

Additional file 1. Surveys on the use of medical online databases and ‘CDSS in Pharmacology’ course.

This appendix presents the core survey questions and the specific sections used across all five surveys. The questionnaires were designed to evaluate different stages of the educational intervention, including baseline resource utilization, immediate educational outcomes, long-term impact, and comparisons with medical students who did not participate in the course and practicing physicians. The core questions: assessing use of specific online information resources and attitudes toward formal CDSS education, provide a consistent framework for evaluating participants' search habits and were intentionally retained with identical wording and response scales across all five questionnaires, to enable direct longitudinal and cross-sectional comparisons. The single-item measure of overall drug-search frequency was adapted in wording and response granularity to reflect the expected usage patterns of each population (e.g., students versus practicing physicians). Additional sections tailored to the objectives and target population of each survey are presented subsequently. Additional methodological details regarding questionnaire development and validation are provided at the end of this file. The surveys were distributed via administrative offices to enrolled students or through distribution groups for non-affiliated communities. Although the native languages of the medical student and practitioner populations varied (e.g., Hebrew, Arabic, English, Russian), all were proficient in Hebrew and English, including reading and writing. All surveys were translated from Hebrew.

The following instructions and consent were given at the beginning of each survey:

The survey is conducted anonymously. The participation in the survey is voluntary, and you are not obligated to take part in the study. There is no requirement to complete the questionnaire, and you may skip any questions you do not wish to answer. By completing the survey, you are giving

informed consent for the data to be used for research purposes and for evaluating the course's learning outcomes. If you have any questions, please reach out to Hadar.az@mail.huji.ac.il

The following questions were given in each survey:

Please rate how frequently do you use online sources for drug search	Twice daily	Daily	2-3 times weekly	Weekly	Twice monthly	Monthly	Only once or twice	Never
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How frequently you use the following online sources for drug search:	Never	Rarely	Occasionally	Very frequently	Always
Search engine (e.g., Google)	1	2	3	4	5
Open information page (e.g., Wikipedia)	1	2	3	4	5
Social networking platform (e.g., Facebook)	1	2	3	4	5
Private messaging communication app (e.g., a WhatsApp group)	1	2	3	4	5
Online patient information pages (e.g., on health maintenance organization [HMO] and hospital websites)	1	2	3	4	5
Health professions information pages (e.g., WikiMed)	1	2	3	4	5
Textbook	1	2	3	4	5
Drug database from the Ministry of Health	1	2	3	4	5
Hebrew-language medical portal (e.g., Infomed)	1	2	3	4	5
English-language medical portal (e.g., Medscape)	1	2	3	4	5
Pharmaceutical company websites	1	2	3	4	5
International medical database (e.g., UpToDate)	1	2	3	4	5
International drug database (e.g., Micromedex)	1	2	3	4	5
Consumer medication leaflet	1	2	3	4	5
Physician medication leaflet	1	2	3	4	5
Research database (e.g., PubMed, Micromedex)	1	2	3	4	5
Clinical trials database (e.g., ClinicalTrials.gov)	1	2	3	4	5

Please rate: Do you agree that medical databases should be taught in medical schools?*	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
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* In the physicians' survey (Survey 5) the options were Disagree, Neutral and Agree

Survey 1: Pre-course

Please rate your motivation for taking the course:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The field of pharmacology interests me particularly	1	2	3	4	5
I feel that I lack knowledge in the field of pharmacology	1	2	3	4	5
I want to acquire tools for my future professional development	1	2	3	4	5
I heard that the course is interesting	1	2	3	4	5
I heard that the course is easy	1	2	3	4	5
I am interested in a course with no final exam	1	2	3	4	5

Open-Ended Questions:

- If you have another reason for choosing this course, please specify it here _____
- Please provide any other notes or requests _____

Survey 2: End-of course

Please rate the course experience:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Pharmacology have always interested me; the course broadened my horizons.	1	2	3	4	5
I gained additional knowledge in the field of pharmacology	1	2	3	4	5
The course sparked curiosity to deepen my understanding of pharmacology	1	2	3	4	5
The course was easy to learn	1	2	3	4	5
Assessment through assignments instead of a final exam improved learning outcomes	1	2	3	4	5
The course was enjoyable	1	2	3	4	5

Please rate how you evaluate the course's impact on your CDSS skills. As a result of the course:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I acquired important tools for my future professional development	1	2	3	4	5
I prioritize scientific-based pharmacology sources	1	2	3	4	5
I learned how to find scientific-based pharmacology data	1	2	3	4	5
I gained motivation to critically examine drug data	1	2	3	4	5
I am inspired to explore additional drug databases	1	2	3	4	5
I am equipped to independently research unstudied databases	1	2	3	4	5

Please rate how you evaluate the course's impact on your professional future. As a result of the course:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I plan to regularly use the tools acquired in the course in my future clinical education	1	2	3	4	5

Please rate how valuable you feel the course experience was

Minimally valuable									Extremely valuable
0	1	2	3	4	5	6	7	8	9

Open-Ended Questions:

- Please provide suggestions for improvement of any activity _____
- Please describe what did you find most valuable about the course _____

Survey 3: Post-course

Current year of medical school or residency: _____

Please rate how do you recall and evaluate the course experience:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Pharmacology have always interested me; the course broadened my horizons.	1	2	3	4	5
I gained knowledge about drug applications	1	2	3	4	5
The course sparked curiosity to deepen my understanding of pharmacology	1	2	3	4	5
The course was easy to learn	1	2	3	4	5
Assessment through assignments instead of a final exam improved learning outcomes	1	2	3	4	5
The course was enjoyable	1	2	3	4	5

Please rate how you evaluate the course's impact on your CDSS skills. As a result of the course:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I acquired important tools for my future professional development	1	2	3	4	5
I prioritize scientific-based pharmacology sources	1	2	3	4	5
I learned how to use peer-reviewed drug databases, which continues to serve me to this day	1	2	3	4	5
I learned how to identify misleading drug information	1	2	3	4	5
I am inspired to explore additional drug databases	1	2	3	4	5
I am equipped to independently research unstudied databases	1	2	3	4	5
I gained tools relevant to my daily clinical practice	1	2	3	4	5

Please rate how you evaluate the course's impact on your professional development:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
I consistently apply course skills and tools	1	2	3	4	5
I gained an advantage over my colleagues in understanding drug use	1	2	3	4	5
I acquired skills that enhanced my performance in other subjects	1	2	3	4	5
I consistently share the course knowledge with peers	1	2	3	4	5

Please rate how valuable you feel the course experience was

Minimally valuable										Extremely valuable
0	1	2	3	4	5	6	7	8	9	

Open-Ended Questions:

- Please provide suggestions for improvement of any activity_____
- Please describe what did you find most valuable about the course_____

Survey 4: Medical students during their clinical training (course non-participants)

**This questionnaire was distributed to all students in the clinical years. The survey instructions clarified that it is intended for those who did not participate in the 'CDSS in Pharmacology' course during their preclinical years. This section of the questionnaire serves as a verification step to ensure that the survey results include only respondents who are not graduates of the course.*

Have you attended dedicated training on medical databases during your studies?	Yes	No
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If yes to the previous question, please specify:

Have you participated in the course "CDSS in pharmacology" which trains students in the use of drug-related information databases?	Yes	No
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Current year of medical school or residency: _____

Do you personally know peers who participated in the "CDSS in pharmacology" course, where they learned about drug-related information databases?	Yes	No
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If you answered yes to the previous question, please rate how would you evaluate the drug database usage skills of your peers who participated in the course compared to your own:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Participation in the course gave my peers an advantage over me in understanding the use of medications	1	2	3	4	5
I believe there are subjects in which my peers performed better due to their training in using drug databases	1	2	3	4	5
I believe I would have performed better in some subjects if I had received training in drug databases during my preclinical studies	1	2	3	4	5
I often consult with my peers who participated in the course regarding drug databases	1	2	3	4	5

Please rate how do you evaluate the importance of dedicated training in drug databases for your professional future:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My knowledge of digital CDSS does not meet my pharmacology training requirements	1	2	3	4	5
I can independently and critically research drug databases without needing a course	1	2	3	4	5
I believe that training in drug databases, if conducted, should occur during the preclinical stages	1	2	3	4	5

Please rate how do you evaluate the importance of dedicated training in medical databases for your professional future:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
My knowledge of digital CDSS does not meet my medical training requirements	1	2	3	4	5
I can independently and critically research medical databases without needing a course	1	2	3	4	5

Open-Ended Questions

- If you have any comments or insights, please share them here _____

Survey 5: Physicians

Area of clinical practice

Internal	Surgery	Pediatrics	Other
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If marked 'other', please specify _____

Role in the Department

Department Head	Deputy Head or Other Management Role	Senior Physician	Subspecialty Fellow	Resident	Intern
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Age

20-29	30-39	40-50	50-70	>70
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Have you participated in a course or workshop on using medical databases during the last five years?	Yes	No
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How much time, on average, do you dedicate to finding an answer?	A few minutes	Quarter of an hour	Half an hour	One hour	Several hours	Several days
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Are you usually satisfied with the answers you find using CDSS?	Never	Rarely	Occasionally	Very frequently	Always
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What is missing in the answers you find? _____

Questionnaire Development and Validation

The questionnaires were developed in accordance with the study objectives and the relevant literature on educational evaluation (Artino AR, La Rochelle JS, Dezee KJ, Gehlbach H. Developing questionnaires for educational research: AMEE Guide No. 87. *Med Teach.* 2014;36:463–74). Content and face validity were established through iterative review by individuals with expertise in pharmacology, clinical practice, and medical education. The review focused on item clarity, relevance, and alignment with the study objectives and intended educational outcomes. An informal comprehension check was conducted at the start of the first in-person course session, in which Survey 1 respondents were asked as a group whether any items were unclear; no concerns were raised. The questionnaires comprised several predefined domains, including behavioral measures, single-item evaluations, and multi-item educational outcome domains (Supplementary Table A1). Psychometric analyses were performed for the multi-item educational outcome domains included in the primary outcome analyses (Table 4 of the manuscript). Internal consistency was assessed using Cronbach's alpha, and exploratory factor analysis was performed to examine evidence supporting construct validity where appropriate (Supplementary Table A2). Behavioral frequency measures and single-item questions were designed to assess distinct variables rather than a single latent construct and were therefore not subjected to internal consistency or factor analyses.

Supplementary Table A1. Development and validation strategy for the study questionnaires

Questionnaire component	Validation approach
Frequency of information resource utilization	Expert review; identical wording and response scales across all questionnaires to enable longitudinal and cross-sectional comparisons
Attitudes toward formal CDSS/database education	Expert review; similar wording and response scales across all questionnaires
Overall course value (0–9 scale)	Adapted from the standard institutional course evaluation questionnaire routinely administered by the Hebrew University
Immediate educational outcomes (Survey 2)	Expert review; internal consistency and exploratory factor analysis (see Supplementary Table A2)
Long-term educational outcomes (Survey 3)	Expert review; internal consistency and exploratory factor analysis (see Supplementary Table A2)

Supplementary Table A2. Psychometric evaluation of the multi-item educational outcome domains

Educational domain	Cronbach's α	KMO	Bartlett's test	Exploratory factor analysis
Immediate educational outcomes (Survey 2)	0.501	0.602	$p = .021$	No stable factor solution following principal axis factoring; consistent with multiple related educational outcomes rather than a single latent construct
Long-term educational outcomes (Survey 3)	0.793	0.773	$p < .001$	Principal axis factoring (forced one-factor solution); 39.8% variance explained; factor loadings 0.62–0.83 for five of seven items. Stable one-factor solution supporting coherence of the educational domain

Abbreviations: KMO, Kaiser–Meyer–Olkin measure of sampling adequacy. The analyses were performed on the educational outcome domains presented in Table 3 of the manuscript, including the immediate CDSS educational outcomes (Survey 2) and the long-term educational outcomes (Survey 3).