

## Identifying Research Priorities for School Improvement in the Developing World

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*This paper discusses a research agenda setting project conducted for an international non-governmental organization which aims to help create a regionally relevant, high-quality knowledge base on key education issues of policy and practice. Specifically, we illustrate how our team adapted the Child Health and Nutrition Research Initiative (CHNRI) methodology for research priority setting to identify areas for future education research. The paper focuses on the methods used and lessons learned from adapting these methods for education research, as opposed to the results of the exercise itself. While the traditional CHNRI model is not directly applicable to education research, an adapted version of this methodology provides an evidence-based approach to support the decision making process of research funders. The CHNRI method does not provide definite answers on what research should be funded; rather it provides a solid platform to support informed discussion on ways research can be prioritized.*

### **Introduction**

The field of international development is founded upon the idea that highly specialized knowledge and technical skills have the potential to solve some of the most critical challenges facing our world (Easterly, 2013). In the twenty-first century, as the global paradigm has shifted away from a global economy based on material resources and other forms of physical capital, to a global economy based on knowledge as the new source of wealth (Stiglitz, 1999), the concept of evidence-based development or knowledge-based aid, has gained emphasis. Today, the ability to produce and use knowledge is seen as critical to a nation's comparative advantage (Government of Canada, 2001), and is a major focus in international development (World Bank, 2009). As a result, there is a growing demand for empirically based evidence and specialized technical advice to help developing countries and aid agencies to assess the impact of development activities.

Research is valuable to both policy makers and practitioners in many fields. In education, empirical evidence plays a vital role in improving the quality of schooling

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across the globe. It has the potential to improve both the efficiency and effectiveness of educational policy and practice by providing attested information to enhance the quality and cost-effectiveness of policies (Levin, 2010; Livingstone, 2005). In the case of international education development, limited resources combined with an increased culture of accountability has created a demand for evidence-based decision making at all levels. However, despite increasing calls for evidence-based development, there are many gaps in our empirical understanding of education development around the world. As a result, development organizations are orienting themselves towards supporting knowledge generation in order to fill these gaps (Piotrosky, 2014).

The shift from funding programs to funding research to promote development can be difficult. Organizations struggle with how to generate a systematic and transparent processes for creating research agendas that identify not only what research is necessary, but also what research would have the most impact on the ground? How can organizations ensure that voices from the developing world are represented, and how do stakeholders ensure that the research funded is both methodologically sound and practically relevant? This paper discusses a research agenda setting project conducted for an international non-governmental organization which aims to help create a regionally relevant, high-quality knowledge base on key education issues of policy and practice. This knowledge base should, then, stimulate debate, shape policy, contribute to project learning and improve the effectiveness of education programs in a specific region of the developing world. Specifically, we illustrate how our team adapted the Child Health and Nutrition Research Initiative (CHNRI) methodology for research priority setting to identify priority areas for future education research. Rather than focusing on the results of the exercise itself, this paper discusses the CHNRI method and the concepts learned from adapting this method for education research.

### **The Child Health and Nutrition Research Initiative (CHNRI) Research Priority Setting Method**

In 2005, the CHNRI, a project of the Global Forum for Health Research, identified the need for a, “practical and systematic tool that could assist priority setting in health research investments” (Rudan, 2012, p. 237). Over the next two years, a panel of experts (including researchers, program makers from low and middle income countries, and representatives of international organizations) funded by the World Bank, worked over a series of 12 consecutive meetings to develop a methodology appropriate for setting research priorities that was both scientifically rigorous and replicable (ibid).

The resulting CHNRI research priority setting exercise is a systematic and transparent approach to research agenda setting which involves working with an array of experts in a certain field of research. In its original model, the CHNRI method limited the definition of research strictly to activities which resulted in the generation of new knowledge, but over the years this definition was expanded to include knowledge mobilization activities as well (Tomlinson, et al., 2007). The CHNRI exercise is a flexible method which can be used to prioritize research investments on a local, national, regional or global scale (Rudan, et al., 2008). This exercise can be implemented by a small group of individuals responsible for representing the vision and interest of

organizations which invest in research. Thus, this methodology is appropriate for organizations making sizable investments in research such as large INGO's, multilateral organizations, national governments, and other research funding organizations (ibid).

While the actual steps may differ depending on the context, the CHNRI framework identifies five key components for setting research priorities which guide each iteration of this method. These include (see Tomlinson, et al. 2007; 2009):

1. Gathering Technical Experts and defining the context (i.e. geographic scale, time period, and target population);
2. Systematically listing research options by domain of research;
3. Scoring all listed research options by a pre-determined set of criteria;
4. Addressing stakeholders values (this could include weighting certain criteria in order to account for a particular item which is highly valued by the funding agency); and
5. Program budgeting and, marginal analysis and advocacy.

A key component of the CHNRI exercise is developing criteria for rating and prioritizing the list of research options produced. While these can be adapted to suit the needs and interests of the funding organization, CHNRI's standard criteria include the following five dimensions (from Rudan, 2012, p. 238):

1. the likelihood that the proposed research question is answerable;
2. the likelihood that the proposed research would result in an effective health intervention;
3. the likelihood that this resulting intervention would actually be deliverable, affordable and sustainable;
4. the maximum potential that the intervention would reduce the disease burden; and
5. the likelihood that this intervention would reduce inequality.

These criteria not only help to identify research priorities, but also help investors identify the potential benefits and risks of an array of research options (Wanzy, et al., 2013). While the sponsor of this project chose not to, the funding agency can choose to weight one or more of the criteria in the analysis stage in order to address their specific values and interests (Tomlinson, et al., 2008).

Analysis of the CHNRI survey responses includes computing the Research Priority Score (RPS), average combined rating for all respondents across criteria for each research question. The Average Expert Agreement score (AEA) is also computed which shows the degree of agreement and variability across experts on the ratings for each question. The RPS is based on a possible score of 100 points. The closer to 100, the higher the score and priority given to that question across all respondents while a score closer to 1.00 in the AEA suggest greater consensus. Both scores are used to generate a ranking of research priorities based on the level of agreement among experts.

Overall RPS is calculated as the mean of score for each criteria per each question:

$$[(\text{Criteria 1 score})+(\text{Criteria 2 score})+(\text{Criteria 3 score})+(\text{Criteria 4 score})]/ 4$$

AEA is calculated for each research question following Dean and colleagues (2013) guidelines. They suggest calculating AEA as the “average proportion of scorers that gave the most common answer while scoring that question” (p.5), according to the formula:

$$\frac{1}{4} \times \sum_{q=1}^4 \frac{N(\text{scorers who provided the most frequent response})}{N(\text{scorers})}$$

*Note:* Where q is 1 of the 4 criteria questions that experts used to evaluate competing research questions

The CHNRI exercise relies on the collective opinions of a group of experts, as opposed to one expert opinion. The highly structured format of the CHNRI methodology and independent scoring ensures that no single individual is able to dominate the process, which limits the possibility of personal bias distorting the outcome (Tomlinson, et al., 2007). Instead, the process identifies the points of greatest agreement, and as such, the CHNRI method is viewed as, “a widely applicable tool for consensus development in any area of research” (Rudin, 2011, p. 239). While the results of a CHNRI exercise do not determine where resources for research will be directed, the findings provide useful information that reflects and synthesizes the views of a broad range of knowledgeable experts in a designated field.

### **Applying the CHNRI Method to International Education Development Research**

Originally used to identify research priorities related to child health and nutrition, the CHNRI method has been adapted to support research agenda setting for an array of health related issues such as global mental health research (Tomlinson, et al., 2009), reducing maternal and child mortality in low and middle income countries (Dean, et al., 2013), Childhood Diarrhoeal Disease (Wanzy, et al., 2013), and determining research priorities on the issue of Family Planning (Campbell, Higginbotham, & Polonsky, 2014). However, we found no evidence that this methodology has been applied outside of the health sector. To our knowledge, this paper deals with the first time this process has been used to identify and prioritize research needs in the education sector.

The CHNRI exercise has been traditionally used for specific interventions in the context of health research and is a model which cannot be entirely transferred to education. Thus, we had to adapt the CHNRI model to suit the needs of the sponsor organization. In turn, as detailed in the paragraphs below, the revised model is more appropriate for the complex and multi-dimensional nature of education research in the developing world.

#### *The Need for a CHNRI in Education*

In response to Education for All and Millennium Development Goals, many national governments and non-governmental actors in developing countries gave primacy to policies and interventions designed to increase access to primary education to all children. However, the experiences of our sponsor organization suggest that

improvements in access do not necessarily produce improvement in quality. Tangible improvements in quality contribute to better enrollment and retention, and strengthening the quality of education in schools requires a comprehensive whole school approach to school improvement that addresses these dimensions in a coordinated and coherent way. The success of school improvement inputs, such as teacher and head teacher training, should not be limited to evidence of participation satisfaction and implementation of new programs and practices. Any measurement of success must take into account evidence of student outcomes. Another key lesson is that the sustainability of school improvement structures and processes, and scaling up beyond the schools and education personnel initially targeted do not just happen. Sustainable education development requires strategic partnerships with local education system authorities and institutions, while at the same time working within, influencing and leveraging national education policy and resource realities.

Many of these issues and lessons learned by our sponsor organization are aligned with findings from international and North American research on school improvement (Hargreaves and Shirley 2012). However, international research on school improvement increasingly emphasizes the collection of data and employment of experimental research and intervention designs to enable more targeted solutions to specific programs. In order to address this issue, the sponsor organization planned to invest in regionally relevant, high-quality research on key education issues of policy and practice which could contribute to improving the effectiveness of education programs in a specific region of the developing world.

The sponsor organization had previously participated in a CHNRI exercise to support their work in the health sector, and recognized the potential this methodology has for research priority setting in other sectors. Our team at the Ontario Institute for Studies in Education (OISE) was brought on to support this project.

The OISE team used the following approach to gathering and synthesizing information about gaps and opportunities for research priorities in support of the sponsor organization's objectives. This section is structured according to the five key components of the CHNRI method. Here we highlight some of the key ways we adapted this methodology to address the needs of our sponsor and the context of education research in the developing world. On this note, in the traditional CHNRI model 'Addressing Stakeholder Needs' is listed as step four out of five. However, in our model we collaborated with the sponsor organization throughout the duration of the project to ensure that the project was addressing their needs. Therefore, in this paper we have included stakeholder needs under each of the other aspects of the CHNRI model as opposed to listing it under a separate heading.

#### *Gathering Technical Experts and defining the context*

In order to define the context of this project, our team at OISE completed a review of the sponsor organization's internal documents related to school improvement and to education in the specific region of focus for this project. During this phase, we identified six broad areas commonly addressed in the funding agencies school improvement

initiatives in the developing world. This included: a) teaching and learning, b) teacher development (pre- and in-service), c) school management and leadership, d) parent and community involvement; e) system-level factors, i.e., policies, human and resource capacity; and f) early childhood development and education. These six themes combined with the sponsor organizations focus on a specific geographical region of the developing world defined the context of this CHNRI exercise and were therefore used to frame the context for the rest of the project.

In consultation with the project sponsor, our team also identified 84 education experts knowledgeable about the region and subject, internal and external to the sponsor, including a mix of local and non-local experts, and both academic and professionals who were later invited to participate in the project.

In order to ensure our frame met our sponsor organization's needs, we hosted a full day meeting with a group of stakeholders from the sponsor organization as well as a select group of education experts early on in the process. Based on a discussion paper provided by the Principal Investigators, we discussed the six broad themes identified above, as well as the types of research questions and methodologies which had the potential to have a catalytic impact in the field. Insights gleaned from this discussion were taken into consideration during the development of our list of research options outlined below.

*Systematically listing research options by domain of research*

In a traditional CHNRI, the small group managing the project would be responsible for creating the initial list of research options. However, for our project, we utilized the approach of Dean, et al. (2013), who included two iterations of the CHNRI in their exercise. Based on this adaptation, we developed a short open-ended survey to solicit input about primary / pre-primary education research needs and priorities for a group of countries within a particular region of the world. All 84 education experts were invited to respond to this survey either online or by telephone. In total, we received 22 responses (26%). This initial survey data was then combined with sponsor organization document summary data to generate a comprehensive list of 267 potential research options.

In the health sector, it is common for CHNRI participants to rank hundreds of research options in a CHNRI exercise (e.g. Wanzy, et al., (2013) ranked 466 research options); we, however, did not feel that education experts would participate in our CHNRI if it required them to rank the 267 research options that we identified through phase one of this project. Therefore, for the second phase, we clustered and reduced the list of research options into 89 research questions categorized under key themes.

*Scoring all listed research options by a pre-determined set of criteria*

Based on a review of prior CHNRI reports and in consultation with the funding agency we developed a set of four criteria which were used for evaluating the research questions. These included:

1. *SYSTEM IMPACT*: Research on this question will be catalytic / instrumental in *improving system-level policies and interventions* that support teaching and learning across diverse contexts in the developing world.
2. *SCHOOL IMPACT*: Research on this question can lead to substantial *improvements in school level practices that support children's learning and development* across diverse contexts in the developing world.
3. *STUDENT IMPACT*: Research on this question is likely to lead to *substantial improvements in boys' and girls' learning and development outcomes* in diverse contexts in the developing world
4. *RESEARCH FEASIBILITY*: Research on this question is *methodologically feasible* in developing world contexts.

The ranking of the 86 research questions was completed through an online survey. In this second survey, questions were presented by major thematic area (e.g., teacher development, school management and leadership). Respondents could opt out of sections if they did not have sufficient knowledge to respond. Thus, the number of respondents varies for different thematic areas because some surveys were only “partially” completed (the respondent completed at least one full section, but not all sections). The second survey was sent to 115 regional education experts including the original 84. 37 responses were received including 27 complete and 10 partial surveys. Examples of the questions and results are presented in tables 1 and 2.

**Table 1. Example of Overall Research Questions and Results**

<i>Theme</i>	<i>Proposed Research Questions</i>	<i>(n)</i>	<i>System</i>	<i>School</i>	<i>Student</i>	<i>Feasibility</i>	<i>RPS</i>	<i>AEA</i>
TL	What pedagogical and classroom management strategies are effective in improving the quality of learning in large primary school classes?	27	0.85	0.98	0.95	0.95	93.17	0.80
ECD&G	What types of ECD programs have the strongest impact on student learning over time?	17	0.94	0.85	0.94	0.88	90.44	0.79
SM&L	What capacities/skills do primary school head teachers need to effectively perform leadership and administrative roles in different contexts?	17	0.88	0.92	0.89	0.92	90.33	0.84
TD	What are the positive and negative factors affecting teacher attendance and absenteeism? How can these be best addressed?	32	0.88	0.92	0.89	0.92	90.23	0.78
ECD&G	What kinds of training and credentials for early childhood program personnel best support effective pre-primary teaching?	15	0.93	0.88	0.84	0.94	89.74	0.77



**Table 2. Example of Research Questions and Results in a Thematic Domain**

<i>TEACHING AND LEARNING</i>	<i>N</i>	<i>RPS (%)</i>
What pedagogical and classroom management strategies are effective in improving the quality of learning in large primary school classes?	27	93.17
What practices are most effective for student transitions from local to national languages and/or English as languages of instruction?	26	89.47
What kinds of innovative non-traditional approaches to teaching and learning are happening in East African schools and classrooms and with what results?	27	89.45
What kinds of supports are needed by primary teachers to implement multilingual education effectively?	25	88.92
How are school systems and schools interpreting and responding to the demands for 21st Century Learning Skills in both policy and practice? What impact is this having on learning outcomes?	26	88.46

The survey invited the respondents to identify their organizational affiliation and position. The characteristics of the 37 respondents to the second CHNRI survey were as follows:

# Respondents: N = 37 / 101

- Complete = 27
- Partial (answered at least one section) = 10

Geography (location of employment, not ethnic affiliation)

- From the specific region of the developing world we focused on in this project (three countries represented) = 62% (23/37)
- From the developed world (Australia, France, Switzerland, Canada, USA, UK) = 38% (14/37)

Role (n = 35, 2 missing personal data)

- Academic = 48% (17/35)
- Non-Academic = 52% (18/35)

Analysis of the CHNRI survey responses included computing the Research Priority Score and the Average Expert Agreement score (AEA) which shows the degree of agreement and variability across experts on the ratings for each question. While it is possible to weigh certain criteria based on the funding agencies, values, and focus (Tomlinson, et al., 2008), the agency which funded this project did not request any weighting.

Results of the CHNRI were presented by listing research questions both by overall ranking based on RPS score, as well as by thematic domain area where research questions were listed by their overall RPS rank under each theme.

#### *Rapid Reviews of the Literature*

In addition to the CHNRI exercise, our team completed a series of rapid reviews to synthesize research-based knowledge, issues and knowledge gaps identified in the literature. These reviews covered research literature internationally and regionally in five domains<sup>2</sup> (teaching and learning, teacher development, school management and leadership, parent and community and early childhood development and education).

The rapid reviews utilized a strategic search method to identify key resources such as existing systematic reviews, literature reviews, reports and other gray literature from well-known and reliable sources on school improvement in general as well as in the contexts of developing countries and the specific region related to this project. To this end our team identified search terms for and recorded more than 765 individual searches (465 in Google and 362 in Google Scholar). We combed through and collected links to potential sources from approximately 4,135 pages of Google and Google Scholar search results. Completing the initial search, we identified 1) key sub-themes; 2) prominent authors and organizations; and 3) created a list of documents to be considered for the rapid review. We summarized key resources making note of significant findings, the evidence-base supporting these findings, and any knowledge gaps identified in the literature.

The final documents included in the series of rapid reviews focused primarily on knowledge from extensive systematic reviews of the literature related to the sub-themes of this series, supplemented by recent empirical studies of particular relevance to our focus region and 10 other developing country contexts. The findings of this series of rapid reviews were reported alongside the results of the CHNRI exercise, and contributed to reinforce the overall findings in the prioritization exercise.

#### *Program Budgeting and, Marginal Analysis and Advocacy*

The results of the CHNRI process were provided in a detailed report to the project sponsor. This report helped to inform the sponsor organization in setting priorities for research and was then used as the basis for a call for research proposals. The OISE team was not involved in the actual selection of research projects that were ultimately funded.

#### **Reflections from the CHNRI Exercise**

As mentioned, we are not presenting the results of our CHNRI exercise in this paper. Instead, the following section highlights what we learned about applying the CHNRI methodology to education research in the context of the developing world.

As with any research, there are limitations to consider that arise from the methodologies employed. It is important to remember that the CHNRI exercise results in a ranking of

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<sup>2</sup>Rapid reviews are available at the CIDEC website:  
[http://www.oise.utoronto.ca/cidec/Research/SESEA\\_Research\\_Consultancy.html](http://www.oise.utoronto.ca/cidec/Research/SESEA_Research_Consultancy.html)

research topics based on the combined ratings of the experts surveyed using a set of criteria for judging the merits of those questions. The evaluation criteria used to rate the research questions on the survey were selected in consultation with the project sponsor. They are not the only criteria that could have been used, and perhaps the results may have varied had different or more criteria been employed. Some CHNRI studies use up to seven criteria, which we judged excessive for this survey.

Greater response to the second survey (n= 37/115) may have provided more data; however, the current response rate of n=37 exceeds the acceptable levels for robust survey research. More importantly, reports on use of the CHNRI process in the health sector suggest that once 25-30 responses have been received, the rankings of research priorities do not substantially change as the “exercise reaches saturation” (Dean et al., 2013, p.5).

Our respondents came from a diverse group of academics and professionals working in international agencies, having expertise in education in the region of focus. However, few responses were received from the regional government education authorities we contacted. Furthermore, while a number of respondents (n=10) opted out from rating the questions of certain thematic sections, we feel confident that for the lower response sections the experts who chose to respond had sufficient knowledge in that particular thematic domain. However, in future CHNRI surveys, we would suggest targeted recruiting of experts in specific domains.

One of the interesting findings from the CHNRI exercise was that the initial open-ended survey yielded a wide range of potential topics/questions for research but little consensus on those areas across the 22 experts who responded to that initial survey/interview. Only one or two experts explicitly named most topics. It was not possible to identify relative priorities amongst the different questions overall or within each major thematic area from this initial consultation. That fact confirmed the need to engage in a second stage in the research agenda setting process to enable prioritization of possible research questions.

After completion of the analysis of the second survey we found the final rankings are relative; numerical differences between the questions are not great. The CHNRI procedure does not result in judgments of “significant differences” between items in statistical terms. Nonetheless, it does produce and reflect a sense of relative priorities drawing upon the knowledge of a broad range of experts in the field of inquiry.

While the rapid reviews of the research in specific domains were used to supplement and triangulate the survey findings, the reviews proved especially useful in confirming the importance of the potential research priorities, and in highlighting potential research topics that were not captured in the survey process.

### **Conclusions**

While the traditional CHNRI model is not directly applicable to education research, an adapted version of this methodology provides an evidence-based tool to help research

funders make tough choices as to what research should be prioritized. A research priority setting exercise of this nature is not able to provide definite answers on what research should be funded, but it does provide an excellent starting point for an informed discussion on what research should be prioritized.

In addition to providing a detailed methodology for consensus building and priority setting, we found several other key benefits to the CHNRI method. As described earlier, our project involved participants from both the global north and the global south. This allowed us to incorporate the opinions and ideas of our colleagues in the global south in the research priority setting process, colleagues whose voices are not well represented in the literature.

The creators of the CHNRI method believe that this priority setting exercise has the potential for broad application in the developing world (Rudan, 2012). Our experience with the CHNRI model supports this belief. Not only is this a systematic and transparent process for determining a research agenda, but it could also be applied to consensus development and priority setting in other areas of education investment as well. To this end, we believe that the CHNRI model has great potential for education decision makers in the developing world who may not have access to, or don't feel their perspectives are accurately or appropriately represented in the global knowledge base. The CHNRI method allows for decision makers in the global south to identify their own education experts, and provides a structured process that could support decision makers in the global south to set their own research agenda and in turn define their own priorities for development.

In addition, this systematic approach for setting a research agenda provides the opportunity to bring academics, policy makers and practitioner experts, together who otherwise would not connect to each other, or would generally not share conversations to build consensus on a field of study. The education field may benefit from a greater number of interactions among experts which occur more regularly in other fields.

To sum, an adapted version of the CHNRI method provides a practical, systematic and transparent approach to prioritizing education research investments on a local, national, regional or global scale. We hope that this paper provided useful information that can be built upon to support similar projects in education research investment.

*If you have any questions or comments on this piece, you may contact **Robyn Read** at [Robyn.read@utoronto.ca](mailto:Robyn.read@utoronto.ca).*

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