Hvordan skrive en masteroppgave, doktorgradsavhandling eller vitenskapelig rapport?

GUNNAR HARTVIGSEN, PROFESSOR

HELGELANDSSYKEHUSET
HELGELAANTEN SKÏEMTJEGÅETIE

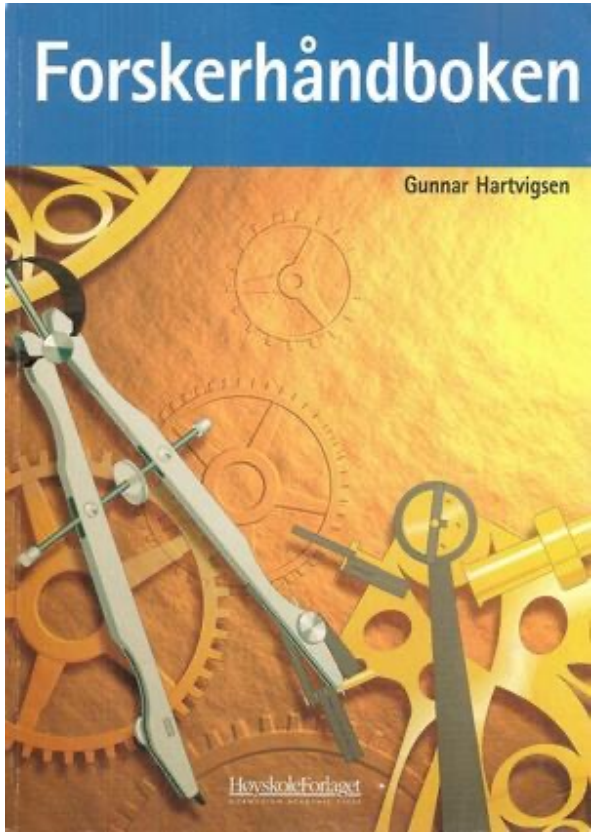
9.4.2024

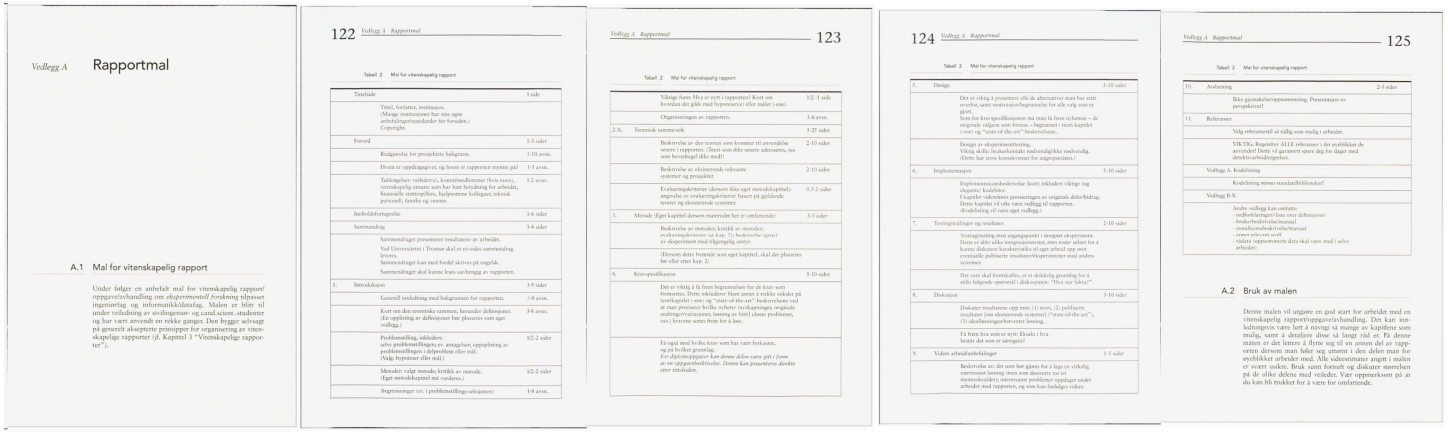
Min veiledererfaring =

Mastergradsstudenter (30 & 60 stp.) = 95 (1)

Ph.d. = 16 (6)

Mentor for vitenskapelig ansatte = 11 (2)





Hartvigsen, G. Forskerhåndboken. Kristiansand: HøyskoleForlaget, 1998. (ISBN: 82-7634-122-5)

https://www.nb.no/items/6fbfc038b58a58b0935c4945e5381a76?page=0&searchText=Forskerhåndboken

FORSKERHÅNDBOKEN

3.1 Vitenskapelig rapport

Den vitenskapelige rapporten er vårt *visittkort* som forsker.

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Sputnik(sjokket)

4. oktober 1957

Sputnik, 1957

Fremtvang en strukturert måte å rapportere vitenskapelige resultater

Thesis structure

I – Introduction

M – (Materials and) Method

R – Results

And

D – Discussion

Thesis structure

I – Introduction

M – (Materials and) Method

R – Results

And

D – Discussion

Avhandlingens struktur

I - Innledning

M – (Materiale og) Metoder

R – Resultater

Og

D – Diskusjon

Avhandlingens struktur

I - Innledning

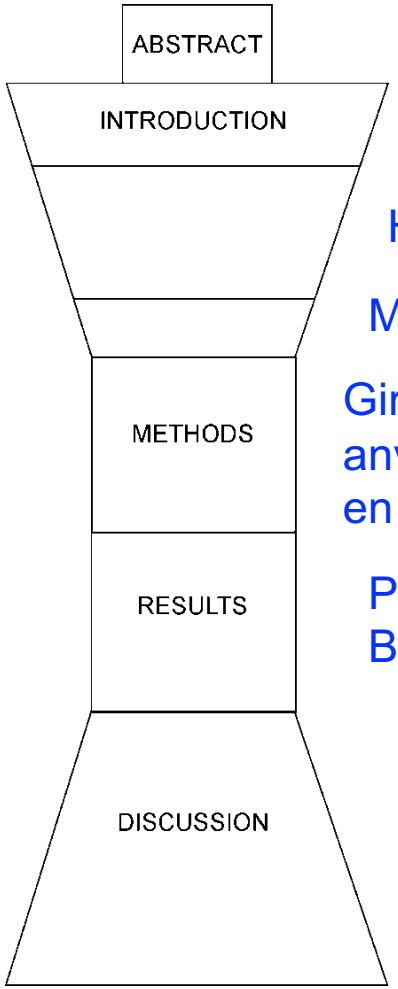
M – (Materiale og) Metode

R – Resultater

Og

D – Diskusjon

The IMRAD structure



Hvorfor er problemet av interesse?

Hva vet vi? Hva er det vi ikke vet?

Målet med prosjektet.

Gir tilstrekkelig informasjon til å vurdere relevans til metoder anvendt, relatert til rapporterte resultater og konklusjoner (slik at en kollega skal kunne gjenskape resultatene).

Presenterer observasjoner på en logisk og sammenhengende måte; Bruk illustrasjoner, grafer, tabeller til å dokumentere resultatene.

Gir konklusjoner, tolkninger og identifiserer potensielle problemer. Relaterer observasjoner til det som er kjent og utvider (om mulig) kunnskapen om problemet. Setter problemet inn i en større sammenheng.

https://www.ntnu.no/blogger/ub-mh/wp-content/uploads/sites/21/2019/02/how-to-write-a-good-masterthesis-2019-final-1.pdf

Avhandlingens struktur

1. Innledning
2. Teori
3. Metode
4. Resultater
5. Diskusjon
6. Konklusjon
7. Referanser

1. Innledning
2. Teori
3. Metode
4. Analyse
5. Drøfting
6. Avslutning
7. Referanser

Avhandlingen

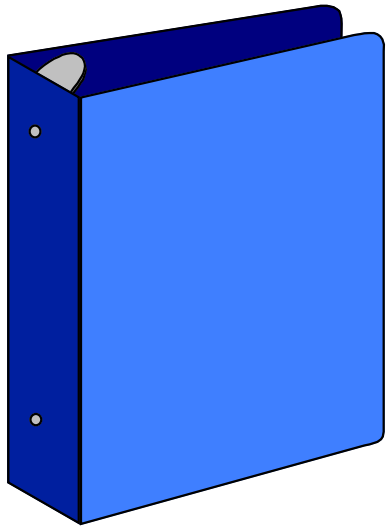
ALTERNATIVER

Avhandlingen: To typer

To typer avhandlinger:

- **Artikkelsamling**
- **Monografi**

Norge: En samling artikler
foretrekkes i medisin, helse, STEM-fag.



Avhandlingen: Artikkelsamling

- Studentene oppfordres til å publisere sine resultater i internasjonale tidsskrifter og/eller presentere sine resultater på internasjonale konferanser.
- På denne måten blir arbeidet stemplet, både i kvalitet og tid, og viktige korreksjoner og justeringer kan foreslås.
- Det blir også vanskeligere for en doktorgradskomite å “angripe” resultatene.

Avhandlingen: Artikkelsamling

Innhold:

1. Introduksjon / kappa (25-200 sider).
2. Artikler (3-5(7) publiserte artikler).

Avhandlingen: Artikkelsamling

En avhandling basert på publiserte artikler kan stå på mer stabile ben fordi:

- Den har vært (sterkt) eksponert for internasjonal evaluering («referee»).
- Forskningen ble “fortløpende” tidsstemplet. Dvs. at resultatene var (i alle fall) et bidrag på den tiden hvor det ble plublisert (dvs. før andre publiserte lignende resultater).

Avhandlingen: Artikkelsamling

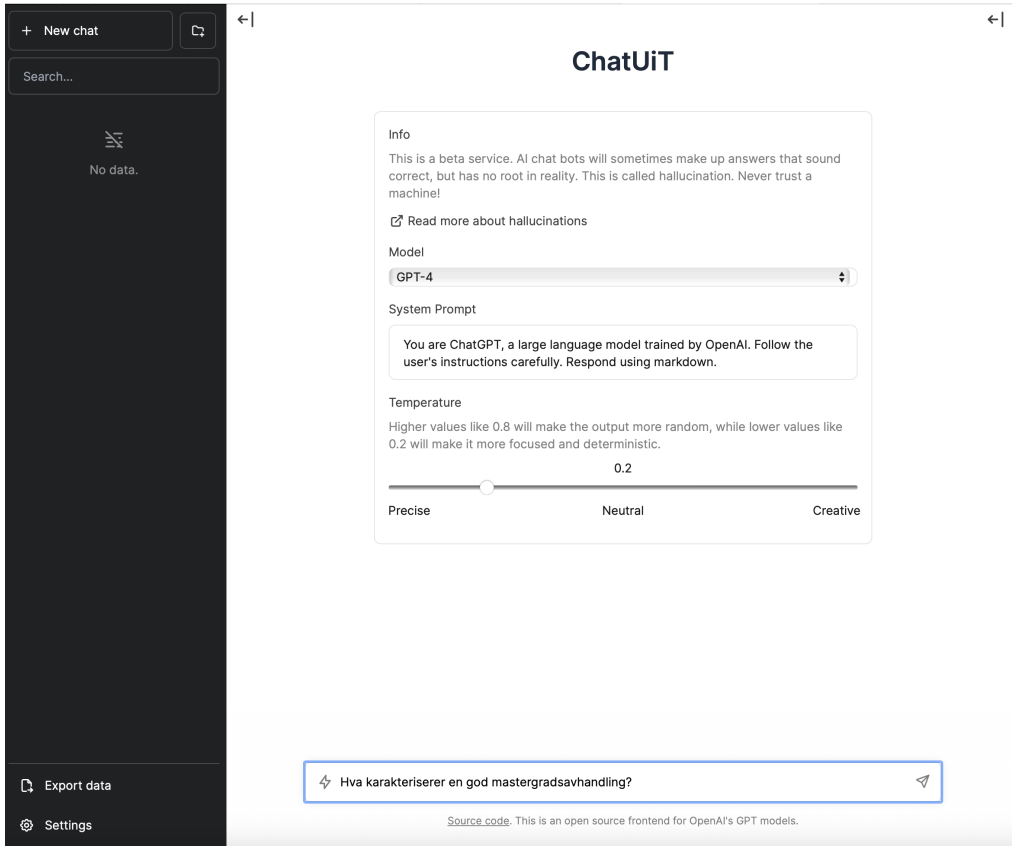
Problemer knyttet til en samling av artikler:

- Mindre dybde.
- Ofte vanskelig å gi en "rød tråd" gjennom alle artiklene.
- Det kan ta mer enn ett år fra innsending til aksept av artikkelen (og aksepten kan være betinget).

Avhandlingen

KARAKTERISTIKA

(MSc vs. PhD)



Hva karakteriserer en god mastergrads-avhandling?

Hva karakteriserer en god doktorgrads-avhandling?

1. Originalitet og bidrag til feltet

Mastergrad

Nyskapende forskning: Avhandlingen bør presentere original forskning eller en ny tilnærming til et eksisterende problem.

Bidrag til kunnskap: Arbeidet skal bidra til det akademiske feltet, enten ved å utvide, utfordre eller forbedre eksisterende kunnskap.

Doktorgrad

Banebrytende forskning: Avhandlingen skal presentere original forskning som utvider grensene for kunnskap innenfor det spesifikke fagfeltet.

Betydelig bidrag: Arbeidet skal representere et betydelig bidrag til fagfeltet, og det forventes at deler av forskningen publiseres i anerkjente fagfellevurderte tidsskrifter.

2. Forskningsspørsmål og hypoteser

Mastergrad

Klart definerte spørsmål: Forskningsspørsmålene skal være tydelig formulert og fokuserte.

Velbegrunnede hypoteser: Hypotesene bør være logisk avledet fra litteraturen og gi en retning for forskningen.

Doktorgrad

Dybde og kompleksitet: Forskningsspørsmålene skal være dyptgående og reflektere kompleksiteten i det valgte forskningsområdet.

Innovative hypoteser: Hypotesene bør være innovative og ha potensial til å åpne for nye forskningsveier eller teorier.

3. Teoretisk rammeverk

Mastergrad

Relevant teori: Avhandlingen skal vise en grundig forståelse av relevant teori og forskning innenfor emnet.

Integrering av teori og praksis: Teorien bør anvendes på en måte som støtter analysen og diskusjonen av forskningsfunnene.

Doktorgrad

Avansert teoretisk forståelse: Avhandlingen skal demonstrere en avansert forståelse av det teoretiske rammeverket og kritisk behandling av eksisterende litteratur.

Teoretisk bidrag: I tillegg til empiriske bidrag, kan avhandlingen også tilby nye teoretiske innsikter eller modeller.

4. Metode

Mastergrad

Egnet metodevalg: Forskningsmetodene som brukes skal være passende for å svare på forskningsspørsmålene.

Metodisk nøyaktighet: Metodene skal utføres med presisjon og være godt begrunnet og dokumentert.

Doktorgrad

Rigorøs metodisk tilnærming: Forskningsmetodene skal være spesielt rigorøse og kan inkludere utvikling av nye metodiske tilnærminger.

Gjennomsiktighet og reproduser-barhet: Metodene og prosessene skal dokumenteres grundig slik at forskningen kan reproduseres og verifiseres av andre.

5. Analyse og diskusjon

Mastergrad

Grundig analyse: Dataene som samles inn skal analyseres på en grundig og kritisk måte.

Kritisk diskusjon: Resultatene skal diskuteres i lys av eksisterende forskning, og avhandlingen skal reflektere over styrker, svakheter, og implikasjoner av funnene.

Doktorgrad

Sofistikert analyse: Dataanalyse skal være sofistikert og kan inkludere komplekse statistiske eller kvalitative teknikker som er egnet for analyse av forskningsdataene.

Dyptgående diskusjon: Diskusjonen skal være dyptgående og reflektere over de bredere implikasjonene av forskningen, både teoretisk og praktisk.

6. Struktur og organisering

Mastergrad

Logisk struktur: Avhandlingen skal ha en klar og logisk struktur som følger en anerkjent akademisk format.

Kohesjon og flyt: Teksten skal flyte godt, med en klar sammenheng mellom kapitler og seksjoner.

Doktorgrad

Kohesiv struktur: Avhandlingen skal ha en kohesiv og logisk struktur som effektivt kommuniserer forskningens omfang og dybde.

Integrering av arbeid: Avhandlingen kan integrere flere publiserte eller publiserbare arbeider som en sammenhengende helhet.

7. Akademisk skriving

Mastergrad

Klarhet: Språket skal være klart, presist og akademisk.

Korrekt referansestil: Kilder og referanser skal være korrekt sitert og formatert i henhold til relevante akademiske konvensjoner.

Doktorgrad

Ekspertnivå-skriving: Skrivingen skal være på ekspertnivå, med presis og klar kommunikasjon av komplekse ideer.

Profesjonell referansestil: Referanser og sitater skal være feilfrie og følge de mest avanserte standardene for akademisk integritet.

8. Konklusjon

Mastergrad

Tydelige konklusjoner: Avhandlingen skal avsluttes med klare konklusjoner som oppsummerer forskningens hovedfunn.

Fremtidig forskning: Det bør gis forslag til hvordan forskningen kan utvides eller forbedres i fremtidige studier.

Doktorgrad

Omfattende konklusjoner: Konklusjonene skal være omfattende og tydelig vise hvordan forskningen har bidratt til kunnskap innen fagfeltet.

Anbefalinger for fremtidig forskning: Avhandlingen skal foreslå områder for fremtidig forskning som bygger på doktorandens arbeid.

9. Presentasjon

Mastergrad

Profesjonelt utseende: Dokumentet skal være pent formatert, med konsistent bruk av skrifttyper, overskrifter og avsnittsstil.

Korrekturlest: Teksten skal være fri for skrivefeil, grammatiske feil og typografiske feil.

Doktorgrad

Profesjonell presentasjon: Dokumentet skal være profesjonelt presentert og formatert i henhold til institusjonens retningslinjer.

Feilfri: Teksten skal være grundig korrekturlest og fri for skrivefeil og grammatiske feil.

10. Etikk

Mastergrad

Forskningsetikk: Forskningen skal utføres på en etisk forsvarlig måte, med nødvendige godkjenninger og samtykker.

Akademisk integritet: Arbeidet skal være fritt for plagiat og gi en ærlig rapport om forskningsprosessen.

Doktorgrad

- **Høy etisk standard:** Forskningen skal holde en høy etisk standard, inkludert behandling av deltakere, data

Hvor lang er en avhandling?

Det er ikke noe universelt svar på "hvor lang er en avhandling?" Sidelengden eller antall ord varierer avhengig av grad, studieretning, skole og land.

Hva forventer vi som veiledere og sensorer?

- **Bachelor's:** 10.000–15.000 ord (35–50 sider)
- **Master's:** 18.000–22.000 ord (65–80 sider)
- **Doctorate:** 80.000–100.000 ord (200–300 sider)

Hvor lang er en avhandling?

En doktorgradsavhandling er en omfattende oppgave – man skriver egentlig en bok.

Husk imidlertid at disse tallene bare er estimater, og at faktiske lengder er mer fleksible.

For eksempel har avhandlinger for vitenskap, teknologi, ingeniørfag og matematikkfelt en tendens til å være kortere enn ikke-STEM-avhandlinger.

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Forsiden | Forskning

Tilstand av kontrollert panikk

Nysgjerrigper. Å finne ut noe ingen visste fra før, er Anne Serine Ognedals fremste motivasjonskraft. Hun forsker på plaststrukturer som krysset hun har foran seg.
FOTO: TORE OKSHOLEN

Å være doktorgradsstipendiat er å finne seg til rette i en tilstand av kontrollert panikk. Men det går bra, bare man

Relaterte artikler

- Dårlig oversikt over stipendiatene
- Stipendiatene i støpeskeien

25.11.2010

Forskning

EU-stipend til Moser

Dansk forskerkomet mistenkt for grovt juks

Tilstand av kontrollert panikk

All forskning i èn kurv

Publisering stadig mindre verdt

Forskning

- Jeg burde kanskje ikke fortelle dette, men æsj - det var en stipendiat for noen år siden som sa det sånn: Å ta doktorgraden er som å stange hodet i en vegg til hullet blir så stort at man kommer seg igjennom. Jeg vet ikke om han ble ferdig.

Anne Serine Ognedal tar sin doktorgrad ved Institutt for konstruksjonsteknikk, og hun har det bra.

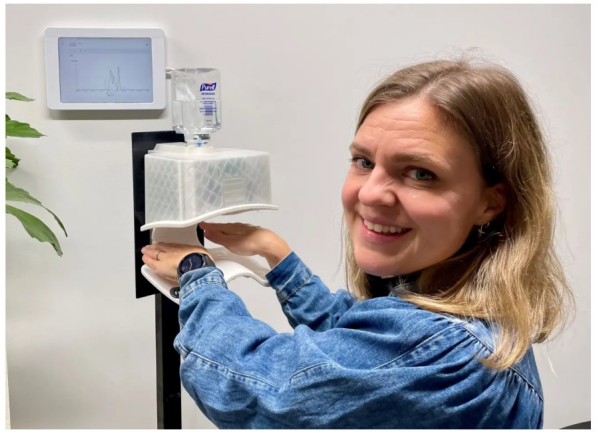
- Jeg har to veiledere, og er medlem av en forskergruppe, forteller hun. Så om hun skulle føle at hun stanger hodet i veggen, har hun noen å gå til.

- Veilederne stikker stadig hodet inn døra og spør hvordan det går. Om man blir sittende med et problem, er det alltid noen å gå til, noen å ta faglige diskusjoner med. Noen som kan motivere deg.

Tekna

Søk Logg inn In English Meny

Forsiden / Tekna Magasinet



UKAS TEKNA-MEDLEM: Anne Serine Ognedal er denne ukas Tekna-medlem. Foto: Privat.

Ukas Tekna-medlem: – Kanskje vi burde invitere flere realfagselever på jobben?

– Det er en kjent sak for alle Tekna-medlemmer at ingeniører har det gøy på jobb. La oss vise det til barn og unge også!

Tekna Magasinet
Publisert: 6. nov. 2023

TEKST
Sondre Tallaksrud

FOTO
Privat

Hver uke stiller vi de samme 10 spørsmålene til ulike Tekna-medlemmer. Denne uka er det Anne Serine Ognedals (40) tur:

Utdanning: Jeg er maskiningeniør fra Produktutvikling og Produksjon på NTNU. Derfra har jeg også en doktorgrad på temaet "Store deformasjoner i plastmaterialer".

Yrke: Jeg jobber med produktutvikling i en tidlig-fase startup som heter Resani.

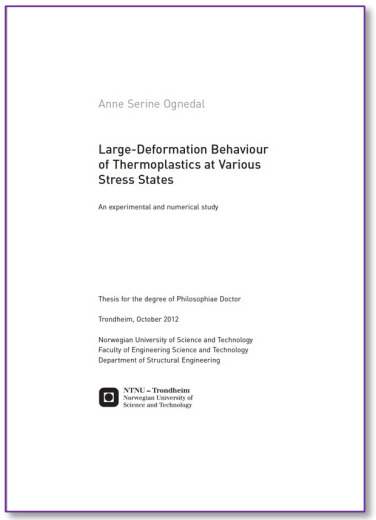
– Hva er morgenrutinen din?

Resani

Anne Serine Ognedal · 3rd
✋HW Engineering Lead Resani🤚
Stavanger, Rogaland, Norway · Contact info
www.resani.com
838 followers · 500+ connections

+ Follow Message More

Norges teknisk-naturvitenskapelige universitet (NTNU)



Anne Serine Ognedal

Large-Deformation Behaviour of Thermoplastics at Various Stress States

An experimental and numerical study

Thesis for the degree of Philosophiae Doctor

Trondheim, October 2012

Norwegian University of Science and Technology
Faculty of Engineering Science and Technology
Department of Structural Engineering

NTNU – Trondheim
Norwegian University of Science and Technology

NTNU
5 yrs 11 mos
Trondheim Area, Norway

Postdoctoral Fellow
Nov 2012 - Jul 2014 · 1 yr 9 mos

SIMLab - Structural Impact Laboratory - NTNU
NTNU's Structural Impact Laboratory (SIMLab) works on developing methods and tools for the virtual product...

PhD Candidate
Sep 2008 - Nov 2012 · 4 yrs 3 mos

SFI SIMLab

Large-deformation behaviuor of thermoplastics at various stress states. An experimental and numerical study.

Product Developer
Laerdal Medical
Aug 2007 - Aug 2008 · 1 yr 1 mo

Education

Norwegian University of Science and Technology (NTNU)
Doctor of Philosophy (PhD), Applied mechanics
2008 - 2012

Norwegian University of Science and Technology (NTNU)
Master of Science (MSc), Mechanical Engineering (Applied Mechanics)
2002 - 2007

Problemanalyse vs. Thesis Proposal

Problemanalyse

1. Problemanalyse
   a) Gjennomgang av eksisterende litteratur [med formål om å avdekke uløste problemer]
   b) (Gjennomgang av eksisterende applikasjoner/teknologi/utstyr/...)
   c) (Gjennomgang av annen kunnskap relatert til området)
   d) Problemavgrensning
   e) Problemstilling
      i. Forskningsspørsmål, delproblem

Hvordan starte et problemorientert prosjekt?

- Første undring
  - Finn et problem fra praksis som du undrer deg over, noe som ikke er slik du mener det bør være ut ifra din viten/kunnskap
  - Undersøk noe du ikke vet
  - Problemet skal ikke være hypotetisk, men reelt
  - Helsefokus

- Formulere en foreløpig problemstilling

“If one wants to solve a [research] problem, one must generally know what the problem is”

(Kerlinger and Lee, 2000, p. 24 i Ellis and Levy, 2008)

“The identification of the research problem is the most difficult and important part of the whole [research] process! ”

(Kerlinger and Lee, 200, p. 15 i Ellis and Levy, 2008)

"Nothing can be so amusingly arrogant as a young man who has just discovered an old idea and thinks it is his own."

--Sidney J. Harris

Sydney J. Harris (1917 - 1986)

Avhandlingen

PERFEKT?

FORSKERHÅNDBOKEN

Den "perfekte" doktorgradsavhandlingen er

- Ubetinget akseptert av bedømmelseskomiteen

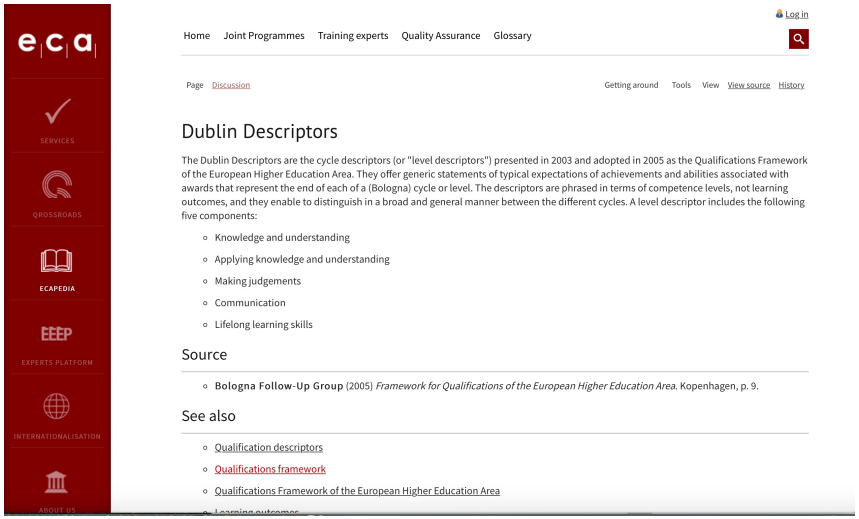
I tillegg:

- Resultater publisert i høyt rangerte tidsskrifter
- Resultater presentert på høyt rangerte internasjonale konferanser
- Ferdig innen nomert tide (3 eller 4 år ahengig av m/u pliktarbeid)
- Gi opphav til andre avhandlinger og forskningsprosjekter
- Føre til sysselsetting
- Ph.d.-kandidaten annerkjennes som ekspert på sitt område

An expert is a man who has made all the mistakes, which can be made, in a very narrow field.

Niels Henrik David Bohr 1885-1962
[Edward Teller, 10 October 1972, US Embassy]

En perfekt ph.d. avhandling oppfyller alle krav i “the Dublin Descriptors”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QROSSROADS
ECAPEDIA
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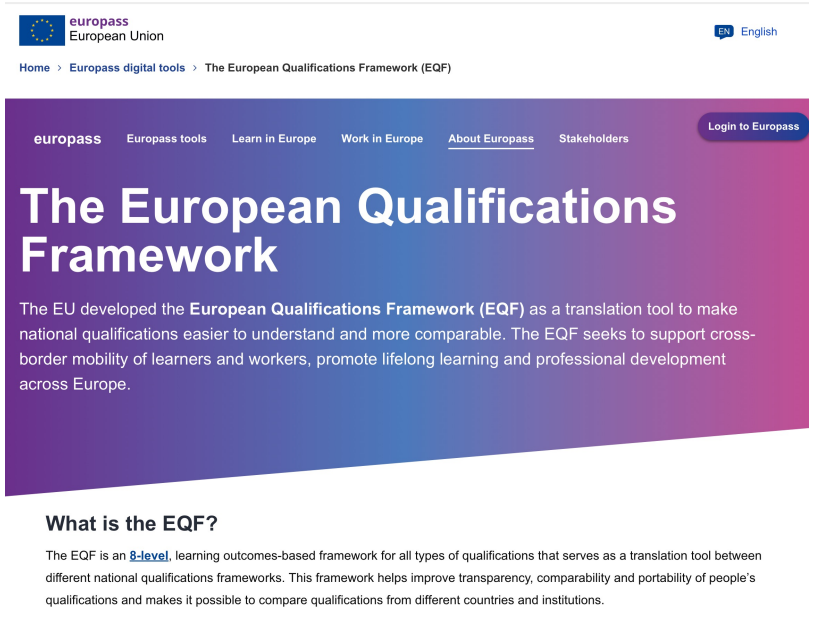
Dublin Descriptors
The Dublin Descriptors are the cycle descriptors (or "level descriptors") presented in 2003 and adopted in 2005 as the Qualifications Framework of the European Higher Education Area. They offer generic statements of typical expectations of achievements and abilities associated with awards that represent the end of each of a (Bologna) cycle or level. The descriptors are phrased in terms of competence levels, not learning outcomes, and they enable to distinguish in a broad and general manner between the different cycles. A level descriptor includes the following five components:
Knowledge and understanding
Applying knowledge and understanding
Making judgements
Communication
Lifelong learning skills
Source
Bologna Follow-Up Group (2005) Framework for Qualifications of the European Higher Education Area. Kopenhagen, p. 9.
See also
Qualification descriptors
Qualifications framework
Qualifications Framework of the European Higher Education Area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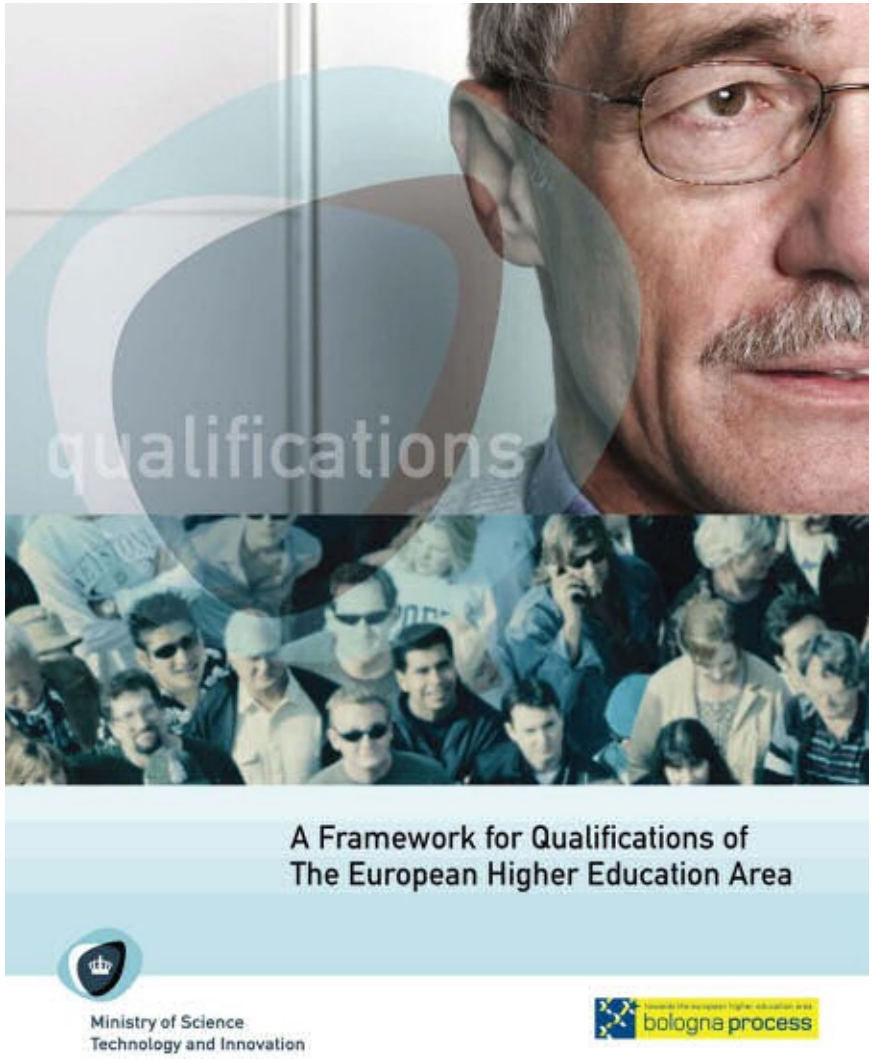
The European Qualifications Framework
The EU developed the European Qualifications Framework (EQF) as a translation tool to make national qualifications easier to understand and more comparable. The EQF seeks to support cross-border mobility of learners and workers, promote lifelong learning and professional development across Europe.
What is the EQF?
The EQF is an 8-level, learning outcomes-based framework for all types of qualifications that serves as a translation tool between different national qualifications frameworks. This framework helps improve transparency, comparability and portability of people's qualifications and makes it possible to compare qualifications from different countries and institutions.


qualifications
A Framework for Qualifications of
The European Higher Education Area
Ministry of Science
Technology and Innovation
bologna process

Appendix III: Overarching Framework of Qualifications of the European Higher Education Area (revised 2018)

THE FRAMEWORK OF QUALIFICATIONS FOR THE EUROPEAN HIGHER EDUCATION AREA

The Paris Conference of European Ministers Responsible for Higher Education 24-25 May 2018 adopted the revised overarching framework for qualifications in the EHEA, implementing the commitment in the Yerevan Communiqué. The revised overarching framework for qualifications in the EHEA comprises the short cycle, the first cycle, the second cycle and the third cycle generic descriptors for each cycle based on learning outcomes and competences, and credit ranges in the short cycle, first and second cycles. Ministers committed themselves to elaborating national frameworks for qualifications compatible with the overarching framework for qualifications in the EHEA. While recognising that each country decides whether and how to incorporate short cycle qualifications within its own national framework, the Paris Communiqué underlined the role ECTS-based short cycle qualifications play in preparing students for employment and further studies as well as in improving social cohesion.

Qualifications Framework for the European Higher Education Area (QF-EHEA)		
	Learning outcomes	ECTS credits
Short cycle qualifications	Qualifications that signify completion of the higher education **short cycle** are awarded to students who: - have demonstrated knowledge and understanding in a field of study that builds upon general secondary education and is typically at a level supported by advanced textbooks; such knowledge provides an underpinning for a field of work or vocation, personal development, and further studies to complete the first cycle; - can apply their knowledge and understanding in occupational contexts; - have the ability to identify and use data to formulate responses to well-defined concrete and abstract problems; - can communicate about their understanding, skills and activities, with peers, supervisors and clients; - have the learning skills to undertake further studies with some autonomy.	Typically include 90-120 ECTS credits
First cycle qualification	Qualifications that signify completion of **the first cycle** are awarded to students who: • have demonstrated knowledge and understanding in a field of study that builds upon their general secondary education, and is typically at a level that, whilst supported by advanced textbooks, includes some aspects that will be informed by knowledge of the forefront of their field of study; • can apply their knowledge and understanding in a manner that indicates a professional approach to their work or vocation, and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study;	Typically include 180-240 ECTS credits

	• have the ability to gather and interpret relevant data (usually within their field of study) to inform judgments that include reflection on relevant social, scientific or ethical issues; • can communicate information, ideas, problems and solutions to both specialist and non-specialist audiences; • have developed those learning skills that are necessary for them to continue to undertake further study with a high degree of autonomy.	
Second cycle qualification	Qualifications that signify completion of **the second cycle** are awarded to students who: • have demonstrated knowledge and understanding that is founded upon and extends and/or enhances that typically associated with the first cycle, and that provides a basis or opportunity for originality in developing and/or applying ideas, often within a research context; • can apply their knowledge and understanding, and problem solving abilities in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their field of study; • have the ability to integrate knowledge and handle complexity, and formulate judgments with incomplete or limited information, but that include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments; • can communicate their conclusions, and the knowledge and rationale underpinning these, to specialist and non-specialist audiences clearly and unambiguously; • have the learning skills to allow them to continue to study in a manner that may be largely self-directed or autonomous.	Typically include 90-120 ECTS credits, with a minimum of 60 credits at the level of the 2nd cycle
Third cycle qualification	Qualifications that signify completion of **the third cycle** are awarded to students who: • have demonstrated a systematic understanding of a field of study and mastery of the skills and methods of research associated with that field; • have demonstrated the ability to conceive, design, implement and adapt a substantial process of research with scholarly integrity; • have made a contribution through original research that extends the frontier of knowledge by developing a substantial body of work, some of which merits national or international refereed publication; • are capable of critical analysis, evaluation and synthesis of new and complex ideas; • can communicate with their peers, the larger scholarly community and with society in general about their areas of expertise; • can be expected to be able to promote, within academic and professional contexts, technological, social or cultural advancement in a knowledge based society.	Not specified

1.http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/QF-EHEA-May2005.pdf

Dublin Descriptors

Dublin Descriptors, (en del av Bologna-prosessen), beskriver flere av **kvalifikasjonene man bør kreve ved fullført doktorgrad**:

- ha vist en systematisk forståelse av et fagområde og mestring av ferdigheter og metoder for forskning knyttet til dette feltet;
- ha demonstrert evnen til å tenke, designe, implementere og tilpasse en betydelig forskningsprosess med vitenskapelig integritet;

1.http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/QF-EHEA-May2005.pdf

Dublin Descriptors

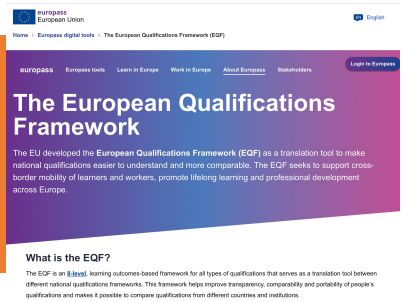
- ha bidratt gjennom original forskning som utvider kunnskapsgrensen ved å utvikle et betydelig arbeid, hvorav noen fortjener nasjonal eller internasjonal fagfellevurdert publisering;
- er i stand til kritisk analyse, evaluering og syntese av nye og komplekse ideer;

1.http://www.ond.vlaanderen.be/hogeronderwijs/bologna/documents/QF-EHEA-May2005.pdf

Dublin Descriptors

- kan kommunisere med fagfeller, det større fagmiljøet og med samfunnet generelt om sine kompetanseområder;
- kan forventes å kunne fremme, innenfor faglige og faglige sammenhenger, teknologisk, sosial eller kulturell utvikling i et kunnskapsbasert samfunn.

Level 8 – learning outcomes



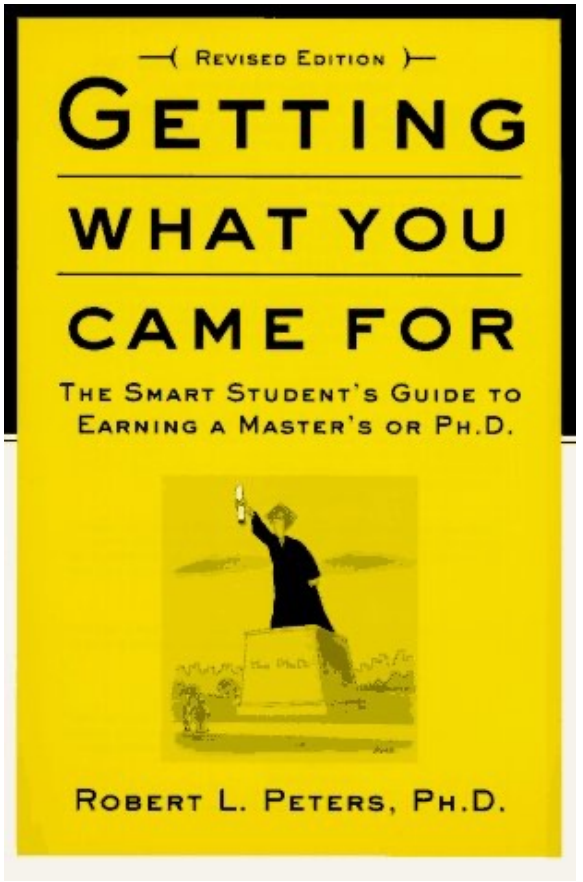
Kunnskap	**Ferdigheter**	**Ansvar og autonomi**
Kunnskap på den mest avanserte grensen til et arbeidsfelt eller studie og i grensesnittet mellom felt.	De mest avanserte og spesialiserte ferdigheter og teknikker, inkludert syntese og evaluering, som kreves for å løse kritiske problemer i forskning og/eller innovasjon og for å utvide og omdefinere eksisterende kunnskap eller faglig praksis.	Demonstrere betydelig autoritet, innovasjon, autonomi, vitenskapelig og faglig integritet og vedvarende forpliktelse til utvikling av nye ideer eller prosesser i forkant av arbeid eller studiekontekster, inkludert forskning.

Tilbake til IMRAD (IMRoD)

Robert L. Peters' story:

Da jeg tok doktorgrad i fiskeadferd ved Stanford på slutten av 1970-tallet, gjorde jeg nesten alt galt. Det tok meg åtte lange, smertefulle år å få min grad, og da jeg var ferdig ville jeg aldri jobbe med fisk igjen. Jeg hadde problemprofessorer og problemfisk, og gikk til slutt tom for penger.

%



Jeg brukte det siste året på å skrive avhandlingen min på en gammel bærbar skrivemaskin i en liten leilighet i Austin, Texas, med utsikt over Jorges Uptown Enchilada Bar and Grill, mens jeg jobbet som servitør på en ferskfiskrestaurant - ikke min ide om avhandlingsrelatert sysselsetting.

Poenget er at alt avhandlingsarbeidet mitt, inkludert kursarbeid, kunne ha blitt fullført på tre år hvis jeg hadde visst hva jeg gjorde. "

Avhandlingen (MSc, ph.d.)

Mulig organisering av arbeidet

Mulig organisering av prosjektet (1)

1. Sett sammen en (foreløpig) oversikt over kunnskapen på området (litteratur, state-of-the-art): Hvor finnes de hvite flekkene på kartet? Hva velger du å fokusere på?
2. Lag en foreløpig tittel.
3. Gjennomfør en systematisk litteratur review. (Hvis naturlig: gjennomfør test av sentrale deler av det valgte tema)
4. (Timeout: Skaff finansiering til å gjennomføre forskningen)
5. Skriv (deler av) metodekapitlet. Utarbeid en protokoll.
6. Søk godkjenning (REK, pasientombud, SIKT) hvis nødvendig.
7. Den eksperimentelle/kliniske delen starter ...

Mulig organisering av prosjektet (2)

8. Skisser de viktigste delene av introdusjonskapitlet («Chapter 1. Introduction» er en miniversjon av rapporten.)
9. Start arbeidet med resultatkapitlet: Sett sammen resultatene (aggregerte data, rådata) i tabeller, figurer og tekstelementer. (Rådata skal plasseres i et Appendix.)
10. Identifiser de viktigste funn/konklusjonene.
11. Skriv resultatkapitlet.
12. Skriv diskusjonskapitlet og fyll inn det som mangler i introduksjonskapitlet.
13. Skriv avslutningskapitlet (Conclusion) og forslag til videre arbeid (further work)
14. Skriv sammendraget (abstract), forord (preface), takksigelser (acknowledgement) og – hvis nødvendig – juster tittelen.

Avhandlingen (MSc, ph.d.)

(Mulig) Struktur

Avhandlingens struktur

1. Introduksjon

1.1 Bakgrunn

1.2 Problemstilling

- 1.2.1 Hovedproblemet
- 1.2.2 Delproblemer
- 1.2.3 Forutsetninger
- 1.2.4 (Mål)

1.3 Metoder

1.4 Hovedfunn

1.5 Rapportens struktur

Avhandlingens struktur

2. Teori

2.1 Litteraturgjennomgang (systematisk)

2.2 State-of-the-art

2.3 (Registrer) Evalueringskriterier

PRISMA

TRANSPARENT REPORTING OF SYSTEMATIC REVIEWS AND META-ANALYSES

HOME | PRISMA STATEMENT | EXTENSIONS | TRANSLATIONS | PROTOCOLS | ENDORSEMENT | News

Welcome to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) website!

PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. PRISMA primarily focuses on the reporting of reviews evaluating the effects of interventions, but can also be used as a basis for reporting systematic reviews with objectives other than evaluating interventions (e.g. evaluating aetiology, prevalence, diagnosis or prognosis).

Who should use PRISMA?

- Authors: PRISMA aims to help authors improve the reporting of systematic reviews and meta-analyses.
- Journal Peer reviewers and editors: PRISMA may also be useful for critical appraisal of published systematic reviews, although it is not a quality assessment instrument to gauge the quality of a systematic review.

News Feed

PRISMA Website re-design

The PRISMA website underwent a much-needed update in October 2015 to update the content of the website. We have updated the look of the site and added the PRISMA extensions, translations, and information about review protocols.

PRISMA Extensions!

Several PRISMA extensions have been published in 2015 so far.

- PRISMA-P for developing review protocols was published in January 2015 in *Systematic Reviews* and the *BMJ*.
- PRISMA-IPD (individual patient data) was published in *JAMA* in April
- PRISMA-NMA (Network Meta-Analyses) was published in *Annals of Internal Medicine* in June

These are in addition to the PRISMA Abstract and Equity extensions, all found on the PRISMA website, here.

Read more...

http://prisma-statement.org

Key Documents

- PRISMA 2020 Checklist
- PRISMA 2020 flow diagram
- PRISMA 2020 Statement
- PRISMA 2020 Explanation and Elaboration

Tweets from @PRISMAStatement

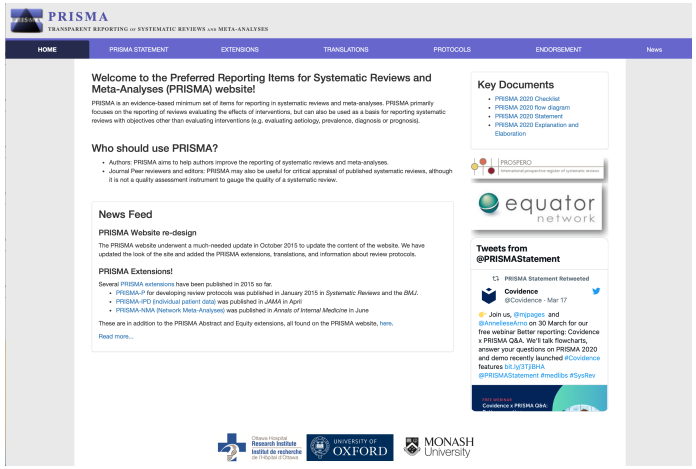
PRISMA Statement Retweeted

Covidence
@Covidence · Mar 17

👉 Join us, @mjpages and @AnnelieseArno on 30 March for our free webinar Better reporting: Covidence x PRISMA Q&A. We'll talk flowcharts, answer your questions on PRISMA 2020 and demo recently launched #Covidence features bit.ly/3TjiBHA @PRISMAStatement #medlibs #SysRev

Ottawa Hospital Research Institute
Institut de recherche de l'Hôpital d'Ottawa

MONASH University



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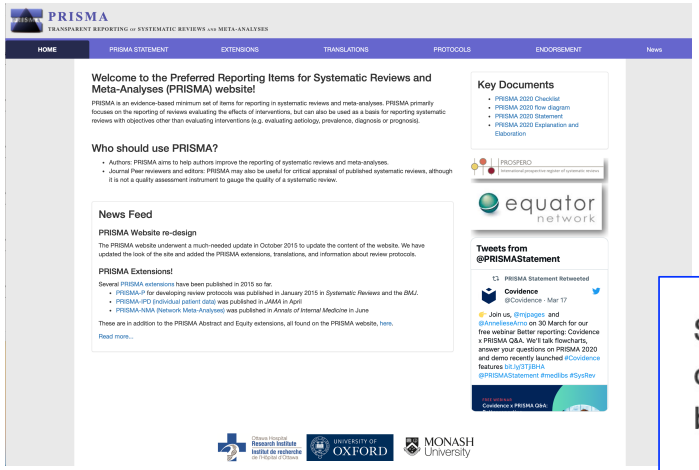

PRISMA Extensions!

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- PRISMA-IPD (individual patient
- PRISMA-NMA (Network Meta-A

These are in addition to the PRISMA A

Several extensions of the PRISMA Statement have been developed to facilitate the reporting of different types or aspects of systematic reviews. Please click on the relevant extension below for more information.

- PRISMA for Abstracts
- PRISMA for Acupuncture
- PRISMA for Diagnostic Test Accuracy
- PRISMA for EcoEvo
- PRISMA Equity
- PRISMA Harms (for reviews including Harm outcomes)
- PRISMA Individual Patient Data
- PRISMA for Network Meta-Analyses
- PRISMA for Protocols
- PRISMA for Scoping Reviews
- PRISMA for Searching
- Extensions in development

In this section you can find out more about the PRISMA Statement, obtain downloads of PRISMA documents, find out more about PRISMA development, and information about funding.

Find out more about the following here:

- PRISMA 2020 Statement
- PRISMA 2020 Explanation and Elaboration (E&E)
- PRISMA 2020 checklist
- PRISMA 2020 flow diagram
- History and development of PRISMA 2020
- Funding
- Citing and using PRISMA 2020

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PRISMA Statement

The PRISMA 2020 Statement was published in 2021. It consists of a checklist and a flow diagram, and is intended to be accompanied by the PRISMA 2020 Explanation and Elaboration document.

In order to encourage dissemination of the PRISMA 2020 Statement, it has been published in several journals.

- BMJ (OPEN ACCESS) Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71
- PLOS Medicine (OPEN ACCESS) Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. PLOS Medicine 2021;18(3):e1003583. doi: 10.1371/journal.pmed.1003583
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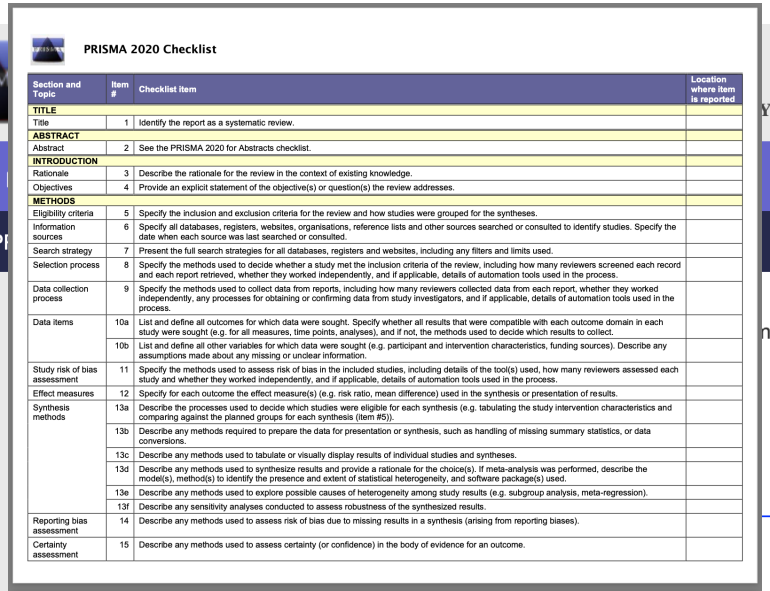
- International Journal of Surgery (OPEN ACCESS) Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. International Journal of Surgery 2021;88:105906. doi: 10.1016/j.ijsu.2021.105906

For more information about citing and using PRISMA click here.



PRISMA 2020 Checklist

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Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	
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Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	
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Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	
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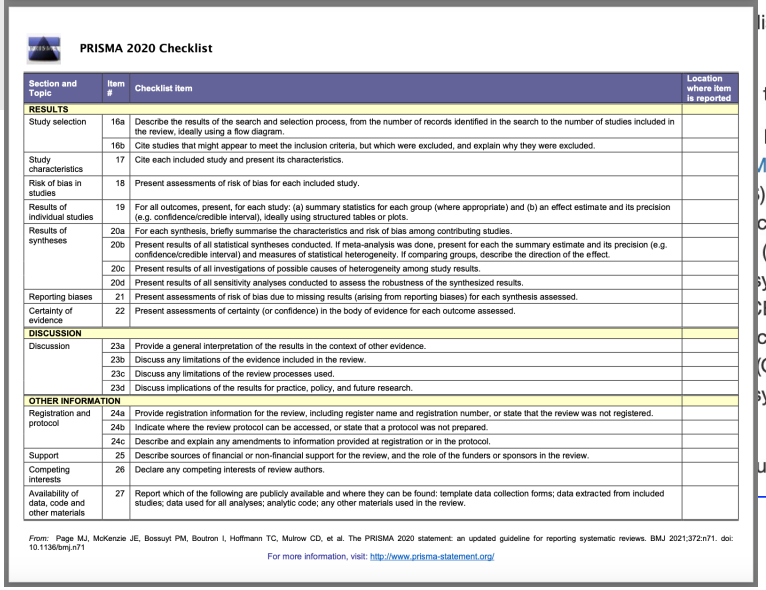
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	



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Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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YSES

TRANSLATIONS PROTOCOLS ENDORSEMENT News

Flow Diagram History & Development Funding Citing & Using PRISMA

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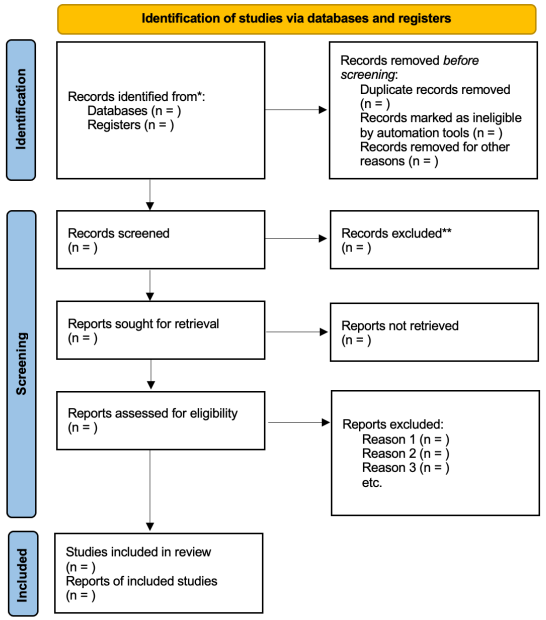
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	
	23b	Discuss any limitations of the evidence included in the review.	
	23c	Discuss any limitations of the review processes used.	
	23d	Discuss implications of the results for practice, policy, and future research.	
OTHER INFORMATION			
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	
	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	
Competing interests	26	Declare any competing interests of review authors.	
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

For more information, visit: http://www.prisma-statement.org/

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

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For more information, visit: http://www.prisma-statement.org/

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addres	
METHODS			
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were g	
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and othe date when each source was last searched or consulted.	
Search strategy	7	Present the full search strategies for all databases, registers and websites, inclu	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of and each report retrieved, whether they worked independently, and if applicable,	
Data collection process	9	Specify the methods used to collect data from reports, including how many revie independently, any processes for obtaining or confirming data from study investig process.	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all resu study were sought (e.g. for all measures, time points, analyses), and if not, the m	
	10b	List and define all other variables for which data were sought (e.g. participant an assumptions made about any missing or unclear information.	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including study and whether they worked independently, and if applicable, details of autom	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference)	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synth comparing against the planned groups for each synthesis (item #5)).	
	13b	Describe any methods required to prepare the data for presentation or synthesis, conversions.	
	13c	Describe any methods used to tabulate or visually display results of individual stu	
	13d	Describe any methods used to synthesize results and provide a rationale for the model(s), method(s) to identify the presence and extent of statistical heterogenei	
	13e	Describe any methods used to explore possible causes of heterogeneity among	
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthes	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a syn	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of ev	

PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item
RESULTS		
Study selection	16a	Describe the results of the search and selection process, from the number of rec the review, ideally using a flow diagram.
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excl
Study characteristics	17	Cite each included study and present its characteristics.
Risk of bias in studies	18	Present assessments of risk of bias for each included study.
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (e.g. confidence/credible interval), ideally using structured tables or plots.
Results of syntheses	20a	For each synthesis, briefly summarise the characteristics and risk of bias among
	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, confidence/credible interval) and measures of statistical heterogeneity. If compar
	20c	Present results of all investigations of possible causes of heterogeneity among s
	20d	Present results of all sensitivity analyses conducted to assess the robustness of
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for eac
DISCUSSION		
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.
	23b	Discuss any limitations of the evidence included in the review.
	23c	Discuss any limitations of the review processes used.
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	24c	Describe and explain any amendments to information provided at registration or
Support	25	Describe sources of financial or non-financial support for the review, and the role
Competing interests	26	Declare any competing interests of review authors.
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: studies; data used for all analyses; analytic code; any other materials used in the

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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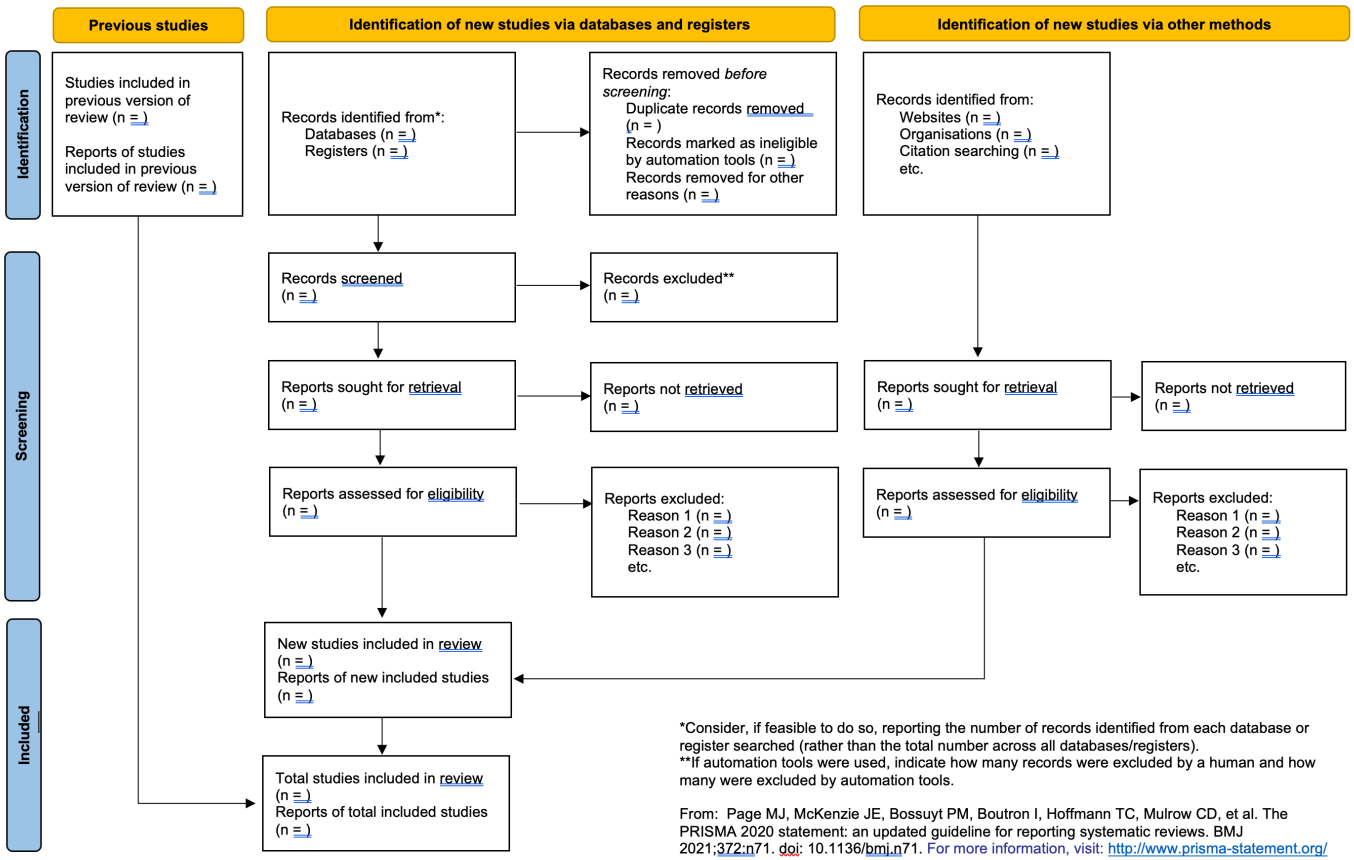
PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only

PRISMA 2020 flow diagram for updated systematic reviews which included searches of databases, registers and other sources



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Not sure which reporting guideline to use?
Reporting guidelines under development
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Reporting guidelines for main study types
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Observational studies STROBE Extensions
Systematic reviews PRISMA Extensions
Study protocols SPIRIT PRISMA-P
Diagnostic/prognostic studies STARD TRIPOD
Case reports CARE Extensions
Clinical practice guidelines AGREE RIGHT
Qualitative research SRQR COREQ
Animal pre-clinical studies ARRIVE
Quality improvement studies SQUIRE Extensions
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Peer reviewing research
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How to develop a reporting guideline
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The University of York Centre for Reviews and Dissemination
Funding
NIHR National Institute for Health Research
EQUATOR highlights
27/02/2023 - Automatic translation now available on the EQUATOR Network website
We're delighted to announce that our partnership with the Pan American Health Organization (PAHO/WHO) has resulted in http://www.equator-network.org becoming multilingual
6/01/2022 - ICMJE Recommendations updated to include new section on preprints
The International Committee of Medical Journal Editors (ICMJE) has updated its official Recommendations for journals and authors and now includes a whole new section about preprints. The document now sets out more detailed advice for journals and authors regarding preprints, […]
Interesting videos
EQUATOR Canada Publication School team educational video
The EQUATOR Canada Publication School team (consisting of patient partners and researchers) have launched an educational video resource, titled "How do I publish a paper? The introductory video provides viewers with practical guidance on how the publication team, consisting of patient/public partners and research team members, can work together to define roles and contributions throughout the publication process.
Centre for Journalology Speaker Series video
The Canadian EQUATOR Centre, home to the Centre for Journalology, has started a new Speaker Series for 2021. The first session in the series was held on the 14th of January and was presented by Dr Lisa Caulley, Dr Robert Frank, Hassan Khan, and Alicia Ricketts, from the Centre. They spoke about recent research on reporting guidelines, planned research examining open science hiring practices, and journal transparency. The recording of the talk is freely available.
News
CONSORT and PRISMA websites down – alternative ways to access the checklists
1/03/2023
Automatic translation now available on the EQUATOR Network website
27/02/2023
EQUATOR Network Newsletter January 2023
31/01/2023
EQUATOR Network Newsletter October 2022
31/10/2022
Launch of the EQUATOR Canada Publication School team educational video
9/09/2022
Sign-up to our newsletter to keep up-to-date with with the latest developments by email.
Latest guest blogger
What is the little thing you can do to increase reproducibility, replicability and trust in science?
5/10/2020
How can reporting quality interfere with reproducibility issues and overall trust in science results? With that question in mind, we participated in the Reproducibility, Replicability and Trust in Science conference organised by the Wellcome Genome Campus from 9 to 11 […]
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The UK EQUATOR Centre is hosted by the Centre for Statistics in Medicine (CSM), NDORMS, University of Oxford. The EQUATOR Network website and database is provided by the UK EQUATOR Centre.
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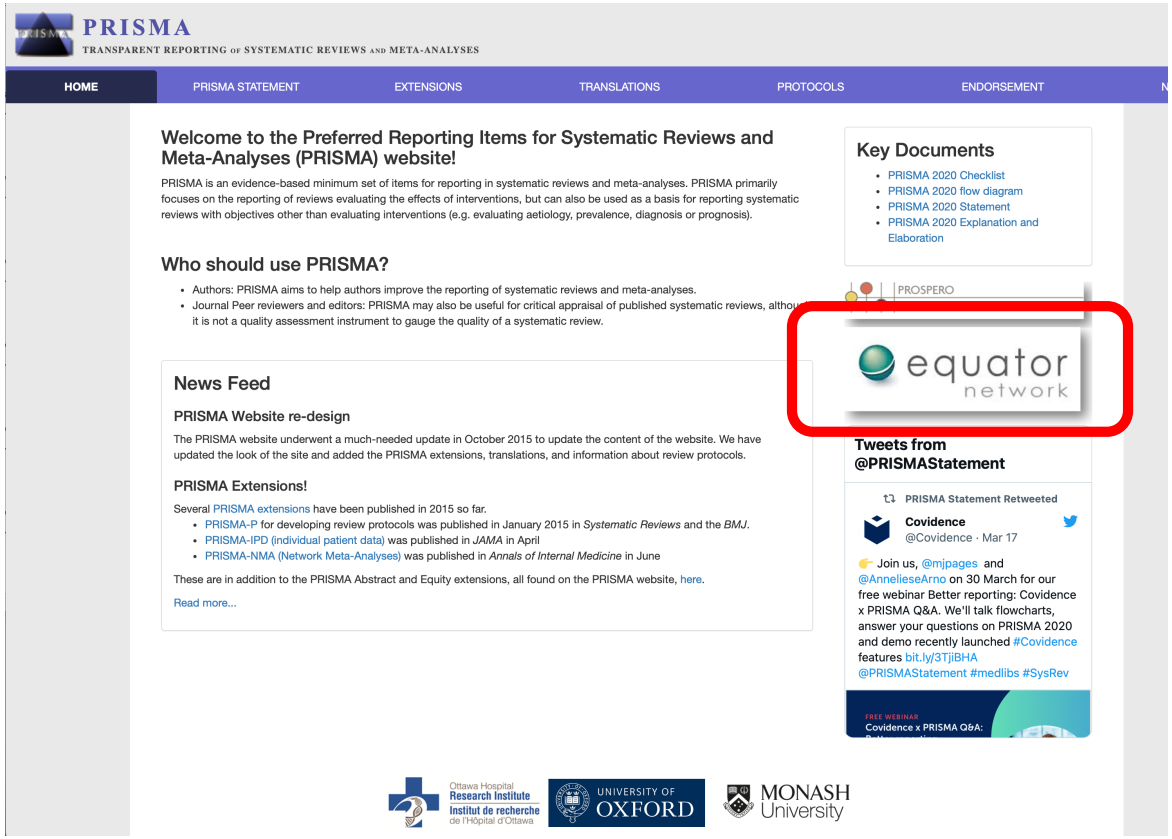
PRISMA
TRANSPARENT REPORTING OF SYSTEMATIC REVIEWS AND META-ANALYSES
HOME
PRISMA STATEMENT
EXTENSIONS
TRANSLATIONS
PROTOCOLS
ENDORSEMENT
Welcome to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) website!
PRISMA is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses. PRISMA primarily focuses on the reporting of reviews evaluating the effects of interventions, but can also be used as a basis for reporting systematic reviews with objectives other than evaluating interventions (e.g. evaluating aetiology, prevalence, diagnosis or prognosis).
Who should use PRISMA?
Authors: PRISMA aims to help authors improve the reporting of systematic reviews and meta-analyses.
Journal Peer reviewers and editors: PRISMA may also be useful for critical appraisal of published systematic reviews, although it is not a quality assessment instrument to gauge the quality of a systematic review.
News Feed
PRISMA Website re-design
The PRISMA website underwent a much-needed update in October 2015 to update the content of the website. We have updated the look of the site and added the PRISMA extensions, translations, and information about review protocols.
PRISMA Extensions!
Several PRISMA extensions have been published in 2015 so far.
PRISMA-P for developing review protocols was published in January 2015 in Systematic Reviews and the BMJ.
PRISMA-IPD (individual patient data) was published in JAMA in April
PRISMA-NMA (Network Meta-Analyses) was published in Annals of Internal Medicine in June
These are in addition to the PRISMA Abstract and Equity extensions, all found on the PRISMA website, here.
Read more...
Key Documents
PRISMA 2020 Checklist
PRISMA 2020 flow diagram
PRISMA 2020 Statement
PRISMA 2020 Explanation and Elaboration
PROSPERO
equator network
Tweets from @PRISMAStatement
PRISMA Statement Retweeted
Covidence
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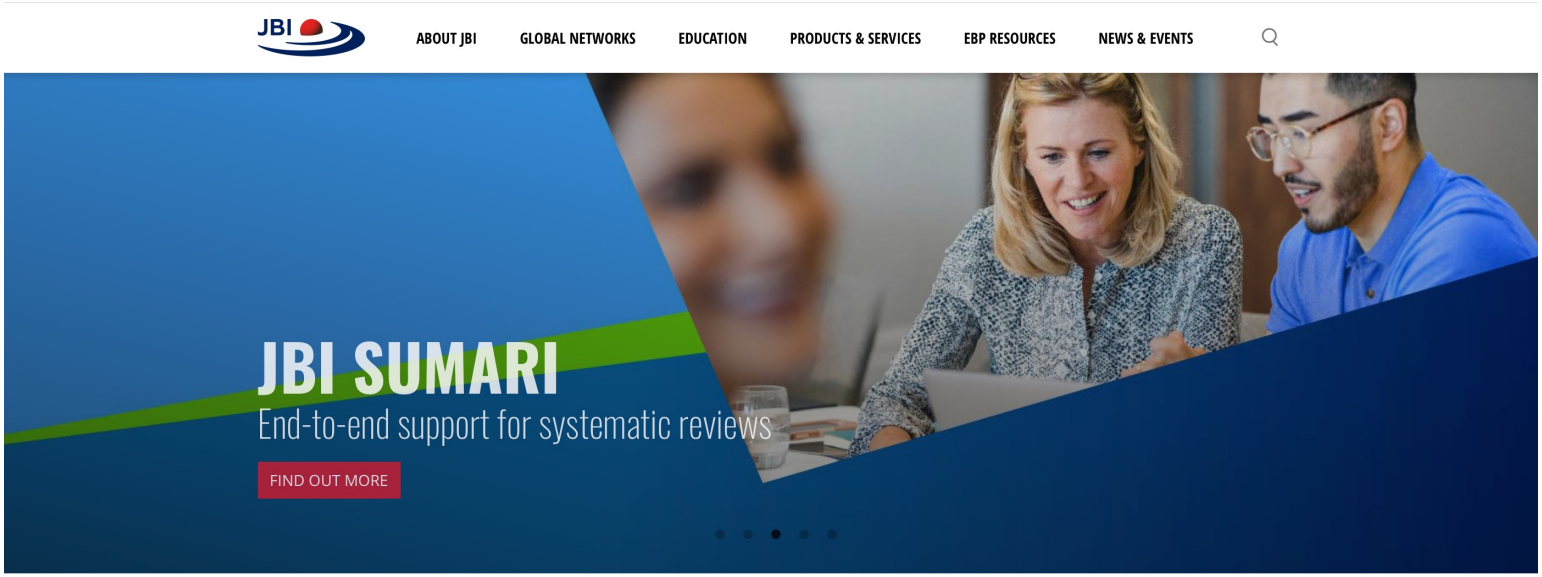


JBI is a global organisation promoting and supporting evidence-based decisions that improve health and health service delivery.

JBI offers a unique range of solutions to **access**, **appraise** and **apply** the best available evidence.

https://jbi.global

ACCESS EVIDENCE

JBI EBP DATABASE
The premier point-of-care resource for making evidence-informed healthcare decisions.

JBI EVIDENCE SYNTHESIS
A multidisciplinary journal publishing diverse, healthcare-related systematic reviews that move beyond effectiveness.

JBI EVIDENCE IMPLEMENTATION
This journal focuses on the science and practice of evidence implementation into healthcare policy and practice.

CRITICAL APPRAISAL TOOLS

JBI's critical appraisal tools assist in assessing the trustworthiness, relevance and results of published papers.

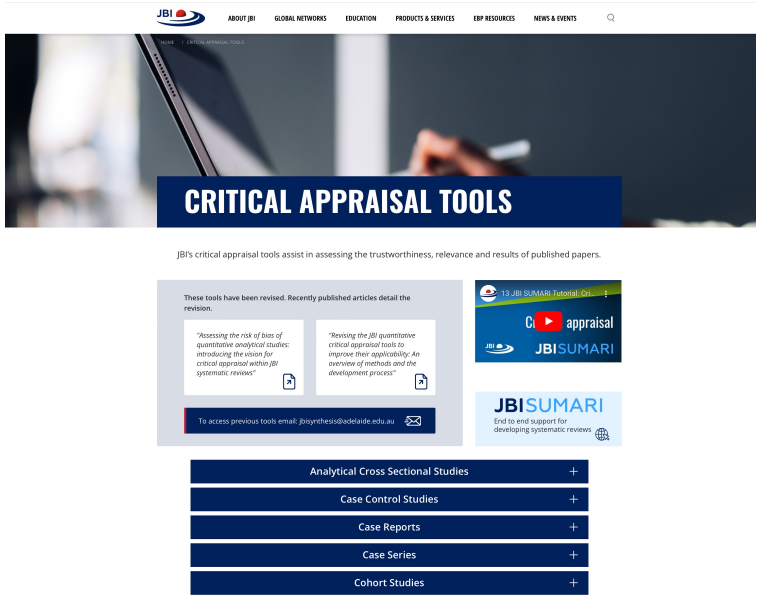
These tools have been revised. Recently published articles detail the revision.

"Assessing the risk of bias of quantitative analytical studies: introducing the vision for critical appraisal within JBI systematic reviews"

"Revising the JBI quantitative critical appraisal tools to improve their applicability: An overview of methods and the development process"

JBISUMARI

End to end support for



https://jbi.global/critical-appraisal-tools

To access previous tools email:
jbisynthesis@adelaide.edu.au

JBISUMARI
End to end support for developing systematic reviews

- Analytical Cross Sectional Studies +
- Case Control Studies +
- Case Reports +
- Case Series +
- Cohort Studies +
- Diagnostic Test Accuracy Studies +
- Economic Evaluations +
- Prevalence Studies +
- Qualitative Research +
- Quasi-Experimental Studies +
- Randomized Controlled Trials +
- Systematic Reviews +
- Text and Opinion +

Analytical Cross Sectional Studies +

Case Control Studies +

Case Reports +

Case Series +

Cohort Studies +

Diagnostic Test Accuracy Studies +

Economic Evaluations +

Prevalence Studies +

Qualitative Research +

Quasi-Experimental Studies +

Randomized Controlled Trials +

Systematic Reviews −

Checklist for Systematic Reviews

How to cite

COPY Aromataris E, Fernandez R, Godfrey C, Holly C, Kahlil H, Tungpunkom P. Summarizing systematic reviews: methodological development, conduct and reporting of an Umbrella review approach. Int J Evid Based Healthc. 2015;13(3):132-40.

Associated publication(s)

JBI Manual for Evidence Synthesis
Chapter 10: Umbrella Reviews

Text and Opinion +

CHECKLIST FOR SYSTEMATIC REVIEWS AND RESEARCH SYNTHESES

Critical Appraisal tools for use in JBI Systematic Reviews

jbi.global

JBI CRITICAL APPRAISAL CHECKLIST FOR SYSTEMATIC REVIEWS AND RESEARCH SYNTHESES

Reviewer_____ Date_____

Author_____ Year_____ Record Number_____

	Yes	No	Unclear	Not applicable
1. Is the review question clearly and explicitly stated?	☐	☐	☐	☐
2. Were the inclusion criteria appropriate for the review question?	☐	☐	☐	☐
3. Was the search strategy appropriate?	☐	☐	☐	☐
4. Were the sources and resources used to search for studies adequate?	☐	☐	☐	☐
5. Were the criteria for appraising studies appropriate?	☐	☐	☐	☐
6. Was critical appraisal conducted by two or more reviewers independently?	☐	☐	☐	☐
7. Were there methods to minimize errors in data extraction?	☐	☐	☐	☐
8. Were the methods used to combine studies appropriate?	☐	☐	☐	☐
9. Was the likelihood of publication bias assessed?	☐	☐	☐	☐
10. Were recommendations for policy and/or practice supported by the reported data?	☐	☐	☐	☐
11. Were the specific directives for new research appropriate?	☐	☐	☐	☐

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

INTRODUCTION

JBI is an international research organisation based in the Faculty of Health University of Adelaide, South Australia. JBI develops and delivers unique e software, education and training designed to improve healthcare practice 70 Collaborating Entities, servicing over 90 countries, JBI is a recognised gl healthcare.

JBI Systematic Reviews

The core of evidence synthesis is the systematic review of literature of a particular intervention, condition or issue. The systematic review is essentially an analysis of the available literature (that is, evidence) and a judgment of the effectiveness or otherwise of a practice, involving a series of complex steps. JBI takes a particular view on what counts as evidence and the methods utilised to synthesise those different types of evidence. In line with this broader view of evidence, JBI has developed theories, methodologies and rigorous processes for the critical appraisal and synthesis of these diverse forms of evidence in order to aid in clinical decision-making in healthcare. There now exists JBI guidance for conducting reviews of effectiveness research, qualitative research, prevalence/incidence, etiology/risk, economic evaluations, text/opinion, diagnostic test accuracy, mixed-methods, umbrella reviews and scoping reviews. Further information regarding JBI systematic reviews can be found in the JBI Evidence Synthesis Manual.

JBI Critical Appraisal Tools

All systematic reviews incorporate a process of critique or appraisal of the research evidence. The purpose of this appraisal is to assess the methodological quality of a study and to determine the extent to which a study has addressed the possibility of bias in its design, conduct and analysis. All papers selected for inclusion in the systematic review (that is – those that meet the inclusion criteria described in the protocol) need to be subjected to rigorous appraisal by two critical appraisers. The results of this appraisal can then be used to inform synthesis and interpretation of the results of the study. JBI Critical appraisal tools have been developed by the JBI and collaborators and approved by the JBI Scientific Committee following extensive peer review. Although designed for use in systematic reviews, JBI critical appraisal tools can also be used when creating Critically Appraised Topics (CAT), in journal clubs and as an educational tool.

JBI CRITICAL APPRAISAL CHECKLIST FOR SYSTEMA REVIEWS AND RESEARCH SYNTHESIS

How to cite: *Aromataris E, Fernandez R, Godfrey C, Holly C, Kahlil H, Tungpunkom P. Summar systematic reviews: methodological development, conduct and reporting of an Umbrella revie Int J Evid Based Healthc. 2015;13(3):132-40.*

When conducting an umbrella review using the JBI method, the critical appraisal instrument Reviews should be used.

The primary and secondary reviewer should discuss each item in the appraisal instrument fo included in their review. In particular, discussions should focus on what is considered accepta aims of the review in terms of the specific study characteristics. When appraising systematic revie discussion may include issues such as what represents an adequate search strategy or appropriate methods of synthesis. The reviewers should be clear on what constitutes acceptable levels of information to allocate a positive appraisal compared with a negative, or response of "unclear". This discussion should ideally take place before the reviewers independently conduct the appraisal.

Within umbrella reviews, quantitative or qualitative systematic reviews may be incorporated, as well as meta-analyses of existing research. There are 11 questions to guide the appraisal of systematic reviews or meta-analyses. Each question should be answered as "yes", "no", or "unclear". Not applicable "NA" is also provided as an option and may be appropriate in rare instances.

1. **Is the review question clearly and explicitly stated?**
   The review question is an essential step in the systematic review process. A well-articulated question defines the scope of the review and aids in the development of the search strategy to locate the relevant evidence. An explicitly stated question, formulated around its PICO (Population, Intervention, Comparator, Outcome) elements aids both the review team in the conduct of the review and the reader in determining if the review has achieved its objectives. Ideally the review question should be articulated in a published protocol; however this will not always be the case with many reviews that are located.

2. **Were the inclusion criteria appropriate for the review question?**
   The inclusion criteria should be identifiable from, and match the review question. The necessary elements of the PICO should be explicit and clearly defined. The inclusion criteria should be detailed and the included reviews should clearly be eligible when matched against the stated inclusion criteria. Appraisers of meta-analyses will find that inclusion criteria may include criteria around the ability to conduct statistical analyses which would not be the norm for a systematic review. The types of included studies should be relevant to the review question, for example, an umbrella review aiming to summarize a range of effective non-pharmacological interventions for aggressive behaviors amongst elderly patients with dementia will limit itself to including systematic reviews and meta-analyses that synthesize quantitative studies assessing the various interventions; qualitative or economic reviews would not be included.

3. **Was the search strategy appropriate?**
   A systematic review should provide evidence of the search strategy that has been used to locate the evidence. This may be found in the methods section of the review report in some cases, or as an appendix that may be provided as supplementary information to the review publication. A systematic review should present a clear search strategy that addresses each of the identifiable PICO components of the review question. Some reviews may also provide a description of the approach to searching and how the terms that were ultimately used were derived, though due to limits on word counts in journals this may be more the norm in online only publications. There

should be evidence of logical and relevant keywords and terms and also evidence that Subject

Headings and Indexing terms have been used in the conduct of the search. Limits on the search should also be considered and their potential impact; for example, if a date limit was used, was this appropriate and/or justified? If only English language studies were included, will such a language bias have an impact on the review? The response to these considerations will depend, in part, on the review question.

4. **Were the sources and resources used to search for studies adequate?**
   A systematic review should attempt to identify "all" the available evidence and as such there should be evidence of a comprehensive search strategy. Multiple electronic databases should be searched including major bibliographic citation databases such as MEDLINE and CINAHL. Ideally, other databases that are relevant to the review question should also be searched, for example, a systematic review with a question about a physical therapy intervention should also look to search the PEDro database, whilst a review focusing on an educational intervention should also search the ERIC. Reviews of effectiveness should aim to search trial registries. A comprehensive search is the ideal way to minimize publication bias, as a result, a well conducted systematic review should also attempt to search for grey literature, or "unpublished" studies; this may involve searching websites relevant to the review question, or thesis repositories.

5. **Were the criteria for appraising studies appropriate?**
   The systematic review should present a clear statement that critical appraisal was conducted and provide the details of the items that were used to assess the included studies. This may be presented in the methods of the review, as an appendix of supplementary information, or as a reference to a source that can be located. The tools or instruments used should be appropriate for the review question asked and the type of research conducted. For example, a systematic review of effectiveness should present a tool or instrument that addresses aspects of validity for experimental studies and randomized controlled trials such as randomization and blinding – if the review includes observational research to answer the same question a different tool would be more appropriate. Similarly, a review assessing diagnostic test accuracy may refer to the recognized QUADAS[1] tool.

6. **Was critical appraisal conducted by two or more reviewers independently?**
   Critical appraisal or some similar assessment of the quality of the literature included in a systematic review is essential. A key characteristic to minimize bias or systematic error in the conduct of a systematic review is to have the critical appraisal of the included studies completed independently and in duplicate by members of the review team. The systematic review should present a clear statement that critical appraisal was conducted by at least two reviewers working independently from each other and conferring where necessary to reach decision regarding study quality and eligibility on the basis of quality.

7. **Were there methods to minimize errors in data extraction?**
   Efforts made by review authors during data extraction can in the conduct of a systematic review. Strategies to minimi extraction in duplicate and independently, using specific to extraction and some evidence of piloting or training aroun

8. **Were the methods used to combine studies appr**
   A synthesis of the evidence is a key feature of a systematic should be appropriate for the review question and the stat evidence it refers to. If a meta-analysis has been conducte

Was it appropriate to combine the studies? Have the reviewers assessed heterogeneity statistically and provided some explanation for heterogeneity that may be present? Often, where heterogeneous studies are included in the systematic review, narrative synthesis will be an appropriate method for presenting the results of multiple studies. If a qualitative review, are the methods that have been used to synthesize findings congruent with the stated methodology of the review? Is there adequate descriptive and explanatory information to support the final synthesized findings that have been constructed from the findings sourced from the original research?

9. **Was the likelihood of publication bias assessed?**
   As mentioned, a comprehensive search strategy is the best means by which a review author may alleviate the impact of publication bias on the results of the review. Reviews may also present statistical tests such as Egger's test or funnel plots to also assess the potential presence of publication bias and its potential impact on the results of the review. This question will not be applicable to systematic reviews of qualitative evidence.

10. **Were recommendations for policy and/or practice supported by the reported data?**
    Whilst the first nine (9) questions specifically look to identify potential bias in the conduct of a systematic review, the final questions are more indictors of review quality rather than validity. Ideally a review should present recommendations for policy and practice. Where these recommendations are made there should be a clear link to the results of the review. Is there evidence that the strength of the findings and the quality of the research been considered in the formulation of review recommendations?

11. **Were the specific directives for new research appropriate?**
    The systematic review process is recognized for its ability to identify where gaps in the research, or knowledge base, around a particular topic exist. Most systematic review authors will provide some indication, often in the discussion section of the report, of where future research direction should lie. Where evidence is scarce or sample sizes that support overall estimates of effect are small and effect estimates are imprecise, repeating similar research to those identified by the review may be necessary and appropriate. In other instances, the case for new research questions to investigate the topic may be warranted.

REFERENCES

1. Whiting P, Rutjes AWS, Reitsma JB, Bossuyt PMM, Kleijnen J. The development of QUADAS: a tool for the quality assessment of studies of diagnostic accuracy included in systematic reviews. BMC Medical Research Methodology. 2003;3:25 doi:10.1186/1471-2288-3-25.

Avhandlingens struktur

3. Metode

3.1 Beskriv metoden(e)

3.2 Beskriv hvordan du løser problemet/delproblemene

3.3 Kritikk av metoden(e) som brukes

Avhandlingens struktur

4. Resultat

- Presentere dine resultater i skyggen av problemet / sub-problemer (i samme rekkefølge som de er oppført i kap 1)

(*I dette kapitlet lister du opp dine resultater uten å diskutere disse.)*

Avhandlingens struktur

5. Diskusjon

- Organiser diskusjonen i samsvar med problemstillingen / delproblemene (i samme rekkefølge som de er oppført i kap. 1)

Avhandlingens struktur

6. Konklusjon

- Videre arbeider
- Sette arbeidet ditt i en større sammenheng
- (FNs bærekraftsmål?)

Avhandlingens struktur

7. Referanser

- ALLE referansene som du har benyttet / henvist til
- Hvis du er i tvil - legg referansen til listen din

Avhandlingens struktur

Vedlegg

- Målinger/ Rådata
- Intervju guide

ANBEFALT: Lag en liten video

NTNU Universitetsbiblioteket

https://i.ntnu.no/oppgaveskriving/struktur-i-en-empirisk-oppgave

English

Struktur i en empirisk oppgave

Oppsett med teoridel

Deler av en oppgave:

- Sammendrag
- Innledning
- Teori
- Metode
- Analyse
- Drøfting
- Avslutning

Kravene til oppsett varierer fra fag til fag, derfor må du undersøke hva som gjelder for fagmiljøet ditt. Noen fagfelt følger for eksempel IMRoD-modellen.

Sammendrag

Lengre oppgaver, som bachelor- og masteroppgaver, skal ha et sammendrag. Det er viktig at sammendraget er informativt, siden det skal kunne leses av lesere som ikke er eksperter på området.Sammendraget skal være kort, helst ikke over én A4-side, og skal gi et overblikk over hovedinnholdet. Du skal fortelle leseren:

- hva du har undersøkt
- hvordan du gjorde det
- hva du fant ut

Ved å lese sammendraget skal leserne kunne avgjøre om de er interessert i å lese resten av teksten.

Innledning

Struktur i en empirisk oppgave

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Innledning (1)

I innledningen skal du plassere deg i fagfeltet og vise at du har kjennskap til tidligere forskning. Innledningen skal gjøre rede for hva vi vet og hva vi ikke vet om feltet.

- Dette gjør du ved å presentere:
- et problem eller et fenomen du skal studere
- bakgrunnen for valg av tema
- problemstillingen eller hypotesene du skal undersøke

Innledning (2)

På slutten av introduksjonen kan du også si noe om hvordan du har tenkt å strukturere resten av oppgaven, som en kort leserguide.

Et tips er å begynne å skrive på innledningen tidlig, slik at den kan gi retning for det videre arbeidet ditt. Så går du heller over innledningen igjen på slutten for å skrive den helt ferdig. Da får du en innledning som har god sammenheng med resten av teksten.

Teori

I teorikapitlet skal du plassere din studie inn i et overordnet teoretisk rammeverk. Formålet med dette kapitlet er å gjøre rede for de spesifikke teoriene og begrepene du anvender senere i avhandlingen. Du bør også begrunne hvorfor de er viktige for din studie. Du skal vise at du har forstått teorien du skal anvende. Pass på å bare skrive om det du bruker i analysen eller i tolkningen av datamaterialet.

Det er verdt å merke seg at ikke alle oppgaver har en egen teoridel. Benytter du deg av IMRoD-modellen, har du presentert tidligere forskning i introduksjonen.

Metode (1)

I dette kapitlet skal du skrive om hvordan du har gått frem metodisk, og vise hvordan valg av design og metode egner seg til å svare på problemstillingen din.

Kapitlet må kunne gi svar på disse spørsmålene:

- Hvordan samlet du inn datamaterialet?
- Hvordan behandlet du dataene du samlet inn?
- Hvorfor valgte du disse metodene?
- Hva er styrkene og svakhetene ved disse metodene?

Metode (2)

Du skal også si noe om hvorfor du har gjort din undersøkelse på den måten du gjorde – og da peke på styrker og svakheter. I tillegg skal du drøfte etiske aspekter ved prosjektet. På den måten viser du at du har kommet frem til resultatene på en pålitelig og troverdig måte, men også at du er reflektert og kritisk overfor arbeidet du har gjort.

Husk også at du her, slik som i teorikapitlet, bare skal skrive om det metodiske som er relevant for din studie.

Analyse (1)

Å analysere gjør du ved å redegjøre, forklare og vurdere funnene dine. Analysedelen av oppgaven blir ofte kalt resultater, slik som i IMRoD-modellen.

I kvantitative studier vil du kanskje i tillegg til å presentere funnene skriftlig, bruke figurer og tabeller for å gi leseren en oversikt og innsikt i hva du har gjort.

Analyse (2)

I empirisk baserte studier vil analysene handle om å beskrive og tolke. Mange vil ofte drøfte enkeltfunnene i dette kapitlet og ta for seg mer overordnede funn i drøftingskapitlet.

Et lurt tips for å finne ut hvordan du kan skrive ditt analysekapittel, er å se hvordan det er gjort i andre oppgaver på tilsvarende nivå fra samme felt.

Drøfting (Diskusjon) (1)

Du skal her drøfte resultatene dine og sette dem inn i en sammenheng. Å drøfte vil si å:

sette ulike synspunkter, momenter, argumenter, faktorer og årsaker opp mot hverandre og vurdere funnene. Finnes det flere ulike tolkninger av resultatene?

Du må i kapitlet svare på:

- hvordan svarer resultatene dine på forskningsspørsmålene dine?
- hva betyr resultatene?

Drøfting (Diskusjon) (1)

Et lurt tips er å gjenta forskningsspørsmålene, slik at leseren blir minnet på hva de er.

Du skal òg se tilbake på studien og vurdere hvor gyldig og pålitelig den har vært.

- Hva kunne blitt gjort annerledes?
- Hva er sterke og svake sider?
- Her kan du for eksempel kritisere metodene som du har brukt, og forklare hva du kunne gjort annerledes.

Avslutning (1)

Om avslutningen din skal være en konklusjon eller en oppsummering, avhenger av problemstillingen din.

En konklusjon skal svare på problemstillingen, mens en oppsummering gjentar det viktigste fra oppgaven.

Det er ikke uvanlig å velge en kombinasjon av de to, hvor du både oppsummerer oppgaven kort, men også svarer på problemstillingen.

Avslutning (2)

Det er lurt å la avslutningen speile innledningen, ved å si hva du har gjort. Avslutningen bør også sette oppgaven din i et større perspektiv, og peke på hvilke muligheter du ser ut fra ditt prosjekt.

- Hvilke bidrag har din undersøke gitt til faget?
- Er det noe som burde blitt studert ytterligere?

Slik tar du utgangspunkt i ditt eget prosjekt og peker på mulighet for oppfølging

It is not once nor twice but times without number that the same ideas make their appearance in the world.

[*On the Heavens*, in T.L.Heath, *Manual of Greek Mathematics*, 1931 (Oxford: Oxford University Press), p. 205]

QUALITIES OF A GOOD MASTER THESIS

Marius Ubostad, 2021-10-26, version 1.0

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1. THESIS DESCRIPTION AND GOAL

What – Why – How.

The problem description and goal of the work have a dependency on the thesis description defined internally or externally as well as the ability of the candidate to clarify the goals of the Thesis and put the work in a greater content.

The introduction should guide the reader to a clear understanding of the problem to solve and why, as well as provide the requirements for a successful result and how to get there.

I want to put humans on Mars because the Earth will die someday when the sun blows up, or Earth gets hit by an asteroid. What do I need to develop to do that? First thing, I need vertical landing reusable rockets. Does anyone know how to do that? No, ok, then I need to figure out how.

2. DESCRIPTION OF CURRENT STATUS

Most problem descriptions will have dependencies on previous research and development. It is important to connect the work towards existing solutions and the introduction should include description of current status on e.g. technical solutions and why is it an interesting problem to solve.

The thesis should contain references such that a reader not skilled in the art can find the necessary knowledge.

The problem description should be precise, and connected to relevant research.

3. NEWNESS FACTOR

One property that separates a good Master Thesis from other reports is the level of newness factor or originality. The bar is in most cases not at the level of providing significant research results in the relevant field but can include combining available methods to solve the problem or provide a different angle.

Does the master have sufficient technical content and level expected of a master thesis in this field? Does it have sufficient academic and scientific focus?

What is the key contribution of the thesis, is it a new contribution, or is it a reproduction of previous work in a new light?

4. DEMONSTRATION OF KNOWLEDGE AND LEARNING

Any reader skilled in the art should be able to read the thesis. The author should demonstrate technical knowledge and provide the necessary technical background and theory. The author should make a judgement and priority of background theory needed to understand the results. It should not be a copy of information produce elsewhere.

5. QUALITY OF REPORT

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6. CRITICAL REFLECTIONS

Does the master solve, and address the problem statement? The analysis and conclusions should be based on presented data and include a clear representation of what is known, and what is new. The author should demonstrate a methodical style of work. Does the conclusion match the results? Does the discussion apply to the results? Is the main contribution of the candidate clear?

The thesis could also give an overview of what the author feel are interesting future directions of the work. What was considered future work, and what would the author further like to explore. This part of the thesis is an opportunity to spawn new Master Thesis, and Ph.D thesis.

7. FORMAL REQUIREMENTS

An assessment [1] form has been developed at NTNU to outline the formal requirements for a master thesis.

The thesis should contain sufficient information such that a person skilled in the art can reproduce the work, as such, the tools used, the methods used, and the source code (should the author desire) could be added in an appendix.

8. CONCLUSION

This memo is a living document which will be revised and updated when the Mikroelektronikkforum meets to discuss this topic or when relevant input is received from the members of MEF. The criteria outlined here should serve as guidelines for the industry providing external Master and for the award of best Master in Microelectronic at NTNU.

REFERENCES

[1] Assessment form for master thesis at IE, Online: https://innsida.ntnu.no/wiki/-/wiki/Norsk/sensurskjema+for+masteroppgaver+mnt-fag

[2] "On Writing Well", William Zinsser, online: https://www.amazon.com/Writing-Well-Classic-Guide-Nonfiction/dp/0060891548

1. OPPGAVEBESKRIVELSE OG MÅL

   Hva – hvorfor – hvordan.

2. BESKRIVELSE AV GJELDENDE STATUS
3. NYHETSFAKTOR (Forskningsbidrag)
4. DEMONSTRASJON AV KUNNSKAP OG LÆRING
5. RAPPORTENS KVALITET
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7. FORMELLE KRAV

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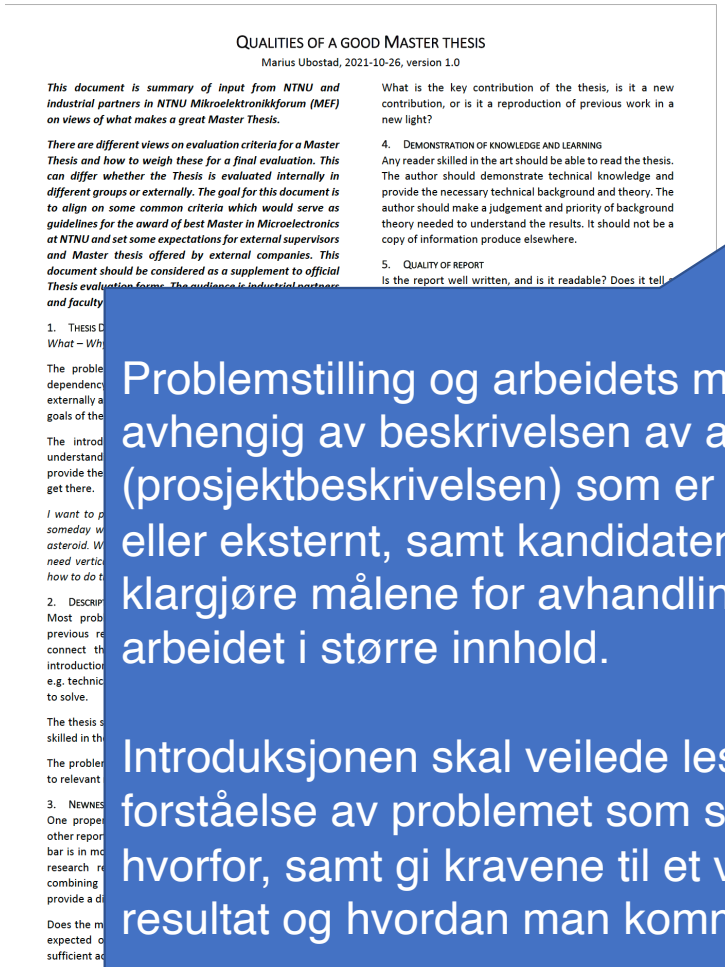

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5. QUALITY OF REPORT

Is the report well written, and is it readable? Does it tell

Problemstilling og arbeidets mål («goal») er avhengig av beskrivelsen av avhandling (prosjektbeskrivelsen) som er definert internt eller eksternt, samt kandidatens evne til å klargjøre målene for avhandlingen og sette arbeidet i større innhold.

Introduksjonen skal veilede leseren til en klar forståelse av problemet som skal løses og hvorfor, samt gi kravene til et vellykket resultat og hvordan man kommer dit.

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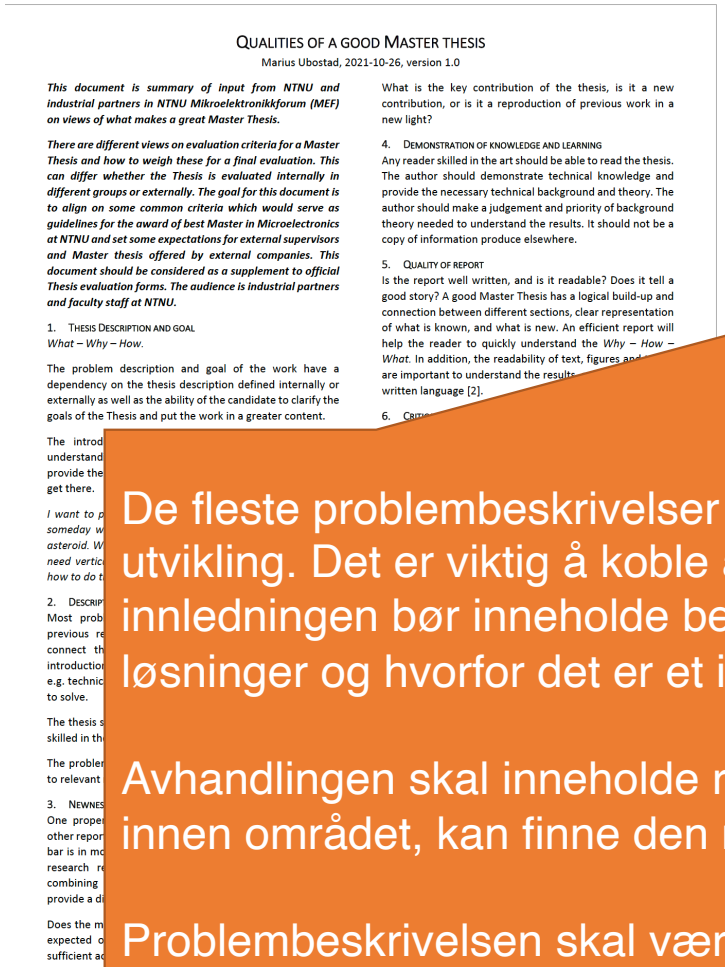

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OG LÆRING

De fleste problembeskrivelser vil ha tilknytning til tidligere forskning og utvikling. Det er viktig å koble arbeidet mot eksisterende løsninger, og innledningen bør inneholde beskrivelse av status på for eksempel tekniske løsninger og hvorfor det er et interessant problem å løse.

Avhandlingen skal inneholde referanser slik at en leser som ikke er oppdatert innen området, kan finne den nødvendige kunnskapen.

Problembeskrivelsen skal være presis, og knyttet til relevant forskning.

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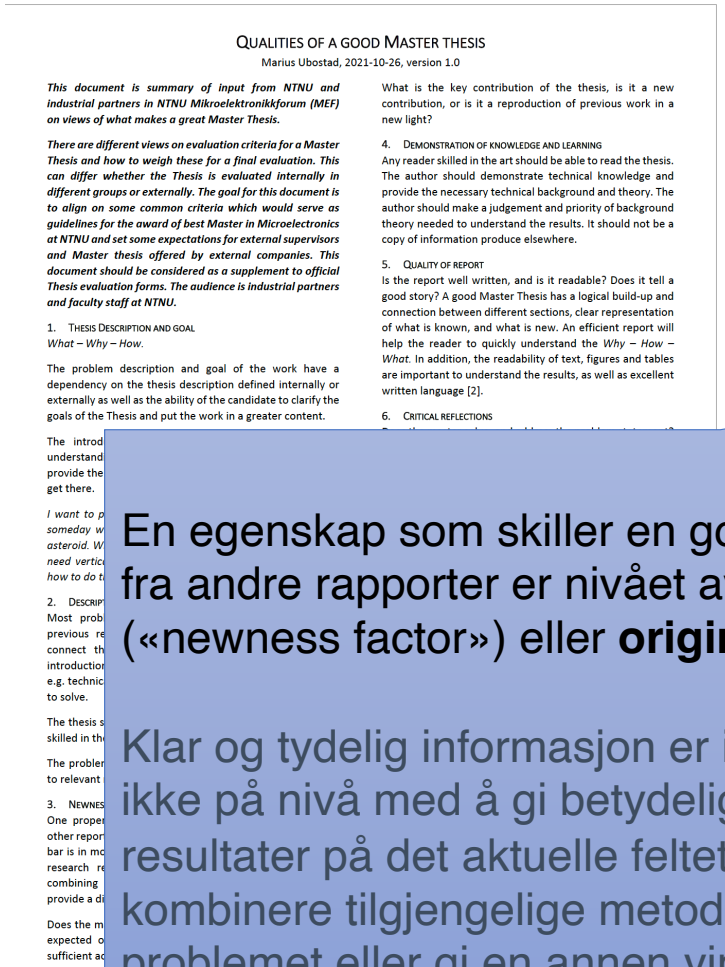

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6. CRITICAL REFLECTIONS

En egenskap som skiller en god masteroppgave fra andre rapporter er nivået av **nyhetsverdi** («newness factor») eller **originalitet**.

Klar og tydelig informasjon er i de fleste tilfeller ikke på nivå med å gi betydelige forsknings-resultater på det aktuelle feltet, men kan omfatte å kombinere tilgjengelige metoder for å løse problemet eller gi en annen vinkel.

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Har masteren tilstrekkelig teknisk innhold og nivå som forventes av en masteroppgave på dette feltet?

Har den tilstrekkelig faglig og vitenskapelig fokus?

Hva er avhandlingens viktigste bidrag, er det et nytt bidrag, eller er det en gjengivelse av tidligere arbeid i et nytt lys?

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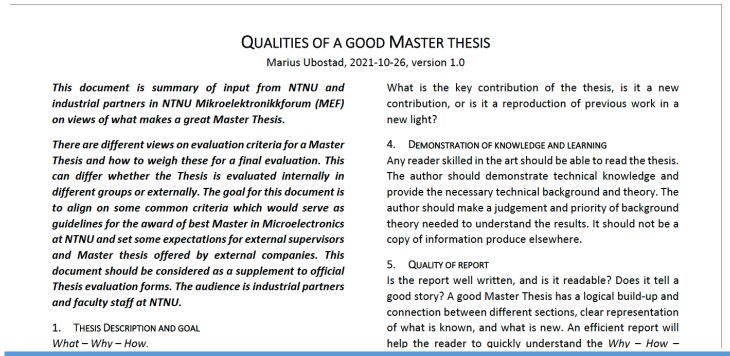

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Enhver leser som har gode kunnskaper om området, skal kunne lese avhandlingen. Forfatteren skal demonstrere teknisk kunnskap og gi den nødvendige tekniske bakgrunnen og teorien.

Forfatteren bør gjøre en vurdering og prioritering av bakgrunnsteori som trengs for å forstå resultatene. Det bør ikke være en kopi av informasjon produsert andre steder.

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FORSKERHÅNDBOKEN

Er rapporten godt skrevet, og er den lesbar? Forteller den en god historie?

En god masteroppgave har en logisk oppbygging og sammenheng mellom ulike seksjoner, klar representasjon av hva som er kjent, og hva som er nytt.

En effektiv rapport vil hjelpe leseren til raskt å forstå hvorfor – hvordan – hva. I tillegg er lesbarheten av tekst, figurer og tabeller viktig for å forstå resultatene, samt et utmerket skriftspråk.

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Løser og adresserer masteren problemstillingen?

Analysen og konklusjonene skal være basert på presenterte data og inkludere en klar representasjon av hva som er kjent, og hva som er nytt.

Forfatteren skal demonstrere en metodisk arbeidsstil. Stemmer konklusjonen med resultatene? Gjelder diskusjonen resultatene? Er kandidatens viktigste bidrag klart?

1. OPPGAVEBESKRIVELSE OG MÅL

   Hva – hvorfor – hvordan.

2. BESKRIVELSE AV GJELDENDE STATUS
3. NYHETSFAKTOR (Forskningsbidrag)
4. DEMONSTRASJON AV KUNNSKAP OG LÆRING
5. RAPPORTENS KVALITET
6. KRITISKE REFLEKSJONER
7. FORMELLE KRAV

FORSKERHÅNDBOKEN

QUALITIES OF A GOOD MASTER THESIS

Marius Ubostad, 2021-10-26, version 1.0

This document is summary of input from NTNU and industrial partners in NTNU Mikroelektronikkforum (MEF) on views of what makes a great Master Thesis.

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   Hv
2. BESKI
3. NYHE
4. DEMO
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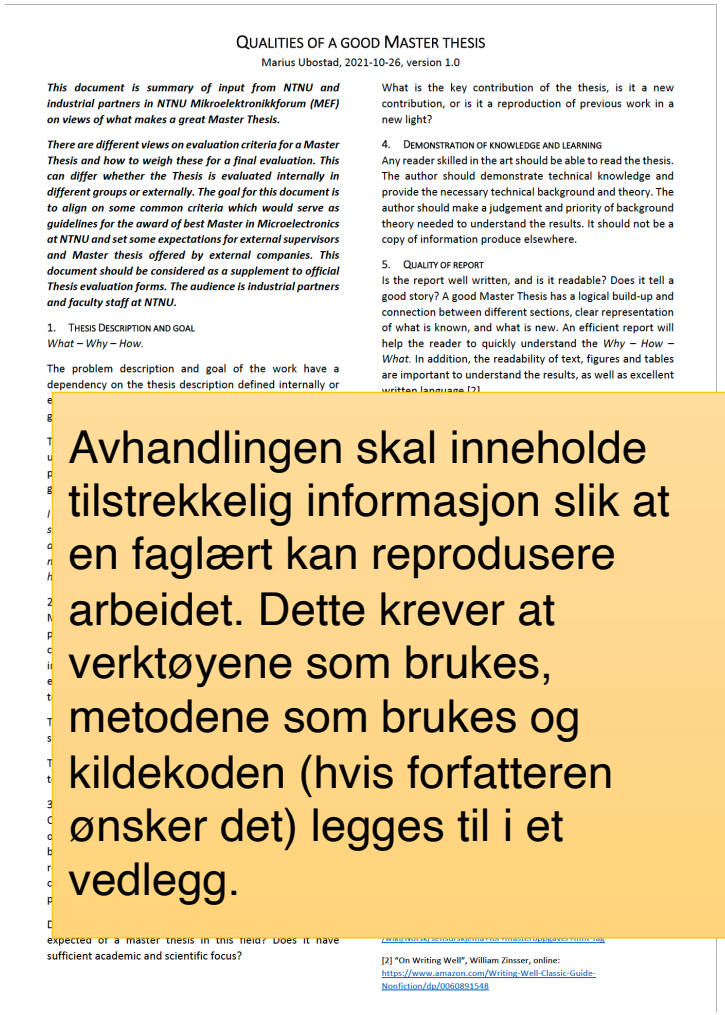
Avhandlingen kan også gi en oversikt over hva forfatteren mener er interessante fremtidige retninger for arbeidet. Hva ble ansett som fremtidig arbeid, og hva ville forfatteren videre gjerne utforske. Denne delen av avhandlingen er en mulighet til å gi opphav til ny(e) masteroppgave(r) og ph.d.-avhandling(er).

FORSKERHÅNDBOKEN



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There are different views on evaluation criteria for a Master Thesis and how to weigh these for a final evaluation. This can differ whether the Thesis is evaluated internally in different groups or externally. The goal for this document is to align on some common criteria which would serve as guidelines for the award of best Master in Microelectronics at NTNU and set some expectations for external supervisors and Master thesis offered by external companies. This document should be considered as a supplement to official Thesis evaluation forms. The audience is industrial partners and faculty staff at NTNU.

1. THESIS DESCRIPTION AND GOAL

What – Why – How.

The problem description and goal of the work have a dependency on the thesis description defined internally or

expected of a master thesis in this field? Does it have sufficient academic and scientific focus?

What is the key contribution of the thesis, is it a new contribution, or is it a reproduction of previous work in a new light?

4. DEMONSTRATION OF KNOWLEDGE AND LEARNING

Any reader skilled in the art should be able to read the thesis. The author should demonstrate technical knowledge and provide the necessary technical background and theory. The author should make a judgement and priority of background theory needed to understand the results. It should not be a copy of information produce elsewhere.

5. QUALITY OF REPORT

Is the report well written, and is it readable? Does it tell a good story? A good Master Thesis has a logical build-up and connection between different sections, clear representation of what is known, and what is new. An efficient report will help the reader to quickly understand the *Why – How – What*. In addition, the readability of text, figures and tables are important to understand the results, as well as excellent written language [2].

[2] "On Writing Well", William Zinsser, online: https://www.amazon.com/Writing-Well-Classic-Guide-Nonfiction/dp/0060891548

Avhandlingen skal inneholde tilstrekkelig informasjon slik at en faglært kan reprodusere arbeidet. Dette krever at verktøyene som brukes, metodene som brukes og kildekoden (hvis forfatteren ønsker det) legges til i et vedlegg.

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Spørsmål?