Consortium for Research on Educational Access, Transitions and Equity

Taking Targets to Task Revisited: How Indicators of Progress on Access to Education can Mislead

Keith M Lewin

CREATE PATHWAYS TO ACCESS
Research Monograph No. 54

January 2011

**University of Sussex
Centre for International Education**

Create

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Consortium for Research on Educational Access, Transitions & Equity
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The Consortium for Educational Access, Transitions and Equity (CREATE) is a Research Programme Consortium supported by the UK Department for International Development (DFID). Its purpose is to undertake research designed to improve access to basic education in developing countries. It seeks to achieve this through generating new knowledge and encouraging its application through effective communication and dissemination to national and international development agencies, national governments, education and development professionals, non-government organisations and other interested stakeholders.

Access to basic education lies at the heart of development. Lack of educational access, and securely acquired knowledge and skill, is both a part of the definition of poverty, and a means for its diminution. Sustained access to meaningful learning that has value is critical to long term improvements in productivity, the reduction of inter-generational cycles of poverty, demographic transition, preventive health care, the empowerment of women, and reductions in inequality.

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List of Acronyms

ALR	Adult Literacy Rate (ALR)
CREATE	Consortium for Research on Educational Access transitions and Equity
EDI	Education Development Index
EFA	Education for All
FTI	Fast Track Initiative
GDP	Gross Domestic Product
GEI	Gender Equity Index
GER	Gross Enrolment Rate
GIR	Gross Intake Ratio
GMR	Global Monitoring Report
GPI	Gender Parity Indices
MDGs	Millennium Development Goals
NER	Net Enrolment Rate
NGO	Non Governmental Organisation
OECD	Organisation of Economically Developed Countries
OSCR	On schedule completion rates
PCR	Primary Completion Rate
UNESCO	United Nations Educational Scientific and Cultural Organisation
USD	United States Dollars
SR5	Survival Rate to Grade 5
WCEFA	World Conference on Education for All
WEF	World Education Forum
ZIP	Zone of Improbable Progress

Acknowledgements

Preface

Ten years after governments, bi-lateral development agencies, and United Nations institutions met at in Dakar in to set out a plan to achieve "Education for All" there is still much work to be done. How we measure progress and identify areas for further research and policy depends heavily on the indicators we use. Development agencies use indicators to release or retain funds for EFA. This important monograph selects some of the key indicators used for EFA and offers an analysis of their strengths and weaknesses.

The monograph discusses measurement, application and ambiguities with Gross and Net Enrolment Rates, Gender Parity Indices, and The Education for All Development Index, used by UNESCO and the Global Monitoring Report. These commonly used and cited, influential measures all provide us with valuable insights but also have the potential, as Lewin reminds us, to mislead. Gross and Net Enrolment Rates for example, assess levels of enrolment, but their changing values can provide misleading signals to policy makers since they can go down as well as up when things are improving. GPIs may also have ambiguous directionality. And the EDI is an aggregate indicator with several component parts which may change in different directions. Unless indicators such as these are properly understood, data can be misunderstood, or in the worst case wilfully misused with the result that policies for EFA can end up being ineffective or poorly targeted.

CREATE has identified widespread problems of over age in grade pupils in schools in many developing countries. It also notes the issues that surround imbalances in the numbers of boys and girls in the population in some countries which be concealed by some uses of GPIs. For this and other reasons better indicators are needed along with more widely understood aspects of the signifiers of progress towards clear goals. This monograph provides essential reading for policy makers, planners, scholars and analysts of education in developing countries who wish to understand critical issues to consider when examining educational targets and also about what is and is not changing as a result of EFA programmes. .

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Summary

Governments, bi-lateral development agencies, and United Nations institutions met at Jomtien in 1990 and Dakar in 2000 to agree support to achieve "Education for All" (EFA). EFA is now the umbrella that embraces much of the aid for educational development in poor countries and its influence in education policy in many developing countries is substantial. It identifies goals and targets and translates these into indicators which are used to evaluate progress and influence flows of resources. The search for evidence based policy depends on measures of performance that can link cause and effect and that represent real gains in progress towards desired outcomes. However, the indicators widely used for access to education have serious problems. This paper[1] selects some of the key indicators used for EFA and offers an analysis of their strengths and weaknesses.

Gross and Net Enrolment Rates (GERs and NERs) are widely used to assess levels of enrolment, but their changing values can provide misleading signals to policy makers. Grade specific enrolment rates may be better. Completion and survival rates for schooling provide improved indications of educational inclusion and exclusion. On schedule graduation rates are better than simple completion rates but are silent on issues of quality and achievement. Gender Parity Indices (GPI) foreground differences in participation related to children's sex. However, most of these indices aggregate and conceal underlying patterns of participation (by age, location, household income) which give insight into causes and opportunities to ameliorate disadvantage. The GPI may also make invisible seriously unequal numbers of boys and girls in populations. The Education for All Development Index (EDI) used by UNESCO and the Global Monitoring Report (GMR) suffers from being a highly aggregated composite index which is difficult to interpret and of limited use since changes over time are often within its margins of error. Simpler indicators may be more useful than composite ones.

The choice of indicators is important. The process of setting and getting targets defined by indicators remains valuable but needs constant interrogation. The homogenising effects of global approaches to EFA has to be mediated by recognition that education policy in practice is national or sub-national at the level of delivering services. Global goals do not always have analogues at country level and conversely national aspirations and realities cannot always be mapped onto global goals. Improving target setting and devising better indicators which allow progress to be assessed and understood requires more nuanced understanding of what indicators do and do not measure, and in appreciating the virtues and vices of setting targets.

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[1] An abridged, amended and shortened paper based on this Research Monograph has been submitted to the Journal of Educational Policy.

Taking Targets to Task Revisited:
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1. Introduction

This paper reviews how targets and indicators have shaped Education for All. The World Conference on Education for All (WCEFA) in 1990, the World Education Forum (WEF) in 2000 and the Millennium Development Goals (MDGs) in 2000 set a policy agenda that lies at the heart of planning for improved educational access in low income countries which has defined the focus of much external development assistance. Central to this process have been targets and indicators for a wide range of outcomes e.g. universal enrolment and completion rates for primary schooling, gender parity in educational participation, reductions in illiteracy. These have been developed at international, regional and national levels. They provide one basis for the rules that mediate relationships between development partners and recipients of development assistance. Thus it has been very common for the financial support for EFA from development partners to be linked to progress towards targets judged through periodic Education Sector Reviews and annual performance reports. Where external assistance is a substantial proportion of government financing, it is easy to see how exogenously determined targets can begin to shape domestic policy. National policy dialogue is likely to be conditioned, and may even be determined by, the targets and indicators of progress that are agreed. Targets thus not only signify desired outcomes but also have practical significance not least in influencing the allocation of resources. But targets need indicators if they are to have operational significance. These indicators are often difficult to devise and easy measure with precision, and are often ambiguous to interpret.

1.1 The Policy Context - WCEFA, WEF, and the MDGs

"Education for All" was unveiled at the World Conference on Education for All (WCEFA) in 1990 at Jomtien, Thailand. This promised a new vision for the 1990s, characterised by five core components – a focus on basic education, an expanded scope for investment in basic education, the mobilisation of new resources, mobilisation of alliances with a range of partners, and an improved understanding of the learning environment and socio-economic context of education and development (Inter Agency Commission, 1990a:30). The final report of WCEFA included a special section on goals and targets. The overarching goal was to "meet the basic learning needs of all children, youth and adults" supported by intermediate goals designed to specify expected attainments and outcomes, focus on excluded groups, and identify observable and measurable indicators of progress (Inter Agency Commission, 1990b:52).

Targets for WCEFA were to be time bound, linked to priority categories of learners, and a realistic appraisal both of existing trends and resources and of the additional resources promised by WCEFA and its development partners. Countries were invited to set their own targets and six dimensions were suggested. These were i) expansion of early childhood care especially for the poor and disadvantaged ii) universal access to and completion of primary education or whatever is considered basic education by 2000 iii) improvement in learning achievement such that an agreed proportion of a cohort (e.g. 80% of 14 year olds) attains the necessary level of learning achievement iv) reduction in the adult literacy rate to one half the level by 2000 with sufficient emphasis on female illiteracy to reduce current disparities, v) expansion of provision of basic education and training in other essential skills required by youth and adults with effectiveness assessed in terms of behavioural changes and impacts on

health, employment, and productivity vi) increased acquisition by families and individuals of the knowledge, skills and values required for better living and sound sustainable development … with effectiveness assessed through behavioural change (Inter Agency Commission, 1990b).

A decade later the World Education Forum (WEF) was held in Dakar, Senegal to take stock of progress and redefine goals and targets for EFA. The goals of WCEFA were rewritten with a substantial overlap but some subtle and not so subtle differences in emphasis (UNESCO, 2000). The six Dakar Goals were i) expanding and improving comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children ii) ensuring that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality iii) ensuring that the learning needs of all young people and adults are met through equitable access to appropriate learning and life skills programmes iv) achieving a 50% improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults v) eliminating gender disparities in primary and secondary education by 2005, and achieving gender equality in education by 2015, with a focus on ensuring that girls full and equal access to and achievement in basic education of good quality vi) improving all aspects of the quality of education and ensuring excellence of all so that recognised and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills (UNESCO, 2000).

Amongst the differences between the WCEFA and the WEF commitments were a growing concern for quality as well as participation at primary level, a shift to targets for learning achievement of 100% rather an 80%, changes in target dates (e.g. from 2000 to 2015 for halving illiteracy etc), the change of essential to appropriate skills for young adults, and the introduction of gender parity in primary and secondary schooling as a goal in its own right at WEF (Little, 2003:2). Though there were many other more subtle changes in wording and emphasis the central agenda remained largely intact with an emphasis on universal access to primary schooling later to be extended to basic education – a reflection of the reality that in an increasing number of countries eight or nine years was becoming the compulsory education cycle.

The promulgation of the Millennium Development Goals (MDGs) later in 2000 after WEF focused the core agenda for education and development to just two priorities. These were i) to achieve universal primary education and ensure that by 2015 children everywhere, boys and girls alike, will be able to complete a full course of primary schooling and ii) to promote gender equality and empower women and eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education. There were altogether eight MDGs and eighteen associated targets. Most were likely to remain beyond reach without more knowledge and skill distributed more evenly across populations. Thus, for example, the broader influence of increased levels of education on reductions in poverty and hunger, child mortality, access to unsafe water, and HIV/Aids and malaria was lost in the background. The fact that no OECD country, or East Asian "miracle" country (World Bank, 1993) had followed a pathway of development determined by prioritising the achievement of the MDGs to the exclusion of a range of other development priorities appeared to have escaped the notice of the drafters (Lewin, 2007b).

The WCEFA and WEF texts display some prominent silences in relation to education as well as more generally on the role of education in development. No goals or targets were set at WCEFA and WEF that relate to teachers either in terms of supply and pupil teacher ratios, or in terms of financially sustainable costs. Investment in increased and more equitable participation secondary schooling only appeared as an aspiration in relation to gender equity in WEF, and not at all in WCEFA. Though greater equity in access is present in the WCEFA and WEF texts, it is not translated into goals and targets beyond gender parity, despite overwhelming evidence that poverty is the most powerful single source of inequity (e.g. Filmer, 2006; Lewin and Sabates, 2011). In both WCEFA and WEF development outcomes beyond enrolment and learning achievement are conspicuously absent in goals and targets.

At WCEFA there was awareness of some of the issues that surround global goal and target setting:

> No regional or global standards can be imposed on countries, and regional plans of action cannot set the rate at which individual countries will progress from current status of basic education to the attainment of the ultimate target. Such aggregate and external specification of the process would represent and abrogation of national autonomy and will not help in the planning and monitoring of basic learning activities." (Inter Agency Commission, 1990a:35).

However, both WCEFA and WEF advocated frameworks for action that specified the dimensions of educational development that would attract support and approval from development partners. At WEF it was made clear that:

> We affirm that no country seriously committed to Education for All will be thwarted in their achievement of this goal by lack of resources"(Dakar Framework for Action, 2000:30).

This was linked to the development of "credible plans" responding to the parameters set at WEF. In practice, if not entirely in principle, fairly universal sets of goals and targets seeped into the real world discourse of policy dialogue, bilateral and multi-lateral support for educational investment, and national plans designed to be credible to those who might provide finance. These assumed with a breathless certainty that "world goals" could and should be translated into national plans of action through a deductive process that leaves little or no space for difference at the national and sub-national level (Little, 2003), and invites the use of homogenising indicators of progress.

Elsewhere I have explored the issues that surround the origin, ownership, and definitions used to generate targets and noted how problematic it is to transfer the legitimacy of target setting from one level to another (Lewin, 2005). International target setting, devoid of the national politics that shape policy that is translated into action, are blind to differences between countries in goals and expectations, starting points, and capacity to implement needed reforms. Targets can also be expressed in many different ways with very different qualities of the indicators used to assess progress. Movement towards an absolute goal (e.g. all children enrolled) is different to relative improvement against past performance (e.g. 5% more children enrolled than last year). It is also different to comparisons with benchmarks derived from elsewhere (e.g. more children enrolled than the average for countries with GDP of less than USD 1,000). In addition, the use of averages to measure gains can conceal changes in distribution (5% more children may be enrolled but there may be no change in the

enrolment rate of the poorest if gains are much greater amongst the middle poor). Averages may need to be weighted to capture changes meaningfully (e.g. the arithmetic average of enrolment gains across all schools based on total enrolments may be different to the average of enrolment growth based on averaging school by school percentage gains).

The techniques of educational planning provide methods to make decisions on resource allocation to achieve goals. This can be done in different ways. "Aspirational planning" locates desired goals in the medium to long term future – five to ten years or more - and generally charts a linear path back to the present identifying what needs to be achieved each year to reach the goal. If targets are too ambitious, sooner or later they will be redefined in more plausible ways or they will simply be ignored as unattainable. If they are too modest the targets maybe dismissed as trivial and easy to achieve with little additional effort needed. In reality financial and non financial bottlenecks often result in progress falling behind an on-track pathway of dates and milestones. Year on year the gradient of what needs to be achieved steepens. The planning and implementation system can then enter a "Zone of Improbable Progress" (ZIP). Either the goals fall into disrepute because they are unachievable and there is no confidence in making more and more rapid progress, or the goals are redefined and shifted forward in time (Lewin, 2007a:30). As Easterly (2006:6) notes aspirational planners can promise great things, but often get distracted by the growing list of goals and targets that they define and the political realities of prioritisation and resource allocation over which interest groups with conflicting aspirations compete.

Standards applied to assessing targets are susceptible to drift depending partly on what is at stake. Providing basic education for all seems clear, but does it mean enrolling all children in the age range in any grade, all children successfully completing a number of years of basic education at any age, all children succeeding on reaching basic education learning competencies, or even all people in the population including adults completing basic education? Ambiguities in specification of goals and targets are common and sometimes deliberate.

Moreover, the evaluation of progress towards targets may be subject to the kind of moral hazard that accompanies success leading to loss of subsidies – if universal enrolment targets are met does the need for external assistance diminish? If tranche releases of development funds are dependent on meeting targets will indicators of progress be politicised? If targets are not met will there be the double jeopardy of disappointing progress and reduced funding? As Goldstein (2004:11) has noted, for targets to be influential there must be some sanction for missing targets, and the greater the stakes the more likely that progress towards targets will be "gamed" to maximise rewards and minimise penalties. Bevan and Hood (2006:421) confirm how targeting is often gamed in public health systems when stakes are high and performance indicators are used to make employment and resource allocation decisions in "regimes of targets and terror".

"Target generating planning" is an alternative to aspirational planning. It depends on establishing the highest rates of growth towards goals and targets that are sustainable (Lewin, 2007a) and setting targets that are challenging but achievable and that which are adjusted in the light of progress. It is less easy to undertake and often politically contentious since it reminds actors of the limits of possibility within feasible resource envelopes and the non financial constraints on growth. It is nevertheless some antidote for the more utopian excesses of EFA where unattainable goals have been set for some countries and which have lost credibility as time has passed and achievements have disappointed. Target generating

planning is also more resistant to gaming the indicators it uses since the expectation is of continuous improvement rather than satisfaction of a static goal the achievement of which represents and end point.

Critically, goals and targets are often set by those at some distance from those charged with getting targets. Target setters live in different worlds to target getters. Ownership at different levels can be unclear. Delegating responsibility to achieve targets without delegating authority and providing control over necessary resources is often a recipe for frustration and goal displacement.

Lastly, much goal and target setting assumes individual targets can be realised independently of other targets though this is rarely the case in education systems. Sustained enrolment gains are not independent of teacher supply and learning material provision, reductions in gender disparities depend on both what is happening to girls and to boys, investment in primary schooling interacts with investment at higher levels. Some targets stand sequential relationships with others such that for example gains in achievement are unlikely without regular attendance of children and teachers, and improved completion rates are compromised by persistent over age enrolment.

The EFA movement suffers from two apparently contradictory trends. On the one hand target setting has become a small scale industry at national level where planners have sought greater and greater precision in specifying outcomes, partly as a result of frustrations with ambiguities in policy and disappointing outcomes over time. Thus indicative indicators have been developed (e.g. Bruns et al., 2003) and projection models used for the Fast Track Initiative (FTI) in some national cases accumulate more than 60 explicit sub-targets for education systems in attempts to be comprehensive in coverage and sector wide in scope. The more targets there are, the less likely they will be prioritised and resourced.

On the other hand, the EFA enterprise has in practice paid far less attention to some targets than others, especially those where progress is difficult to assess, definitions are more culturally specific, and improvements are difficult to achieve. Rights based approaches to development financing of education have overshadowed those based on the pursuit of medium term development outcomes linked to knowledge and skill and the economic activity necessary to sustain high rates of participation in basic education with the demography and revenue raising capacity of poor countries.

Chabott (2003) has convincingly argued that the evolution of EFA has nourished an epistemic community of development professionals who devise ontological frameworks, goals and targets, and guidelines for action that generate consensus in international conferences. The actors in this community relate to the bureaucratic structures and processes that surround development assistance e.g. annual sector reviews, logframes, and disbursement criteria. These rest easily with forms of management and accountability that seek to measure and assess performance against "objectively verifiable indicators" as logframes do. The style appears to have much in common with the "performativity" (Lyotard, 1984) that Ball (1998:123) characterises as a steering mechanism at a distance which replaces intervention and prescription with "target setting, accountability and comparison". But as Easterly notes, in the development agency world there is often some difficulty in determining who the principal is and who the agent, who is accountable to whom, thus whose performativity counts (Easterly, 2006).

2. Targets and Indicators in Practice

In practice, targets, and the indicators chosen to measure progress, define valued outcomes. It may be that this should not be the case. Many feel that such a view of EFA is extremely limited and they are right. It is. However the reality of educational aid is that it requires verifiable indicators within the panoply of planning tools and accountability frameworks that surround aid relationships. The organisations that provide development assistance are bureaucracies that require evidence of impact however imperfect this may be. The political systems that support aid in rich countries need to be able to enter into a discourse of development that can show that things are changing for the better in directions that are generally agreed. This is evidently true of currently unfashionable project approaches to educational assistance, and it remains true within the frameworks that sector wide approaches create. Plans require goals and objectives. Progress demands the ability to assess changes over time. Indicators are needed to achieve this. Targets are linked to indicators to profile flows of activity and investment of resources; and every programme must have its logframe.

Thus target setting and target getting are central features of EFA when development partners are involved. It could not be otherwise since development agencies, and some international NGOs, increasingly lack the capacity to deliver services directly. Their centres of gravity have shifted to favour advocacy and facilitation of governments and to providing technical assistance and resources to help achieve desirable goals and targets. Planning for EFA is more often than not wedded to aspirational planning as noted above. Goals are set which are judged desirable and which may or may not be achievable. Thus in the Global Monitoring Report each year countries "unlikely to achieve the goal" are listed. It is not clear whether this is a plausible invitation to try harder, or recognition of the inevitable that some rates of progress towards some goals are simply neither achievable, nor desirable, given the circumstances that surround attempts at their realisation.

Specifically the discourse around EFA uses a range of key indicators to define and monitor progress. The problem is that each of these indicators comes with characteristics that may not be fully understood by those that use them. The line between simple indicators that have traction in the politics of aid and the pressure on development partners and governments to be seen to "do something that makes a difference" sits uneasily with targets and indicators that are meaningful to both target setters and target getters and which can be used flexibly across a range of contexts. There is also a tension between the "technically sweet" indicators that can be imagined and which satisfy ambitions for precision and comprehensiveness, and the realistic prospect of having reliable data on which to base their realisation and use.

The discussion below provides analysis of some of the issues raised by selected key indicators for EFA. It comments on strengths and weaknesses and provides some guidance to those who use such indicators of some of the misunderstandings that are common. The discussion is in three sections. First the use of Gross and Net Enrolment rates to measure participation is explored along with Primary Completion Rates (PCRs). Second, the use of the Gender Parity Index is analysed. Third, the Education for All Development Index (EDI) used by the GMR is considered. The last section offers some suggestions for improved indicators that just might find their way into the debate about the shape of the MDGs and their associated targets beyond 2010 – the period when almost certainly the MDGs will be revised, reshaped and retimed.

2.1 Gross and Net Enrolment Rates

Gross and Net Enrolment Rates (GERs and NERs) are used to indicate progress towards universal access to primary education. These calculate an index based on the number enrolled across the whole cycle of schooling, not grade by grade. This can mislead. Figure 1 shows enrolment by Grade for two countries. The first has high enrolment rates in every grade and little drop out and is typical of OECD countries with almost full enrolment at primary level. The second case is similar to many low income countries which have had high levels of investment in EFA programmes designed to universalise access e.g. Uganda, Tanzania and Malawi. In these countries enrolment in Grade 1 is much greater than the number of children who are of Grade 1 age - many enter over age and some under age. Drop out is rapid and by the end of the primary cycle only half or less of those in the age group succeed in completing.

The GER for the primary school cycle is the total enrolment of all ages in primary divided by age group for primary grades. Graphically it is the sum of the bars that represent enrolment in each grade divided by the number of grades in primary school. In this example the first country (A) has a GER of 98% since total enrolments are only a little less than the total number of children of primary school age. Interestingly in the second country case (B) the GER is also about 98% because the total of the enrolments for Grades 1 to 6 is the same. However the pattern of enrolments is very different with high attrition and few of those enrolling in Grade 1 succeeding in reaching Grade 6. GER as conventionally calculated is not a good indicator of participation and does not draw attention to key policy issues e.g. over age enrolment and drop out patterns.

NERs compare the total enrolment of children of the appropriate age for the cycle with the number in the population of primary school age. They therefore exclude those over the nominal age for the last year of primary (but not those who are over age in lower grades). NERs are often considered a better indicator of participation than GERs. If we make small assumptions about the distribution of over age children within the primary cycle then the NERs for the two country cases considered may also be very similar. Without knowing how children are distributed across grades, and how their age distribution within grades varies NERs are difficult to interpret and changes in values can have more than one cause.

Figure 1: Enrolments by Grade in Two Countries with similar GERs
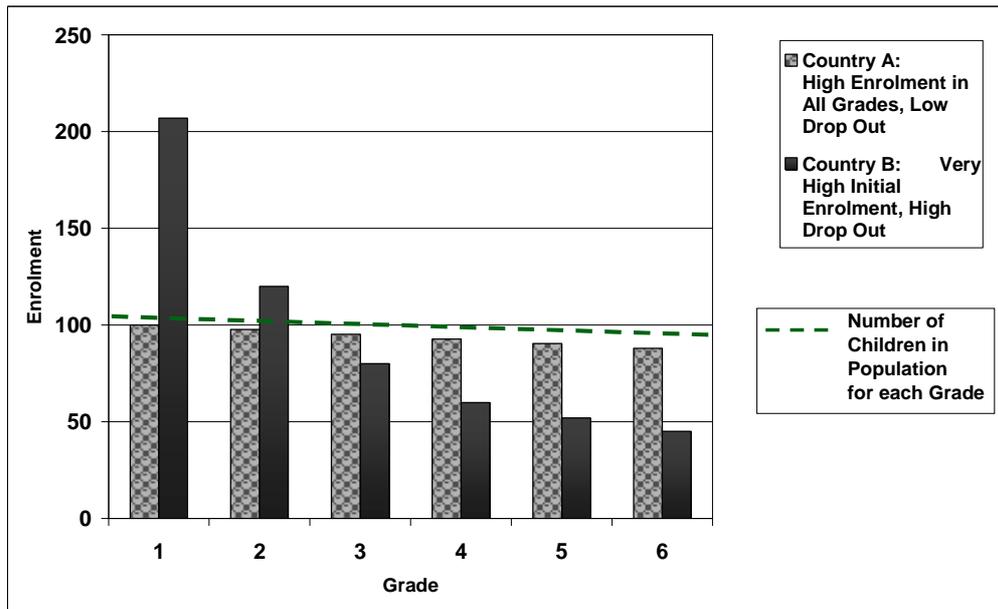
Source: Author's projection

Clearly there is a need for better indicators. Some of the issues are definitional. If full enrolment is the goal then does this mean that every child of school age (6-12 years) should be in school or in school in the correct grade for their age? Or does it mean that all children complete six years of primary schooling whatever age they graduate? If the definitional problems are resolved then the practical problems have to be addressed of whether the data available allows indicators to be measured accurately and this is discussed in more detail below.

GERs can exceed 100% since total enrolment at any age is compared to the age group. Many countries with large scale investment in EFA have GERs as high as 150% as has been the case in Malawi, Uganda, Tanzania and Rwanda. This indicates that many over age children are in the system. Grade specific enrolment rates in low grades will be even higher and may exceed 200% or more in Grade 1. As the internal efficiency of a system improves it ought to be the case that the value of the GER falls since fewer over age children are enrolled. This creates a paradox for targeting. GER should fall when the number of over age children in the system falls as a result of more regular enrolment and progression. But GERs should be increased if many remain out of school. A target value for GER, and changes in the magnitude of GER, are ambiguous, because the same number can arise with different mixes of children in school. Whether GER is below or above 100% it is not clear what it means for participation if it increases or decreases. NERs cannot exceed 100% by definition. However it is also true that changes in a positive or negative direction are not unambiguous unless numbers of children over and under age within grades are known. Increases in NER can occur when repetition within the cycle increases and vice versa.

Interpreting GER increases and decreases thus depends on knowledge of the composition of enrolments by age and grade as well over age enrolments. Simply targeting increases in GER risks replicating inefficient and ineffective systems. GER targets alone can be misleading indicators of progress.

There are other problems with using GERs and NERs as indicators of progress. First, measuring GERs and NERs requires accurate population data for the school age population to determine the denominator. This data is unlikely to be based on current headcounts, but more likely to be based on projections from the last census date. This can be as much as nine years ago, as is currently the case in India, or even more. The errors this introduces are the errors associated with the original data collection, and with the assumptions used for projection which, in the case of India, continue to assume fewer females will be borne than males in many states. These errors of projection may exaggerate or under estimate demographic transitions to low growth and can, over a ten year period, easily generate estimates that err by 10% or more. It is also common to find that population census data based on caregivers reporting of ages of children clusters claimed ages of children around particular points – 5, 10 and 15 year old populations can be anomalously large as a result of reporting bias. Clusters may also be influenced by school admission policy e.g. where there is an upper limit on secondary school entrance age claimed ages often cluster on this value.

Second, enrolment data derived from household surveys is usually judged likely to over report numbers enrolled as a result of status biases between enumerators and respondents. Where EFA programmes have been widely implemented and there is compulsory school legislation, households may be unwilling to admit children do not enrol or attend. In addition some households are not captured in surveys (illegal immigrants, remote settlements, marginalised ethnic groups etc.) and are consequently under represented.

Third, administrative data, generally derived from annual school census surveys, may over report, especially where there are financial incentives to maximise apparent enrolment (e.g. capitation grants). Conversely, administrative data may under report where much enrolment is private, or privately managed, and there is an interest in avoiding regulation, taxation and accountability. School census systems often miss out a (varying) proportion of schools year on year for a range or reasons, and under report private school enrolments.

In some countries, the practice of making statistical adjustments for returns from missing schools are being used to generate headline enrolment rates. This carries risks if these indicators carry financial consequences for tranche release of development partner funding. Clearly the adjustment can be used to arrive at different overall rates depending on the parameters used and may be subject to political manipulation.

Fourth, as noted GERs and NERs depend on accurate data on the size of the age group. NERs need accurate data on the ages of those enrolled as well. This often has a high margin of error in low enrolment countries. Many children may not know their age and have no birth certificates. In some education systems there are age limits for examinations and transition to secondary school. These may encourage misrepresentation by over age children. So also may some school inspection systems which create incentives to fit data to targets.

Fifth, the significance of changes in the value of GER and NER diminishes as they approach 100% from above or below. Like other indicators that approach desired values asymptotically, the significance of changes in the indicator reduces as a limit is approached. Possible gains in the value of the NER if it is already 97% are very different than where the NER is 60%. Also gains on the margin for most indicators which have limits will be more difficult and expensive to realise than gains around the mid values. Thus a 5% gain in NER from 94% to 99% may be more challenging than a 5% gain from 60% to 65%. Clearly a 10% gain is not available from 94%, but is possible from 60%.

The rate of return as limits are approached falls and this may change the balance of advantage between different types of educational investment e.g. a 5% gain in NER from 60% to 65% may be more equity enhancing and more pro-poor than investing the same resource in national curriculum development and in-service training. If NER is 95% then it might be more equity enhancing and more pro-poor to concentrate more on pedagogies and curriculum development designed to reduce differences in performance. There is accumulating evidence that in some low income countries, growth in participation in aggregate has been accompanied by a worsening of the chances of the poorest in progressing through the education system (Lewin and Sabates, 2010). Current measures of participation fail to capture these kinds of important trends.

Thus it is clear that there are many difficulties of measurement and errors associated with missing data, under and over reporting, and random errors in the data management system which can compromise the values attributed to GER and NER. It is also clear that the directions they move in over time do not necessarily result in unambiguous conclusions. Targeting using GERs and NERs over an educational cycle is therefore problematic. Grade specific GERs and NERs are better but rarely used to specify targets. Completion rates are sometimes used as an alternative and it is to these we now turn.

The primary completion rate (PCR) is usually defined as the percentage of students completing the last year of primary school as calculated by taking the total number of students in the last grade of primary school, minus the number of repeaters in that grade, divided by the total number of children of official graduation age.

A closely related indicator published by UNESCO is the Gross Intake Ratio (GIR) to the last grade of primary. This is defined as the total number of new entrants in the last grade of primary education, regardless of age, expressed as a percentage of the population of the appropriate entrance age to the last grade. This definition does not of course ensure that those in the last grade complete the last grade, or that if they do their level of achievement is appropriate. This is important since in some systems pass rates at the end of the primary cycle are 50% or less on national examinations. Even if some are repeaters this suggests that often a third or more fail to complete successfully.

The survival rates to grade n is the percentage of a cohort of children enrolled in the first grade of a given level or cycle of education in a given school year who are expected to reach a given grade (n). Survival rates are calculated on the basis of the reconstructed cohort method, which uses data on enrolment and repeaters for two consecutive years (UNESCO/UIS, 2009). This looks useful but of course assumes that the two years chosen reflect fairly stable patterns of promotion and repetition. Moreover the data used for repetition rates can be very unreliable since these are often self validated and likely to be under reported. Since the reconstructed cohorts do not use age in grade data and data are not at the individual level they can be unreliable. Over age enrolment is important. Many of those enrolled within an educational cycle may be overage on entry to Grade 1 and by two or more years by the time they reach the end of the cycle (Lewin and Sabates, 2010). It does matter whether they survive to the last grade and it means something different to complete the cycle if it takes two or more years longer than it should.

Technically the on-schedule graduation rate is attractive. This seeks to compare the numbers enrolled in one year with those who graduate at the correct age 6 years later for primary. In low enrolment systems this rate may be as low as 20%. The difficulties lie in measurement

over time which really requires the use of child tracking numbers which are becoming more widely available.

2.2 The Gender Parity Index

The Gender Parity Index (GPI) is widely used to assess the extent to which boys and girls appear to have equal access to education. The Global Monitoring Report (GMR) uses a GPI based on the Gross Enrolment Rates for girls as a ratio of the Gross Enrolment Rate for Boys.

GPI = GER (girls)/GER (boys)

At first sight this appears an adequate measure of gender disparity in participation. But it is not. The two most important reasons are discussed below.

First, GERs include those over (and under age) in the numerator. The mix of under and overage boys and girls may not be the same for girls and boys in the respective GERs. Often in low enrolment countries the average age and age range of girls enrolled is narrower than for boys. Typically boys persist longer to older ages before drop out or completion. Figure 2 illustrates this.

Figure 2: Enrolments by Age: Boys and Girls
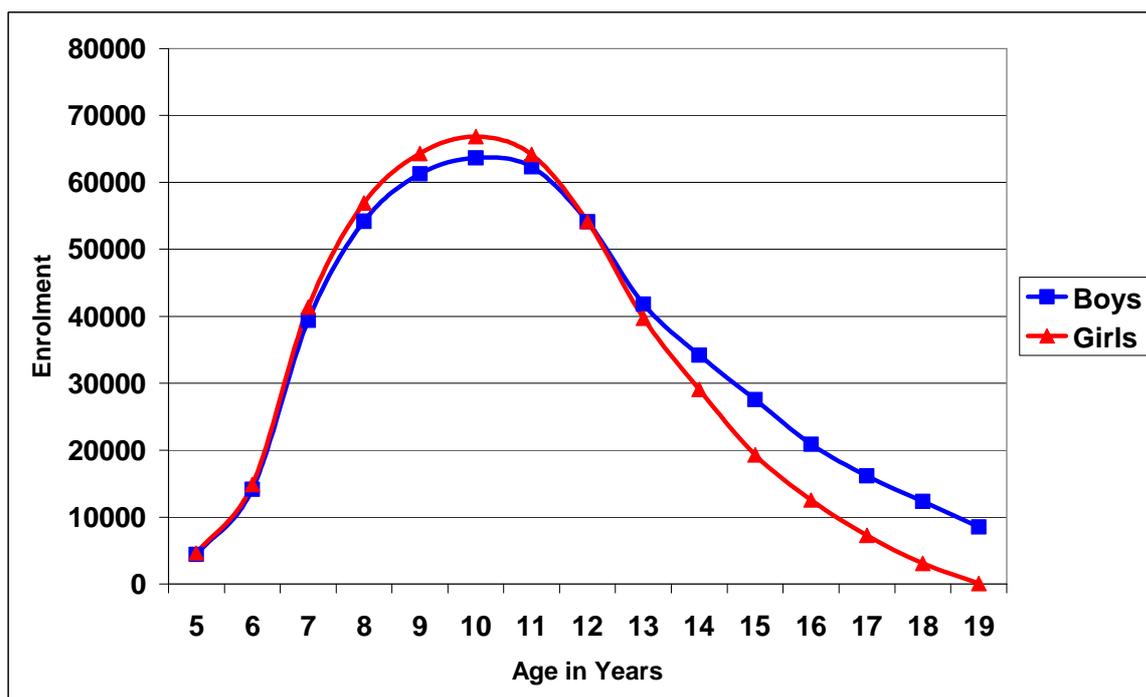
Source: Author's projection

An example illustrates the problem. Table 1 models the enrolment of boys and girls in a country where girls enrol younger but drop out faster after the age of 13 years. This pattern exists in many countries e.g. Ghana and Tanzania. In this system the total number of girls of all ages who are enrolled is less than the number of boys enrolled. If there are the same number of boys and girls in the school age population then the GER for girls is about 96% and for boys 103% in this example. The GPI is 0.929 suggesting that there is a problem with the under enrolment of girls.

Another way of calculating the GPI is to use Net Enrolment Rates (NERs) rather than Gross Enrolment Rates (GERs). These compare the numbers enrolled who are of school age with the total number in the population of those ages. In the example chosen the NER for girls would become 62.6% and for boys 59.9%. The GPI is then 1.046 correctly indicating that within the school age group more girls are enrolled.

Table 1: Enrolment Rates and GPI

	All Ages	6-12 year olds
Girls Enrolled	478,303	313,107
Boys Enrolled	515,035	299,384
Girls in school age population	500,000	500,000
Boys in school age population	500,000	500,000
GER Girls	95.7%	62.6%
GER Boys	103.0%	59.9%
GPI	0.929	1.046

The dilemma of interpretation in this example is clear. GPIs based on GERs suggest that special arrangements are needed to promote girls participation. GPIs based on NERs lead to the opposite conclusion. The profile of enrolments by age makes it clear that, assuming the child age groups are of equal size, boys enrol later and persist longer. An over simple reaction to either value of GPI mis-diagnoses the probable issues and arenas for intervention.

Thus in this example desirable interventions could be drawn from the following list:

i)   ensure boys enrol on-schedule, rather than later than girls
ii)   monitor and minimise repetition and age grade slippage – there is no educational reason why this should be gendered
iii) act to ensure girls in particular reach the end of the basic education cycle before dropout rates associated with older ages and puberty accelerate
iv)   consider appropriate responses to reduce the number of over age boys persisting in the system two or more years over age for their grade.

We can see that GPIs that use Gross or Net enrolment rates are unreliable in giving a simply interpreted picture of gender disparities. Grade specific enrolment rate comparisons linked to age and sex would make the different patterns of participation clearer from the outset.

Second, GPIs whether based on GERs or NERs are blind to imbalances in the numbers of girls and boys in the population. Where sex ratios amongst school age children are at parity this does not matter. Where there are significant differences, as in some States in north India, it is of considerable significance. An example makes the point. In the education system profiled in Table 2 there are 1,000,000 children of school age split equally between girls and boys. If 440,000 girls and 480,000 boys are enrolled then it follows that 60,000 girls and 20,000 boys are not enrolled. The GER in this case is 96% for boys and 88% for girls. The simple GPI based on GERs is therefore 0.92.

Table 2: Enrolments, Enrolment Rates and GPI where the Population has Sex parity

	Girls	Boys	Total	
School Age	500,000	500,000	1,000,000	
Enrolled	440,000	480,000	920,000	
Not Enrolled	60,000	20,000	80,000	
GER	88.0%	96.0%	92.0%	
Gender Parity Index (GPI)			0.92	
Ratio Girls/Boys out of school			3.00	Three times as many girls out of school than boys
Ratio of Girls/Boys in school			0.92	The number of girls enrolled is 92% the number of boys

This situation can be described in many different ways. Each casts a shadow over likely policy interventions.

- The GER for boys is 8 percentage points larger than for girls
- The number of girls enrolled is 92% of the number of boys
- Girls are 48% of total enrolment and boys 52%
- Only 8% of all children are out of school. Girls are 6% of all school age children out of school and boys 2%
- 12% of school age girls are out of school and only 4% of school age boys
- There are three times as many girls out of school as boys
- There is no difference in enrolment status for the great majority of girls and boys since 88% have the same enrolment status
- Only 8% of girls have an enrolment status inferior to that of boys and these children are where gendered interventions should be targeted.

This analysis can be extended by considering the case where the number of girls and boys in the school age population is not the same. Let us suppose there are 15% less girls in the population than boys (Table 3). This equates to a situation where there are 850 girls to 1000 boys which is a skewed ratio that can be found in some parts of India. Let us assume that the enrolments in school remain as they were in the scenario above. GERs are now 96% for girls and only 89% for boys. The GPI based on GERs is now 1.08 indicating that there are more girls than boys enrolled relative to their school age population. The equivalent set of interpretive statements is now:

- The GER for boys is 7 percentage points lower than for girls
- The number of girls enrolled is 92% of the number of boys
- Girls are 48% of total enrolment and boys 52%
- Only 8% of all children are out of school. Girls are 2% of all school age children out of school and boys 7%
- 4% of school age girls are out of school and as many as 11% of school age boys
- There are three times as many boys out of school as girls
- There is no difference in enrolment status for the great majority of girls and boys since 92% have the same enrolment status
- Only 8% of boys have an enrolment status inferior to that of boys and these children are where gendered interventions should be targeted.

The GPI can of course be corrected by adjusting the GERs for girls and boys by the population ratios. Multiplying the GPI based on GERs by the ratio of girls to boys in the population would achieve this and result in an adjusted GPI of 0.92. If this adjustment is not used then it is possible to reach very misleading conclusions and overlook imbalances in the population of girls and boys.

Table 3: Enrolments, Enrolment Rates and GPI where the Population has 15% Fewer Girls

15% less girls in population				
	Girls	**Boys**	**Total**	
School Age	459,459	540,541	1,000,000	
Enrolled	440,000	480,000	920,000	
Not enrolled	19,459	60,541	80,000	
Ratio Girls/Boys out of school			0.3	Girls out of school are one third the number of boys
GER	95.8%	88.8%	92.0%	
Gender Parity Index (GPI)			1.08	
Ratio Girls/Boys in school			0.92	The number of girls enrolled is 92% the number of boys
GPI Corrected by population ratio			0.92	

2.3 The Education for All Development Index (EDI)

The EDI is used by the Global Monitoring Report (GMR) to provide a single index of progress towards EFA (UNESCO, 2009:245). It consists of the arithmetic means of the:

- Net Enrolment Rate (NER)
- Survival Rate to Grade 5 (SR5)
- Adult Literacy Rate (ALR)
- Gender Specific EFA Index (GEI)

The GEI is a composite of the GPI's for primary schooling, secondary schooling and adult literacy. If the GPI exceeds 1.0 it is transformed and inverted e.g. GPI 1.1 becomes 1/1.1 = 0.91. This is necessary to ensure that all four main indicators are scaled from 0 to 1.0 and equally weighted when added together.

The issues raised above in relation to GERs, NERs and the GPI all necessarily affect the EDI as a composite index and may confound its simple interpretation. In particular small increases and decreases in its value would seem difficult to interpret. Not only can these movements arise from different positive and negative movements in its component parts, but also the significance of a positive or negative movement in each component part may be different. As noted above NERs for a cycle can actually fall when repetition within the cycle is falling giving a negative movement for a desirable result

The first problem with the EDI is that is intends to weight equally its four components since:

EDI = ¼ NER1 + ¼ SR5 + ¼ ALR + ¼ GEI.

A simple examination of the distribution of the four components across countries suggests that this is not true (Figure 3). The adult literacy and survival rates to Grade 5 indicators typically have lower values over most of their range than do the indicators for GEI and NER1. This means that in an arithmetic aggregation GEI and NER1 are likely to contribute more to the variance of the aggregate score than do Adult Literacy and Survival Rates to Grade 5. This problem could be remedied by using Z-Score transformations which would put each indicator on a standardised scale and distribution. It would change the rank order of some of the aggregated scores.

Figure 3: Values for the EDI and for its Component Parts
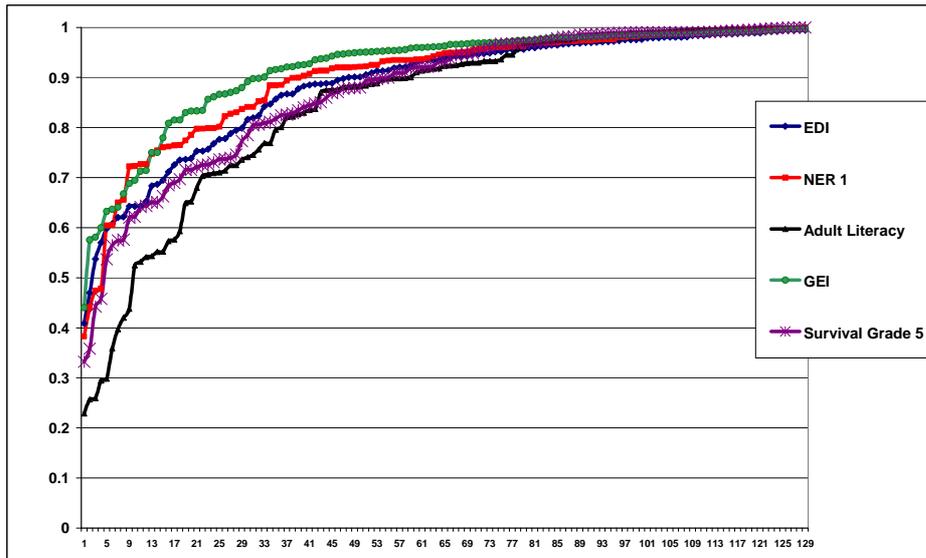
Source: Education for All Global Monitoring Report, UNESCO,

The EDI is a composite index. Its components are aggregated. It is inevitable that uncertainties in the measurement of each indicator will compounded to result in greater uncertainties in the final aggregate measure. An example will suffice to make the point

If the four components of the EDI are given typical values and each has an uncertainty of measurement of +/- 2%[2] then the overall EDI value is 0.884 (Table 4). However minimum and maximum values would vary from 0.866 to 0.936 with whatever probability limits we had put on the error term. This is a variation of about 4% in the value for the EDI.

Table 4: EDI and Uncertainty 2% Average EDI Countries

	Value	Uncertainty	Max value	Min Value
NER1	0.900	2.00%	0.882	0.918
Survival Rate	0.870	2.00%	0.853	0.887
Adult Literacy	0.846	2.00%	0.829	0.863
GEI	0.918	2.00%	0.900	0.936
EDI	0.884		0.866	0.901

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[2] Supposing there is a 95% chance that the true value lies within +/- 2%

This uncertainty would change the ranking of the EDI value of a country when compared to others. Because the EDI follows a curve which converges on the value 1 EDI values much over 0.9 are very close together. This means that errors in measurement can have a large effect on ranking.

Thus a variation of + or – 2% covers the first 52 ranked countries in the most recent EDI chart. A 1% + or – band covers 26 places. Because the variation in EDI is greater for low values the same range of + and – 2% only covers about 5 places at the lowest end of the EDI distribution. Countries with low EDI values are likely to have the least reliable statistics. If the error range is increased to + or – 5% then the uncertainty covers 10 ranks, and at 10% it covers 20 ranks (Table 5). The variation in GEI is over 10% within this error margin.

Table 5: EDI and Uncertainty 5% Low EDI Countries

	Value	**Uncertainty**	**Max value**	**Min Value**
NER1	0.600	5.00%	0.570	0.630
Survival Rate	0.500	5.00%	0.475	0.525
Adult Literacy	0.600	5.00%	0.570	0.630
GEI	0.900	5.00%	0.855	0.945

Variations in the EDI between 1999 and 2006 can be compared for about 50 countries. The result is shown below.

About 80% of countries changed the value of their EDI by less than 5% over the period from 1999 to 2006. About twice as many improved as deteriorated. As can be seen nearly half of the countries on which the EDI has data on change over time fall within + or – 2% (Figure 4). This is almost certainly within the confidence levels of the aggregated data. The EDI is not therefore a very sensitive indicator and cannot be used to provide robust insights into improvement or deterioration over time, especially on an annual basis where changes are much smaller than those over the seven year period analysed.

Figure 4: Relative Improvement in EDI 1999-2006
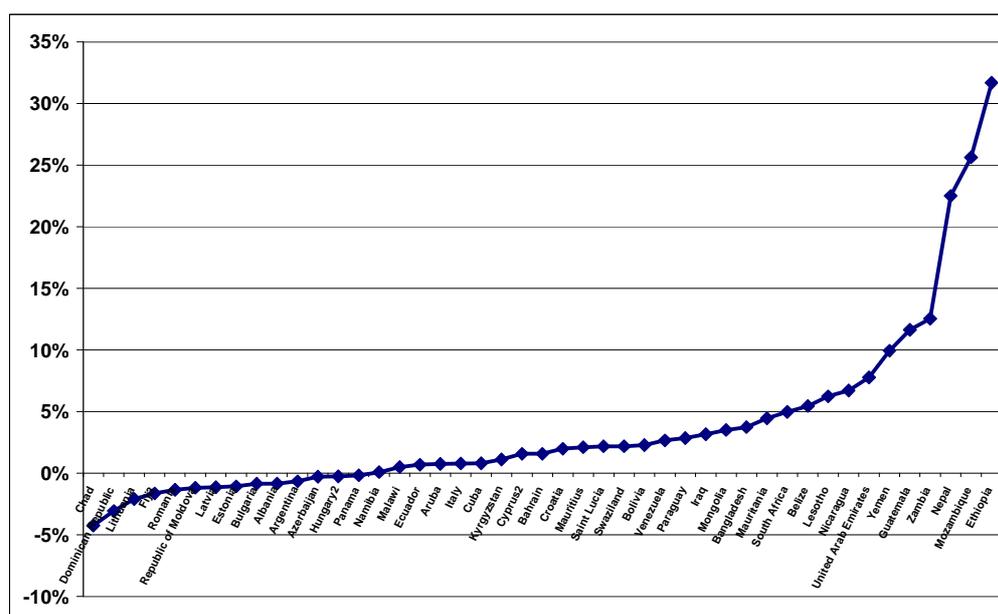
Source: Education for All Global Monitoring Report, UNESCO

Most of the countries that appear to have improved their EDI have low EDI values as might be expected (Figure 5).

Figure 5: Improvement in EDI by EDI Value 1999-2006
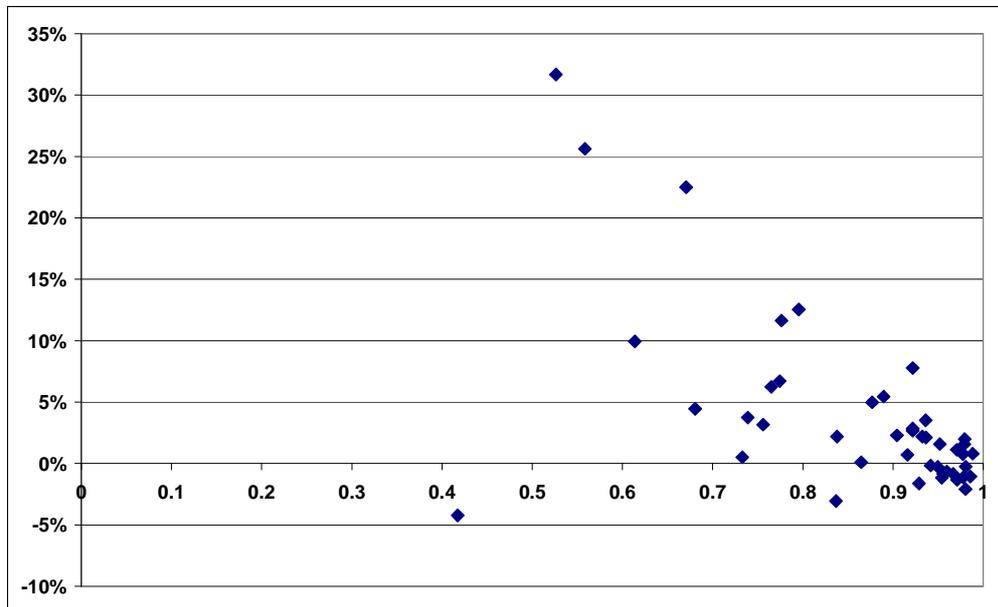
Source: Education for All Global Monitoring Report, UNESCO

This analysis shows how the EDI has considerable limitations as an indicator of educational development. Most obviously it cannot really be used to judge progress in all but a very blunt way. As a composite index with many component parts the interpretation of changes in its value is opaque. Gains are unlikely to be even across its component parts. Some components are unlikely to be susceptible to large changes in the short term (e.g. the adult literacy rate), in others increases and decreases are ambiguous to interpret (e.g. NERs and GEIs). And all have cumulative uncertainties in the precision with which they can be measured. As limits are approached small differences in performance become increasingly meaningless since likely errors in measurement exceed observed variations in values. The EDI indicators are also not independent of each other (survival rates are related to NERs, changes in adult literacy are affected by survival rates, GEIs are affected by NERs and survival rates).

Single indicators with fewer components are often easier to understand. It is also easier to appreciate the possible meanings of positive and negative changes in value and the limitations of such interpretations.

3. Concluding Remarks

Education for All is shaped in practice by the use of targets and indicators. These clearly have their uses and inform policy dialogue at the international and national level, and have implications for educational development at the more local level. Without indicators of progress which can be measured as well as judged there are obvious risks that what is, is replaced by what ought to be in discussions around needed educational reforms (Lewin, 1985). Strategies to improve participation, quality, outcomes and equity all depend on robust understanding of causal relationships between actions and outcomes. Independent measures of progress towards desired goals are essential, most obviously to improve decision making about strategy based on diagnosis of the current status, and the distance that is needed to travel to desired destinations. Without this, anecdotal reasoning and casual empiricism can create images of reality that suit the motives of those who project them, but which may misrepresent, mislead, and misspeak to policy, and result in very poor resource allocation. Those with least voice have least opportunity to influence policy informed largely by power and prejudice unaccompanied by evidence.

That said, the message of this paper is that the use of targets and indicators related to EFA needs revisiting. Experience has accumulated of the some of the polarisations induced by the use and misuse of some current indicators which have sometimes resulted in unbalanced approaches to educational investment, neglect of less easily measured but nevertheless valued outcomes, and a lack of appreciation of some of the systemic aspects of growth and improvement in participation, quality, valued outcomes and more equitable distribution. Enough has been said to show that headline indicators currently in use need careful interpretation if they are to be used as targets over the next decade.

Three examples of the use of indicators have been discussed. Enrolment and participation indicators include GERs and NERs and completion rates. These are widely used but need to be enhanced by an understanding of student flows and underlying patterns of enrolment and progression. Grade specific NERs and GERs are an improvement over cycle GERs. Even better are indicators sensitive to the age of children in each grade. All high enrolment countries have low age in grade variations, and most low enrolment countries have high dispersions of ages in each grade, especially if enrolments have expanded rapidly in the recent past. This is not apparent from current EFA indicators.

On schedule completion rates (OSCR) should be more widely used. These indicate the numbers and proportions of children graduating from a cycle at the appropriate age e.g. 12 years old in a system with an entry age of 6 years and six grades. The OSCR is a proxy for age in grade slippage which, where it occurs, is likely to particularly disadvantage girls. The OSCR is easier to calculate than age in grade distributions for each grade, especially where there is a primary leaving certificate examination which registers candidates and their ages.

Gender Parity Indexes need careful interpretation. They can lead to the conclusion that all girls are relatively disadvantaged when some may not. Depending on how they are computed, GPIs can conceal imbalances in the child population of girls and boys making invisible the most permanent kind of exclusion of all, recently referred to in the Economist (2010) as 'gendercide'. The EDI as currently configured appears of limited value as a policy tool. As a composite index changing values are almost impossible to interpret. Over the short term most changes appear unlikely to be statistically significant and fail to direct attention to needed

reforms. Single indicators of relative improvement may be more useful and easier to understand.

Paradoxically, multi-dimensional indicators that may have been useful in drawing attention to gross under participation in education in poor countries, become less useful as margins are approached. This is not only because uncertainties in the magnitude of changing values become serious problems where small changes are within of margins of error. It is also because providing educational access to "the last 20%" almost certainly requires different indicators and strategies than universalising access to the first 80%. Distributional indicators, which indicate the status of sub-populations (by household income, affinity, group, location etc.) can also be very useful in drawing attention to relative exclusion. They can also suggest ways in which internal efficiency can be improved which are invisible to aggregated and average indicators. Thus reducing the dispersion of teacher pupil ratios, class sizes and learning material availability across a system can improve access to education at lower cost than simply expanding the system in the image of its past. It is also more equitable. Judging the performance of all children in assessment tests, rather than focusing on the best and highlighting these in league tables, can generate incentives to address the learning needs of all rather than a few. Monitoring public costs at primary, secondary and higher education levels is essential to establish ratios that can allow greater participation at affordable costs.

Consistent and persistent efforts to improve the quality of data are needed to underpin future efforts to improve educational access. These are needed at two levels. National data collection systems are essential to improve efficiency and effectiveness and for rational allocation of resources. These can be used to identify key indicators and targets for improvement that are easily understood, and hopefully widely owned. The more transparency there is in collecting and disseminating such sources of information the better in terms of ownership and target getting as well as target setting. The more likely also that the meanings of key indicators and there changing values will be better understood.

But for many educational problems, better information is needed at a local level to monitor progress and influence the decisions that are made that make the difference between education systems that deliver services effectively to the populations they serve and those that do not. The quality of the indicators and targets needs to be different at different levels so that indicators are operationally useful and targets are challenging but achievable. Relative improvement (in age of entry, number repeating, attendance, measures of achievement) is easier to assess and monitor and more meaningful to most actors in education systems than ambitions to reach or exceed "average" or "benchmark" levels of performance in all locations – an ambition doomed to fail. Reductions in disparities are central to achieving equitable growth at affordable cost but are invisible without appropriate indicators that are sensitive to changes in distribution.

This paper has argued that the process of setting and getting targets defined by indicators remains valuable but needs constant interrogation. The homogenising effects of global approaches adopted by development partners and the international community of NGOs and others concerned with EFA has to be mediated by recognition that education policy in practice is national or sub-national at the level of delivering services. Global goals do not always have analogues at country level and conversely national aspirations and realities cannot always be mapped onto global goals. Improving target setting and devising better indicators which allow progress to be assessed and understood requires more nuanced

understanding of what indicators do and do not measure, and in appreciating the virtues and vices of setting targets.

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Consortium for Research on
Educational Access, Transitions & Equity

Funded by DFID

Report summary:

"Education for All" (EFA) identifies goals and targets and translates these into indicators which are used to evaluate progress and influence flows of external financing. The search for evidence based policy depends on measures of performance that can link cause and effect and that represent real gains in progress towards desired outcomes. However, the indicators widely used for access to education have serious problems. Gross and Net Enrolment Rates (GERs and NERs) are widely used to assess participation, but their changing values can provide misleading signals to policy makers. Grade specific enrolment and completion rates may be better but are silent on issues of quality and achievement. Gender Parity Indices (GPIs) foreground differences related to children's sex but often aggregate and conceal underlying patterns of participation (by age, location, household income) and may make invisible seriously unequal numbers of boys and girls in populations. The Education for All Development Index (EDI) suffers from being a highly aggregated composite index which is difficult to interpret and of limited use since changes over time are often within its margins of error. This paper selects some of the key indicators used for EFA and offers an analysis of their strengths and weaknesses. Improved target setting with better indicators is needed which gives a more nuanced understanding of what indicators do and do not measure.

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Professor Keith Lewin is Director of the Centre for International Education at the University of Sussex and Director of the CREATE research partnership. He has extensive experience of school systems in Sub-Saharan Africa, South and South East Asia, and China, has published 18 books and over 100 scholarly articles and chapters, and has supervised 40 D Phil students. He has worked extensively with the International Institute of Educational Planning, and with the World Bank, DFID, DSE/GTZ, UNICEF, and UNESCO and with many national governments. Keith made invited contributions to the world education conferences at Jomtien and Dakar, and has subsequently been directly involved in national sector development planning in Uganda, Tanzania and Rwanda, and in India supporting DFID's bilateral programmes. His research interests include the economics of education and educational financing, educational policy and planning for EFA, teacher education, educational innovation and implementation, science education policy, assessment, and aid to education.

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