

Chapters on Interdisciplinary Research and Research Skills

Chapters on Interdisciplinary Research and Research Skills

Koen van der Gaast

Machiel Kestra (ed.)

Laura Koenders

Steph Menken (ed.)

Ger Post

Chapters on Interdisciplinary Research and Research Skills is part of the Series Perspectives on Interdisciplinarity.



This book is a special edition, compiled for to the MSc Course Research Methodologies as taught at the Faculty of Aerospace Engineering at Delft University of Technology.

The first part consists of chapters from *An Introduction to Interdisciplinary Research*, Steph Menken and Machiel Keestra (eds) (2016), ISBN 9789462981843. Authors are Lucas Rutting, Ger Post, Machiel Keestra, Mieke de Roo, Sylvia Blad and Linda de Greef.

The second part consists of chapters from *Academic Skills for Interdisciplinary Studies, revised edition*, Koen van der Gaast, Laura Koenders and Ger Post (2019), 9789463720922. This book was originally published as *Academische vaardigheden voor interdisciplinaire studies* by Joris J.W. Buis, Ger Post and Vincent R. Visser (2015). Now available as *Academische vaardigheden voor interdisciplinaire studies. Vierde, herziene druk*, by Koen van der Gaast, Laura Koenders and Ger Post (2019), 9789463725118. Translation: Vivien Collingwood.

Cover and interior design: Matterhorn Amsterdam

ISBN 978 94 6372 825 6
e-ISBN 978 90 4855 397 6 (pdf)
NUR 143

© Koen van der Gaast, Machiel Keestra, Laura Koenders, Steph Menken, Ger Post / Amsterdam University Press B.V., Amsterdam 2020

All rights reserved. Without limiting the rights under copyright reserved above, no part of this book may be reproduced, stored in or introduced into a retrieval system, or transmitted, in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the written permission of both the copyright owner and the author of the book.

Every effort has been made to obtain permission to use all copyrighted illustrations reproduced in this book. Nonetheless, whosoever believes to have rights to this material is advised to contact the publisher.

Contents

Part 1	From 'An Introduction to Interdisciplinary Research'	8
1	Introduction	9
2	What is science? A brief philosophy of science	13
2.1	What is science?	13
2.2	Moving through the Science Cycle	14
4	Interdisciplinarity	21
7	The interdisciplinary research process	24
7.1	The IIS model of interdisciplinary research	24
7.2	Planning your research project	29
8	The problem	30
Step 1	Identify problem or topic	30
Step 2	Formulate preliminary research question	38
9	Theoretical framework and research question	41
Step 3	Develop theoretical framework	43
Step 4	Finalize research question	61
Step 5	Formulate sub-questions	61
10	How to collect and analyze your data	62
Step 6	Develop research methods and design	62
Step 7	Data collection and analysis	67
11	Discussion and conclusion(s)	69
Step 8	Interpret results, discuss research & draw conclusion(s)	70
	References	74

Part 2	From 'Academic Skills for Interdisciplinary Studies'	78
1	Preparatory reading and searching	79
	Familiarizing yourself with a topic	79
	An initial literature search	81
	Exploratory reading	89
	Sources	92
	Other useful sources	92
2	Gathering and organizing key information	93
	Optimizing your study environment	93
	Learning objectives	94
	Reading strategies	95
	Organizing information	99
	Sources	101
	Other useful sources	101
3	Studying thoroughly and critically	102
	Sentence-level analysis	102
	Types of argumentation	104
	Critically evaluating texts	109
	Sources	111
	Other useful sources	111
4	From your topic to your question	112
	Theoretical framework	113
	Sources	117
5	Formulating a good question	118
	Characteristics of a research question	118
	Types of questions	119
	Sources	121
6	A testable concept	122
	Why operationalize?	122
	From dimensions to indicators and variables	123
	Operationalization and validity	124
	Other forms of operationalization	125
	Sources	126
7	Making a research instrument	127
	Qualitative versus quantitative	127
	When qualitative and when quantitative?	128
	Making a qualitative research instrument	132
	Validity and reliability of your instrument	135
	Assessment by an ethics committee	136
	Sources	137
	Other useful sources	137

8	Research practice	138
	Research practice: quantitative research	138
	Research practice for qualitative research: conducting interviews	142
	Sources	148
	Other useful sources	148
9	The structure of your article	149
	Argumentation structure	149
	The structure of a scholarly article	154
	Valorization	164
	Sources	164
10	Finishing your article: academic writing, titles, and abstracts	165
	Sources	169
	Other useful sources	169
11	Citing sources and the bibliography	170
	Reference management software	171
	In-text citations	173
	Citations in the bibliography	175
	Sources	179
	Other useful sources	179
12	Preventing fraud and plagiarism	180
Appendices		182
	Appendix A	Sample literature review
		184
	Appendix B	Sample research article
		194
	Colophon	206