برنامج: مهارات البحث العلمي التاسع

Quality in Scientific Research

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Topics to be covered

- Definition
- Research Quality Standards
- Checklists
- Validity
- Steps of Scientific Research
- Quantitative Research
- Qualitative Research
- NCAAA and Research Quality + KPIs
- Levels of quality
- Quality Indicators of Scientific Research
- The key influences
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- Characteristics of a High Quality Research
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Definition of Quality

1. The standard of something as measured against other things of a similar kind; the degree of excellence of something.
"an improvement in product quality“

2. a distinctive attribute or characteristic possessed by someone or something.
"he shows strong leadership qualities“

In research…..

The standard definition of "scientific quality" is through the conformity with the principles of the "scientific method". This method is described in terms of the formulation, testing, and modification of hypotheses, but these ideas are then mostly illustrated by examples of very revolutionary scientific discoveries (like Einstein´s theory of relativity).

Definition of Quality (cont.)

A more practical criterion for scientific quality is that the research should lead to some new idea (and this may be a theoretical hypothesis, an experimental law, the causal relation between two phenomena, or a new technology, etc.) and that the credibility or the usefulness of this new idea be corroborated by theoretical or empirical arguments (*e.g.*, a mathematical analysis, an experimental verification, a statistical investigation, etc.). For the aspect "new", we refer to Annex **Innovation, originality**.

Another aspect that should be taken to consideration is the community, environment and society needs.

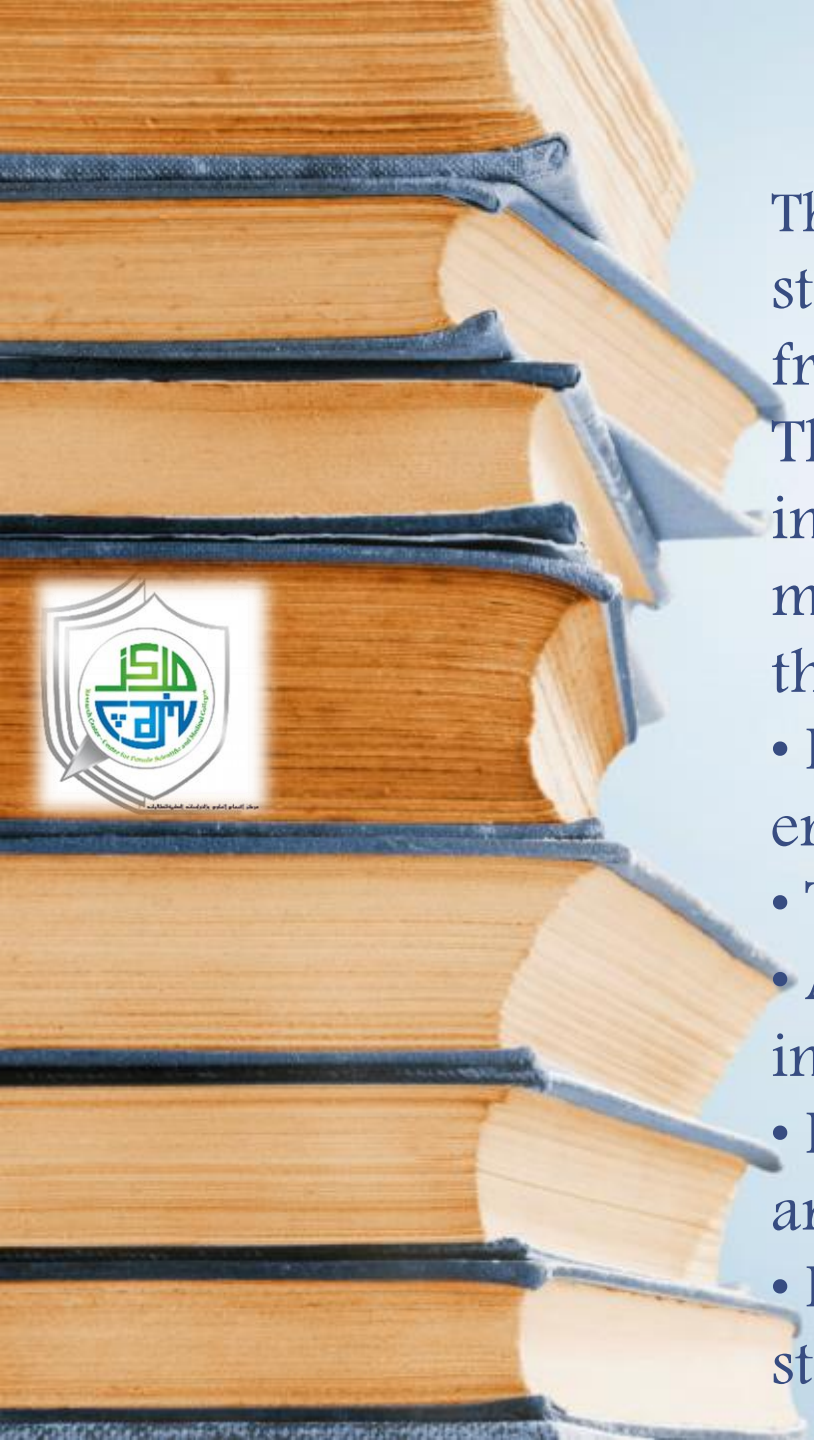
Quality in Scientific Research

Assessing the quality of research is hardly a new or novel idea. Researchers have long debated the best criteria and means for determining the scientific rigor and significance of empirical studies in the natural, social, and behavioral sciences. What is different is that the concern with ***research quality*** has taken on renewed meaning for academic institutions, governments, foundations, nonprofit agencies, and nongovernmental and intergovernmental organizations in light of the intersecting global interests in **quality standards**, **performance measurement**, **accountability**, **evidence-based policy** and **practice**, and value for money in research investments.

If we take this ***definition*** seriously, it implies a set of qualitative characteristics like:

- The research (and its ensuing publications) should start from a well defined research question (otherwise, there would be no need for a new idea).
- The researchers should be aware of the standard knowledge in the domain of the research performed (as well about the facts as about the commonly accepted hypotheses).
- All reasoning should follow strict logical rules.
- Experiments should be reproducible.
- There should be openness with respect to a full description of the experimental or theoretical circumstances and details. (No magic tricks!)

"…the systematic process of collecting and analyzing information (data) in order to increase our understanding of the phenomenon about which we are concerned or interested."



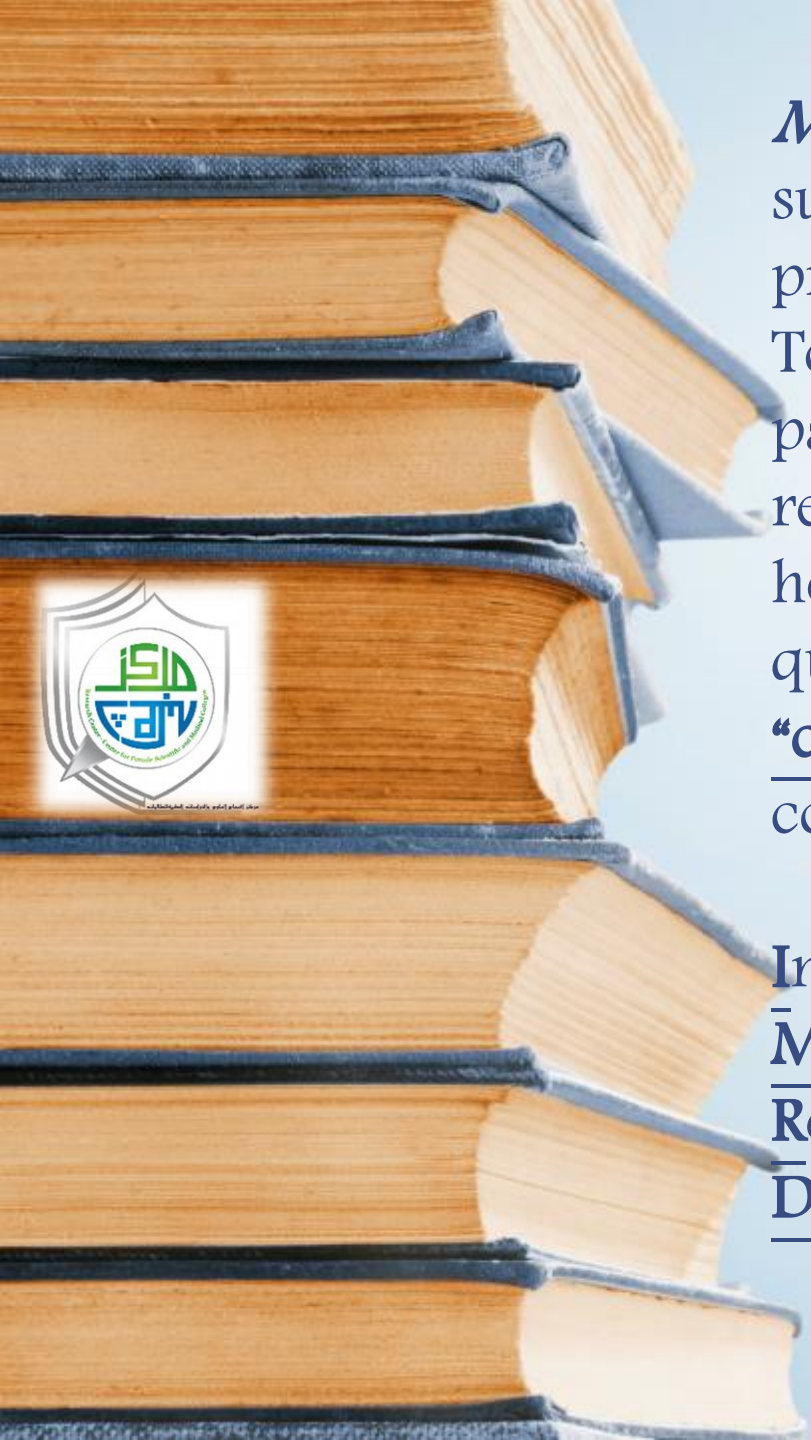
Research Quality Standards…(1)

The National Research Council (2002) and others have described standards that shape scientific understanding and that are frequently used to frame the discourse on the quality of research. This has lead to the term scientifically based research being used in some settings to address research quality. Frequently mentioned standards for assessing the quality of research include the following:

- Pose a significant, important question that can be investigated empirically and that contributes to the knowledge base
- Test questions that are linked to relevant theory
- Apply methods that best address the research questions of interest
- Base research on clear chains of inferential reasoning supported and justified by a complete coverage of the relevant literature
- Provide the necessary information to reproduce or replicate the study

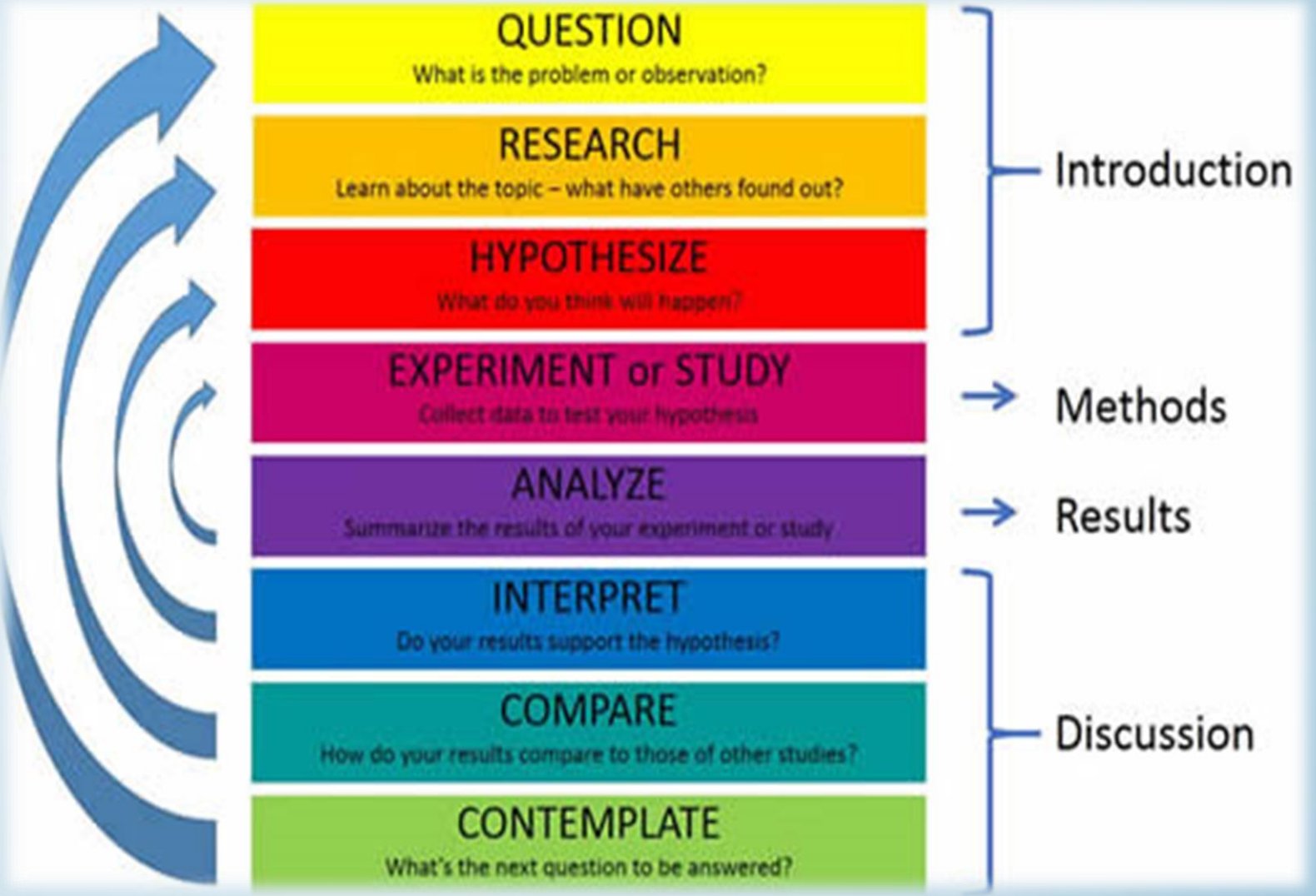
Research Quality Standards…2

- Ensure the study design, methods, and procedures are sufficiently transparent and ensure an independent, balanced, and objective approach to the research
- Provide sufficient description of the sample, the intervention, and any comparison groups
- Use appropriate and reliable conceptualization and measurement of variables
- Evaluate alternative explanations for any findings
- Assess the possible impact of systematic bias
- Submit research to a peer-review process
- Adhere to quality standards for reporting (i.e., clear, cogent, complete)



Moher, Schulz, and Altman (2001) …..
suggest that "inadequate reporting borders on ***unethical*** practice when ***biased*** results receive ***false credibility***."
To facilitate quality review, several groups of scholars, particularly among **public health** and **medical researchers**, have recommended standardized research reporting frameworks to help ensure that essential research information needed to assess quality is included in journal articles. Often described as **"checklists,"** these standards for reporting are more comprehensive than the basic IMRAD..

Introduction
Methods
Results, and
Discussion or Conclusion)


QUESTION
What is the problem or observation?
RESEARCH
Learn about the topic – what have others found out?
HYPOTHESIZE
What do you think will happen?
EXPERIMENT or STUDY
Collect data to test your hypothesis
ANALYZE
Summarize the results of your experiment or study
INTERPRET
Do your results support the hypothesis?
COMPARE
How do your results compare to those of other studies?
CONTEMPLATE
What's the next question to be answered?
Introduction
Methods
Results
Discussion

Checklists …vary by methodology used and specific research designs. There are several standardized formats for general and specific research designs, including the following:

• **CONSORT** (Consolidated Standards for Reporting Trials): a 22-item checklist for reporting simple two group, parallel, randomized controlled trials (Moher, Schulz, & Altman, 2001). Available at http://www.consort-statement.org/statement/revisedstatement.htm

• **QUOROM** (Quality of Reporting of Meta-Analyses): a 17-item checklist for reporting systematic reviews (Moher et al., 1999).
Available at http://www.consort-statement.org/QUOROM.pdf
QUOROM is only available in pdf format.

• **MOOSE** (Meta-Analysis Of Observational Studies in Epidemiology): a 35-item checklist for reporting observational studies (Stroup et al., 2000).
Available at http://www.consort-statement.org/Moosecheck.pdf or http://jama.ama-assn.org/cgi/content/full/283/15/2008

• **TREND** (Transparent Reporting of Evaluations with Nonrandomized Designs): a 22-item checklist for nonrandomized designs (2004).
Available at http://www.trend-statement.org/asp/documents/ statements/AJPH_Mar2004_Trendstatement.pdf
TREND is only available in .pdf format.

• **STARD** (Standards for Reporting of Diagnostic Accuracy): a 25-item checklist for diagnostic test accuracy (STARD, 2001).
Available at http://www.consort-statement.org/stardChecklist.PDF or http://www.consortstatement.org/stardstatement.htm

Characteristics of Good research

1. Originates with a question or problem.
2. Requires clear articulation of a goal.
3. Follows a specific plan or procedure.
4. Often divides main problem into sub problems.
5. Guided by specific problem, question, or hypothesis.
6. Accepts certain critical assumptions.
7. Requires collection and interpretation of data.
8. Cyclical (helical) in nature.

A valid study answers research questions in a scientifically rigorous manner. Threats to a study's validity are found in three areas:

Internal Validity

To determine whether a research study has internal validity, a research consumer should ask whether changes in the outcome could be attributed to alternative explanations, which are not explored in the study. For example, a study may show that a new curriculum preceded a significant increase in children's reading comprehension. The study must rule out alternative explanations for the increase in reading comprehension, such as a new teacher, in order to attribute the increase in reading comprehension to the new curriculum. Studies that specifically explain how alternative explanations were ruled out are more likely to have internal validity.

External Validity

To assess whether a study has external validity, a research consumer should ask whether the findings apply to individuals whose place, times, and circumstances differ from those of study participants. A study's external validity is closely related to the generalizability of the findings. For example, a research study shows that a new curriculum improved reading comprehension of third-grade children in Iowa. As a research consumer, you want to ask whether this new curriculum may also be effective with third graders in New York or with children in other elementary grades. Studies that randomly select participants from the most diverse and representative populations are more likely to have external validity.

Construct Validity

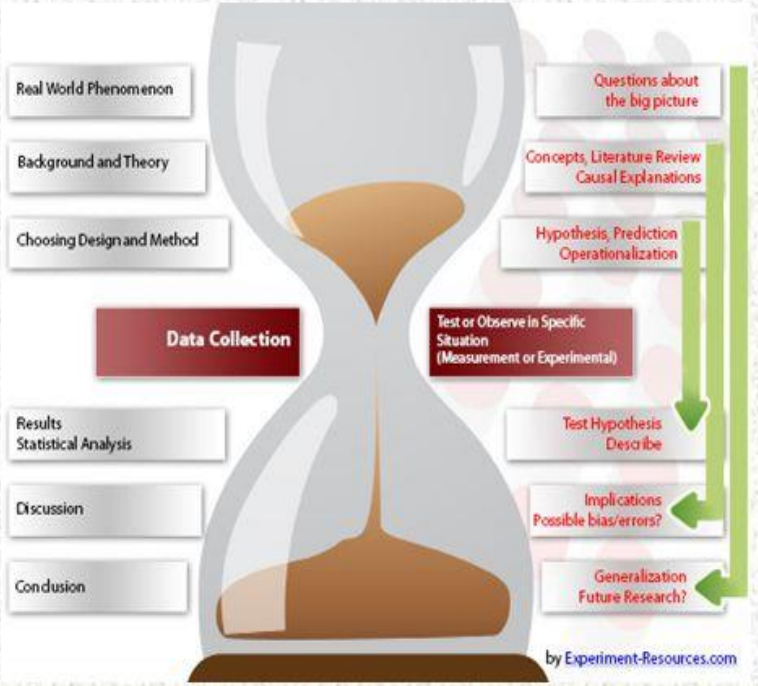
To assess whether a study has construct validity, a research consumer should ask whether the study has adequately measured the key concepts in the study. For example, a study of reading comprehension should present convincing evidence that reading tests do indeed measure reading comprehension. Studies that use measures that have been independently validated in prior studies are more likely to have construct validity.

Research Projects

- Research begins with a problem.
- Identifying this problem can actually be the hardest part of research.
- In general, good research projects should:
  - Address an important question.
  - Advance knowledge.

Steps of the Scientific Research

The steps of the scientific process has a structure similar to an hourglass - The structure starts with general questions, narrowing down to focus on one specific aspect, then designing research where we can observe and analyze this aspect. At last, the hourglass widens and the researcher concludes and generalizes the findings to the real world.



Quantitative Research Assessment Tool

1- Population and Sample

a. Population. Does the population that was eligible to be selected for the study include the entire population of interest? Or, is the eligible population a selective subgroup of the population of interest?

b. Randomized Selection of Participants. Were study participants randomly selected for the study? Or, did study participants volunteer (nonrandom)? Or, were they located through specific organizations (nonrandom) or through acquaintances of the researchers (nonrandom)?

c. Sample Size. How many participants were selected for the study? Does the sample include enough participants from key subgroups to accurately assess subgroup differences? This is best used in comparison to other studies.

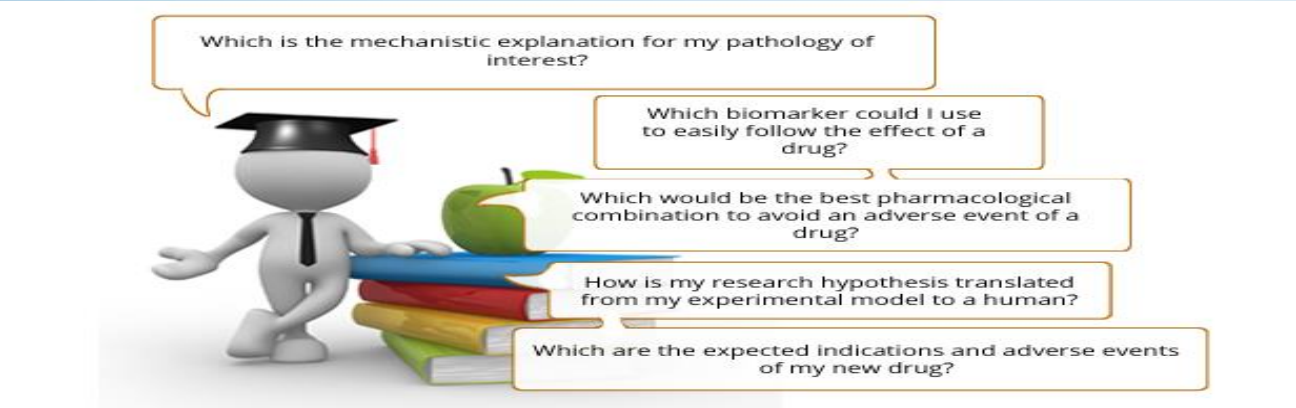
d. Response and Attrition Rate. What proportion of the selected sample completed the study? In longitudinal studies, what proportion of sample members participated in follow-up studies?

Quantitative Research Assessment Tool

2- Measurement

a. Main Variables or Concepts. Are each of the main variables or concepts of interest described fully? Can the main variables or concepts be matched to the variables in the tables?

b. Operationalization of Concepts. Did the authors choose variables that make sense as good measures of the main concepts in the study? Have these variables been used in previous studies or are they an improvement over previous studies?



https://www.youtube.com/watch?v=IsAUNs-IoSQ

https://www.youtube.com/watch?v=cwU8as9ZNlA

Quantitative Research Assessment Tool

3- **Analysis**

a. Numeric Tables. Are the means and standard deviations/standard errors for all the numeric variables presented?

b. Missing Data. Are the number of cases with missing data specified? Is the statistical procedure(s) for handling missing data described?

c. Appropriateness of Statistical Techniques. Does the study describe the statistical technique used? Does the study explain why the statistical technique was chosen? Does the study include caveats about the conclusions that are based on the statistical technique?

d. Omitted Variable Bias. Could the results of the study be due to alternative explanations that are not addressed in the study?

e. Analysis of Main Effect Variables. Are coefficients for the main effect variables in the statistical models presented? Are the standard errors of these coefficients presented? Are significance levels or the results of statistical tests presented?

Qualitative Research Assessment Tool

I. Compared to other qualitative studies that may utilize survey instruments or multiple interviewers, ethnographies are somewhat unique since the data are often collected and analyzed by a single person – the ethnographer.

II. Qualitative research need to know how to evaluate qualitative findings, it is also important to understand that methods of enhancing research validity can be built into a study…
   - Member checking
   - Discomfirmed Evidence
   - Triangulation
   - Thick Description

III. Guba and Lincoln (1981) propose four criteria for evaluating qualitative findings and enhancing trustworthiness …
   - Credibility
   - Transferability
   - Dependability
   - Confirmability

Traditional Criteria for Judging Quantitative Research	Alternative Criteria for Judging Qualitative Research
internal validity	credibility
external validity	transferability
reliability	dependability
objectivity	confirmability

NCAAA and Research Quality

Expectations for research vary according to the mission of the institution and the level of the program (e.g. college or university, undergraduate or postgraduate program). In this standard (NCAAA) an analysis should be made on the extent and quality of research activities of faculty teaching in the program, and on how their research and other current research in the field is reflected in teaching…

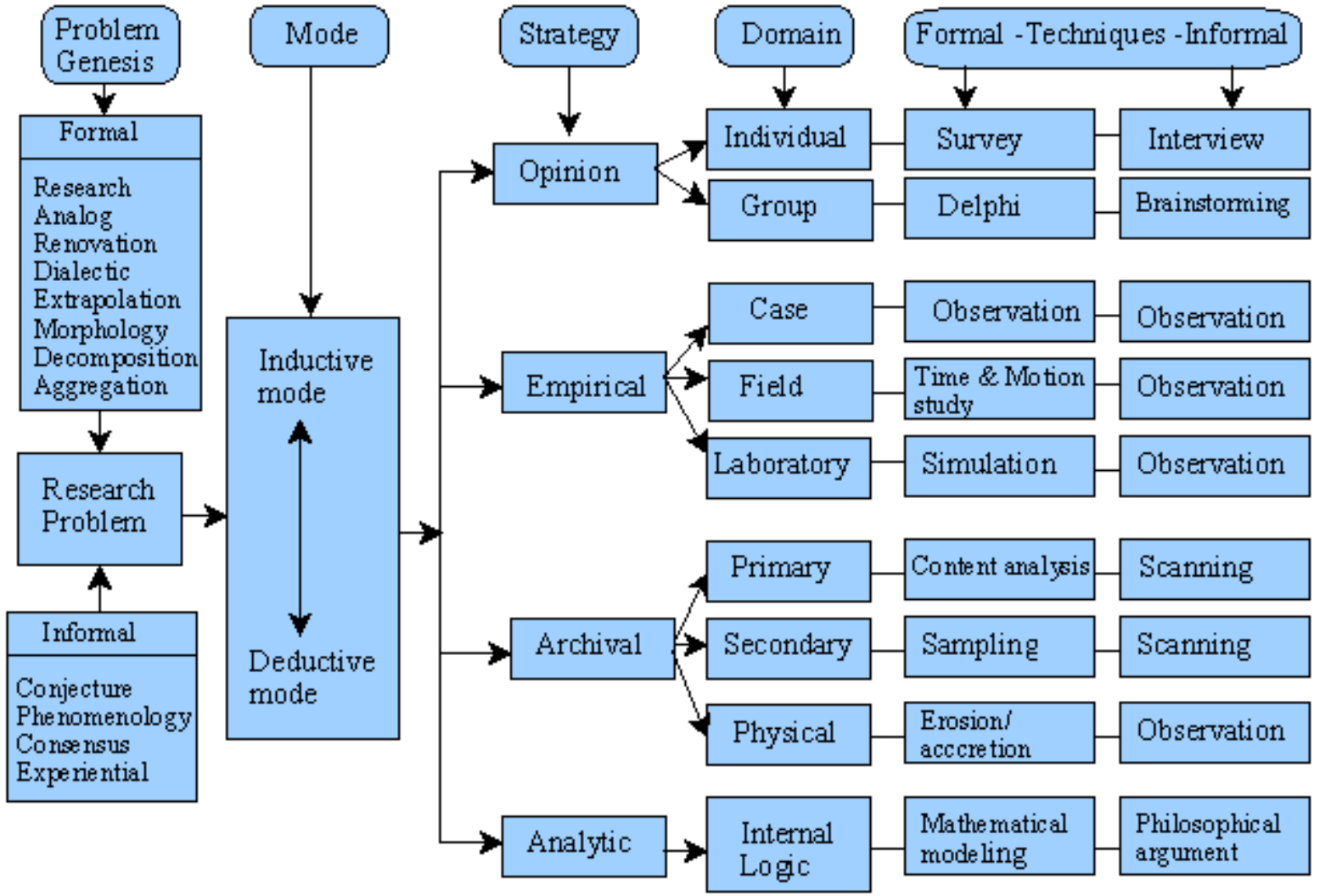
- ✓ Teaching Staff and Student Involvement in Research
- ✓ Research Facilities and Equipment

• NCAAA (The National Commission for Academic Accreditation & Assessment)

NCAAA Research KPIs

Standard 10 Research	S10.1	26. Number of refereed publications in the previous year per full time equivalent teaching staff. (Publications based on the formula in the Higher Council By law excluding conference presentations)	Program College Institution
	S10.2	27. Number of citations in refereed journals in the previous year per full time equivalent faculty members.	Program College Institution
	S10.3	28. Proportion of full time member of teaching staff with at least one refereed publication during the previous year.	Program College Institution
		29. Evaluation of facilities and environment supporting research (Means average and Level achieved based on survey)	
		30. Ratio of internal research and innovation funds in proportion to the total number of full–time faculty members	
	S10.4	31. Number of papers or reports presented at academic conferences during the past year per full time equivalent faculty members.	Program College Institution
		32. Number of research and innovations registered as intellectual property or patented within the past 5 years	
	S10.5	33. Research income from external sources in the past year as a proportion of the number of full time faculty members.	Program College Institution
	S10.6	34. Proportion of the total, annual operational budget dedicated to research.	Institution

A Framework for Research Methodology*



* Adapted from Buckley, Buckley & Chiang Exhibit 1, p. 15.

High-Quality Research

- Good research requires:
  - The scope and limitations of the work to be clearly defined.
  - The process to be clearly explained so that it can be reproduced and verified by other researchers.
  - A thoroughly planned design that is as objective as possible.
  - Highly ethical standards be applied.
  - All limitations be documented.
  - Data be adequately analyzed and explained.
  - All findings be presented unambiguously and all conclusions be justified by sufficient evidence.

Research literature representing **levels of quality**:

(1) Collaboration as measured by the number of authors per paper, Analyses showed that as the number of authors per paper increases, the proportion of high quality papers also increases and the Collaborative Index can be used to measure quality in the aggregate.

(2) Quantitative productivity of countries, It was found that the quantity and quality of research done in a country are positively related.

(3) Diachronous (prospective) citations covering the first five years of publication, All analyses of the citation data confirmed the hypotheses that highly rated papers are significantly more highly cited than average papers and the rates of uncitedness decline with quality.

(4) Total self-citations,

(5) Proportions of self-citations made by first-named authors, The proportion of self-citations to total citations decreases with increasing quality and, on average, first-named authors of quality papers cite them proportionally fewer times than first-named authors of run-of-the mill papers do. and

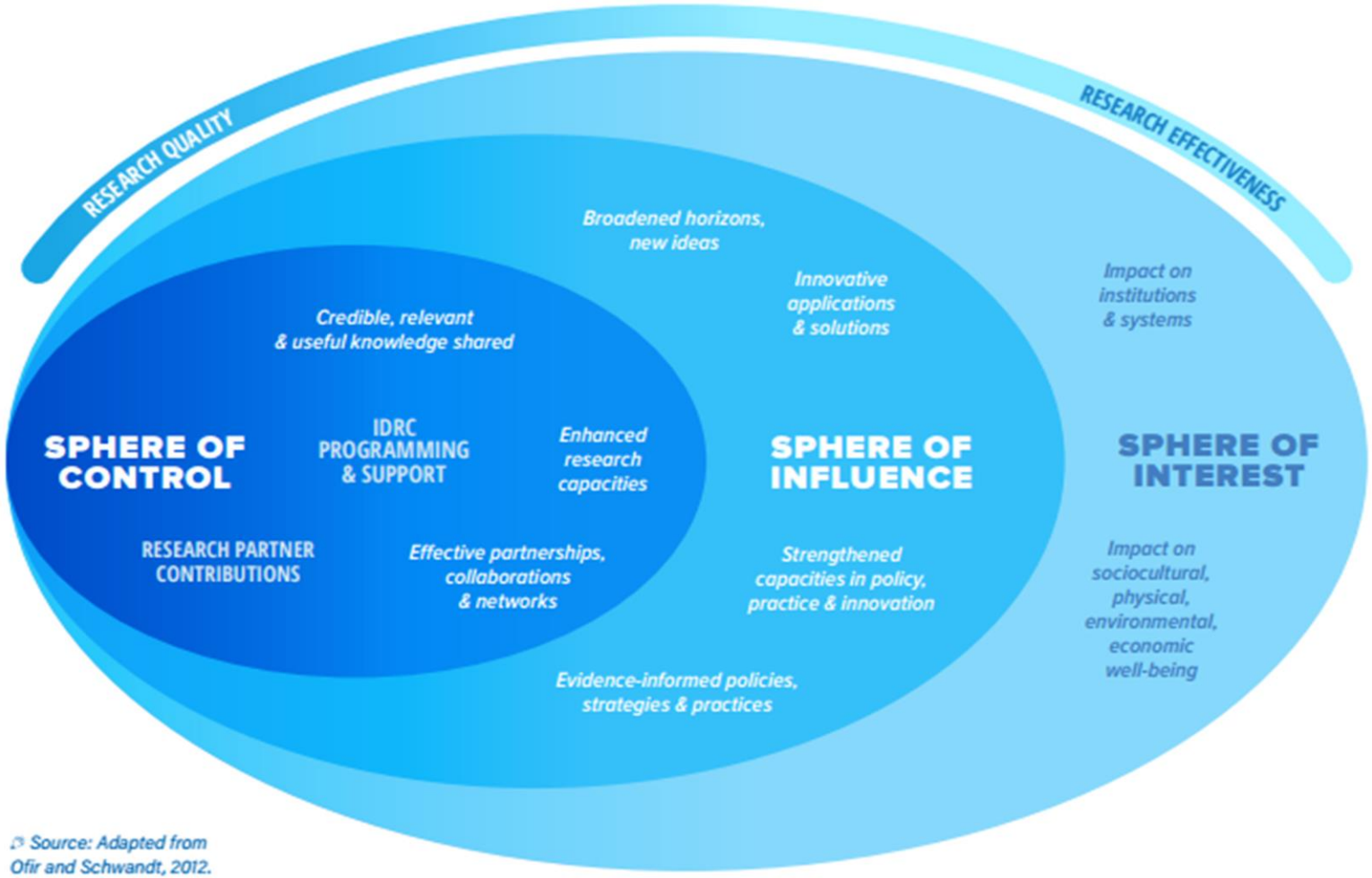
(6) The extent of dispersion of articles among journals. as quality increases, the extent of literature scatter or dispersion increases.

Quality Indicators of Scientific Research

One of the requirements for earning credit for scientific research is publishing the outcome of experiments, Three such indicators are:

- **Journal Impact Factor …** Currently, JIFs are provided every year by Thomson Reuter. JIF is the ratio of citations in the current year to articles published in the journal in the previous 2 years divided by the number of the articles published in the same 2 years
- **Citations …** The citation of a publication, especially, other than self citation represents peer recognition and is accepted as one of the most important indicators of quality.
- ***h*–Index …** *h*–Index is the most rigorous quality indicator of scientific research. This index was devised by J. E. Hirsch who called it *h* index. A high value of *h* indicates a high quality of research. A scientist has an index *h* if *h* of his/her Np papers (total publications) have at least *h* citations each, and the other (Np–*h*) papers have no more than h citations each. For example, if a scientist is rated to have $h = 20$, it means that 20 of his papers (out of, say, total of 50, Np is 50) were cited at least 20 times each. The remaining 30 were cited less than 20 times each

FIGURE 1 Research quality, research effectiveness, and spheres of control



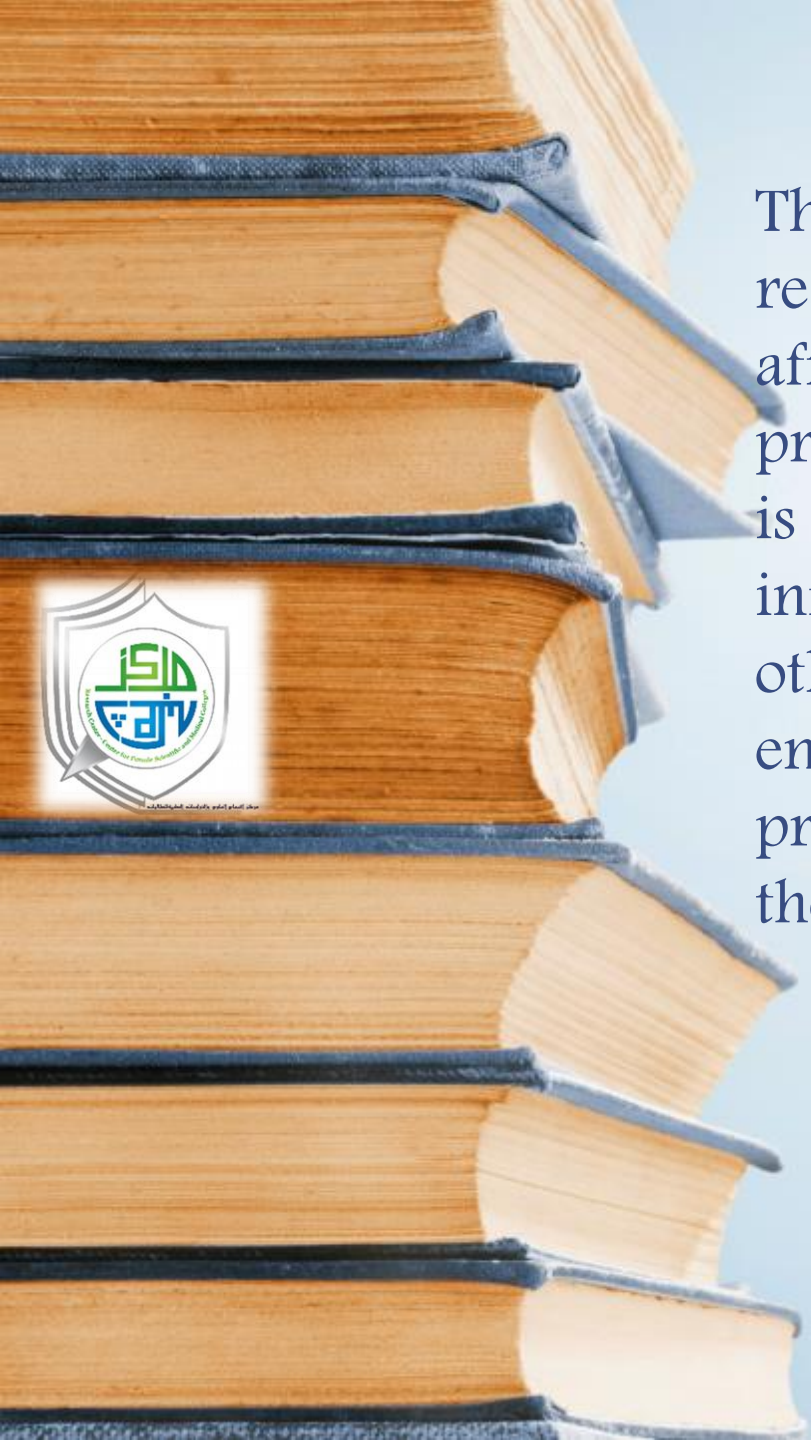
Source: Adapted from Ofir and Schwandt, 2012.

Criteria for a Good Research Process

- Research is an extremely cyclic process.
- This isn't a weakness of the process but is part of the built-in error correction machinery.
- Because of the cyclic nature of research, it can be difficult to determine where to start and when to stop.

STEPS FOR MAKING A GOOD RESEARCH

- Raising a Question.
- Suggest Hypothesis.
- Literature Review.
- Literature Evaluation.
- Acquire Data.
- Data Analysis.
- Data Interpretation.
- Hypothesis Support.



The key influences

This component highlights those influences – either within the research endeavor or in the external environment – most likely to affect the quality of the research. Such influences cannot be fully predicted if the assessment is ex ante, but this sensitivity to context is one of the most novel aspects of the Framework. The key influences are meant to help evaluators, managers, funders, and others to make meaningful and systematic considerations of the enabling or constraining factors of the research and the risk profile of the project, program, or portfolio, and to incorporate these to the extent possible into their assessments.

1- MATURITY OF THE RESEARCH FIELD— The extent to which well-established theoretical and conceptual frameworks exist and from which well-defined hypotheses have been developed and subjected to testing, as well as a substantial body of conceptual and empirical research in the research field.

2- RESEARCH CAPACITY STRENGTHENING— The extent to which the research endeavor or project focuses on strengthening research capacities through providing financial and technical support to enhance capacities to identify and analyze development challenges, and to conceive, conduct, manage, and communicate research that can address these challenges.

3- RISK IN THE RESEARCH ENVIRONMENT— The extent to which the organizational context in which the research team works is supportive of the research, where "supportive" refers, for example, to institutional priorities, incentives, and infrastructure.

4- RISK IN THE POLITICAL ENVIRONMENT— The extent of external risk related to the range of potential adverse factors that could arise as a result of political and governance challenges, and that could affect the conduct of the research or its positioning for use. These range from electoral uncertainty and policy instability to more fundamental political destabilization, violent conflict, or humanitarian crises.

5- RISK IN THE DATA ENVIRONMENT— The extent to which instrumentation and measures for data collection and analysis are widely agreed upon and available, and the research environment is data rich or data poor.

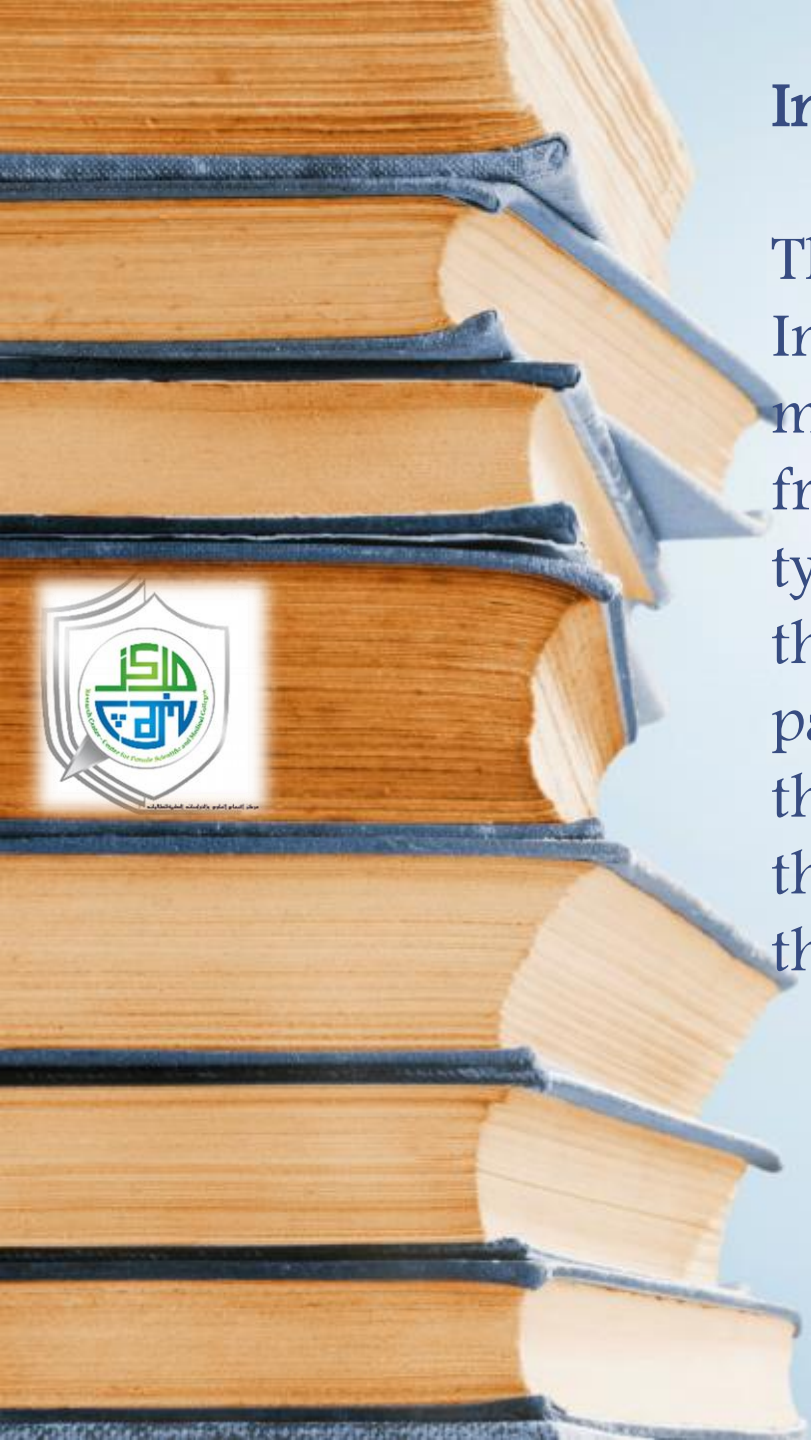
The research quality dimensions

1- RESEARCH INTEGRITY— Considers the technical quality, appropriateness and rigor of the design and execution of the research as judged in terms of commonly accepted standards for such work and specific methods, and as reflected in research project documents and in selected research outputs. Specified emphases include the research design, methodological rigor, literature review, systematic work, and the relationship between evidence gathered and conclusions reached and/or claims made. Peer reviewed and non-peer reviewed outputs undergo different assessment processes using different criteria.

2 - RESEARCH LEGITIMACY— Considers the extent to which research results have been produced by a process that took account of the concerns and insights of relevant stakeholders, and was deemed procedurally fair and based on the values, concerns and perspectives of that audience. Legitimacy deals primarily with who participated and who did not; the process for making choices; how information was produced, vetted and disseminated; how well knowledge was localized, and if it respected local traditions and knowledge systems. This dimension also includes a sub-dimension that asks the assessor to consider the potentially negative consequences and outcomes for populations affected by the research, gender-responsiveness, inclusiveness of vulnerable populations, and engagement with local knowledge.

3 – RESEARCH IMPORTANCE— Considers the importance and value to key intended users of the knowledge and understanding generated by the research, in terms of the perceived relevance of research processes and products to the needs and priorities of potential users, and the contribution of the research to theory and/or practice. Sub-dimensions include the originality and relevance of the research.

4 – POSITIONING FOR USE— Considers the extent to which the research process has been managed, and research products/ outputs prepared in such a way that the probability of use, influence and impact is enhanced. The uptake of research is inherently a political process. Preparing for it therefore requires attention to user contexts, accessibility of products, and 'fit for purpose' engagement and dissemination strategies. It also requires careful consideration of relationships to establish before and/or during the research process, and the best platforms for making research outputs available to given targeted audiences and users. Positioning for use calls for strategies to integrate potential users into the research process itself wherever this is feasible and desirable. Sub-dimensions include knowledge accessibility and sharing, action ability, and timeliness.



In conclusion…

The ***first three dimensions*** – Research Integrity, Legitimacy and Importance – are the core quality features typically found in more or less developed forms in most research quality assessment frameworks. ***The fourth dimension*** – Positioning for Use – is less typical and is the plus (RQ+) feature of the framework. During the Framework development process, IDRC and its research partners determined that it would be reasonable to hold themselves accountable for taking steps to increase the likelihood that the research would be used – in other words, for positioning the research findings for influence and eventual impact.

BOX 3 Examples of the quality dimension and subdimension rubrics

Dimension 1.0: Research Integrity

UNACCEPTABLE 1 2	LESS THAN ACCEPTABLE 3 4	ACCEPTABLE TO GOOD 5 6	VERY GOOD 7 8
The research has little to no scientific merit. The defensibility of the approach is questionable. There are severe lapses in methodological rigor of literature review, data collection and data analysis.	There is evidence of efforts to meet methodological standards but the efforts do not fully succeed. There are major shortcomings in the justification for the choice of research design and methods.	Accepted methodological standards in the design and execution of the research are met.	The scientific merit is without question. There is evidence of exceptional thoroughness in the research design and all phases of research execution. The project could serve as an exemplar of what it means to achieve this criterion.

Dimension 2: Research Legitimacy; Subdimension 2.4: Engagement with Local Knowledge

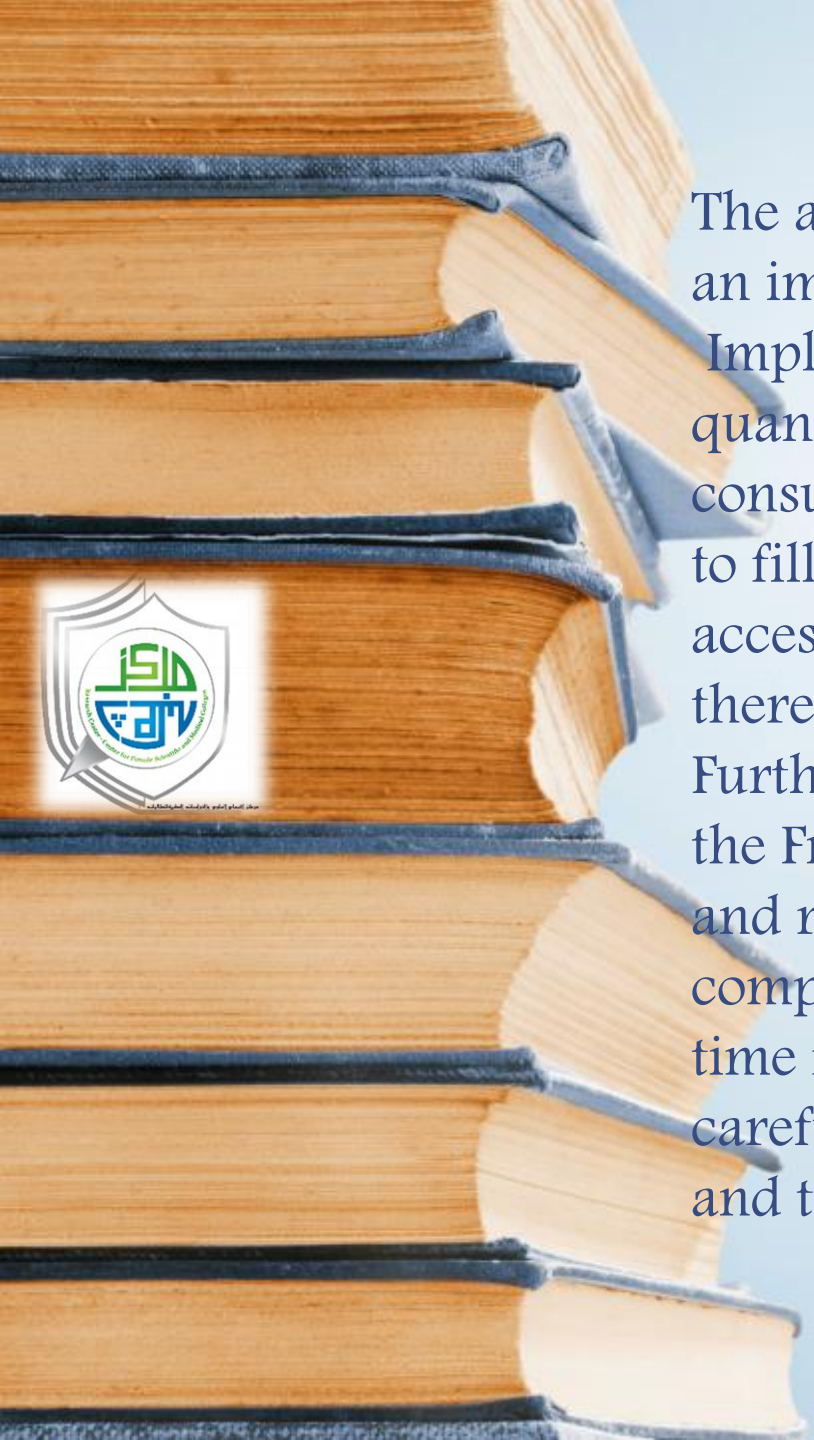
NOT APPLICABLE	UNACCEPTABLE 1 2	LESS THAN ACCEPTABLE 3 4	ACCEPTABLE TO GOOD 5 6	VERY GOOD 7 8
The nature of the research is such that local knowledge and engagement do not need to be taken into account.	Engagement with local contexts has been neglected during the research process. Several major weaknesses can be found, related to how research needs and questions were identified, local communities or populations engaged, local contexts and knowledge systems considered, and local benefits from the research process assured.	Local contexts and engagement have been considered during the research process, but some weaknesses remain related to how research needs and questions were identified, local communities or populations engaged, local contexts and knowledge systems considered, and/or local benefits from the research process assured.	Local context and engagement have been a focus in the research process. Few, if any, minor weaknesses remain related to how research needs and questions were identified, local communities or populations engaged, local contexts and knowledge systems considered, or local benefits from the research process assured.	Local context and engagement have been a clear and systematic focus in the research process. Research needs and questions were appropriately identified, local communities or populations engaged, local contexts and knowledge systems considered and respected, and local benefits from the research process assured.

Dimension 3: Research Importance; Subdimension 3.2: Relevance

UNACCEPTABLE 1 2	LESS THAN ACCEPTABLE 3 4	ACCEPTABLE TO GOOD 5 6	VERY GOOD 7 8
There is little or no evidence that the research might contribute to a local priority, a key development policy or strategy, or an emerging area that might demand solutions in the foreseeable future. Needs assessments and justification for the work are absent or unconvincing.	There is some evidence that the research might contribute to a local priority, a key development policy or an emerging area that might demand solutions in the foreseeable future. A focus on this area of work at this time appears sufficiently justified.	There is good evidence that the research might contribute to an important local priority, a key development policy or strategy, or an emerging area of some significance that might demand solutions in the near future. A focus on this area of work at this time has been well justified.	There is good evidence that the research is already recognized as having the potential to address a critical local priority, a key development policy or strategy, or an important emerging area that is highly likely to demand solutions in the near future. A focus on this area of work at this time puts the researchers at the cutting edge of an active and/or important field of work.

Dimension 4: Positioning for Use; Subdimension 4.2: Timeliness and Actionability

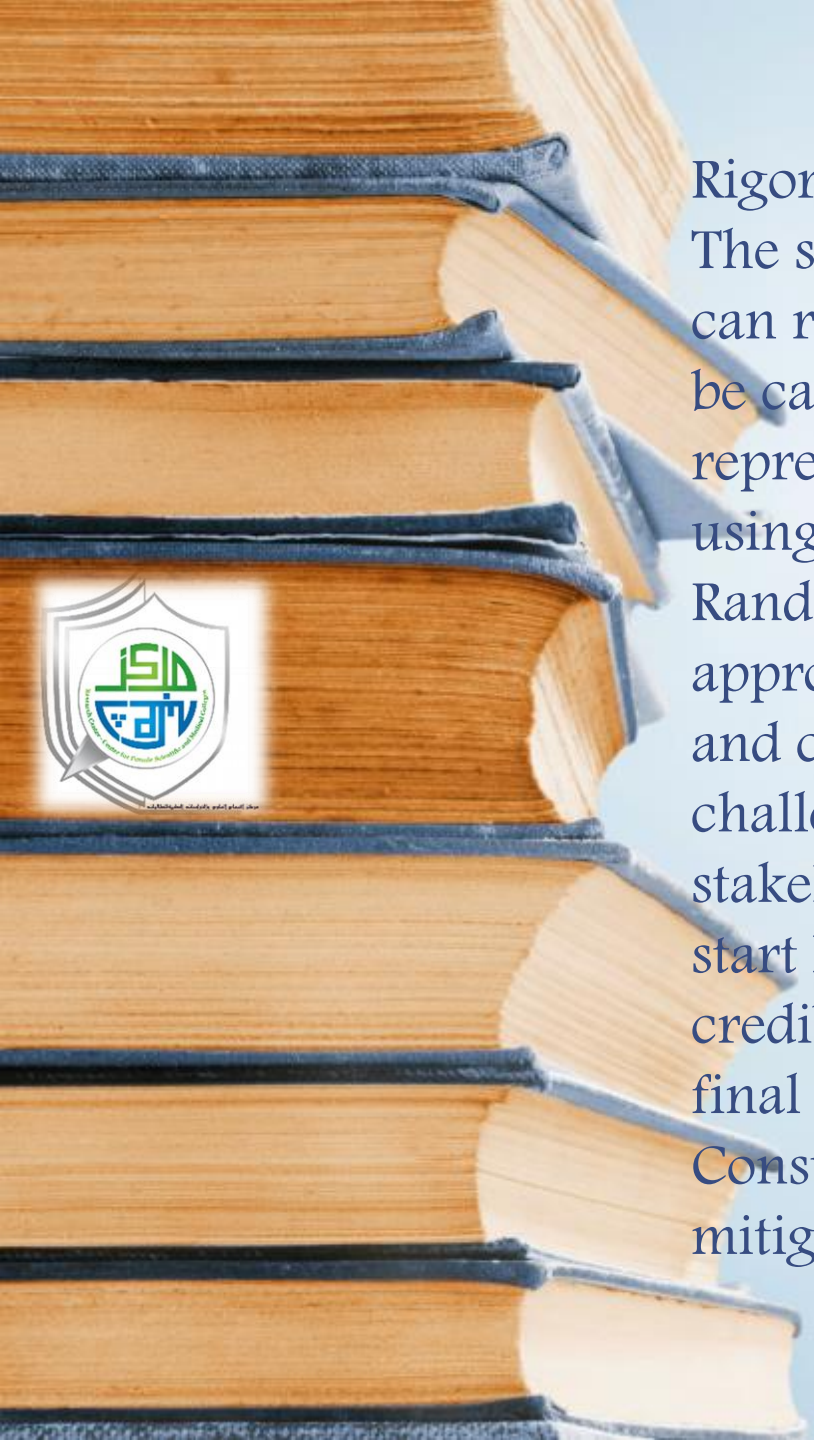
UNACCEPTABLE 1 2	LESS THAN ACCEPTABLE 3 4	ACCEPTABLE TO GOOD 5 6	VERY GOOD 7 8
There is little or no evidence that any analysis of relevant user environment was undertaken and that institutional, political, social, or economic contingences were considered.	There is evidence that some analysis of the user setting was under undertaken; however, consideration of is incomplete and, furthermore, the analysis is not accompanied by discussion of actual strategies or plans to move the knowledge to policy or practice.	There is evidence that the user environment and major contingencies have been examined and reflected upon and connected to strategies and plans for moving the research into policy or practice in a timely manner.	The analysis of the user environment and contingencies is exceptionally thorough and well-documented or articulated. There is evidence of careful prospective appraisal of the likelihood of success of strategies designed to address contingencies.



Challenges and Pitfalls…(1)

The assessment is time-consuming, especially when robust triangulation is an imperative …

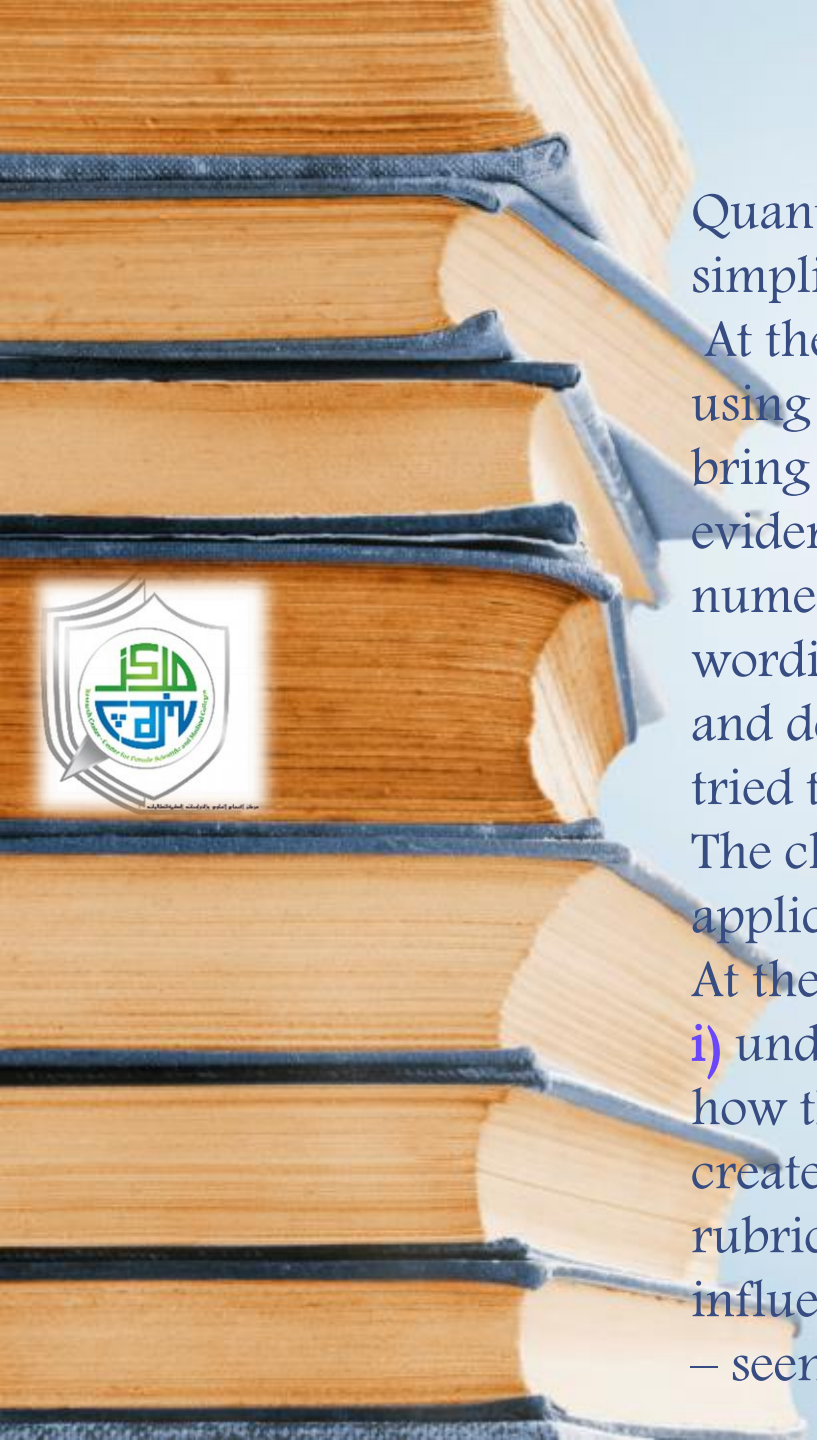
Implementation of the RQ+ approach requires synthesis of qualitative and quantitative data from multiple sources and methods. Extensive consultation with internal and external stakeholders proved to be essential to filling gaps and allowing for sufficient triangulation. The quality and accessibility of sources of project and program data and information are therefore critical factors in the feasibility and value of the approach. Furthermore, where monitoring systems are set up without reference to the Framework components, data collection may require significant time and resources. Reviewers were of the view that the trade-off between comprehensiveness, ease-of-use, and reliable results versus the additional time needed was worthwhile. However, when applying the Framework, careful planning should go into determining a justifiable degree of effort and time



Challenges and Pitfalls …(2)

Rigorous and credible sampling is critical …

The sampling strategy is crucial for the credibility of the whole effort, and can require a significant level of mindfulness to execute. It must therefore be carefully and thoughtfully conducted in order to ensure fair representation of the research program under review. Sampling is done using a purposeful approach, implemented in an iterative manner. Random sampling may be a completely appropriate and preferable approach for project selection in another context. Sampling from large and complex program portfolios can be technically and politically challenging, and, for best results, must be perceived by primary stakeholders and users as credible and legitimate. Considering from the start how to ensure a purposefully or randomly selected sample that is credible and acceptable to all primary stakeholders, or endorsed by the final authority, will streamline discussions and manage expectations. Consultation with program staff is of great value. Of course, a view to mitigating potential biases should be kept in mind.



Challenges and Pitfalls …(3)

Quantification after blending quantitative and qualitative data can appear to give simplistic results…

At the micro level, the RQ+ approach asks reviewers to assess research projects using both qualitative and quantitative data. Rubrics were considered helpful to bring about more precision in judgment, including by blending the two types of evidence. However, this process became problematic when results were expressed in numerical values (e.g. the rubric ratings). In a sense, without reference to the precise wording of the rubrics, they were perceived as not appropriately capturing the rigor and depth and, hence, the true value and spirit of the assessment. Some reviewers tried to mitigate this perception by using color coding instead of quantitative ratings. The challenge was further compounded by sub-dimensions that were "not applicable" in certain programs.

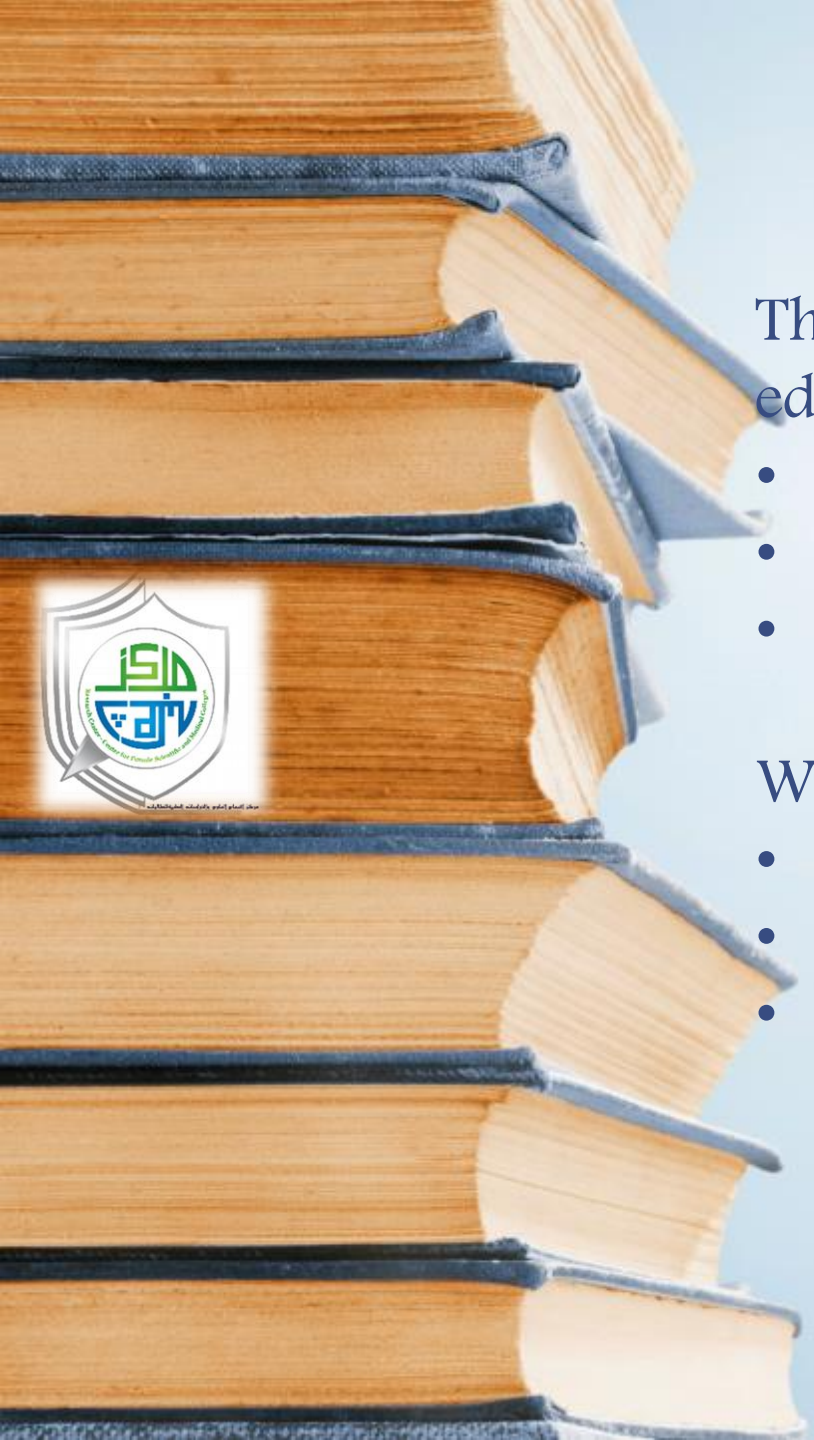
At the macro level, data comparison and aggregation presented two challenges: i) understanding the relative values of scores between (sub) dimensions and deciding how these should be weighted and valued, and ii) working with the uncertainties created when following rubric aggregation to the program level. The value of a rubric in establishing a program-wide average or composite assessment for influencing factors or sub-dimensions at an overall program level can be – and was – seen by reviewers and program staff in both positive and negative terms

PROMOTING QUALITY …(1)

- Professional associations and education research journals should work in concert with **funding agencies** to create an infrastructure that takes advantage of technology to facilitate data sharing and knowledge accumulation in education research
- Most codes of ethics that specify professional norms and expectations for social scientists **include standards** for ways in which individual investigators are responsible for contributing to their field as a whole.
- Ensure **appropriate resources** are available for education researchers conducting large-scale investigations in educational settings to build partnerships with practitioners and policy makers.
- **Peer review** panels in federal agencies that fund education research should be composed to promote the participation of people from a range of scholarly perspectives and traditionally underrepresented groups and provide opportunities for professional development.
- To promote improvements in education research capacity and infrastructure as broadly defined by the committee, their implementation will require **leadership and resources** from the many organizations and individual investigators that constitute the diverse and diffuse field of education research.

PROMOTING QUALITY …2

- Area worthy of investigation has to do with the relationship between the “supply” of education research and the “demand” for it.
- The crucial role of the community of investigators, including funding agencies, to support efforts to integrate and build on findings from related work.
- Another set of tools or strategies that can facilitate the continued development of a coherent knowledge base is the sharing of data.



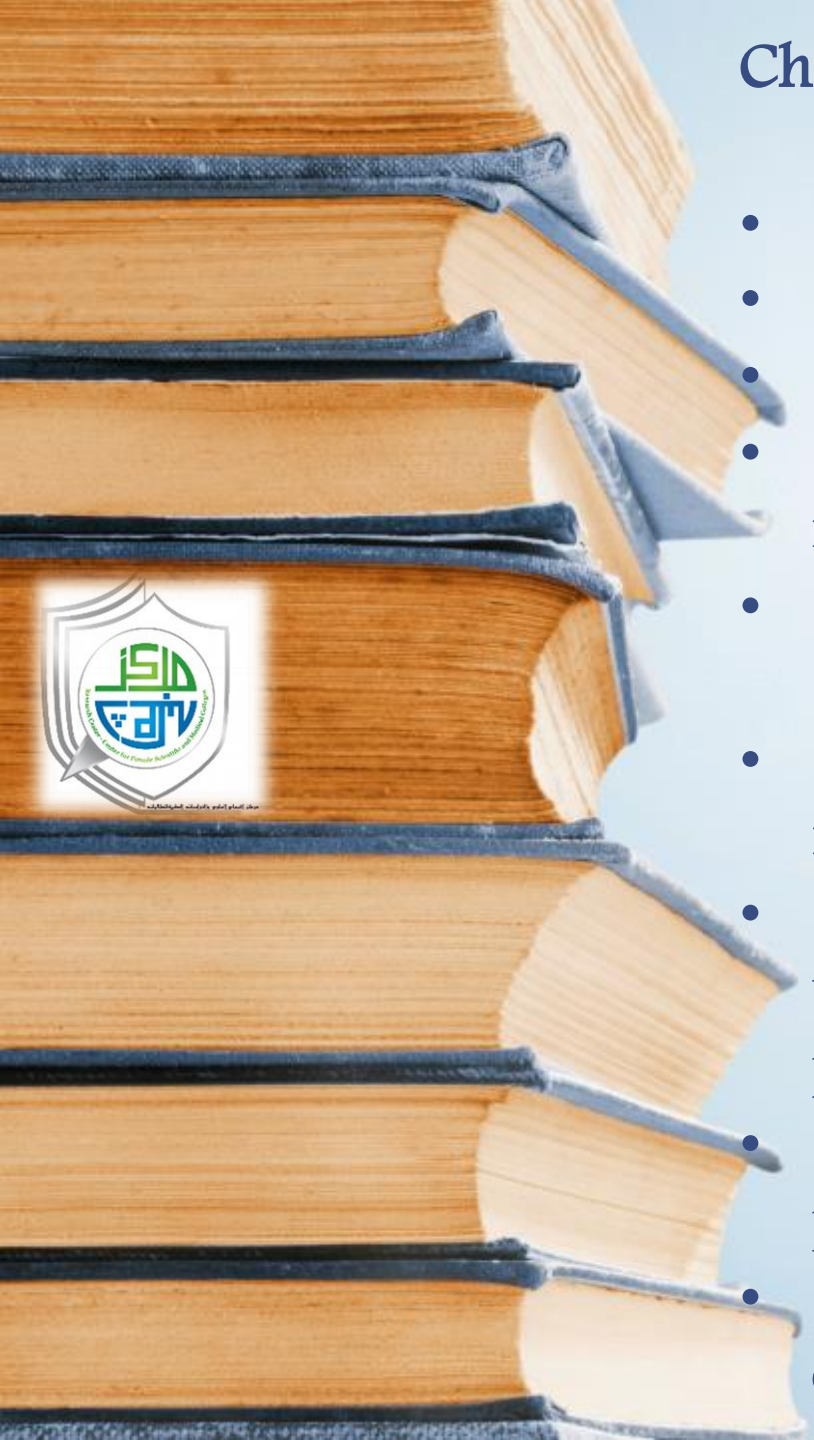
STRATEGIC OBJECTIVES

Three strategic objectives for advancing scientific research in education has been identified:

- promoting quality,
- building the knowledge base, and
- enhancing professional development.

We may add other three objectives:

- Serving the community
- Expanding economic development, and
- Establishing a solid foundation of collaboration between education institutions and environment



Characteristics of a High Quality Research Study Include:

- A well-defined research topic and a clear hypothesis
- Focused research questions responsive to a literature review
- An absence of research bias
- High quality data fit for their intended use and reliable, valid, relevant, and accurate
- Analytical methods appropriate to the data and the questions (descriptive or inferential)
- Findings of the study written in a way which brings clarity to important issues
- Tables and graphics which are clear, accurate and understandable with appropriate labeling of data values, cut points and thresholds
- Include both statistical significance results and effect sizes when possible
- The conclusions and recommendations both logical and consistent with the findings.

Characteristics of High Quality Literature Reviews:

- Use of the most credible sources such as professional journals
- A synthesis of relevant papers including those that may be contrary to one's hypotheses
- Intuitively organized overview of the literature and a conclusion that summarizes and synthesizes key ideas from the review

Characteristics of High Quality Policy & Practice Reports:

- Policy issues are clearly defined
- Existing evidence is compiled and explained
- Alternative options are identified and/or explained
- Evaluation criteria are explored
- Potential outcomes are reviewed
- Policy recommendations may be made

Characteristics of High Quality Exploratory Data Analysis:

- Invites additional intuitive insight or more questions
- May reveal important and unexpected relationships among and between variables
- Include both statistical significance results and effect sizes when possible
- Avoids reliance on previous assumptions in order to maximize chances for insight which may uncover important relationships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спасибо
dank je
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thank you
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Reference links:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3386428/

http://ktdrr.org/ktlibrary/articles_pubs/ncddrwork/focus/focus9/Focus9.pdf

http://www.researchconnections.org/content/childcare/understand/research-quality.html

http://www.socialresearchmethods.net/kb/qualval.php

http://w3.unisa.edu.au/rqie/bibliometrics/quality.asp

https://www.nap.edu/read/11112/chapter/3

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