences between the profiles. The MLA competency profile places greater emphasis on detailed performance indicators for developing educational curricula, utilizing learner-centered approaches, and implementing innovative instructional methods. It also provides specific guidance on creating and implementing strategic plans, inspiring and leading others, and securing external funding. While the Dutch competency framework includes educational competencies, it focuses more on determining local and organizational educational needs and evaluating learning outcomes, with less emphasis on pre-defined instructional design. In the domain of "Research Data Management," both the MLA and Dutch competency profiles support the FAIR data principles. However, the Dutch profile emphasizes knowledge of data sharing and reuse from an open science perspective.

Maintaining the relevance and currency of this competency profile poses a challenge, particularly with the rapid evolution of technology. The impact of generative AI on our competencies and profession is still uncertain. Nevertheless, staying informed about AI developments, educating ourselves, and testing new tools will be crucial. Generative AI is likely to significantly influence the construction of search strategies for systematic reviews, presenting both opportunities and risks.

In conclusion, our competency framework provides a detailed and current overview for Dutch health information specialists. While its global applicability remains to be explored, it highlights essential skills and knowledge areas critical to the profession. Ongoing updates and adaptation to technological advancements, including AI, will be necessary to ensure its continued relevance.

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