

HEART

HEALTH & EDUCATION ADVICE & RESOURCE TEAM

Helpdesk Report: Learning Achievement: Textbooks

Date: 21.10.13

Query: In what circumstances do textbooks improve learning?

These helpdesks were designed to enable an extensive search for evidence on various methods for improving learning. There are a series of six similar reports, each is based on an edit of a literature search for their chosen method. After the initial search had been done the search fields were expanded to include further search engines and search methods, for more information please see the search strategy section of the report.

The list of methods searched in the series are: textbooks, teacher training, infrastructure and basic facilities, school leadership, school governance and student performance data.

Enquirer: DFID

Content

1. Screened results from search strategy
2. Additional resources
3. Search strategy
4. Screening method

1. Screened results from search strategy

A total of 10 documents were assessed as potentially relevant.

The Support to Rural India's Public Education System (STRIPES) Trial: A Cluster Randomised Controlled Trial of Supplementary Teaching, Learning Material and Material Support

R. Lakshminarayana, A.Eble, P. Bhakta, C. Frost, P. Boone, D. Elbourne, V. Mann (2013)

Plos One. 8 (7)

Available at:

<http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0065775>

Background: The aim of the STRIPES trial was to assess the effectiveness of providing supplementary, remedial teaching and learning materials (and an additional 'kit' of materials for girls) on a composite of language and mathematics test scores for children in classes two, three and four in public primary schools in villages in the Nagarkurnool division of Andhra Pradesh, India.

Methods: STRIPES was a cluster randomised trial in which 214 villages were allocated either to the supplementary teaching intervention (n = 107) or to serve as controls (n = 107). 54 of

the intervention villages were further randomly allocated to receive additional kit for girls. The study was not blinded. Analysis was conducted on the intention to treat principle, allowing for clustering.

Results: Composite test scores were significantly higher in the intervention group (107 villages; 2364 children) than in the control group (106 villages; 2014 children) at the end of the trial (mean difference on a percentage scale 15.8; 95% CI 13.1 to 18.6; $p < 0.001$; 0.75 Standard Deviation (SD) difference). Composite test scores were not significantly different in the 54 villages (614 girls) with the additional kits for girls compared to the 53 villages (636 girls) without these kits at the end of the trial (mean difference on a percentage scale 0.5; 95% CI -4.34 to 5.4; $p = 0.84$). The cost per 0.1 SD increase in composite test score for intervention without kits is Rs. 382.97 (4.45 pound, \$7.13), and Rs. 480.59 (5.58 pound, \$8.94) for the intervention with kits.

Conclusions: A 18 month programme of supplementary remedial teaching and learning materials had a substantial impact on language and mathematics scores of primary school students in rural Andhra Pradesh, yet providing a 'kit' of materials to girls in these villages did not lead to any measured additional benefit.

Methods:

Primary and empirical

Experimental: Cluster RCT

Necessary but Not Sufficient: Challenges to (Implicit) Theories of Educational Change-Reform in Nepal's Primary Education System

T. Khaniya and J.H. Williams (2004)

International Journal of Educational Development. 24 (3) 315-28

Abstract available at: <http://www.sciencedirect.com/science/article/pii/S0738059304000069>

(This paper is also included in the infrastructure, leadership and teacher training returns)

Educational quality reforms are undertaken in hopes that students in a higher quality education system will acquire more of the curriculum. However, the authors argue, there is no necessary connection between investments in educational quality and improved learning outcomes. A national assessment of grade 3 students in Nepal found few differences in learning competencies before and after a multi-year reform project involving improvements in classrooms, curriculum, textbook distribution, teacher training packages, administration and supervision system, school management, and community involvement in school management. The article explores the implications for educational reform initiatives and theories of educational change.

Methods:

Evaluation method not stated in abstract

The Challenge of Education and Learning in the Developing World

M. Kremer, C. Brannen and R. Glennerster (2013)

Science. 340 (6130) 297-300

Abstract available at: <http://www.sciencemag.org/content/340/6130/297.short>

Across many different contexts, randomized evaluations find that school participation is sensitive to costs: Reducing out-of-pocket costs, merit scholarships, and conditional cash transfers all increase schooling. Addressing child health and providing information on how earnings rise with education can increase schooling even more cost-effectively. However, among those in school, test scores are remarkably low and unresponsive to more-of-the-same inputs, such as hiring additional teachers, buying more textbooks, or providing flexible grants. In contrast, pedagogical reforms that match teaching to students' learning levels are

highly cost effective at increasing learning, as are reforms that improve accountability and incentives, such as local hiring of teachers on short-term contracts. Technology could potentially improve pedagogy and accountability. Improving pre- and postprimary education are major future challenges.

Methods:

Secondary
Non-systematic review

School Resources and Academic Performance in Sub-Saharan Africa

V.E. Lee and T.L.Zuze (2011)

Comparative Education Review. 55 (3) 369-97

Abstract available at:

<http://www.jstor.org/discover/10.1086/660157?uid=28262&uid=3738032&uid=2&uid=3&uid=5910784&uid=67&uid=28260&uid=62&sid=21102750024827>

(This paper is also included in the infrastructure report.

We investigate links between students' achievement and several resource inputs in African primary schools, using data from the 2000 Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ-II). We focused on four sub-Saharan countries that had in place legislation mandating free and universal primary schooling: Botswana, Malawi, Namibia, and Uganda. Using multilevel modelling (hierarchical linear models), we found strong links between material and human resources and grade 6 students' achievement in reading and mathematics. Structural features such as school shifts and school size were negatively associated with achievement, although effects varied across countries. We discuss policy implications of our findings within each country's educational context. (Contains 14 footnotes and 3 tables.)

Methods:

Primary Empirical
Non-experimental

An Evaluation of the Gender Sensitive Nature of Selected Textbooks in the Zimbabwean Secondary School Curriculum

E. Mutekwe and M. Modiba (2012)

Anthropologist. 14 (4) 365-73

Available at:

[http://www.krepublishers.com/02-Journals/T-Anth/Anth-14-0-000-12-Web/Anth-14-4-000-2012-Abst-PDF/Anth-14-4-365-12-733-Mutekwe-E/Anth-14-4-365-12-733-Mutekwe-E-Tx\[12\].pdf](http://www.krepublishers.com/02-Journals/T-Anth/Anth-14-0-000-12-Web/Anth-14-4-000-2012-Abst-PDF/Anth-14-4-365-12-733-Mutekwe-E/Anth-14-4-365-12-733-Mutekwe-E-Tx[12].pdf)

The aim of the study was to evaluate the gender sensitivity and balance of selected textbooks in the Zimbabwean school curriculum. An evaluation instrument was designed to evaluate the books and focus group interviews were carried out with a purposive and gender stratified sample of students. The data management and analysis procedures adopted covered both the content and discourse analyses of selected history text books in addition to the interpretations of participants' verbatim statements from the focus group discussions. The study revealed that a great deal of patriarchal values and ideologies are embodied in the textbooks. The textbooks analysed were found to contain gender biases, imbalances and stereotypes. The interviews' carried out revealed that students were overtly and covertly affected by the gender representations in textbooks. In depicting traditional gender stereotypes, textbooks shaped students in particular ways and affect their academic achievement and career choices. The study recommends that textbooks in schools should be carefully selected to avoid those that are full of gender biases or stereotypes. Where possible

textbooks could be rewritten to ensure gender sensitivity in order to avoid producing and peddling gender role ideologies and stereotypes that differentially reinforce boys and girls for not only different but highly gender polarised social roles.

Methods:

Primary and empirical

Non-experimental: document analysis and focus groups

What Happens to Textbooks in the Classroom? Pupils' Access to Literacy in an Urban Primary School in Ghana

K. Opoku-Amankwa (2010)

Pedagogy, Culture and Society. 18 (2) 159-72

Abstract available at:

<http://www.tandfonline.com/doi/abs/10.1080/14681366.2010.488042>

Textbooks research over the last two to three decades tends to suggest that the availability of textbooks, especially in schools in developing countries, is associated with student achievement. Such conclusions based largely on quantitative studies provide very little information about pupils' access to and use of books, and the actual interaction between teachers, pupils and texts. This case study of classrooms in a public primary school in Ghana draws on observation, interviews and focus group discussions with teachers and reveals how a wide range of factors determine pupils' access to literacy, including classroom dynamics, class size, seating arrangements, classroom norms and culture, and teachers' understanding and interpretation of the official textbook policy. (Contains 3 figures.)

Methods:

Primary and empirical

Non-experimental: Observation, interviews and focus groups

Introducing Science Experiments to Rote-Learning Classes in Pakistani Middle Schools

A.W. Pell, H.M. Iqbal and S. Sohail (2010)

Evaluation & Research in Education. 23 (3) 191-212

Abstract available at:

<http://www.tandfonline.com/doi/abs/10.1080/09500790.2010.489151>

A mixed-methods sequential research design has been used to test the effect of introducing teacher science demonstrations to a traditional book-learning sample of 384 Grade 7 boys and girls from five schools in Lahore, Pakistan. In the quasi-experimental quantitative study, the eight classes of comparable ability were designated either Experimental or Control. After pre-testing for attainment and attitudes to science, the Experimental classes were taught the physics topics of Electricity and Light/Colour by means of teacher demonstrations. The Control classes were taught the same topics through textbook exposition. Post-tests on the original measures and residual gain analysis resulted in the girls in the Experimental classes showing significantly greater improvement on both topic tests. Boys in Experimental classes recorded significantly higher scores on the Electricity test only. Attitudes to science show distinct gender-dependent factor structures reflecting national cultural characteristics. Initially, puzzling outcomes as Experimental class students reassessed their attitudes were explained by post-hoc interviews in a qualitative follow-up. Interviews with teachers showed that they were fully aware of the deficiencies of the science presented but attributed this to an overloaded, rigid, test-oriented curriculum. Implications for the education of girls and curriculum improvement are discussed.

Methods:

Primary empirical
Quasi-experimental quantitative study and qualitative interviews

Textbooks and Learning Materials Program: Zambia. Final Report

Anonymous (2009)

US Agency for International Development. Information Center, Ronald Reagan Building, Washington DC 20523-1000.:

Available at:

<http://files.eric.ed.gov/fulltext/ED507878.pdf>

The Mississippi Consortium for International Development's (MCID's) intervention involved the development, publication and distribution of an Integrated Foundations of Learning Kit, focused on numeracy. This intervention was aligned with Zambia's priorities and strategies and matched the requirements of the Textbooks and Learning Materials Program (TLMP) grant. Materials in the Kit built upon and enhanced existing materials and added new, complementary materials aligned to the new syllabus. The implementation strategy for the intervention reflected an integrated approach to teaching and learning with emphasis on Zambia-based content. While focusing on mathematics and numeracy, the intervention also was designed to enhance the Zambian Ministry of Education's (MoE's) efforts to integrate cross-cutting life skills materials--HIV/AIDS and Gender--into the curriculum. The strategy incorporated quality control measures and a capacity-building approach to program development, including the involvement of indigenous writers/authors, illustrators and publishers in all phases of implementation as well as teacher training. The materials developed included: (1) For Fourth Grade: Learners' Books; Teachers' Books for fourth grade textbook; electronic version of books on CD; and instructional posters; and (2) For Fifth Grade: Learners' Books; Teachers' Books for fifth grade textbook; electronic version of books on CD; and instructional posters. Attachments include: (1) Chart of TLMs [textbooks and learning materials]; (2) Teacher Training Summary Chart; (3) Copy Right Information; (4) Inventory Report and Request for Disposal; (5) Cost share Report; (6) Distribution Information; (7) Report Submission Dates; (8) Other Matters; and (9) Final Evaluation Report.

Methods

Evaluation method not stated in abstract

Many Children Left Behind? Textbooks and Test Scores in Kenya. NBER Working Paper No. 13300

P. Glewwe, M. Kremer and S. Moulin (2007)

National Bureau of Economic Research. 1050 Massachusetts Avenue, Cambridge, MA 02138-5398.:

<http://www.nber.org/papers/w13300>

A randomised evaluation suggests that a program which provided official textbooks to randomly selected rural Kenyan primary schools did not increase test scores for the average student. In contrast, the previous literature suggests that textbook provision has a large impact on test scores. Disaggregating the results by students' initial academic achievement suggests a potential explanation for the lack of an overall impact. Textbooks increased scores for students with high initial academic achievement and increased the probability that the students who had made it to the selective final year of primary school would go on to secondary school. However, students with weaker academic backgrounds did not benefit from the textbooks. Many pupils could not read the textbooks, which are written in English, most students' third language. The results are consistent with the hypothesis that the Kenyan education system and curricular materials are oriented to the academically strongest students rather than to typical students. More generally, many students may be left behind in societies that combine 1) a centralised, unified education system; 2) the heterogeneity in student

preparation associated with rapid expansion of education; and 3) disproportionate elite power.

Methods

Primary and empirical
Experimental: Randomised evaluation

Books, Buildings and Learning Outcomes: An impact evaluation of World Bank support to basic education in Ghana

H. White and E. Masset (2004)
Department for International Development:
Available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/67926/ghana-education.pdf

Both the quantity (enrolments) and quality (pupils' learning outcomes) of schooling improved in Ghana over the 1988-2003 period. These gains are directly linked to better school quality, particularly improved infrastructure and greater availability of school supplies. This in turn can be linked to donor support, in particular the World Bank's support, which has financed the construction of 8,000 classroom blocks and provided 35 million textbooks over the period.

Methods

Primary
Non-Experimental

EdQual Policy Brief No. 2. The impact of language of instruction, teacher training and textbooks on quality of learning in Africa

J. Clegg (2010)
DfID
Available at: http://r4d.dfid.gov.uk/PDF/Outputs/ImpQuality_RPC/pb2.pdf

This policy brief supports arguments to extend quality mother-tongue education and suggests changes to teacher education/ development and textbook readability to address the impact of language of instruction. It draws on EdQual research that shows how the language used in classrooms impacts on teaching strategies.

Methods

Primary and empirical
Non-experimental mixed methods

2. Additional resources

The following resources were identified through previous HEART helpdesk searches and their references.

School Resources and Educational Outcomes in Developing Countries: A Review of the Literature from 1990 to 2010

Paul Glewwe, Eric Hanushek, Sarah Humpage and Renato Ravina (2011)
NBER working paper 17554.
Available at: <http://faculty.apec.umn.edu/pglewwe/documents/Edinput7.pdf>

Developing countries spend hundreds of billions of dollars each year on schools, educational materials and teachers, but relatively little is known about how effective these expenditures

are at increasing students' years of completed schooling and, more importantly, the skills that they learn while in school. This paper examines studies published between 1990 and 2010, in both the education literature and the economics literature, to investigate which specific school and teacher characteristics, if any, appear to have strong positive impacts on learning and time in school. Starting with over 9,000 studies, 79 are selected as being of sufficient quality. Then an even higher bar is set in terms of econometric methods used, leaving 43 "high quality" studies. Finally, results are also shown separately for 13 randomized trials. The estimated impacts on time in school and learning of most school and teacher characteristics are statistically insignificant, especially when the evidence is limited to the "high quality" studies. The few variables that do have significant effects – e.g. availability of desks, teacher knowledge of the subjects they teach, and teacher absence – are not particularly surprising and thus provide little guidance for future policies and programs.

Methods

Secondary
Systematic Review

The Effectiveness of Inputs in Primary Education: Insights from Recent Student Surveys for Sub-Saharan Africa

Sebastian Fehrer, Katharina Michaelowa and Annika Wechtler (2009)

The Journal of Development Studies, 45 (9)

Abstract at:

<http://www.tandfonline.com/doi/abs/10.1080/00220380802663625#.UmECG9I3uSo>

With SACMEQ and PASEC there are now two large data bases available on student achievement, socio-economic background and school and teacher characteristics in both anglophone and francophone sub-Saharan Africa. A joint analysis of PASEC and SACMEQ in a common education production function framework allows us to estimate the impact of educational inputs on student achievement in 21 sub-Saharan African countries and to compare our results with those of earlier empirical studies for education systems in Africa and other world regions. In our analysis we focus on school equipment, teacher quality and class organisation. The issue of teacher and student incentives cannot be adequately addressed with the given data. Our results are based on a traditional retrospective analysis of student achievement in PASEC and SACMEQ countries. In contrast to the 'nothing works' result from most industrialized countries' studies we find robust positive correlations of achievement test scores and the possession of textbooks and negative correlations with teaching in shifts. The most striking result is the weak or even absent correlation of achievement test scores and teacher education and professional training. However, some differences between francophone and anglophone education systems can be observed in this context if differences in the sampling methodology are duly taken into account.

Methods

Secondary
Non-Systematic Review

Education Inputs In Uganda: An Analysis of Factors Influencing Learning Achievement in Grade Six

Harriet Nannyonjo (2007)

World Bank Group: Washington

Available at:

<https://openknowledge.worldbank.org/bitstream/handle/10986/6758/405290UG0Educa101OFFICIAL0USE0ONLY1.pdf?sequence=1>

This study on effective use of school inputs in Uganda is intended to contribute to the policy debate on how to make the best use of available resources to improve learning outcomes. It comes at an opportune time in Uganda when there are increasing demands on the education budget, yet it is unlikely that substantial increases in the sector budget envelope will be provided given other competing national priorities, as well as the need for additional resources to finance post primary education and training. This report emphasises: the need for a balanced focus on resource availability and use, because without appropriate use or management, resources may not lead to improved learning; helping teachers to effectively teach large classes; and the importance of investing more in in-service training focused on pedagogical practices than on training teachers to acquire academic qualifications. The study also points to the need to examine and include teacher effectiveness as key criteria for determining teacher remuneration. With regard to automatic promotion, this study, and indeed the general literature suggest that repetition tends not to work within the same context and the same teaching styles. The findings of this study clearly demonstrate the need to focus on school and classroom processes and better use of education resources focused on improvement of learning.

Methods

Primary and Empirical
Non-experimental design

Improving Learning in Primary Schools of Developing Countries: A Meta-Analysis of Randomized Experiments

Patrick J. McEwan (2013)

Wellesley College

Available at: <http://academics.wellesley.edu/Economics/mcewan/PDF/meta.pdf>

I identified and coded 76 randomised experiments conducted in developing-country primary schools from the mid-1970s to 2013. The experiments evaluated the impact of 110 school-based treatments on language and mathematics test scores, as compared with “business as-usual” in the same settings. The treatments included instructional interventions, health interventions, and incentive-based interventions. On average, monetary grants and deworming had effects that were close to zero and statistically insignificant. Nutritional treatments, treatments that provided information to parents or students, and treatments that improved school management and supervision had small mean effect sizes (0.04-0.06) that were not always robust to controls for study moderators. The largest mean effect sizes included treatments with instructional materials (0.08); computers or instructional technology (0.15); teacher training (0.12); smaller classes, smaller learning groups within classes, or ability grouping (0.12); student and teacher performance incentives (0.10); and contract or volunteer teachers (0.10). Metaregressions that controlled for treatment heterogeneity and other moderators suggested that the effects of materials and contract teachers, in particular, were partly accounted for by composite treatments that also included teacher training and class size reduction. A caveat is that interventions like deworming and school lunches often affected enrolment and attainment independently of learning, implying that student time is not always used productively in schools. There is insufficient data to gauge the relative cost-effectiveness of categories of interventions.

Methods

Secondary
Non-Systematic Review

When Do Textbooks Matter for Achievement? Evidence from African primary schools

M. Kuecken & M. Valfort (2013)

Economics Letters, 119, 311–315

Abstract available at: <http://www.sciencedirect.com/science/article/pii/S0165176513001213>

This study analyses the impact of textbook ownership in addition to sharing in 11 sub-Saharan African countries. The study finds no average impact of textbooks on student test scores, although a positive impact for students at the top of the socioeconomic distribution is found. Moreover, this impact arises solely from textbook sharing. This result is consistent with the fact that sharing is associated with positive externalities via knowledge transfers, an effect that simple textbook ownership does not produce.

Methods

Not stated in the abstract

An Investigation of the Relationship between School and Pupil Characteristics and Achievement at the Basic Education Level in Malawi

Demis Kunje, Elizabeth Selemeni-Meke and Keiichi Ogawa (2009)

Journal of International Cooperation in Education, Vol.12 No.1

Available at: <http://home.hiroshima-u.ac.jp/cice/12-1DemisElizabethKeiich.pdf>

This study investigated how school, classroom and pupil factors influence pupil achievement in mathematics, English and Chichewa. Tests in the three subjects were administered to 6,000 pupils in 100 primary schools. The results indicate the follows: low achievement in English and mathematics; greater achievement in urban schools, especially in English; better pupil performance in schools with teacher pupil ratios below 50 in standard 7; better pupil performance in classes with trained teachers; and better pupil performance in classes with textbooks in any ratio than those without textbooks. At the upper level, pupils at an appropriate age performed better than overage or underage pupils; boys consistently performed better than girls, although the differences were small; a pupil's family socioeconomic status had a positive influence on achievement; and the mother's education was also positively related to performance. The study concludes that basic education with rudimentary structures requires appropriate trained teacher pupil ratios to promote cognitive growth.

Methods

Primary and Empirical

Non-experimental

3. Search strategy

Databases and websites searched:

- Education Resources Information Centre (ERIC)
- British Education Index (BEI)
- Web of Knowledge – limited to Social Sciences Citation Index only
- R4D DfID Research For Development
- Gov.uk: Publications section and DFID evaluation reports
- 3ie Systematic Review Database
- 3ie Database of Impact Evaluations
- The Campbell Library
- EPPI Centre
- Google Scholar (first ten pages of results)

Search strategy concepts

The search strategy was tailored to the functionality of the different databases searched. In searching the academic databases, ERIC, BEI and Web of Science, search strings were

developed for the search concepts, Textbooks, DFID priority countries and Learning Achievement and these were combined. Both keyword and subject heading searches were carried out. Other databases had more limited search functionality and were searched within topic/ sector areas e.g. Education or using fewer keywords.

The full search strategies for ERIC, BEI and Web of Science are included in Annex B. Please see the following tables for summaries of the search strategies and results.

ERIC, BEI and Web of Science

Database and Dates covered	Date searched	Concept search strategy	Hits	Hits if LMIC countries used instead of Dfid
Education Resources Information Centre (ERIC)	4-10-13	Textbooks and Dfid countries and Learning Achievement. Limited to Primary & Secondary Education, yrs 2000-2013	44	170
British Education Index (BEI)	7-10-13	As ERIC but No primary or secondary school limit included	3	
Science Citation Index & Social Sciences Citation Index WOS	8-10-13	As ERIC but No primary or secondary school limit included	22	70

Further detail on the search methods are outlined in Annex C.

4. Screening method

Studies were assessed against the following inclusion criteria:

- Geography: DFID priority countries. A list of priority countries is provided in Annex A. Both Tier 1 and Tier 2 countries were included
- Language: Limited to English language only
- Relevance: Studies which address the thematic research question i.e. **In what circumstances do textbooks improve learning?** and which look at **effects** on learning achievement
- Study design: Primary empirical studies (quantitative or qualitative) and secondary analysis (systematic reviews or rigorous literature reviews) which meet the relevance criterion were included. Case studies, theoretical, conceptual and policy papers were excluded.
- Publication date: Within last 10 years

Studies were screened on the basis of the abstract. Where studies were potentially relevant but their adherence to the inclusion criteria could not be fully ascertained from the abstract (for example, evaluation methodology was not stated), they were included in the list, so they can undergo further screening from the full text at a later date.

Study design was described using the DFID How To Note: Assessing the Strength of Evidence:

<https://www.gov.uk/government/publications/how-to-note-assessing-the-strength-of-evidence>

Authors

This query response was prepared by Imogen Featherstone, Judy Wright and Thomas Veale

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