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COST ANALYSIS GUIDANCE FOR USAID-FUNDED EDUCATION ACTIVITIES

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Cost Analysis Guidance for USAID-Funded Education Activities

Office of Education, Bureau for Economic Growth, Education, and Environment (E3)

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CONTENTS

1. INTRODUCTION

Guidance Objectives and Audience

This guidance document is produced by the USAID Office of Education for USAID evaluation partners, implementing partners, and USAID Missions commissioning cost analysis studies. This Guidance puts forward a common framework for analyzing costs of USAID-funded education interventions. It builds on and is complemented by the *Cost Reporting Guidance for USAID-Funded Education Activities* (2018), also produced by the USAID Office of Education. The cost analysis approach presented in this note is designed to be applicable to the cost data collected following the Cost Reporting Guidance. Both guidance notes build on existing systems and best practices with collection and analysis of cost data.

This Guidance consists of two main parts. The opening part illustrates common cost questions that USAID staff and implementing partners, partner governments, research organizations, academics, and other stakeholders may be asking, and presents an overview of analytical methods to answer these questions. It also describes typical cases of cost analysis results utilization and broader applicability of findings. USAID staff, partner governments, and commissioners of cost analyses will find this part useful.

The second part of this document contains a practical guide to implementing cost data analyses, with templates and resources. This part is designed for researchers, evaluators, and cost analysts.

The Guidance is designed to help establish the process and procedures for how evaluators and cost analysts examine cost data in the education sector, and set standards for reporting on findings. Following this Guidance will ensure comparability and transparency of cost analysis results and lay a strong foundation for continuous learning and improvement of USAID-funded interventions in the education sector.

Why Invest in Cost Measurement?

While the field of international education has made great strides in recent years with raising the number and the quality of impact evaluations, their results would be more complete with associated cost data for the evaluated interventions. Policymakers and donors cannot make fully informed decisions about the best way to invest limited resources without information about the costs of achieving desired outputs and outcomes through different interventions or delivery strategies. Data on the cost of interventions is also critical for making responsible decisions about scaling and sustaining interventions within country systems.

There is agreement in the education development sector that we can achieve better and more sustainable results if we use cost data alongside effectiveness data to inform investment decision-making. However, despite decades of investments, the cost of specific components of common interventions in the education sector is poorly understood due to lack of associated cost data. We do not know unit costs for such common interventions as teacher training or the production of books, nor do we know how these costs vary in response to features of the interventions and the context in which it is implemented. Costs of the essential components of education delivery are frequently bundled with the cost of other components, and thus are not readily available for examination.

The USAID Office of Education cost measurement initiative works to address this gap and to establish systems and processes for capturing the costs of education interventions. The initiative also supports linking costs to outcomes and enables value-for-money analyses, thus providing a pathway toward resource optimization across interventions and contexts. Routine cost measurement will lay the foundation for expenditure-sensitive development intervention decisions as well as national and regional policy decisions. USAID Education Policy emphasizes the need for collection, analysis, and use of comprehensive cost data in order to inform investments as well as decisions in partner countries pertaining to scaling, replicating, and sustaining interventions to support their journey to self-reliance.[1] Detailed data on costs of intervention components are also necessary for intervention design, budgeting, and management.

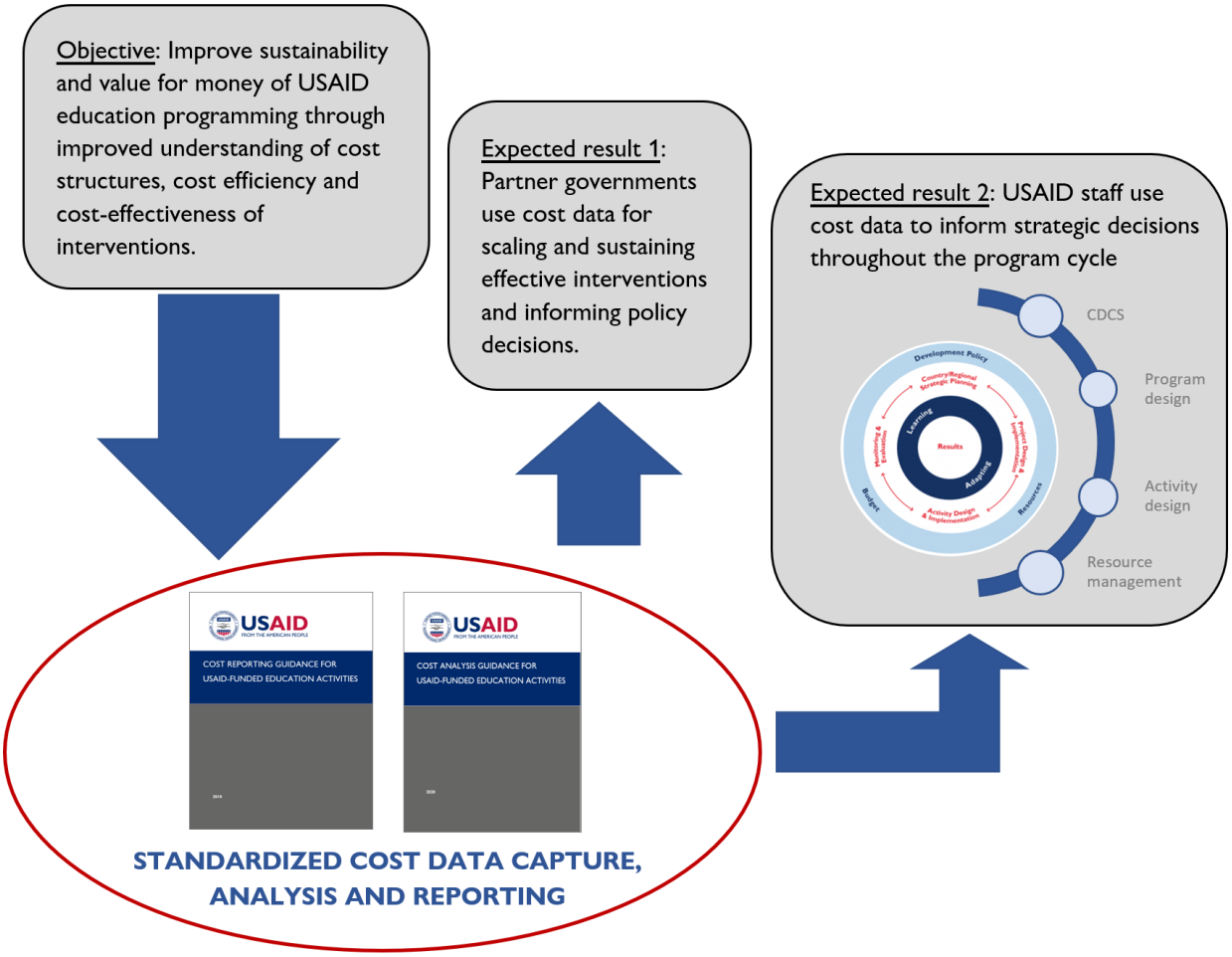
USAID's guidance notes on cost reporting and cost analysis represent the first step in the routinization of cost data collection and analyses. This step is part of the ongoing improvement of the evidence base in the education sector. The overarching objective of the cost measurement initiative is to improve sustainability and overall value for money of USAID investments in the education sector, with two key results:

1. Sustainability and journey to self-reliance: ensure that effective interventions can be scaled and sustained by costing out intervention components for transfer to partner governments.

2. Improvement in planning and management of USAID education investments: a) improve value for money of USAID investments in education by studying cost-effectiveness of comparable interventions to identify the least costly models with the greatest impact on the outcomes of interest; b) improve intervention efficiency through identification of cost drivers; and c) inform intervention design, planning, and budgeting through a better understanding of intervention cost structures in different contexts (Figure 1).

[1] In 2018, USAID began reorienting its strategies, partnership models, and program practices to achieve greater development outcomes and work toward a time when foreign assistance is no longer necessary, following the framework called the Journey to Self-Reliance. Under this framework, USAID policies, strategies, and activities aim to empower host country governments and USAID partners to achieve locally sustained results, help countries mobilize public and private revenues, strengthen local capacities, and accelerate enterprise-driven development.

FIGURE 1. Cost measurement objectives and approach



What Cost Questions Can We Answer?

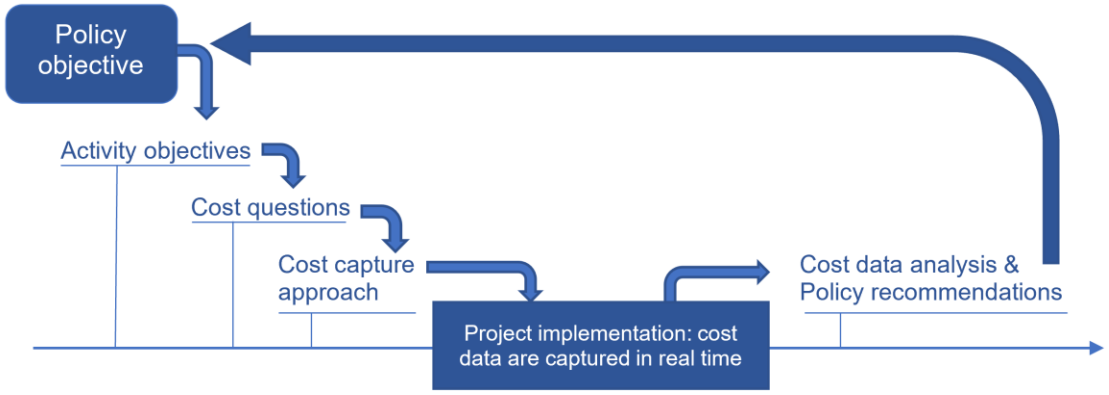
USAID's cost analysis approach is designed to answer cost analysis questions that directly support the objective of improving sustainability and the value for money of USAID investments in education, as outlined in the previous section. Cost analyses can be used for a variety of purposes. They can support government policy objectives, inform future USAID investment decisions, or help inform discussions with sector stakeholders. USAID Mission staff and their partners, in collaboration with the partner government and local stakeholders, will identify cost analysis objectives that will support specific strategic or operational priorities in the country.

Translating priorities and objectives into cost analysis questions requires consultations with key stakeholders early in the process, to ensure consensus on the end result of the cost measurement activities. Cost questions should be answerable, utilization-focused, and help advance concrete objectives. Different cost analysis objectives and questions will necessitate a collection of different data. To answer questions about the cost of sustaining an intervention, for instance, we need to know how much the USAID-funded activity spent on developing this intervention as well as how much was spent on its implementation. Questions about cost-effectiveness of different models would require impact data

for each model in addition to cost data. Routine cost data captured throughout activity implementation can also help with activity management by providing important insights into what resources are allocated to various components and what support it is able to generate from various stakeholders.

Articulating cost questions early in the process will enable the collection of the most appropriate data throughout the implementation of the intervention (Figure 2).

FIGURE 2. Cost measurement process

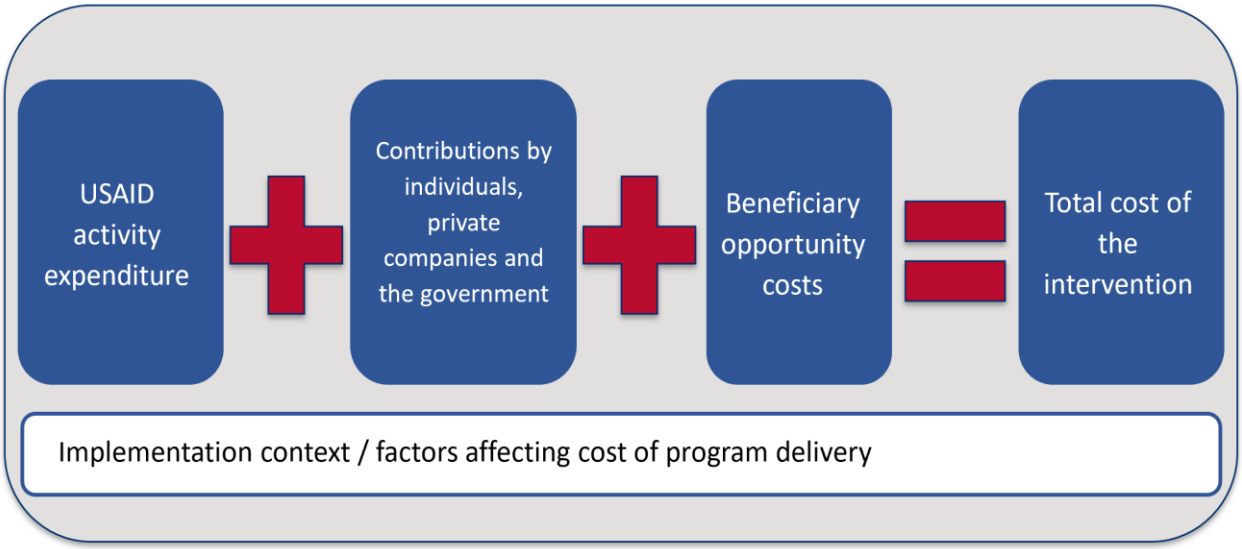


As this figure illustrates, similar to impact evaluations, the cost questions need to be determined prior to launching intervention activities so that appropriate cost data processes are established at the start of the intervention. It is difficult, if not impossible, to accurately estimate these costs retroactively, when systems were not in place to capture them as the costs are incurred.

To answer cost questions, we need to measure costs of activity components or specific interventions. **Cost measurement refers to a process of collecting, processing, analyzing, and reporting on the costs of interventions**. As outlined in the *Cost Reporting Guidance*, cost data are comprised of expenditure data; individual, private sector, and government contribution data and beneficiary opportunity costs.[2] Additionally, to implement cost data analyses, we need to have data on intervention details (e.g. duration of trainings, geographic coverage of services). Figure 3 shows components of cost measurement that together help arrive at the total cost of an intervention. All three data components must be captured in order to accurately measure intervention costs.

[2] For more details on the cost capture, please refer to *Cost Reporting Guidance for USAID-Funded Education Activities*, 2018.

FIGURE 3. Total intervention cost components



The following section expands upon the recommended cost analysis methods and data requirements for each of them and discusses what questions can be answered using each cost analysis method.

2. COST ANALYSIS METHODS

This note presents a cost analysis approach that is based on commonly used methods and best practices in development economics, education economics, and related fields. While this approach was tailored for cost data generated using USAID's *Cost Reporting Guidance* (2018), it can be applied to other cost data as well.

The following terminology is referenced throughout this document. Familiarity with these terms will facilitate understanding of this document. For a more detailed explanation please refer to the Glossary in the Annex of this document and to USAID's *Cost Reporting Guidance*.

- *Cost* is defined as the totality of incurred monetary expenditure and in-kind contributions that resulted in a given education output or outcome.
- *Cost analysis* is defined here as any type of data analysis that involves intervention cost data, with or without additional data on outputs or outcomes.
- *Cost category* is defined as class of costs incurred to produce a particular kind of education output or outcome, such as trained teachers or teaching and learning materials. USAID's Cost Reporting Guidance includes the following cost categories: 1) general operations, management, and reporting; 2) assessments and evaluations; 3) higher education/pre-service teacher training; 4) in-service teacher training; 5) teaching and learning materials; 6) system strengthening; 7) private-sector engagement; 8) parents and community engagement; 9) safe schools and infrastructure; 10) grants, scholarships, and cash transfers to individuals/families; 11) grants to organizations; and 12) other.
- *Expenditure* is the amount of money spent to develop and/or implement an education intervention, including all labor, materials, travel, and all other expenditures, as captured through the accounting system for the reporting period.
- *Ingredients* are the list of resources and their quantities that were used in the intervention implementation.[3]
- *Contributions* are in-kind or monetary donations by the host government, non-governmental entity, or private individuals, valued at or over $1,000 each and essential to achieving activity objectives. Includes beneficiary opportunity costs.
- *Shared costs* refer to costs that support multiple tasks across the intervention. For example, costs of renting a space for program staff.
- *Dosage* refers to the amount of intervention that a beneficiary is supposed to receive or actually receives (if such data are available). For example, length or frequency or teacher training

[3] Henry Levin (1983, 2001) formalized this approach in education economic analysis as the "ingredients method." This method "distinguishes between input quantities and prices; the product of quantities and prices yields an estimate of the total social cost of an intervention, program or policy." (Clive Belfield, A. Brooks Bowden, and Henry M. Levin, 2018. "Cost estimation in education: The ingredients method," Chapters, in: Scott Farrow (ed.), *Teaching Benefit-Cost Analysis*, chapter 16, 200-207, Edward Elgar Publishing.)

sessions, frequency of community engagement events, or frequency of teacher coaching visits.

With the right data in hand from cost reports, analysts have several options for the kinds of cost analysis they can do, each of which address slightly different questions and require somewhat different data. The cost analysis objectives, questions, and intended use of results that were originally specified should determine the selection of the analysis type. No single analysis type is appropriate for all questions or all intervention types. Likewise, there is no single cost analysis method that we should seek to apply to every intervention. Attempting to apply a particular method when the necessary data are not available might result in inaccurate estimates that are not useful for decision making. It is important to note, however, that if relevant data are available, it is possible to conduct multiple types of analyses with regard to the same intervention.

Table 1 summarizes four main cost analysis methods with associated illustrative objectives, questions, and data requirements. The following sub-sections provide more detail on each type of analysis and include real case studies that used these analyses.

TABLE 1. Cost analysis methods and illustrative questions

ANALYSIS METHOD[4]	WHAT QUESTIONS CAN IT ANSWER?	WHAT CAN COST ANALYSIS HELP ACHIEVE?	WHAT DATA WILL ANALYSTS NEED?
Cost-economy analysis	What did it cost to deliver this intervention? How much was spent on different tasks? How much should the government budget for a scale up?	Help budget for the new activity. Help transition the intervention or its elements to the government.	Expenditure and contributions reports disaggregated by cost categories and ingredients; a method for allocating shared costs across cost categories. Local price database for common inputs. Government cost structures; output data.
Cost-efficiency analysis	What did this intervention cost per *output* delivered? How does that compare to other *delivery methods* for this output?	Identify unit costs per output. Compare unit costs across delivery methods and identify which one achieves the most outputs, within a given budget.	Expenditure and contributions reports disaggregated by cost categories and ingredients; a method for allocating shared costs across cost categories. Output counts, using common indicator for all interventions, disaggregated by delivery methods.
Cost-effectiveness analysis	What did this intervention cost per *outcome* delivered? How does that *compare* to other interventions that produce this outcome?	Compare costs of outcomes across different interventions. Identify the intervention that achieves the most outcome, within a given expenditure per beneficiary.	Expenditure and contributions reports disaggregated by cost categories and ingredients; a method for allocating shared costs across cost categories. Credible estimates of the impact. Credible estimates of the cost and effects of comparable interventions.

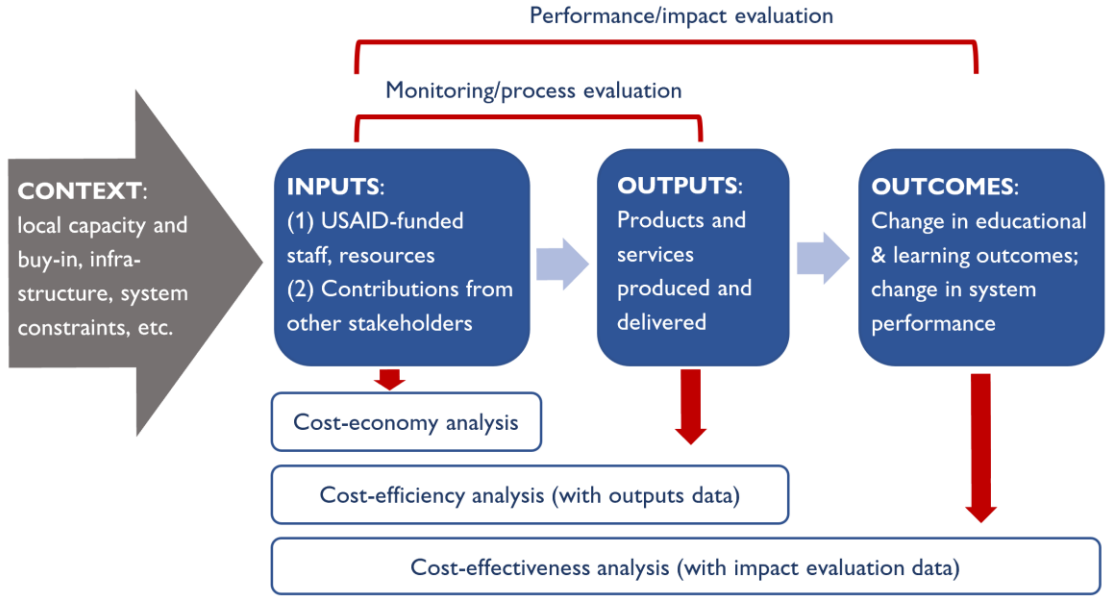
[4] The first three cost analysis methods presented here correspond to the three elements of DFID's Value-for-Money framework that emphasizes economy, efficiency, and effectiveness as three main parts of the value-for-money of development programming.

ANALYSIS METHOD[4]	WHAT QUESTIONS CAN IT ANSWER?	WHAT CAN COST ANALYSIS HELP ACHIEVE?	WHAT DATA WILL ANALYSTS NEED?
Cost-benefit analysis	How did the costs of this intervention compare to the monetary value of the benefits created?	Identify whether the studied intervention was "worth" the investment in monetary terms.	Expenditure and contributions reports disaggregated by cost categories and ingredients; a method for allocating shared costs across cost categories. Credible estimates of intervention's impact on (multiple) outcomes. Economic valuation of the long-term benefits of the intervention.

It is important to have cost measurement integrated throughout the activity life cycle and aligned with monitoring and evaluation activities to ensure a collection of all relevant cost and results data. This is particularly important for cost-efficiency and cost-effectiveness analyses, which are not possible without output and outcome data. For example, if we want to compute unit costs for teacher training, the system for capturing costs of different activity tasks needs to be set up to allow for isolation of teacher training-specific costs. Likewise, if we need to know cost-effectiveness of teacher training in improving the reading scores of second graders, the system for capturing costs should be set up to allow for isolation of those costs. In addition, the activity needs to have an impact evaluation that specifically measures improving reading scores.

Figure 4 demonstrates this alignment, mapping common cost analysis methods to the logic model of an intervention and corresponding evaluations.

FIGURE 4. Logic model with evaluations and cost analyses[5]



[5] Figure 4 does not include cost-benefit analysis because of a lack of key data in contexts where USAID implements education interventions. This is not because cost-benefit analysis *per se* is not worthwhile, but because the necessary data to do cost-benefit analysis well is almost never in place.

The next four sections will describe each of these analysis methods, explain what we can learn using each method, and describe the associated data requirements. Each section includes a case study illustrating an application of the method to a real-world development problem.

Cost-Economy Analysis

"Cost-economy analysis" refers here to a family of economic analyses designed to examine the components of the intervention, which inputs went into each component, and at what price these inputs were purchased. These analyses will help establish the total costs of an intervention, as well as its potential for sustainability and the costs of scaling it up to other areas within the country. While not typically thought of as an economic evaluation method, this kind of analysis is nonetheless important for ensuring cost control, and in forming the basis for other analyses that compare costs to outputs or outcomes. Detailed information on pricing of common inputs is very useful for future intervention design. By separating non-recurrent[6] and donor-associated expenditure[7] from recurrent intervention implementation costs (for example, expatriate management costs versus local management costs), such data can also help establish whether running the intervention as designed is fiscally sustainable for local actors.

What can we learn? Knowing how much was spent on different activities within an intervention and what prices were paid for different inputs, paired with detailed data on outputs, provides a basis for cost-efficiency and cost-effectiveness analyses. Cost-economy analysis can also help answer sustainability-related questions, such as unit cost variations with different scale options. An examination of the cost structure of the intervention helps isolate costs that would need to be borne if the intervention were sustained long-term, as well as those expenses that are associated with donor-supported intervention, such as donor reporting or technical support travel.

What data do we need?[8] Cost-economy analysis is not possible without detailed cost data. First, all donor intervention-related expenditure data must be captured in real time, using cost categories that are aligned with analysis questions. Second, operations costs must be separated from management costs, and intervention design/development/creation (i.e. non-recurrent) costs must be separated from intervention implementation (recurrent) costs.[9] Field costs must be reported separately from foreign head office/expatriate costs. Finally, if exploring equity implications of price differences (or other equity-related questions), capturing costs disaggregated by relevant equity dimensions (e.g. urban versus rural populations) will be necessary. For example, if an objective of the cost-economy analysis is to better understand the price difference between building a school in a relatively central location versus remote communities, the intervention will need to track costs of building remote schools separately.

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[6] Non-recurrent costs are typically associated with costs of developing and piloting the intervention model.

[7] Donor-associated expenditure are the costs that the intervention would not have if it were implemented by the government. For example, costs of compliance with donor regulations, costs of oversight from the head office, much of security, transportation, human resources, and legal costs fall into this category.

[8] Here and elsewhere in this guidance, all references to types of cost data are based on Cost Reporting Guidance for USAID-Funded Education Activities (2018).

[9] Ibid.

Case Study: Using Cost-Economy Analysis to Compute Scale-up Estimates

With an explosion of mobile phone ownership in low-income countries, donors are considering using them for education intervention delivery. But are mobile phone-based interventions indeed effective and cost-effective in improving student achievement, and should they be scaled up? In 2015/2016, USAID co-funded[10] the implementation and an impact evaluation of the Makhalidwe Athu activity (MA) to test whether using mobile phones would indeed help improve student learning. MA was a nine-month pilot intervention to improve the reading skills of 1,200 students in 2nd and 3rd grade in Zambia's Eastern Province. The activity provided reading materials in a local language and supported reading activities through SMS messaging to caregivers of children selected to participate in the pilot. MA participated in the pilot of USAID's cost reporting approach and captured costs (Table 2).

TABLE 2. Makhalidwe Athu expenditure data[11] using USAID pilot[12] cost categories

SUMMARY EXPENDITURE DATA	AMOUNT (USD)	PERCENT
Cost Category 1: General Management and Operations	$333,913	39.6
Cost Category 2: M&E and Reporting	$118,479	14.0
Cost Category 4: Teaching and Learning Materials	$195,963	23.2
Subcategory 4: (Development)	$92,252	10.9
Subcategory 4: (Promotion and Production)	$11,191	1.3
Subcategory 4: (Distribution/Transmission)	$92,520	11.0
Cost Category 7: Parent/Community Involvement	$146,496	17.4
Subcategory 7: (Development)	$5,325	0.6
Subcategory 7: (Implementation)	$141,171	16.7
Cost Category 11: Complementary Activities	$48,669	5.8
TOTAL	$843,519	100.0

The impact evaluation found the activity successful given the short exposure time: it achieved 0.27 effect size increase in student reading fluency and 0.23 effect size in reading comprehension (equivalent to an additional year of schooling) using difference-in-difference analysis of intervention and control groups' reading scores at baseline and endline. Initial cost analysis estimated the per student intervention cost to be US$700, including both development and implementation costs. Recognizing that the small scale and

[10] The activity was funded by the All Children Reading Partners (USAID, World Vision, and the Australian Government), designed and implemented by Creative Associates, and evaluated by the National Opinion Research Center (NORC) of the University of Chicago.
[11] Actual data are provided here with a gracious permission of MA's implementer, Creative Associates.
[12] The cost categories underwent some changes between the 2017/2018 pilot and the revised guidance of December 2018.

the pilot nature of the activity affect the unit cost, an analysis of activity costs was conducted to establish how much it would cost to scale the activity up nationally. The cost-economy analysis found:

- If scaled up, the activity would be implemented through the Ministry of Education and thus not need to have start-up, close-out, USAID compliance, reporting, and other donor-funded activity-related expenses.
- Since the intervention was already developed, development costs could be limited to a production and translation to local languages of new stories.
- With economies of scale, many per-learner costs could be reduced dramatically.

The final scale-up costs per student were estimated to be $20.10 for students in Lusaka and Eastern Province, and $21.60 for those in other parts of the country.

The evaluator highlighted several considerations regarding these estimated costs. First, MA was piloted in predominantly rural areas. Several things could change in urban areas. Cell phone ownership could be higher. This would imply that the intervention's fixed costs could be lower per student. It is also possible that the lack of reading materials is less of a problem in urban areas than in rural areas. This could decrease the uptake of the intervention because reading resources are not in such need; on the other hand, if children have better reading skills in urban areas than in rural areas, the impact of the activity could be higher as the intervention had greater impacts on more-able students, which would increase the effectiveness of the intervention per dollar invested.[13] Finally, two costly aspects of the proof-of-concept project could be eliminated or significantly reduced. The expensive—but infrequently used—IVR (automatic call-in) feature cold be dropped, and "stand alone" community mobilization activities could be integrated into the routine school-community group meetings. The estimates of cost per child in a scale-up scenario reflect a projection of the likely costs if these changes were made, built upon the detailed cost economy analysis conducted of the pilot intervention.

To conclude, having clear cost data in addition to impact data for this intervention provided crucial information for USAID and the government of Zambia to inform future decisions about scale-up of the intervention. Without cost data, impact evaluation findings alone are insufficient to inform scale-up and/or sustainment decisions in the context of tight budgets and competing priorities.

Cost-Efficiency Analysis

Achieving efficiency means maximizing the outputs achieved by the activity (e.g. number of teachers trained, number of books produced) given the inputs used. Thus, cost-efficiency analysis provides a good measure of "operational" efficiency. However, there may be a trade-off between cost-efficiency and overall intervention effectiveness, quality, or equity. For example, an intervention can achieve a low unit cost of teacher training by reducing the duration of the training and eliminating coaching support. This might seem cost-efficient from the point of view of unit costs of teacher training, but such training may fail to produce desired gains in learning outcomes. **As with all cost analyses, cost-efficiency results**

[13] USAID Impact Evaluation of The Makhalidwe Athu Activity (Zambia), 2017. Produced by NORC at the University of Chicago. Report available at https://dec.usaid.gov/dec/home/Default.aspx.

should therefore be interpreted alongside other information about the intervention being studied, including its results.

What can we learn? Cost-efficiency analysis compares the costs of an intervention to the outputs derived from that intervention. Such analysis is useful when choosing among alternative delivery models for a given output. For instance, cost-efficiency analysis would reveal how much it costs per teacher per year if the intervention provides professional coaching through different delivery modes, or to compare unit costs of books produced using different procurement processes. Cost-efficiency analysis can also help to uncover how context features or intervention characteristics drive the cost per output. For instance, how will the cost per teacher-day of a training intervention change based on the remoteness of schools? As these examples show, the value of cost-efficiency data is that it helps us better understand how cost-efficiency is affected by features of the intervention or the context and enable us to plan and manage activities with this information in mind. To be able to achieve this objective, the analysts would need to have a very clear idea of the theory of change of the intervention and what outputs look like with sufficient detail to ensure fair comparisons can be made.

What data do we need? Similar to cost-economy analysis, we need detailed cost data, including expenditure data disaggregated by relevant cost categories and sometimes sub-categories (depending on the cost questions asked) as well as "ingredient" data in each category (i.e., labor, fringe, travel, other direct costs, fees), contributions data, and details of the intervention data. This minimum data "package" will allow the analyst to compute cost-efficiency estimates for the outputs produced by the intervention. When cost-efficiency analysis is used for comparing interventions, it is particularly important that the methodology for capturing and for analyzing the cost and output data are the same for all of the compared interventions. In order to ensure that the cost-efficiency analysis can be applied consistently, highly detailed cost and output data are needed. Each intervention output must be counted using the same metrics. For example, if we are conducting a cost-efficiency analysis of two interventions where one measures the cost of a teacher training intervention using students reached as the main metric, while the other intervention measures cost per teacher, the results cannot be meaningfully compared. Best practice when planning a cost-efficiency analysis is to identify analysis questions at the onset of the intervention implementation and align both cost and output capture for both interventions. For more detailed guidance on how to conduct cost-efficiency analyses, see references at the end of this guidance note.

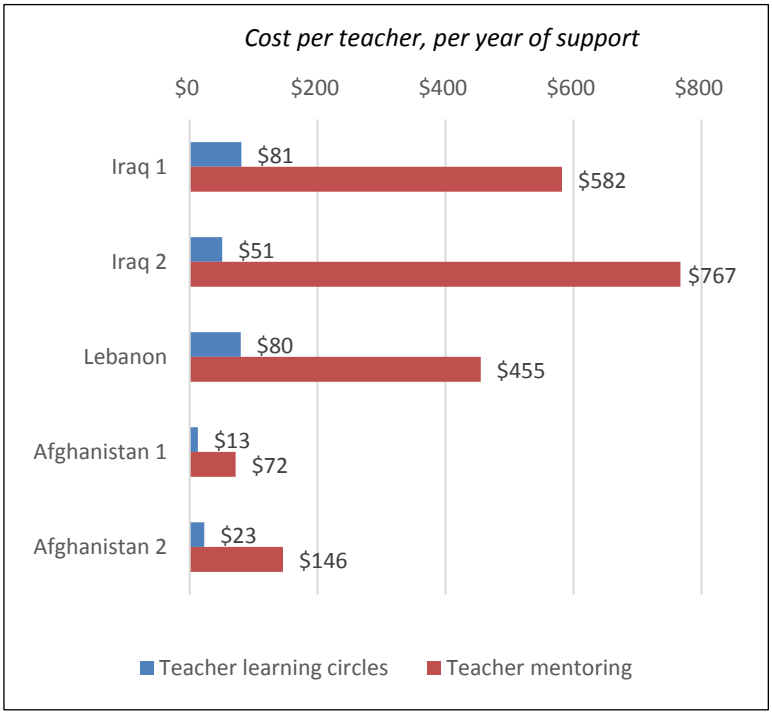
Case Study: Cost-Efficiency of Different Models of Teacher Support

The International Rescue Committee[14] invests in several types of teacher development activities including face-to-face workshops, mentoring, and teacher learning circles (TLCs). The education team expressed an interest in knowing how much it costs per teacher to provide ongoing professional support through two mechanisms: teacher learning circles and one-on-one coaching. They conducted a comparative cost-efficiency analysis to explore the costs of running these various professional development interventions across interventions in Afghanistan, Iraq, and Lebanon. Most of the interventions provided multiple kinds of support to the teachers they served, and the analysis had to

[14] International Rescue Committee provided permission to use real data from their projects for this guidance note.

separate out the costs of face-to-face workshops, individual coaching, and TLCs to estimate the cost per unit of training for each of them.

FIGURE 5. Cost-efficiency of teacher learning circles compared with teacher mentoring (excluding support costs)



Comparing the two modalities of long-term support for teacher professional development, the results showed that TLCs cost $49 per teacher per year on average while one-on-one mentoring costs $423 per year. This provided valuable information for planning of future interventions and investment decisions.

Cost-Effectiveness Analysis

Cost effectiveness is commonly understood as maximizing the outcomes achieved (e.g. increase in student literacy, increase in job readiness) per inputs used in the intervention. Cost-effectiveness analysis utilizes two pieces of information: the cost efficiency of an intervention (cost per output, such as cost to train one teacher) and the effectiveness of the intervention (impact per output, such as improvement in learning outcomes per teacher trained). These are sometimes combined in a ratio,[15] such as the cost per increase in learning outcomes, but keeping these two components separate in the presentation of the results helps us understand the results more clearly. Two interventions with the same cost-effectiveness might have very different costs and impact: one of them could be high-cost and high-impact, while another one could be low-cost and low-impact. The host government, USAID, and other stakeholders thus need both pieces of information in order to make an informed decision: cost per beneficiary and cost per effect.

What can we learn? Cost-effectiveness analysis places the costs of an intervention in relation to the outcomes created by that intervention. In other words, cost-effectiveness uses the information from a cost-efficiency analysis as well as information from impact evaluations. Such analysis is useful when trying

[15] The established approach is to standardize the results of comparisons of multiple programs by converting them to the same dollar unit (say, $100) or the same effect unit (typically, one standard deviation). However, presenting cost-effectiveness results as a ratio after such conversions has significant interpretation problems. For example, we may see analysts report an intervention producing two standard deviations of effect per $100 spent per beneficiary, while in reality this program spent $1 per beneficiary and produced 0.02 SD in effect. Obviously, the implications of such misrepresentation can be quite substantial for policymakers who are attempting to use this information to inform their decisions. Additionally, such reporting is also inaccurate since the intervention was not actually tested with $100 investment per beneficiary. In reality, with this level of investment, the results could be vastly different from the anticipated ones.

to choose which intervention (or a combination of intervention elements) is likely to cause the greatest change in outcomes per dollar spent as well as for comparative assessment of the value produced by different interventions. For instance, a cost-effectiveness study could compare cost and results of a paper-based reading intervention with a technology-based reading intervention. A technology-based intervention might be more costly, but the analysis can help establish whether it results in proportionately greater impact, and which intervention is ultimately more cost-effective. Cost-effectiveness analysis relies on rigorous impact estimates derived from experimental or quasi-experimental evaluations. The availability of rigorous impact estimates is the major constraint on conducting cost-effectiveness analyses. Although it may be tempting to try to conduct cost-effectiveness analysis using non-experimental[16] estimates of impact, the results will merely reflect whatever assumptions of impact were used in calculations.

The value of cost-effectiveness analysis comes from comparing interventions: the performance of a given intervention can only be judged when compared with another intervention's costs and effects. The validity of cost-effectiveness comparisons is determined by **accuracy and completeness of cost and impact estimates**.

What data do we need? Since cost-effectiveness analysis is comparative in nature, the results of comparisons of different interventions would be most accurate if both costs and impacts are captured and analyzed using identical or very similar methodology across the compared interventions. In order to ensure that the cost-effectiveness analysis can be applied consistently across the compared interventions, highly detailed cost and output data are needed. Additionally, both compared interventions must be rigorously evaluated with a strong counterfactual. The outcomes must be measured using the same impact indicators across the compared interventions. For example, if one intervention measures impact in percent of students who reach the benchmark of proficiency on a national reading assessment while another intervention measures impact in improvement in EGRA scores, the results cannot be meaningfully compared.[17] Best practice when planning a cost-effectiveness analysis is to use the same impact indicators and ensure that interventions collect and report on cost, outputs, and outcomes following an established methodology. It is also very important to adhere to proper documentation of data collection and analysis steps as well as the assumptions used in the analysis. For further guidance, please see references at the end of this Guidance Note.

Case Study: Using Cost and Effectiveness Data to Inform Investment Decisions[18]

Over the past two decades, a new wave of randomized evaluations has examined how developing countries can help 1) children who are not in school gain access to education and 2) those in school improve their learning. A comparative cost-effectiveness analysis by Kremer, Brannen, and Glennerster reviewed evidence on intervention impact and presents the cost per standard deviation of change in literacy test scores for 30 interventions that had been studied with impact evaluations (SD). Figure 6 plots both cost and impact-per-beneficiary for each intervention.[19] The intervention with the highest impact per child is also the second-most expensive intervention. There is also little relationship between

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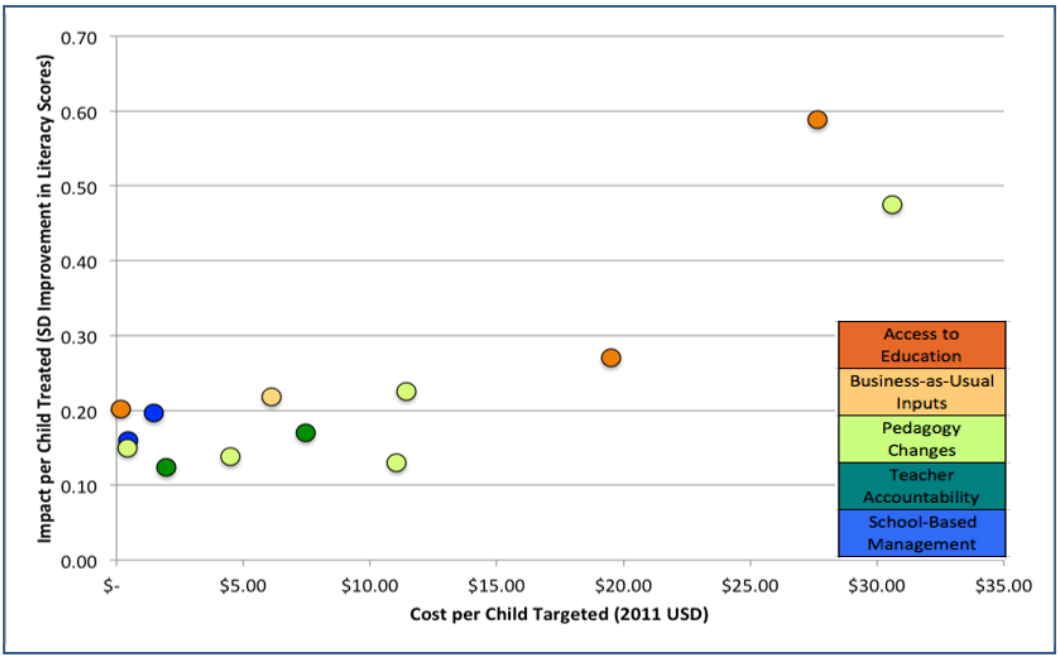
[16] Estimates from quasi-experimental designs are acceptable for use in cost-effectiveness analysis, although randomized controlled trials will remain the preferred method for estimating the impact of an intervention.
[17] It should be noted that even EGRA scores might not be comparable across contexts or across sub-populations.
[18] The figure is based on data from Kremer, Brannen, and Glennerster (2013), presented in Tulloch (2019).
[19] In the paper, Kremer et al instead plot impact per dollar spent.

spending and impact in the $0-$10 range. How can this information be used in decision-making? We might decide that based on the data presented in this figure, any investment below $20 is not "worth it" since it does not appear to produce a large difference from "business as usual." Therefore, we might advise policymakers to reduce the number of beneficiaries and increase the expenditure per beneficiary. Alternatively, we might know that anything above $15 per child is not fiscally feasible. Then, we might want to limit how small of an impact we are willing accept. For example, we might want to forgo anything below 0.12 standard deviations if we consider the effort – even if not very expensive – not worth it.

FIGURE 6. Cost-effectiveness of student learning interventions



Note that the interpretation of these cost-effectiveness results did not focus on identifying the single intervention with the absolute highest impact per dollar and concluding that it was "the best." Nor did it discuss the role of the context, which is bound to play a significant role in driving prices up or down. Instead, **comparative cost-effectiveness information allowed the researchers to look for patterns in the results and assess what was driving high cost-effectiveness in specific contexts, and how reliably different models produced results across contexts**. When using this information to make intervention choices in a particular context, a policymaker would still need to pair it with information about whether approaches were feasible and appropriate in that country and education system.

Cost-Benefit Analysis

Cost-benefit analyses (a family of analyses that includes a rate of return/return on investment analysis) compares the total costs of an intervention (including costs to society) to the monetized value of the totality of intervention's benefits (including social benefits accrued to those who did not directly benefit from the intervention). In contrast to the methods described above, the costs of an intervention can be compared to the benefits of that same intervention, not to other interventions.

What can we learn? Since both the cost and the benefit are expressed in monetary terms, the comparison of cost and benefit is straightforward and the conclusion of whether the intervention was "worth it" is unambiguous. As such, cost-benefit analysis is well suited for certain types of questions, for example, in cases of interventions with multiple outcomes that cannot be meaningfully measured with a single metric, or when an intervention entails a large one-time investment that could be justified by both private and public gains that accrue over a long period of time.

What data do we need? Conducting a cost-benefit analysis has stronger data requirements than other cost analyses and requires assumptions about how an intervention's effects will play out over time. In addition to the impact evaluation evidence that is required for cost-effectiveness analysis, cost-benefit analysis requires impact evaluation evidence for all possible outcomes influenced by the intervention under study, and typically needs impacts measured over longer periods of time.[20] It also requires estimating the public and private direct and indirect costs. While it might be possible to calculate intervention costs and benefits using speculative estimates of impact from pre-post analyses or different contexts, this can also significantly increase the margin of error of results. However, one advantage of cost-benefit analysis is that comparative data from other interventions is not required; the results from one intervention can be interpreted by itself since cost-benefit analysis tells us whether (given our assumptions) the value of that intervention exceeded the cost.

Monetization of the totality of long-term outcomes of an intervention is a necessary step in a cost-benefit analysis. Such monetization of USAID-supported interventions is generally not feasible at present because we do not have the necessary trend data sets. Therefore, this guidance does not recommend using cost-benefit analysis to achieve objectives of cost measurement articulated by USAID Office of Education.[21]

Cost analysis methods presented in this section can help answer a variety of questions regarding policy and programmatic decisions. There is no one type of cost analysis that is "the best" or answers all questions; policy or programmatic questions will inform what cost data are collected and which analysis methods are best-suited to answer them.

Figure 7 highlights distinctions between questions that different cost analysis methods can answer, and practical use of these answers for USAID and its partners.

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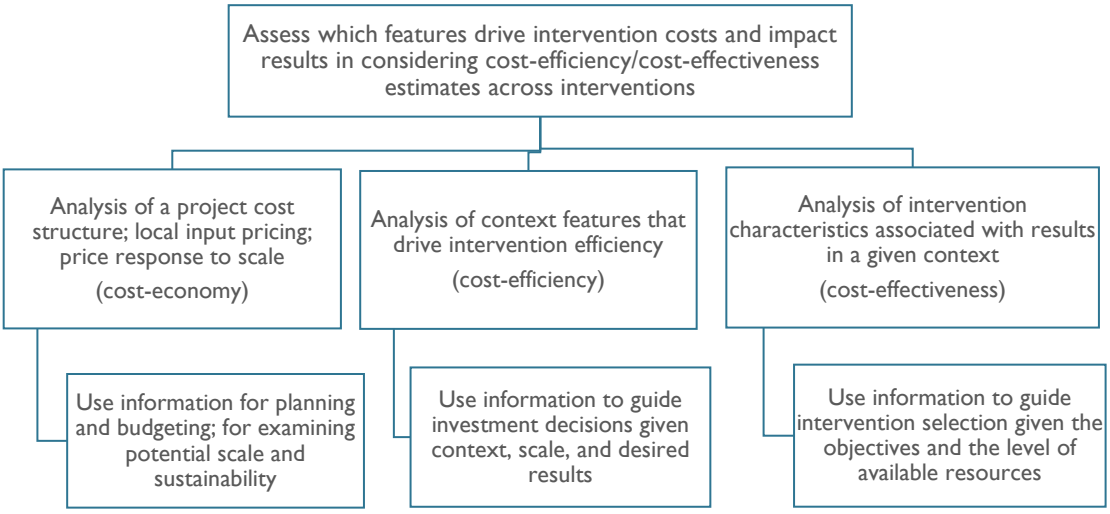
[20] In cases when there is existing evidence of links between shorter-term outcomes (e.g. completion) to longer-term outcomes (e.g. employment and earnings), we can use shorter-term outcomes to estimate the cost-benefit and rate of return.

[21] As the international education sector develops standardized impact metrics that have demonstrated associations with economic growth, cost-benefit analysis of large education interventions will become much more feasible. One such approach is Learning Adjusted Years of Schooling (LAYS). Introduced in the 2018 World Development Report, LAYS combines both quality and quantity of schooling, and offers a way of comparing the time a particular education system takes to achieve the learning gains made in a year of schooling in a system achieving a high-performance benchmark.

FIGURE 7. What can we learn from different cost analyses?



Box 1 summarizes the key principles of conducting cost analyses. The next section will explore in-depth how to interpret cost analysis results and, in particular, associated constraints. It will examine what we can learn about different cost drivers of interventions, and dive into the question of the application of cost analysis findings in other contexts.

Box 1. Key Principles of Cost Analysis

Ensure the right high quality data are collected. The quality of cost analysis results is determined by the quality and relevance of cost and results data that are used to produce them.

Involve stakeholders early. There is no single best type of cost analysis; it depends on the decision-making needs of these stakeholders. Identifying and involving the right stakeholders early in the process will help establish cost analysis objectives and resulting questions to ensure the right data are collected.

Document intervention implementation and its context. The main objective of any cost analysis is not only to produce cost estimates for specific outputs/outcomes, but to help us understand why: what features of context and intervention influence cost and results, including dosage, scale, types of beneficiaries, and input pricing.

"Don't count paperclips." Throughout the process of data collection and analysis, it is important to focus attention on the big-ticket items, such as labor, and letting the main objectives of the analysis drive data collection and analysis decisions.

Be transparent and clear about assumptions and limitations in reporting on results. Cost analyses are particularly valuable when the results of multiple analyses can be used comparatively; transparency about the analysis *and* the analyzed intervention's design and implementation will help make results more useful.

3. LEARNING FROM COST ANALYSIS RESULTS

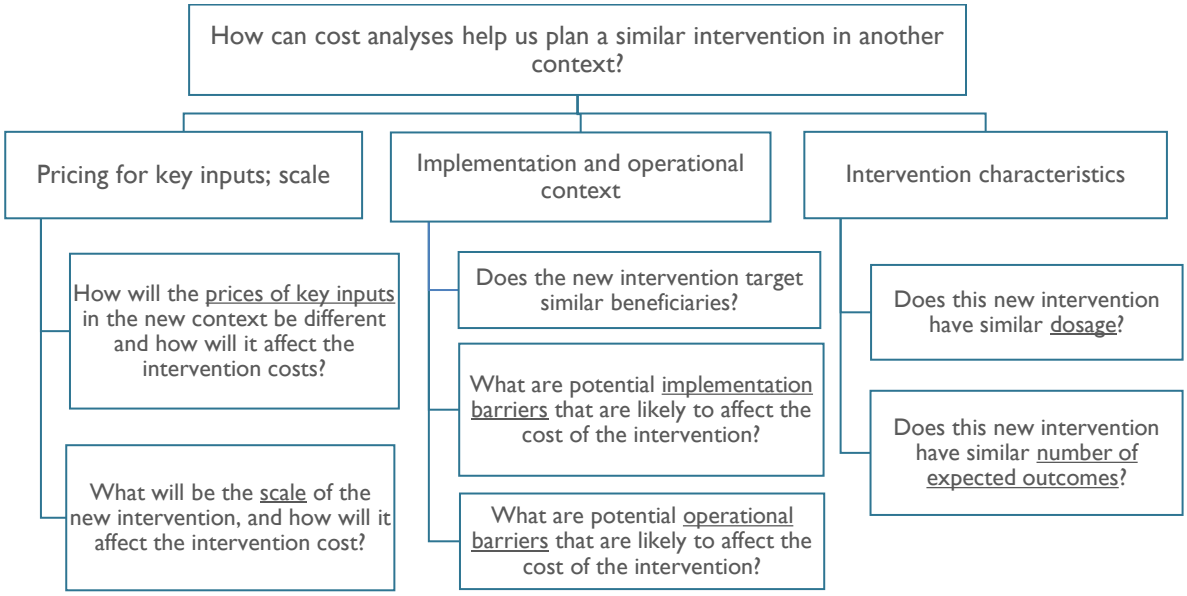
How results from cost analyses are used is as important as how they are conducted; misapplication of the results about a single intervention, or a comparison of several interventions, can undermine the usefulness of cost analyses. Cost analysis can be used to generate cost-efficiency or cost-effectiveness estimates of specific interventions, but it will not always be able to help determine which intervention is "the best" and whether it should be replicated elsewhere. As with any analysis, caution should be used when trying to generalize findings or assuming that findings can be easily and successfully translated from one context to another. **The value of cost analyses is in uncovering which characteristics of interventions and contexts in which they are implemented drive their cost or improve their value-for-money**. Knowing not just whether an intervention is cost-efficient/cost-effective, but why, is crucial. The answer to the "why" question will provide valuable information in determining overall value-for-money of the investment; information on cost and results alone will not be sufficient in choosing among alternative interventions.

In order to understand why an intervention is cost effective, we need to know to costs of intervention components, and we also need to understand the structure of implementation: how much and what kind of labor went into delivering intervention components, what the delivery methods were, what sort of materials were used (and which ones were produced by the intervention versus were already in place), etc. Breaking down the intervention into its "ingredients" helps answer a centrally important question of external validity of cost estimates, or their applicability to other contexts. What can we learn from cost analyses that will "translate" well to other contexts? Rather than thinking about how well a cost-efficiency/cost-effectiveness estimate will apply in another context, it is easier to break this out into two separate questions.

- **How might outputs/outcomes change?** The outputs and outcomes of any intervention result from an interaction of the intervention with the context in which it is being implemented. In other words, the context of the education system largely determines whether the intervention will "succeed" or "fail" in achieving its intended results. For example, a teacher training intervention might be very effective in a stable education system where teacher turnover is low and attendance is high, but the same intervention might fail in a system with high teacher absence and turnover. An education system analysis will help determine whether the intervention's theory of change is applicable to the particular country context. See Bates and Glennerster, 2017 for a helpful framework to determine when results might generalize to new contexts.

- **How might intervention costs change?** It is not really a question of "if" intervention costs will change from one place to another, but "how much" they will change. There are a few key features that seem to drive costs across interventions; these will help us understand whether the average cost is likely to be higher or lower in a new setting than in the place the intervention was originally studied. Figure 8 outlines the main categories of factors that might influence the applicability of data from another context: pricing of labor and goods, intervention scale, and local context features.

FIGURE 8. Applying cost analysis results to another context



Thus, while we have to apply consistent metrics and methods when conducting cost analyses, we should not necessarily be expecting to see consistent results across different interventions in different contexts. As comparative cost analysis becomes more routine in the education sector, a top priority should be to learn what features drive or constrain costs and effects of different interventions. Sometimes the drivers will be contextual (e.g. low population density, high security costs), and while they cannot be helped, data on the implications of these contextual factors will help to plan and budget better. In other cases, the drivers of value for money are changeable features of education interventions, in which case we have derived insights about how to improve our interventions in order to improve cost-effectiveness.

As discussed above, the point of comparative cost analysis is not that some analytical method will guarantee the applicability of the results to every other situation. This is simply impossible because of the differences in price levels, institutional quality, and population needs, among many other factors. Rather, **the goal is to understand what features of context and intervention drive the costs and results of interventions**.

An analysis of pricing, context, and intervention characteristics is useful at any stage of donor decision-making: when managing an existing intervention, when planning for sustainment of a successful intervention, and when assessing intervention's viability in a new context. The next three sections will explore them in greater detail.

Pricing as a Cost Driver

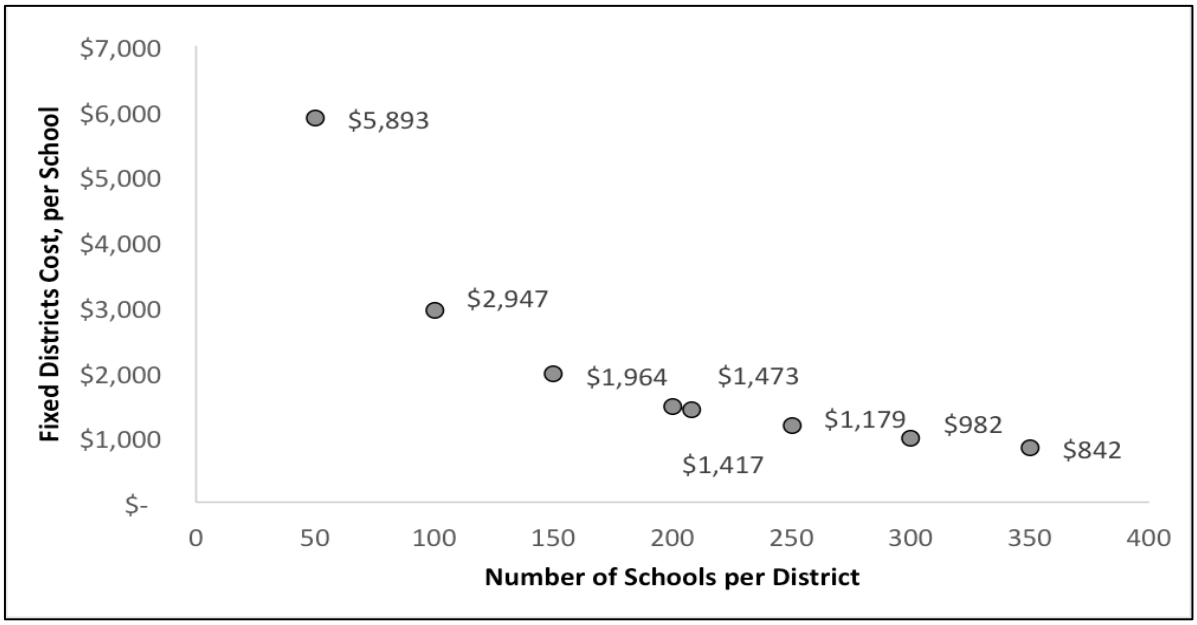
Input prices vary greatly and sometimes unexpectedly. The common cost drivers of education inputs include how well infrastructure is developed, safety of movement, accessibility/proximity of the country to major international hubs and routes, and availability of qualified labor. The latter in particular is a major cost driver of donor-funded education interventions. Lastly, intervention scale will affect prices of key inputs.

Price of Inputs. Price levels vary from country to country, in particular the price of goods such as workbooks, vehicles, venue rentals, etc. While it may be too difficult to figure out the exact price of every good in the place in which we are hoping to run an intervention, we can identify the top five inputs that make up most of the intervention cost (so long as we have real-time, detailed cost data) and find information on the prices of those goods in the new context. This will help assess if the cost is likely to be higher or lower than in the originally studied context. The price of labor (i.e. wages) is particularly important to consider. In some countries, especially post-conflict countries, the prices of skilled labor (e.g. master trainers, intervention managers) may be unusually high. In other countries, especially rapidly growing economies like India, the price of skilled labor may not be as high. While it may be too difficult to figure out the exact wages of every position necessary to run an intervention, we can identify the top five staff positions that make up most of the intervention cost and find information on the likely wages for those positions in a new context. This will help us assess if the cost is likely to be higher or lower than in the originally studied context.

Intervention Scale. The unit cost of produced outputs and outcomes (e.g. cost per unit of improvement in student learning outcome of interest, cost per trained teacher) may change quite a lot when an intervention is implemented at a small scale versus at a large scale. This is because of the start-up costs and the costs for developing/piloting a new intervention. Such costs will be incurred regardless of the scale of the intervention. When interventions reach only dozens of schools and hundreds of learners, these costs are not "spread out" over very many outputs/outcomes, and so the unit cost per output/outcome tends to be quite high. But as the number of reached students and schools increases, economies of scale allow the costs per unit to drop. Figure 9 illustrates this point by showing how the intervention cost per beneficiary drops as the number of schools participating in the intervention increases. When the intervention only reached 50 schools in the first implementation phase, the total cost per school was nearly $6,000. However, when the number of schools in the intervention reached 350, the cost per school dropped to less than $1,000.[22]

[22] Data for this publication are graciously provided by International Rescue Committee (IRC) and reflect cost-efficiency analysis of USAID's Pakistan Reading Intervention implemented by IRC.

FIGURE 9. The effect of intervention scale on an intervention cost per beneficiary



Estimating the cost of scale-up is not straightforward in diverse contexts. Interventions are typically piloted with a small number of beneficiaries, which may not be representative of the diversity of the entire country or a region. Unless the intervention was tested for effectiveness and cost-effectiveness with all sub-populations in the area to which the scale estimates are computed, we could not be certain that our pilot cost and impact estimates will apply to those sub-populations. In fact, it is quite likely they will not, but having an estimate of the likely minimum costs is a better start than not having any estimate at all when planning a scale-up of an intervention.[23] **It is typically more expensive to reach and help improve outcomes for learners who are marginalized**, such as orphans and vulnerable children; out-of-school youth, ethnic, religious, and linguistic minorities; and learners in rural and remote areas, among others. In particular, crisis and conflict can affect the effectiveness and cost-effectiveness of interventions in unexpected and unpredictable ways. In some instances, the unit costs of intervention outputs can actually increase when taken to scale: for example, when the necessary capacity is lacking in areas where the intervention has been scaled to but was present in the pilot area. It is important that cost analysts highlight these nuances when calculating scale-up cost projections.

Context as a Cost Driver

Context affects implementation costs in many ways. Economic, political, and cultural factors interact with the intervention and need to be clearly understood when planning and managing an education intervention and when considering adapting an intervention to a new context. "Context" is not understood here as a geographic construct but rather a combination of factors in which specific populations are situated. For example, a single geographic region located within one country may have a

[23] One way to help address the issue of precision of scale-up estimates is to test the intervention with the populations that are likely to require more resources to reach and to improve learning outcomes.

diverse population, and different sub-populations will have different "contexts," which affects their access to and interaction with the education system. **In-depth understanding of context factors affecting the intervention will help inform interpretation of cost-efficiency analysis results and evaluate how they might change if applied to a different context.**

Characteristics of beneficiaries. The costs and the results of an intervention will greatly depend on the type of beneficiaries it is trying to reach. Improving learning outcomes of marginalized students, for example, could be significantly more expensive than improving learning outcomes of students who are not considered at-risk. We might be able to reach this group by tweaking the existing "mainstream" intervention slightly, while in other cases we might need to develop a new intervention specifically targeting marginalized learners. Geography, proximity to school, disability status, language, parental literacy, and socio-economic status are all important factors that could influence both the cost and the effectiveness of an education intervention in either direction.[24] Since USAID places particular emphasis on reaching the poorest and most vulnerable, it is important to collect data on beneficiaries alongside cost and output/outcome data, to ensure we clearly understood what types of beneficiaries the results of cost analyses are applied to.

Implementation Context. The efficiency of conversion of inputs into outputs is largely determined by the context features. For example, if target beneficiaries' access to the intervention is restricted by systemic or circumstantial barriers, it will significantly affect cost-efficiency of the intervention delivery. Barriers to education must be, therefore, considered part of the existing education system analysis. A consideration must be given to potential barriers to implementing this specific intervention with these specific beneficiaries. There may be pre-existing constraints associated with intervention implementation, such as socio-economic, political, religious, or linguistic conditions that conflict with the fundamental assumptions of the intervention. For example, implementing a mother tongue-based reading intervention in a context without an existing orthography for that mother tongue will have a much higher cost than implementing a similar intervention for a mother tongue with an established orthography. Therefore, **the implementation context is likely to affect the *content* of the intervention, and, therefore, its cost.**

Operational Context. The costs of an intervention will be influenced by the existing prices, as described in the previous section, as well as by the capacity of the local institutions. When considering the cost drivers of the existing intervention and how the costs of an intervention may change if implemented in a new context, the relationship between cost-efficiency and local capacity needs to be well-understood. We need to consider if this intervention could be applied and, if so, how the intervention design and delivery would have to be adapted for a context where capacities and systems differ from the intervention's original setting. If adaptations were required, what additional costs would this entail?

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[24] While there are some nascent methods for quantifying the value of equity in value-for-money calculations, these rely on a number of assumptions and are more complex than most donor agencies can achieve in practice. Instead of trying to quantify "equity" as part of the value-for-money metric, it is instead recommended to think about reaching marginalized and vulnerable populations as a specific sub-population, which can impact intervention costs and results. To take a concrete example, adolescent girls might face many barriers in accessing education. On one hand, some studies find higher impacts among more marginalized sub-populations (e.g. the experience with conditional cash transfers in Burkina Faso in Akresh et al, 2013 and multiple cases cited in Evans and Yuan, 2019), while on the other hand, some studies find higher impacts for the subpopulations who were initially better prepared academically (for example, Muralidharan and Sundararaman, 2011 and Dulfo et al, 2017).

Infrastructure and input pricing, including existing capacity, are not the only operational context considerations. Other operational constraints may include host-country political upheavals, natural crises, and economic fluctuations, among other factors. USAID-specific constraints include procurement restrictions, shifting policies and strategies that affect implementation, new reporting mandates, and unexpected allocation changes, among other factors. Ultimately, **operational context will shape *how* the intervention is being implemented, and, therefore, its cost**.

Intervention Delivery and Characteristics

The details of intervention delivery are critically important when analyzing an intervention's cost-effectiveness, comparing cost-effectiveness estimates of multiple interventions, and considering implementation of an intervention in a new context. Three aspects of intervention delivery are of particular importance: intervention dosage, how many different outcomes the intervention is trying to achieve, and what beneficiaries the intervention is reaching.

Intervention dosage. Any intervention has an optimal dosage under which the intervention achieves the best investment-to-result ratio. If we reduce the dosage, we will not get the improvement we are looking for; if we increase the dosage, we are likely to spend more money than necessary. **Costs and impacts do not scale up and down in a linear manner, nor do they scale up and down at the same rate.** The issue of relationship between dosage and results requires close attention when intervention effectiveness is considered, and in particular in relation to scale and sustainability-related questions.

An intervention that was found to be cost-effective with a high dosage of treatment and high cost per beneficiary would not work the same way if the cost per beneficiary were reduced. For example, if teacher coaching was found to be effective at a price point of $100 per teacher per year, then a reduced budget of $50 per teacher per year will likely not produce half of the original impact on student learning. In fact, the intervention would need to be tested again to measure the impact and cost-effectiveness given the new dosage.

Interventions with multiple outcomes. One general challenge in comparative cost analysis is assessing interventions with multiple outcomes. The result of cost-efficiency and cost-effectiveness analyses of different interventions is the cost per output or outcome achieved. For instance, we might want to compare cost-effectiveness of two primary grade reading interventions, one of which focuses on training teachers in reading while the other trains teachers in both reading and in math. The latter intervention might be more expensive per unit of outcome in reading achievement but might be less expensive if we consider outcomes in both reading and math. While the cost effectiveness measure accurately captures the value for the money spent in terms of improving literacy outcomes, it does not capture the entire "value" of the intervention.[25]

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[25] The problem of using cost analysis to assess interventions with multiple outcomes is analogous to the problem of comparing houses that we are considering purchasing. The cost per square foot is a standard, intuitive metric that can be applied to all of the homes we might consider buying. But this metric hardly captures all of the relevant features we consider when buying a home: we also care about how nice the interior is, how big of a yard it has, where it is located, etc. And while we could, in theory, come up with a quality-adjusted, yard-adjusted, neighborhood-adjusted measure of cost per square foot, it will become increasingly difficult to calculate and interpret that measure. In the end, most people consider the cost per square foot *alongside* other information about quality and location, rather than trying to pack it all into a single measure.

The challenge of multiple-outcome interventions can be seen as an aspect of understanding cost analysis results. Cost analysis cannot and should not be used to encapsulate all information about the value of an intervention—some interventions may have benefits that are not captured in cost-efficiency or cost-effectiveness analysis, some interventions may be feasible or appropriate only in certain contexts, and so forth. Cost analysis is not a substitute for these other crucial decision-making inputs; it is a complement to them when considered in the context of specific policy or investment objectives.

To summarize the key points of this section, cost analysis estimates should never be assumed to apply "as-is" to another context, and neither should they be dismissed as entirely irrelevant. An application of cost analysis results to another context is feasible when we take into account a number of considerations, including pricing, scale, context, and intervention characteristics (Figure 8).

Regardless of how well the analysis of application of cost estimates to another context is performed, the cost-efficiency and cost-effectiveness estimates will be just projections until the intervention is fully tested and cost data are collected in a new context. We recommend using results of cost analysis alongside other considerations and being cognizant of their potential limitations.

The next section of the Guidance will examine the practical aspects of conducting cost analyses. Used alongside associated templates, it is designed to serve as a reference for cost analysts and evaluators. Information presented above will be used in the next section to illustrate specific analytical techniques recommended for the cost analysis of USAID-funded education interventions.

4. PRACTICAL GUIDE TO CONDUCTING COST DATA ANALYSES

This section contains a step-by-step practical guide for conducting cost data analyses using the methods introduced in the previous section. While it draws on the information presented in the first two sections of the Guidance, cost analysts and evaluators will be able to use it as a stand-alone reference guide.

The section is organized according to the six steps needed to successfully perform analysis of cost data sets (Table 3). These steps are presented from the perspective of a cost analyst. While some of them could be (and should be) implemented by others, such as the development of cost study objectives, a cost analyst would need to complete all six steps when implementing a cost study. As illustrated in Figure 2 in Section 1, we recommend that consultations around cost study objectives be conducted early in the intervention planning to ensure necessary data are collected.

TABLE 3. Cost data analysis steps

STEP	OBJECTIVES	ACTIONS
Step 1. Conduct preliminary data checks	Ascertain quality and completeness of the available data on expenditure, contributions, and intervention details. Describe and attempt to fill in data gaps. Assess comparability (when analyzing a set of activities).	Review expenditure reports, contributions reports, details of implementation reports, and supporting documentation (cost reporting manual, M&E plan) for the activity. Check for data gaps and inconsistencies in reporting on cost. Supporting documentation such as the cost reporting manual can be used for assessing the quality of the data.

STEP	OBJECTIVES	ACTIONS
Step 2. Review cost analysis objectives and questions	Ensure that there is no mismatch between objectives, cost analysis questions, and available data so that the results of cost analyses are useful for USAID's strategic and operational objectives.	Review existing cost analysis questions (if available) and existing evaluation reports. If possible, engage with key stakeholders to check if cost analysis questions are still of interest and to achieve a common understanding of key objectives.
Step 3. Develop a cost analysis plan	Create a documentation trail regarding matching cost analysis questions with methods and the steps for the analysis.	Based on questions and the available data, select cost analysis methods. Prepare the cost analysis plan.
Step 4. Prepare data for analysis	Produce a cost analysis data set. Ensure comparability of cost analysis results across analytical outputs.	Prepare the selected data for analysis using standard procedures.
Step 5. Implement analyses	Produce cost analysis results that respond to the cost analysis objectives and answer the cost analysis questions.	Build worksheets and analyze data.
Step 6. Report and document	The report should provide clear answers to cost analysis questions; assess the value for money of an intervention, an activity, or a class of activities (if appropriate) and provide sufficient information on methodology to ensure replicability.	Codify the results of the analysis in a cost analysis final report.

Step 1. Preliminary Data Check

While it might be tempting to begin a cost study with a review of objectives, it has been our experience that those will need to be (re)defined when data availability is ascertained. Therefore, the first recommended step in preparing for analysis is to perform a preliminary data check for the analyzed activity or set of activities, followed by the review of objectives and questions in Step 2. The purpose of the preliminary data check is to:

- Assess quality and completeness of the available data on expenditure, contributions, and intervention details; supporting documentation such as cost-reporting manuals can be used for assessing the data.
- Cross-check evaluation data (if available) with details of implementation and cost categories on which the activity reported.
- Determine if there are any data gaps; attempt to fill in the gaps by engaging with data producers/managers.
- If analyzing a set of activities for comparison purposes, establish comparability of data.

If the cost analysis objectives and questions are already well-defined, analysts can use the preliminary data check to see if the proposed questions are feasible and to estimate the level of effort for the cost

analysis. For instance, a cursory review of the list of in-kind contributions to the education activity would help assess the level of effort needed to monetize these contributions.

Data Checks for Analyzing a Single Intervention

To begin, collect and review the following documents produced by the activity as part of cost reporting as outlined in the *Cost Reporting Guidance for USAID-Funded Education Activities* (2018). For each activity,[26] review:

- **Cost Reporting Manual**. The cost reporting manual documents the cost categories for cost reporting and describes the tasks under each category. The manual provides an overview of what resources were used in the intervention. Implementing partners develop the cost reporting manual following USAID's *Cost Reporting Guidance* (2018) and in consultation with USAID education staff during the activity startup. A review of the cost reporting manual provides an insight into cost categories, sub-categories, and definitions the partner used in this activity.

- **Financial Reports.**[27] Depending on the reporting schedule of the award, financial reports are produced by implementing partners on a quarterly or annual basis. Analysts should check reporting frequency to ensure no reports are missing. The reports contain expenditure data disaggregated by the standard cost reporting categories, and may contain data by sub-category, as well. It is important to assess the level of detail reported, e.g. which ingredients data (labor, materials, travel, ODC, fees) are included and whether line item ingredients needed for sustainability analysis are included.

- **Contributions Reports**. Worksheets contain host government and non-government contributions, cost share contributions by the implementing partner, and beneficiary contributions. Analysts will use the descriptive information provided by implementing partners as an input to estimate the monetary value of in-kind and direct government, donor, and non-government contributions, and to estimate the opportunity cost of beneficiary time contributed to the intervention. It is important to review the amount of detail in the item descriptions to scope how much additional information the analyst will need to collect to monetize each contribution.

- **Intervention Details**. Implementing partners report the information needed to calculate costs per output, including the selected, relevant outputs and dosage of education interventions (e.g. the amount of the intervention delivered in hours of instruction or in hours of technology exposure, or the amount of instruction a teacher might have received). Information on the number of beneficiaries that received the intervention should also be included. Any given education activity may report on multiple interventions corresponding to different tasks under

[26] Some activities are implemented with support from multiple partners. Typically, USAID receives cost reports from the prime holder of the award, but the reports may include specific sections with information on the tasks performed by the subs.
[27] Various types of awards will have different financial reporting templates. Data reported using different templates may be used for the analyses as long as they include "ingredient" reporting (labor, travel, equipment, etc.) and use USAID standard cost reporting categories.

the activity objectives. It is important to check availability, quality, and completeness of different intervention data and their correspondence to the cost-reporting categories.

- **Evaluation Reports, if available**. If the cost study includes cost-effectiveness questions, the analyst will need to include the results of an impact evaluation in the analysis. Checking the availability of evaluation data early in the process helps establish feasibility of answering questions relating to the cost-effectiveness of the intervention.

Feasibility of cost analyses is determined by availability and quality cost data and data on outputs/outcomes of the intervention. If relevant data are not available and the analyst will have to make a lot of assumptions to compensate, the analyst may determine that the final estimates will not be precise enough to justify the resource investment in the cost analysis.

Data Checks for Multiple Interventions

The complexity of the preliminary data check increases proportionately to the number of activities or interventions included in the analysis. When analyzing a set of activities or interventions, an analyst would need to ensure comparability of interventions on key objectives, comparability of cost categories, and comparability of outputs/outcomes of the intervention (Table 4).

TABLE 4. Preliminary data checks for single and multiple activities

DATA TYPE	DATA CHECK FOR A SINGLE ACTIVITY/INTERVENTION	DATA CHECKS FOR MULTIPLE ACTIVITIES/INTERVENTIONS
Financial data disaggregated by standard cost categories	Check standard categories of reporting, missing data.	Assess comparability of standard categories reported across data sets.
Contributions: host government, non-government contributions, cost share, beneficiary costs	Check completeness of contributions data.	Check completeness of contributions data for each activity. Assess whether the level of detail on contributions is comparable across activities.
Intervention details	Check quality and completeness of data on intervention details; check that the number of beneficiaries is reported.	Assess comparability of intervention objectives, beneficiaries, duration, and other critical characteristics. Check quality and completeness of data on intervention details.
Measures of outcomes	Check quality and completeness of the measures of outcomes and their alignment with activity components for which cost data are collected.	Assess quality, completeness and comparability of outcomes measures (including disaggregation levels), and their alignment with activity components for which cost data are collected.

The key advantage of USAID's cost measurement approach is that it standardizes how activities capture expenditure, contributions, and details of the interventions. As a result, standardized costs and outputs are well-defined and will be comparable across many activities. This enables comparisons of unit costs across multiple contexts to help better understand cost drivers.

Comparability will be more limited for analyses of line-item costs or of sub-categories of cost. The *Cost Reporting Guidance for USAID-Funded Education Activities* (2018) allows partners to self-define sub-categories of their activities. As a result, more nuanced analyses of costs might be limited to single activities or require additional data collection.

Step 2. Cost Analysis Objectives and Questions

Following a preliminary data check, the next step is to ensure that there is no mismatch between objectives, cost analysis questions, and available data so that the results of cost analyses are useful for USAID's strategic and operational objectives. To accomplish this, the analyst should:

- Review existing cost analysis questions and overall objectives (Table 5).
- Perform a more detailed data check of the activity cost data against the analysis questions and objectives.
- Review existing evaluation reports to determine what outcome data are available.
- Engage with key stakeholders to check if cost analysis questions/objectives have changed; achieve a common understanding of key cost analysis objectives that can be fulfilled given the available data.
- Revise cost analysis questions that are aligned with objectives and available cost data and are also sufficiently detailed.

Clarifying Cost Analysis Objectives

To ensure alignment between objectives, cost analysis questions, and the available data, we need to first review existing objectives and associated questions against the available cost and outcome data. Is the activity looking to scale up? Transfer the intervention to the government? Are stakeholders interested in expanding the intervention to a different beneficiary group or a different context? Objectives will drive decisions about which questions to include in cost analysis.

A more detailed examination of the activity cost data will be needed to establish limitations of what can be learned. Ideally, cost analysis questions are generated early in the activity and are based on the overall strategic and operational objectives of the Mission, the government, and the implementing partner. Questions can then drive the approach to cost data capture, to ensure necessary data are being collected. However, objectives typically evolve over time, and the alignment between objectives and data may be reduced. **A thorough review of expenditure, contributions, and details of the intervention data, including associated evaluation data, will help clarify what questions can and cannot be answered.**

Consulting with the key stakeholders to achieve a common understanding of the objectives of cost analysis and to refine cost analysis questions is an essential step. For example, if the cost data analysis is needed to inform a sustainability plan for a component of a USAID-funded activity, a consultation with the national government representative might be necessary. Consultations with both USAID officers managing the activity and their implementing partner are generally recommended for all activity-level

analyses. Such consultations will also help manage expectations regarding what questions can be answered given the available data.

The following questions can be used to guide stakeholder discussions. A clear response to each will help make the cost analysis objectives explicit and prepare for the next step, which is to draft appropriate cost analysis questions.

TABLE 5. Clarifying the cost analysis objectives

WHAT DO WE NEED TO KNOW?	WHY IS IT IMPORTANT?
What is the objective of the cost analysis?	The stakeholder's perception of a problem often motivates the call for analysis. Stakeholders' cost analysis objectives need to be stated explicitly so there is no confusion about the goals and audience of the cost analysis. For instance, the problem statement "we need to know the real cost of implementing reading activities in remote communities" can be stated in more specific terms by clarifying which remote communities, which reading activities, and why we need to know the real cost—is it in order to transfer the activity to the government or to inform the follow-on USAID activity? When the objective is explicit, analysts can more easily define the decision problem and assess whether the data are available for the level of analysis that will be needed.
How do stakeholders anticipate using cost analysis results?	A discussion about the practical use of cost analysis results is helpful to clarify operational objectives of the analysis. For example, if the host government intends to use the results to budget for implementation in the specific areas, this information would help the analyst to produce necessary estimates.
Who is the audience for the analysis?	Clarity about the audience for cost analysis results will help inform the strategy for communicating them. The expected audiences include the USAID Mission, USAID/Washington, host country government, and implementing partners. Other audiences may include other donors working in the country, private investors, and researchers, among others.

Defining Cost Analysis Questions

Defining the cost analysis questions is the most important step in preparation for analysis. The questions should be clearly linked to objectives, very specific, and answerable. Answers to cost analysis questions should provide the information needed for operational objectives. Well-defined cost analysis questions should:

- Relate directly to the stated objective of the analysis
- Provide the necessary level of details to support decision-making by stakeholders
- Be answerable using cost analysis methods available cost data

Developing cost analysis questions begins with the strategic or operational objectives for the analysis followed by clarification of how the analysis results will be used. Information on the expected use of cost analysis results is centrally important for cost analysis. Answering the same question, like "What is the per unit cost for teacher training?" will depend on whether the teacher training will be delivered by the host government, by a USAID-funded partner, or by a private company, and will require different data.

Let's consider, for example, a frequently asked question, "How should much the host government budget to scale up a successful pilot activity funded by USAID?" Using detailed cost data from the pilot, the first cost question could be "What was the total cost to develop this pilot activity?" Since we are only interested in estimating the cost of continued implementation, we need to be able to isolate development costs from implementation costs.

The second questions could be "What was the total cost to implement this pilot activity, and what were the components of the total cost?" Understanding the structure of the total cost of the pilot is very important since different parts of the total cost will change differently when scaled up. For example, a better understanding of the government contribution to the pilot will provide necessary information for the government decision-making, since every contributed resource has an opportunity value and should not be assumed free and available for scale up.

Once we know the structure of the total cost, the value of the host government contributions, and the target scale parameters, we can explore the final question: "How much should the government budget to implement the intervention at scale?" To consider this, analysis may need to further disaggregate fixed and variable costs and identify any existing constraints to consider how prices and quantities will shift under different scale assumptions. A sensitivity analysis could be used at this point to assess how much price or quantity variations of key inputs will affect total cost and incremental costs of the intervention when scaled up.

This example highlights some of the challenges of translating the utilization question "How much should the government budget to scale up a successful pilot activity?" into a set of cost analysis questions that can provide decision-relevant information and can utilize available data and cost analysis methods.

Translating a policy objective into cost analysis questions requires the analyst consult with key stakeholders to obtain a solid understanding of the key decision problem, to think carefully about what kind of information is necessary to support the analysis, and to evaluate the data sets to be sure there is sufficient data to carry out the proposed analysis. As shown in this example, the analysis may require several questions or steps to produce the needed information.

Table 6 shows examples of cost analysis questions from various workstreams of the USAID education portfolio. The provided examples illustrate cost measurement objectives corresponding to two key areas of cost measurement results: sustainability and a country's journey to self-reliance, and improving value-for-money of USAID education investments through more data-driven planning and management.

TABLE 6. Illustrative cost analysis questions

OBJECTIVE	UTILIZATION	INITIAL QUESTIONS	FINAL QUESTIONS
Sustainability – Supporting a Country's Journey to Self-Reliance			
Transfer of the intervention to the government	Government will use cost data analysis results to budget the continued	What are the implementation costs of teacher/instructor training?	• How much should the government budget to implement an annual five-day refresher teacher training for all primary grade teachers in Provinces A, B, and C? • What are the costs of labor to deliver training?

OBJECTIVE	UTILIZATION	INITIAL QUESTIONS	FINAL QUESTIONS
	implementation of the intervention		• What are the costs of materials for the training? • What are the costs of logistics to support the training? • How will these costs differ if other provinces are added?
Advocate for continued funding for the intervention by other funders or USAID	USAID will use cost data analysis results to prepare a business case for continued funding of the successful intervention by other funders	What is the cost-effectiveness of continuous teacher coaching?	• What is the cost to implement a coaching program for all primary grade teachers in Provinces A, B, and C with the dosage of coaching used in the USAID activity? • What is its cost-effectiveness? • What are the costs of labor to deliver coaching? • What are the costs of materials? • What are the costs of logistics to support coaching? • How will these costs differ if scaled to other provinces?
Improving Value-for-Money of USAID Education Investments			
Identify the most cost-effective intervention	Implementing partner will scale up most cost-effective intervention	Which of the two tested workforce development models is most cost-effective?	• When implemented with $XX investment per youth beneficiary, which of the two workforce development models resulted in more youth employed six months after the end of the intervention? • What was the cost of each additional youth employed compared to the control group, for each model? • How will these costs vary if the intervention is scaled up to XXX number of beneficiaries in XXX locations?
Identify the most cost-efficient way to supply schools with materials	USAID will compare unit costs of books procured by different partners to identify the best book procurement practices	What are the costs to reprint and deliver books produced by the USAID activity?	• Using pricing information from USAID-funded activity, what are the costs to reprint leveled reader books? • What are the costs to reprint supplemental readers? • What are the costs to reprint teacher guides? • What are the cost drivers, and can they be manipulated through procurement process or other means to help reduce costs?
Inform the follow-on programming	USAID uses cost data analysis results to develop an IGCE and output/outcome targets for the next activity	What is the cost structure of the current higher education activity?	• What is the proportion expended on USAID-specific tasks such as general management, operations, and reporting? • What are the unit costs of capacity-building per institute supported through the activity? • How much was spent on supporting performance-related reforms in those institutions? • How much was spent on scholarships? • What was the total value of the contributions leveraged through the activity?

Assemble Appropriate Data Sets for the Analysis

Once the objectives and cost analysis questions are clearly defined, the next step is to review available information on the intervention and data on expenditure and contributions. This review will help establish whether there the available data will allow for answering the cost questions of interest.

USAID takes the cost of education activities as the sum of:

- USAID activity expenditures,
- The value of in-kind and direct host-government and non-governmental contributions, and
- The value of in-kind user and beneficiary costs, including opportunity costs.

USAID includes the value of in-kind costs when they contribute directly to the education activities' outputs. For instance, when beneficiaries receive training as a requirement of their participation in a USAID-funded education activity, USAID acknowledges the opportunity cost to beneficiaries of the time spent in training. When youth participants of a workforce development program attend workforce readiness training, the time they spend in the training is not "free" to them since they could possibly be working during this time and earning income. On the other hand, if a teacher-coaching program is implemented during school hours when teachers are already paid for being in school by the government, such time is considered already compensated for and therefore does not need to be included as part of the total cost.

Different cost analysis questions will require different types of data. For example, if we need to know the cost of sustaining an intervention, we need to know how much the USAID-funded activity spent on developing this intervention and how much was spent on its implementation. The disaggregation of labor costs by local versus international labor is also essential for estimating the cost of activities that are likely to be transferred to the host government. Another example is a frequently asked question about the cost-effectiveness of different intervention models. To answer this question, the cost analysis will need to include data on effectiveness of both models from the impact evaluation, in addition to detailed cost data. Table 7 shows the data requirements for cost analysis questions listed in Table 6 above.

TABLE 7. Data requirements to answer different cost analysis questions

OBJECTIVE	FINAL QUESTIONS	COST DATA REQUIREMENTS
Sustainability – Supporting a Country's Journey to Self-Reliance		
Transfer of the intervention to the government	How much should the government budget to implement an annual five-day refresher teacher training for all primary grade teachers in Provinces A, B, and C? What are the costs of labor to deliver training? What are the costs of materials for the training? What are the costs of logistics to support the training? How will these costs vary if other provinces are added?	• Complete expenditure data for the teacher training intervention including the breakdown between development costs and implementation costs • Labor cost data disaggregated by local and international staff • Costs of materials and logistics used for the training • Details of government and non-government contributions to the coaching • Details of the intervention
Advocate for continued funding for the intervention by other funders or USAID	What is the cost to implement a coaching program for all primary grade teachers in Provinces A, B, and C with the dosage of coaching used in the USAID-funded activity? What is its cost-effectiveness? What are the costs of labor to deliver coaching? What are the costs of materials? What are the costs of logistics to support coaching? How will these costs vary if scaled to other provinces?	• Impact evaluation results of the coaching intervention, with effect sizes • Complete expenditure data for the intervention including the breakdown between development costs and implementation costs • Labor cost data disaggregated by local and international staff • Costs of materials and logistics used for the coaching • Details of government and non-government contributions to the coaching • Details of the intervention
Improving Value-for-Money of USAID Education Investments		
Identify the most cost-effective intervention	When implemented with $XX investment per youth beneficiary, which of the two workforce development models resulted	• [Given the same expenditure per beneficiary under both models] employment data for the two models of WFD, baseline and endline

OBJECTIVE	FINAL QUESTIONS	COST DATA REQUIREMENTS
	in more youth employed six months after the end of the intervention? What was the cost of each additional youth employed compared to the control group, for each model? How will these costs vary if the intervention is scaled up to XXX number of beneficiaries in XXX locations?	• Complete expenditure data for both models including the breakdown between development costs and implementation costs • Labor cost data disaggregated by local and international staff • Details of government and non-government contributions to the coaching • Details of the intervention for both models
Identify the most cost-efficient way to supply schools with materials	Using pricing information from the USAID-funded activity, what are the costs to reprint leveled reader books? What are the costs to reprint supplemental readers? What are the costs to reprint teacher guides?	• Details of material printing order including type, details of printing (including quality), numbers • Details of costs of material distribution
Inform the follow-on programming	What is the proportion expended on USAID-specific tasks such as general management, operations, and reporting? What are the unit costs of capacity-building per institute supported through the activity? How much was spent on supporting performance-related reforms in those institutions? How much was spent on scholarships? What was the total value of the contributions leveraged through the activity?	• [Analysis conducted after the completion of the activity] complete expenditure data on the entire activity, disaggregated by cost categories • Details of government and non-government contributions to the coaching • Details of the intervention, including outputs

Once the cost data requirements are clear, the next step is to select the necessary primary and secondary data sets.

PRIMARY INTERVENTION DATA

The cost analysis objective and questions will determine whether we will need primary data from a single education activity, or data from multiple activities. If the objective is to map out the cost structure of a single activity, only data from that activity will be needed. However, if the objective is to estimate the average unit cost of a specific output across USAID's education portfolio, then data from more than one activity are needed. In such cases, the analyst will need to develop specific selection criteria to guide the choice of data sets.

Comparative cost, cost efficiency, and cost effectiveness analysis will always require a selection of appropriate data sets. Comparisons of intervention models are performed on the basis of two factors:

- Similarity of the main objectives. The costs of two or more intervention models should be compared only if they present viable alternatives for accomplishing the same objective.
- Comparability of output/outcome metrics: The outputs and outcomes of two or more interventions are comparable as long as they use comparable measurement approach/tool[28] of

[28] Traditionally, analysts use a standard deviation as a measure of outcome to compare interventions. However, the effect size is not well-suited to measure change among non-normally distributed populations. Alternatively, effect sizes for quartiles of proficiency standards could be used when measuring change in subjects where such standards (e.g., standards put forth in the Global Proficiency Framework for reading and math in grades 2-6) and associated test-specific benchmarks exist.

outputs and/or outcomes. The reports on intervention details as well as evaluation reports should contain necessary information to determine comparability.

Other important considerations in establishing comparability of intervention models include:

- Target population. The set of interventions selected for a comparative cost analysis should be related to the stakeholder's population of interest. For example, if stakeholders want to know the range of costs for education interventions designed to improve the reading fluency of primary school students, the selected data sets should pertain to primary school students, or children of a similar age. Interventions designed to have an impact on reading fluency of significantly different populations (e.g. students with disabilities versus students without disabilities) should not be considered comparable.

- Scale. It is challenging to interpret cost efficiency ratios of education interventions operating at two completely different scales. For example, the unit cost of teacher training in a pilot activity may change substantially when scaled to reach a much larger population. It is not always clear if input costs will increase or decrease at scale; some prices may go up and some go down depending on whether costs are fixed or variable. If the necessary level of detailed data is available for all interventions, then scenario modeling for scale up, as described in Section 2, can help analysts understand costs of two interventions at comparable scale. The scale of an intervention can also affect impacts. For instance the observed impacts of a pilot program can go down when the intervention is scaled up (Bold et. al 2013), or occasionally it can go up.[29]

- Dosage of the intervention. A multi-year activity may lead to greater exposure, which may increase its effectiveness in comparison to an intervention of a much shorter duration. USAID recommends selecting interventions of comparable duration for comparison purposes.

SECONDARY DATA ON CONTEXT

To assess the value for money of education activities, the analyst needs to consider the context in which they were implemented. Secondary data from a variety of sources such as the World Bank, OECD, UNESCO, UNDP, and other international organizations can provide needed background to assist in assessing the value for money of the activity or to explain a variation in expenditure observed in the data across activities implemented in different contexts.[30]

Analysis of contextual factors can help determine whether the results of the cost analysis can be generalized to other contexts or settings. For example, suppose USAID has an objective to increase the net primary school enrollment rate in the countries it operates. Data shows that country enrollment rates varied widely in 2015, from a low of 32 percent to a high of 100 among the 173 reporting

[30] At present, USAID does not have a set list of variables for inclusion in cost analyses, but is encouraging analysts to explore existing datasets that contain relevant context information. For example, for information on population density, see World Bank (2019), World Development Indicators. Available at https://data.worldbank.org/indicator/EN.POP.DNST). For information on expenditures per student, see World Bank's *Education Statistics* (2019), available at https://databank.worldbank.org/reports.aspx?source=1159&series=UIS.XUNIT.USCONST.1.FSGOV. For information on water and electricity, see World Bank's *World Development Indicators* (2019), available at https://data.worldbank.org/indicator/SH.H2O.SMDW.ZS. For information on fragility, conflict, and violence, see World Bank's *Harmonized List of Fragile Situations* (2018), available at http://pubdocs.worldbank.org/en/189701503418416651/FY18FCSLIST-Final-July-2017.pdf.

countries (the median was about 93 percent). We could speculate that the cost of increasing enrollment by one percentage point in the country with the lowest-rate at baseline costs less than increasing enrollment by one percentage point in a country with 95 percent enrollment. Why? Where enrollments already are low, it may be more feasible to overcome barriers. In contrast, barriers impeding enrollment where 95 percent already are enrolled may be more difficult to remove. Perhaps the unenrolled primary grade students are difficult to identify or access, and efforts to increase their enrollment are more costly because they require more sustained outreach, such as special accommodation or safe transportation access.

The process of understanding context starts with identifying key features of a setting that constrain or enable the intervention.[31] Cost analysis seeks to identify those key features to not only incorporate them into the analysis, but also to provide a space of cost drivers as well as cost mitigators for a wider discussion among stakeholders.

At the time of the publication of this guidance note, USAID has too little comparative data on the differences in costs across contexts to know how context affects cost. Therefore, secondary data are useful in assisting in interpreting observed cost differences across interventions and activities. A contextual analysis of country-level factors that may affect the cost estimate is particularly important when estimating costs to implement an intervention in a new setting or performing comparative cost analyses.

Secondary sources are also useful for estimating the monetary value of contributed labor, goods, or services. Some activity inputs and resources do not have market prices readily available. For example, a volunteer who commits 10 hours per week to read with children in a USAID-funded educational activity in Rwanda forgoes potential income from the alternative use of her skills. We estimate the market value of this volunteer's time using wage data from secondary sources together with estimates of the volunteer's contributed time and skill level. This requires us to know or assume what a "representative" individual is (e.g. assume a skill set or level of educational attainment that approximately equivalent to that of the volunteer). This process of pricing contributions is referred to as "shadow pricing." Specific methods for estimating shadow prices are taken up in Step 4 of this section.

Assess Completeness of Data

After the data sets for the analysis have been selected, it is useful to compile a data inventory to assist in reviewing data sets in preparation for the analysis. This step is particularly useful when analyzing multiple interventions since such a data inventory helps to systematically record and compare data availability and quality across interventions.

[31] For more information on the complexity of context in education research, see Sobe, N. and J. Kowalczyk (2012). "The Problem of Context in Comparative Education Research." *ECPS: Journal of Educational, Cultural and Psychological Studies*. 6. 10.7358/ecps-2012-006-sobe.

TABLE 8. Assessment of data completeness

SOURCE	WHAT DATA ARE AVAILABLE? WHAT DATA ARE MISSING OR INCOMPLETE?	IS THERE SUFFICIENT DATA TO IMPLEMENT THE COST ANALYSIS?
Expenditure reports	Record reported cost categories, ingredients, whether any are missing, and their completeness. Review cost reporting manual to help assess data quality.	Sufficient quality of data to calculate total costs, cost per ingredient? Sufficient quantity of data to analyze costs over time? Sufficient detail in cost categories and subcategories of reporting to analyze cost economy or impact of scale (i.e. check for separate reporting fixed and variables costs, of start-up and recurring costs, or of line items).
Contributions, beneficiary costs	Record frequency and completeness of contribution data, data on time contributed by beneficiaries. Establish if any contribution data or beneficiary contribution data are missing.	Determine which non-pecuniary costs will need to be estimated and what data will be used. (See Step 4).
Intervention details	Review intervention details reports for completeness. Consult activity documentation to confirm accuracy. Document any gaps in data. Record beneficiary counts.	Assess feasibility of reporting the number of beneficiaries, calculating cost per household or beneficiary, unit costs, incremental costs, average costs, cost per output, outcome, and cost per standard indicator.

Match Analysis Methods to Objectives

After a close review of the data, the next step is to finalize which analytical methods will be used to answer cost analysis questions.

Cost-Economy Analysis can be used to answer "big picture" activity design and sustainability questions, and they also lay the foundation for answering efficiency and effectiveness questions.

Activity design questions might involve analyzing the costs of specific interventions as well as education activities as a whole. This might include calculating total or incremental costs and disaggregating costs according to different dimensions of the education activity such as implementation site and costs over time for multi-year programs. The selected data sets must report data at the required level of disaggregation in order to map out the cost structure of an activity in accordance. Cost analysis methods for the activity design questions are the appropriate choice when the objective is to estimate total or intervention-specific costs.

Sustainability questions help estimate the costs of intervention components for the purpose of replication, scaling, or sustaining an activity by a different provider. Detailed cost data by category, ingredient, sub-ingredient (e.g. international versus local labor) are necessary to accurately compute cost estimates under different assumptions. Information about expected scale up or conditions of replication is also necessary (e.g. how many and what kind of beneficiaries, geography, provider).

Cost Efficiency Analysis methods are useful for estimating the levels of investment needed to produce desired outputs and calculating the unit costs of producing the same outputs across different contexts. The selected data sets must report dosage and output metrics. These methods are useful for comparing an activity's outputs to the cost of inputs used in the program to choose between alternative

delivery models, as well as for identifying the alternative that maximizes the given output for the least cost.

Cost-Effectiveness Analysis methods are useful for comparing the impact of programs with similar objectives that use a similar level of resources per beneficiary to implement them. They are also useful for comparing cost per impact of the same intervention implemented across different contexts/settings to improve our understanding of the interplay between intervention characteristics, context features, and results. Cost-effectiveness analysis allows calculating cost per attributable outcome and cost-effectiveness of comparable interventions. Using this method requires two or more interventions with objectives and outcome measures generated from an impact evaluation. Preferably, the measure of effectiveness represents a final outcome. If an intermediate outcome is selected, it needs to be directly related to the activity's objectives.

Step 3. Cost Analysis Plan

Once the cost analysis questions and objectives are well-defined and matched with cost analysis methods, the next step is to create a cost analysis plan. The cost analysis plan serves two purposes. First, it is a roadmap to structure and plan the cost analysis using the cost datasets, and second, it informs the final Cost Analysis Report generated at the conclusion of the analysis to document the findings. As shown in Table 9, the cost analysis plan contains five sections.

TABLE 9. Cost analysis plan sections

SECTION	TITLE	CONTENT	SOURCE
1	**Background, Context, and Stakeholders**	• Describe the overall background of the activity and important contextual factors that might affect the cost analysis, such as conflict, environmental, and target population. • Describe the stakeholders (e.g. USAID Mission, the host government, local NGOs participating in the intervention, and other donors working in the same area and their respective responsibilities). • List the key partner organizations and their contributions to the education activity.	Key program documents and contribution reports
2	**Intervention or Activity Description**	• Often a single USAID-funded activity will have multiple activities that take place in different locations at different times. Therefore, documenting the objectives of the intervention/activity, geographic scope, and time-frame provides an important frame for the reader. • Describe the education intervention/activity or activities being costed. Include a brief statement describing the intervention's theory of change and information about beneficiaries, geography, and the scale of the activity.	Key program documents and the intervention details reports
3	**Cost Analysis Objectives, Utilization, and Cost Questions**	• State the objectives of the cost analysis. As a means of providing greater depth and understanding on the selected cost objectives, analysts are encouraged to elaborating on the potential policy relevance. • Describe how the findings are intended to be used, and the detailed cost analysis questions.	Step 2 of this document provides guidance on the creation of cost questions.

SECTION	TITLE	CONTENT	SOURCE
4	**Primary and Secondary Data**	• Detail which costs will be counted within each dataset. For example, depending on the research question and cost analysis approach, these counted costs might include direct costs for activity inputs, staff time on implementation and support, and in-kind donations such as venues for training. Additionally, analysts should list any costs that will be excluded. For example, the cost of USAID-operated activity (Category 1) might fall outside of the scope of the cost analysis and therefore might not be applicable. • List the key outputs and/or outcomes that will be included in the cost analyses.	Intervention detail report
5	**Cost Analysis Methods, Assumptions, and Limitations**	• List the cost analysis methods to be used (i.e. cost-economy (activity design and sustainability), cost-efficiency, and cost-effectiveness) • List all the assumptions used in the analyses, to inform the reader which findings are sensitive to what conditions. • To avoid inappropriate use, clear limitations should be provided noting how the findings fall outside the scope and intent of the cost analysis.	This guidance note provides guidance on methods, assumptions, and limitations.

Step 4. Preparation of Data for Analysis

There is a wide range of suitable spreadsheet models and worksheets that can be used to house, prepare, and analyze cost data. Because organizations vary in their software choices, USAID does not advocate for a standard model (e.g. USAID does not state that all analyses need to take place in Microsoft Excel or R). Regardless of the type of spreadsheet chosen, there are five types of worksheets generally needed to conduct a cost analysis:

- **Overview:** Provides basic information about the cost analysis being conducted inclusive of the country, implementing partner(s), intervention/activity, beneficiaries, geography, cost analysis objectives, cost questions, the intended use of findings, and stakeholders. It also includes a space for questions/notes and a cost category legend.

- **Expenditures and Contributions:** Includes all of the expenditure and contribution data from the general ledger. It also includes the corresponding intervention details for a specific activity or class of activities. Shows all calculations for currency conversion, amortization or depreciation, inflationary adjustments, and discounting.

- **References and Sources:** Document the websites used for currency conversion, inflation adjustments, and any other websites or secondary sources used.

- **Outputs and Outcomes:** Contains the outputs and outcomes data relevant to the specific cost analysis.

- **Findings:** Details the finding for specific cost analysis question(s) being addressed.

In this step of preparing the data, analysts will use the first three of the worksheets (Overview; Expenditure and Contributions; References and Sources). The remaining two worksheets (Outputs, Outcomes, and Findings; and References and Sources) are described in Step 5 - Data Analysis. (Please see Guidance Templates for examples of these worksheets).

Worksheet 1. Overview

Analysts should document the basic information about the cost analysis in the first few pages of the spreadsheets. This information may include the country, implementing partner(s), activity or intervention, beneficiaries, and geographic scope. It can also include the cost analysis objectives and intended use of findings, cost questions, methods, and years (i.e. base year and year of analysis). This information serves as an easy summary for the cost analysis contained in the worksheets.

Some analysts also find it helpful to keep a legend of the implementing partner's cost categories on the Overview Worksheet. Because implementing partners will not need to report on all of the cost categories, their general ledger numbering protocol may differ from those laid out in *Cost Reporting Guidance for USAID-Funded Education Activities* (2018). This legend could help reduce miscommunication on the activity's cost categorization.

Worksheet 2. Expenditures and Contributions

Stage 1. Gather Expenditure Data

Depending on the reporting schedule of the award, implementing partners submit financial reports, contributions, and intervention details on a quarterly or annual basis. The cost question(s) will dictate which reports are needed and to what extent the data need to be disaggregated. More disaggregated data allow for a more rigorous cost analysis. To minimize errors, USAID recommends that analysts, to the extent possible, keep the expenditure data in their original general ledger format and add the necessary columns or rows to conduct the cost calculations. These adjusted general ledger outputs are referred to as the Expenditures and Contributions Worksheet. They can be structured by year (e.g. if an activity being analyzed lasts for three years, there will be one worksheet for each year) or a single worksheet that contains multiple years of data. The structure depends on the analyst's preference, the calculations that need to be conducted, and the general ledger output.

On Fringe Benefits

Fringe benefits can be incorporated into a cost analysis in two different ways. The first is to wrap the additional costs into an individual's salary and the second is to include a separate line item for all fringe benefits. There are advantages and disadvantages to each. The advantage of including benefits directly into an individual's salary is that it is a more accurate estimation of the total wage. In the absence of including this information, an individual's salary will appear to be less than actual. However, adjusting the salary to include benefits may require an additional step.

The second method is to have a separate line specifically for benefits. This is a clean way to manage fringe benefit expenditures for a large number of individuals and it serves as a visual assurance to the analyst that these additional costs have been included in the calculations. Whichever approach the analyst selects, she should be explicit in her notations and calculations. In the absence of clear notation, it can be difficult for others to know for certain what has or has not been included.

On NICRA

The Negotiated Indirect Cost Rate Agreement (NICRA) is an estimate of an organization's indirect cost rate (i.e. its facilities and administrative costs, and fringe benefit expenses) that has been established with the United States Government. It may enter into the expenditure report as

an ingredient in all cost categories, often as "Indirect Costs." Since the NICRA rate and shared expenses are negotiated by each organization, it is important to ask the reporting entity about what is included in its NICRA and receive guidance on its appropriate treatment in the costing. NICRA may cover only a portion of overhead costs, therefore, an organization may additionally report overhead ingredients separately from NICRA/indirect costs.

Stage 2. Monetize Contributed Resources

USAID is interested in estimating the cost of an activity or class of activities to society as a whole and, therefore, considers all contributed or purchased resources that were necessary to achieve the activity's results. The value of the contributed resource represents its opportunity cost. While the resource may have been donated, if the activity is replicated in a new context or scaled up in the future, the same resource might need to be purchased (Dhaliwal et al., 2014). The conventional assumption is that all resources have an opportunity costs and must be included in the analysis (Levin et al., 2018).

One often overlooked contribution is a beneficiary's time. Omitting the cost to beneficiaries can bias the results of a cost analysis. For example, in one study, the cost of an education activity in Madagascar dramatically increased after the parents' time attending meetings required by the education activity were included in the analysis (Dhaliwal et al., 2014). Beneficiary time and resources (e.g. travel) represent the use of scarce resources. To approximate the market price or shadow price of a contributed item, analysts will need to gather secondary data. The Resource section of this document provides guidance on where to locate secondary data.

On Market Prices

In general, there are two ways to estimate the cost of contributed goods and services: market prices and shadow prices.[32] A market price reflects the point at which the demand of purchasers meets the supplies of providers (Levin et al., 2018). For example, if reading devices were procured at no cost, the estimated market value per device could be obtained by gathering estimates from the supplier who contributed the original devices, new suppliers, or using the organization's existing procurement channel.[33]

On Shadow Prices

Shadow prices are used when no market value readily exists for a resource (Levin et al., 2018). For example, there is no fair market price for a volunteer who spends two hours per week reading with 2nd grade students for a USAID-funded activity. Still, the volunteer's time must be included in the cost analysis since the volunteer foregoes potential income, and volunteers may not be available in a different context. Analysts will need to approximate the cost of the volunteer's time using the next closest use. For example, the value of the volunteer's time could be estimated using the current hourly market price

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[32] The estimated cost of a contributed item is referred to as the resource's "opportunity cost," or what is given up by not using the resource in some other way. Market prices and shadow prices are both derived from the idea of opportunity cost. For more information on costing contributed resources and shadow prices, please see Levin and McEwan (2001), Boardman et al., (2011), Dhaliwal et al., (2014), McEwan, (2012), Hollands et al., (2016), and Levin et al., (2018).

[33] Additional research is needed to estimate the market distortion prevalent in an organization's actual procurement channels or in the general market (i.e. market prices). According to Levin et al. (2018), market distortion can occur due to highly concentrated markets with less competition, information failures, and externalities. Additionally, the very existence of large USAID activities could introduce market distortions where none previously existed or could exacerbate existing inequalities. USAID cautions analysts on this potentiality and encourages further exploration of this topic.

of tutors.[34] To approximate a shadow price, analysts will need to know those specifications that determine the price of the particular item. For example, the price of a tutor generally varies by the tutor's education level, years of experience in tutoring, as well as the setting (e.g. urban, rural, or remote), the subject matter of instruction, and age or grade of the students being tutored. Analysts will also need to know the volunteer's time commitment (e.g. how many hours per week, how many days per week, and how many weeks per year). With this information, an estimate of the volunteer's time can be generated.

On "Units"

Analysts should take special care when documenting a resource's unit. Misalignment between unit prices and the timeframe of the analysis is a common mistake and can lead to inaccurate results. For example, if a parent volunteers one hour per month for nine months, but the analyst has obtained a per month or per year wage for tutors (i.e. the shadow price), the per month or year wage will need to be converted into an hourly wage to align with parent's actual volunteer time (i.e. the dosage). Analysts should review all units to ensure alignment.

Stage 3. Perform Currency Adjustment

Often accounting inputting procedures dictate that "local" expenditures are exchanged into the currency of record upon entry into the general ledger. If the expenditure is expressed in something other than U.S. dollars (USD), analysts should use the World Bank's World Development Indicators to convert the costs into USD. These indicators represent the official exchange rates determined by national authorities or the legally sanctioned exchange market. They express local currency units relative to USD, based on the annual average of monthly averages.[35]

All expenditures should be converted into USD for the year in which the cost was incurred (e.g. expenses incurred in 2015 Vietnamese Dong should be converted into 2015 USD).[36,37] When reporting the cost analysis findings, analysts are required to state the method of currency conversion and cite the exchange rate source used in the analysis. (See Step 6. Documentation and Reporting discussed further in this document).

The value of contributed resources can often be found in the local currency. Analysts should document the value of the resource in the local currency and then use the World Development Indicators to adjust it to USD. The resource used for the currency adjustment can be documented in the Resources and Sources Worksheet for easy reference.

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[34] For more information on methods to estimate shadow prices, see Levin and McEwan (2001), Boardman et al. (2011), McEwan (2012), Dhaliwal et al. (2014), Hollands et al. (2016), and Levin et al. (2018).
[35] The World Bank's World Development Indicators, PA.NUS.FCRF (LCU per US$, period average) https://databank.worldbank.org/data/reports.aspx?source=2&series=PA.NUS.FCRF
[36] This guidance recommends that analysts use standard market exchange rates (as opposed to using purchasing power parity—PPP). PPP represents the activity costs as though they had been implemented in the United States. Given that USAID's education activities are implemented in low- and middle-income countries, this representation overstates the financial costs of implementation. Standard market exchange rates allow analysts to communicate the results more accurately and better inform education activity strategy (IRC, 2016).
[37] The World Bank's World Development Indicators, PA.NUS.FCRF (LCU per US$, period average) https://databank.worldbank.org/data/reports.aspx?source=2&series=PA.NUS.FCRF

Stage 4. Conduct Depreciation and Amortization

Sometimes assets that are used in an activity have sustained benefits after the activity has ended. In these instances, analysts should allocate only the portion of the asset's cost to the activity. USAID recommends applying the cost of the assets whose "useful life" is more than five years. In USAID activities, there are few assets that have a useful life exceeding five years. For example, supplies are generally consumed in a single year, equipment and materials are often "used up" at the conclusion of an activity, and vehicles and facilities are generally leased. However, if a vehicle, for example, is purchased and donated to the host government at the conclusion of an activity, then just the portion of the vehicle's "useful life" will need to be applied to the relevant cost analysis. This process is described below.[38]

a. Tangible Assets

The annual cost for leased tangible assets, like equipment, facilities, and vehicles, can be easily established through existing contracts or invoices. However, calculating the annual costs associated with tangible assets that are purchased, used over the course of an activity's lifetime, and then donated, for example, to the local government required some additional calculations. Depreciation is the amount of a tangible asset that is "consumed" in a year (Levin et al., 2018). USAID recommends using straight-line depreciation. In this calculation, the cost of the item is divided by its useful life to obtain a per year figure. For example, assume an implementing partner purchased a 2002 Toyota Kluger. The price was $10,000 and the vehicle has a 10-year useful life. The analysts would apply $1,000 to each year of the applicable cost calculation. This same process can be used for other applicable tangible assets (Levin et al., 2018).

b. Intangible Assets

Intangible assets are assets that are not physical. Intellectual property or transferred knowledge are common intangible assets. Intangible assets are amortized, meaning the cost of the asset is spread out over the course of the asset's "useful life" (Stickney and Weil, 1994). While the names of the processes are different for tangible and intangible objects, there is little notable variation in the calculations. However, intangible assets can be trickier to amortize than depreciating tangible assets because it is significantly more difficult to define the usable life. Take, for example, the intangible asset of the knowledge obtained in teacher training. The cost of the teacher training can be spread out over the duration of an activity or longer if there is reason to believe that the teachers will continue to use the content after the activity has ended, or until the attendees need a refresher training (Levin et al., 2018). USAID suggests that analysts consider the length of time that the activity was in place and the context to determine if amortization of the intangible asset is warranted.[39]

The final cost analysis report, discussed later in Step 6, should note whether tangible or intangible assets were depreciated or amortized and, if so, which and over what period of time.

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[38] Annualization takes into account an asset's depreciation and the interest that could have been earned on the undepreciated portion of the asset (Levin et al., 2018). This document does not provide guidance on annualizing assets. Instead, tangible assets are depreciated and intangible assets are amortized using the straight-line method.

[39] For more information on amortizing intangible assets, see Hollands et al. (2016) and Levin et al. (2018).

Stage 5. Adjust for Inflation and Discount Cost Streams

Expenditure data inherently reflect the prices of the year in which the expenses were incurred. This presents two potential problems when analyzing cost data within a project and across projects. Within a project, this is problematic because the project may have been implemented for many years and, as a result, the resources were purchased in different years (e.g. some resources were purchased in 2013 and others in 2018). Across projects, this is problematic because the projects may have been implemented at different times (e.g. one project started in 2013 and another began in 2016).[40] To account for these potential distortions, analysts may need to make two adjustments for inflation. These inflationary adjustments and discounting cost streams are described below.

a. Deflate to Base Year

To address the first problem (i.e. resources used in a project were purchased in different years), deflate the costs of the resources back to the base year (i.e. the year the project or activity began). Take, for example, an intervention that was implemented in 2013 (i.e. the "base year") and concluded in 2018. The cost of resources purchased in different years (e.g. books were purchased in 2013 and 2018) is deflated back to 2013, the base year.[41] If this adjustment is not conducted, the cost of the resources purchased in 2018 may appear to be more expensive than the cost of the same resources purchased in 2013 (Grand Bargain Cash Working Group: Value-for-Money Workstream (2019). This adjustment can be made using the World Bank GDP deflator.[42,43] Values that are not adjusted for inflation are said to be expressed in "nominal" or "current" terms. Once nominal values are adjusted for inflation, they are said to be expressed in "real" or "constant" terms of the base year.

b. Discount Cost Streams

Next, the present value of the cost is calculated from the perspective of the base year (i.e. 2013). Discounting is different from depreciation or inflation. Discounting represents the choice a funder faces between incurring costs in the current year or investing the funds in the current year and then incurring the costs in the following year (Levin et al. 2018; Dhaliwal et al. 2012). For example, society perceives incurring a cost now differently from incurring a cost several years in the future. The equation for discounting to the present value is shown in **Equation 1**, where *c* is the incremental cost, *t* is time, and

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[40] Grand Bargain Cash Working Group: Value-for-Money Workstream (2019); Dhaliwal et al. (2014).
[41] While the year chosen is rather arbitrary, USAID suggests the base year for simplicity.
[42] The World Bank GDP deflator is available at https://data.worldbank.org/indicator/ny.gdp.defl.zs.
[43] In general, there are two ways to measure inflation: the consumer price index (CPI) and the GDP deflator. Because the CPI includes a fixed basket of goods and services purchased by households, economists typically use this index to calculate the cost of living. However, it is not considered to be a comprehensive measure of inflation, given its focus on household goods and services that are not representative of the inputs of an education program. To measure the rate of inflation, economists typically use the GDP deflator, which includes all final goods and services produced in a country.

r is the discount rate, often referred to as the social discount rate (SDR). Analysts should apply a 10 percent SDR for education activities lasting longer than three years.[44,45]

Equation 1. Present Value

$$Present\ Value = \sum_{t=1}^{n} \frac{Cost_t}{(1+r)^{t-1}}$$

c. Inflate to Year of Analysis

Finally, a second inflationary adjustment may need to be conducted. The second inflationary adjustment accounts for the problem of comparing projects that were implemented at different times (e.g. the base year for one project is 2013 and the base year for another project is 2016). Omitting this second inflationary adjustment may make the 2013 project appear to be less expensive than the 2016 project. When comparing costs across projects, analysts should choose one year (i.e. the "year of analysis") and all costs should be inflated or deflated to that year using the World Bank GDP deflator. After doing so, the costs are said to be expressed in "real" terms of the year of analysis.

Analysts calculate the total costs over time, by category, and by stakeholder. Stakeholders can be assigned to the totals for each category or sub-category if a stakeholder analysis is included in the overall analysis.

When reporting cost findings, analysts are required to document depreciation or amortization, cite the GDP deflator that was used in the analysis, state the rationale for discounting or not discounting costs, note the base year and year of analysis, and report all costs in real USD. The source used to adjust for inflation can be documented in Resources and Sources Worksheet.

Step 5. Implementation of Analysis

Cost analysis, in general, is not complicated, but it can be tedious, and analysts can easily find themselves spending much more time on the analysis than intended. As a general rule, analysts should consider the following advice. Henry Levin once said, "Don't count paperclips," meaning that **analysts should invest their time estimating the costs of those resources that account for the largest percentage of the overall costs, and spend proportionately less effort on estimating the**

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[44] There is considerable variation noted in the literature as social discount rates vary across organizations. The appropriate discount rate is dependent upon who is making the investment, and different decision-makers will use different estimation methods (Dhaliwal et al., 2014). For example, the Grand Bargain Cashing Working Group applies a 10 percent social discount rate to their activities lasting three years or more (Grand Bargain Cash Working Group, 2019). J-PAL used 10 percent across a range of developing countries (Dhaliwal et al., 2014). USAID used 12 percent for the Feed the Future activity in Guatemala (USAID Guatemala, 2013). In general, education activities implemented in developed countries tend to have lower social discount rates (e.g. 3-7 percent) than in developing countries (e.g. 8-15 percent) (Zhuang et al, 2007). Raising the social discount rate tends to reduce the net present value of an education activity investment making activity investments less worthwhile. Per this guidance, 10 percent is the appropriate social discount rate for education projects implemented in low- and middle-income countries. Please see Boardman et al., (2011) for more information on the theoretical and empirical literature on social discount rates (McEwan, 2012)

[45] This guidance does not recommend discounting benefit streams (i.e. effects). For more information on discounting benefit streams, please see Zhuang et al. (2007); Dhaliwal et al. (2014); Levin et al. (2018).

cost of those resources that make up a very small percentage.[46] For example, in general, the costs associated with personnel often make up the largest percentage of the overall cost for an activity and therefore, analysts should invest the largest percentage of their time estimating costs involving personnel.[47] But this is not always the case. As the analysis begins to take form, analysts can identify those resources that account for the bulk of the overall costs and then devote their efforts into their analyses and documentation (Levin et al., 2018). **"Don't count paperclips" is a good general rule for cost analysis studies.**

This document presents guidance for conducting cost analysis using three different methods: cost-economy, cost-effectiveness, and cost-efficiency.[48] For each method, the complexity of the analysis will increase with the complexity of the intervention or activity being analyzed and the cost question posed.

While the USAID Office of Education has standardized its cost-capture approach, analysts will be limited in the rigor of their analysis if they do not have access to disaggregation of cost data for the activity being analyzed. Aggregated cost categories restrict the required calculations. For example, conducting a cost-effectiveness analysis is not possible if development and implementation costs cannot be separated. The balance of this step assumes that the analyst has access to the necessary disaggregated data as structured by the *Cost Reporting Guidance for USAID-Funded Education Activities* (2018).

As specified in Step 4, this guidance offers suggestions for two different worksheets for these analyses. These worksheets include Outputs and Outcomes, and Findings. Different from Step 4, Step 5 is organized by method, and the use of the remaining two sheets is embedded in each.

Method 1. Cost-Economy

Cost-economy analysis assesses the estimated cost of an activity, as well as the costs associated with its replication, scale, or sustainability. Each of these are discussed in turn.

ACTIVITY DESIGN

Activity design questions look at the overall cost structure of the activity and its associated activities. The cost-economy analysis method helps understand a "big picture" view of the costs of different activity components. For example, analysts can measure the costs associated with developing and implementing an in-service teacher training, an activity's start-up or close out costs, and overall operations. Cost-economy analysis also includes generating a list of the prices for the individual resources (e.g. the unit price of computers used or facilities rented). There is no standard equation for activity design questions, as often the cost questions require cost category and sub-category totals.

Data and Analysis. The data required for specific activity design questions such as "What are the unit costs of capacity-building per higher education institute (HEI) supported through the activity?" are obtained in the Systems Strengthening, Capacity-Building category. The data should be entered into the

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[46] While Henry Levin was specifically referring to the ingredients method, the general advice is applicable here.
[47] Personnel is often the largest category of costs using the ingredients method. However, given USAID's cost capture method, personnel may not be the largest category in these analyses.
[48] Monetization of the totality of long-term outcomes of an intervention is a necessary step in a cost-benefit analysis. Such monetization of USAID-supported interventions is frequently not feasible because it would require making multiple assumptions that can have a great impact on the results. Therefore, this guidance generally does not recommend using cost-benefit analysis to achieve objectives of cost measurement articulated by the USAID Office of Education.

Expenditures and Contributions Worksheet and adjusted for currency, inflation, depreciation or amortization, and discounting as warranted. This is an instance when the analysts may consider amortizing these intangible assets. If the capacity-building has a useful life that exceeds the life of the activity, then the analysts may consider dividing up the cost of the capacity-building by its useful life to obtain a per year figure. If the activity lasted longer than three years, then the cost stream will be discounted as well. Analysts should document the rationale for amortization and discounting if applied. The data should then be aggregated by year, category, and HEI.

Beneficiaries by institute should be included in the Outputs and Outcomes Worksheet. The unit costs of capacity-building per HEI by year and total can be documented in the Findings Worksheet

Results. The results of an activity design analysis are generally straight-forward and require little interpretation. Often the findings include the total cost of an activity inclusive of its development and implementation costs. The calculation could involve the incremental cost of an activity (i.e. the portion of the control (or counterfactual) subtracted from the treatment). It also might include site-level analysis overtime and by resource. For all applicable analysis, analysts should document the logic for including or excluding costs, how in-kind resources were valued, and if attrition (i.e. actual as opposed to planned beneficiaries) was a factor in the analysis. These details should be documented in the Cost Analysis Final Report.

SUSTAINABILITY

Sustainability helps estimate the cost of replication, scaling, or sustaining an activity. Replication infers that an activity or intervention will be enacted as originally implemented, or with minimal adjustments, in a location different from the original site. Sustainability means that an activity or intervention will be maintained as it was implemented, or with minimal adjustments, at the original site. Scaling is the act of expanding a tested concept, such as a pilot, to serve a larger number of beneficiaries in the same or different location(s). Additionally, replication, scaling, or sustainability may or may not include the transfer of the activity to an entity or organization different from the original implementer.[49]

When estimating the costs to replicate, scale, or sustain an activity, analysts can calculate the average cost or marginal cost. These two terms are not interchangeable. The average cost is derived by dividing the total cost (i.e. fixed and variable) by the quantity produced or beneficiaries served. The marginal cost is the change in the total cost divided by the change in quantity (see Equations 2 and 3). For example, the total cost is the cost to serve the entire population of a school. The average cost is the cost to serve each student in that school. Marginal costs are calculated as the difference in costs by adding one extra student (e.g. moving from 1,999 to 2,000 students) or an extra school (Levin et al., 2018).[50] Calculating the marginal cost is more complex than estimating the average cost. Understanding this distinction is critical when conducting a cost analysis.[51]

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[49] USAID recognizes that the transfer or adoption of a program from one entity to another can involve changes to the original project design, adjustments in procurement practices, or additional costs (e.g. the original implementer may or may not act in an advisory role). USAID recommends that analysts take these adjustments into consideration if applicable.

[50] Marginal costs can take into account changes in procurement practices, economies of scale, and supply chain analysis. USAID recognizes that this current version of estimating replication, scaling, and sustainability is a simplified version of a more complex analysis.

[51] Average cost and marginal cost will be the same if the assumed counterfactual/business-as-usual scenario is zero expenditure and zero outputs.

Equations 2 and 3. Average Cost and Marginal Cost

$$Average\ Cost = \frac{Total\ Cost}{Quantity} \qquad Marginal\ Cost = \frac{\Delta\ Total\ Cost}{\Delta\ Quantity}$$

Data and Analysis. The USAID cost capture approach includes separating expenditure reporting by development and implementation sub-categories. Development costs are incurred at the beginning of an activity. Implementation costs are incurred once the intervention has been designed and tested. For replication, scale, and sustainability questions, analysts will primarily focus on those costs incurred during the implementation phase of an activity.

Replication uses implementation expenditure data and intervention details data to generate a cost estimate. While the data may be available, analysts need to consider the differences in context to determine if replicating the activity is appropriate. Replication is rarely as simple as picking up an activity and situating it in a different location. For replication questions, analysts should consider the effect of the new context on how the expenditures are procured and the potential change in the intervention details. If the contexts are very similar, estimating the cost to replicate an activity is straightforward.

Scaling requires that the analyst address the changes in fixed and variable implementation costs. Fixed costs are those that do not vary with the number of participants or beneficiaries served. Variable costs do. When estimating changes in scale, most analysts focus on the changes in the variable costs. However, the changes in the fixed costs can be more complicated. Take, for example, an in-service teacher training that was successfully implemented in three provinces and the host government is now interested in scaling it to two additional provinces. In this situation, the variable costs, such as materials, would be adjusted based on the new quantities. For the fixed costs, the analyst will need to consider the capacity of the facilities where the original training took place. Most activities cannot expand infinitely without eventually requiring additional fixed inputs. Analysts should take care to consider any limits to the capacity of fixed assets and consider how the prices and inputs will change under scale conditions. In this in-service teacher training example, analysts would need to ascertain the number of teachers in the additional two provinces, the number of instructors needed, and the potential change in facilities.

Sustainability questions are interested in the cost associated with the implementation of an activity. If the size and scope of the activity are not being adjusted, sustainability questions can be addressed without the need for secondary data.

To conduct these three types of analyses, all necessary data identified in the cost analysis plan should be included in the Expenditures and Contributions Worksheet. All data should be adjusted, as described in Step 4. Analysts should document the necessary outputs (e.g. the number of teachers trained and teaching and learning materials received) in the Outputs and Outcomes Worksheet. All final calculations should be noted on the Findings Worksheet.

Results. While the results can be straightforward to interpret, perhaps the most important aspect of describing the results of cost data analysis for a sustainability objective is documenting the assumptions and limitations. For example, using planned numbers of teachers trained instead of the actual number of teachers trained could over- or underestimate the actual costs. Additionally, changes in how the implementing partner procured the training materials may deviate significantly from how the host-

government will procure these same materials. Finally, how an activity like teacher training may or may not intersect with the host government's business-as-usual practice of providing in-service teacher training could affect the cost. In short, analysts should be mindful of the strengths and weakness of their calculations and provide full transparency on each.

That said, these assumptions and limitations do not need to be seen as restrictions. Instead, noting and discussing these assumptions and limitations can lead to a richer and more pragmatic discussion with stakeholders about the costs estimates. All assumptions and others relevant to the specific analysis should be included in the final report (see Step 6. Cost Analysis Final report).

Method 2. Cost-Efficiency Analysis

Cost-efficiency analysis evaluates the cost per output of an activity. Like cost-effectiveness analysis, cost-efficiency analysis is comparative. It allows policymakers and practitioners to select between alternative delivery mechanisms used to generate an output that is comparable. Unlike cost-effectiveness analysis, cost-efficiency analysis does not provide an effectiveness measure to assess the overall "value" or quality of different interventions. Still, a cost-efficiency analysis can be conducted throughout an activity's life to inform decision making, resulting in cost-savings adjustments that ultimately allow us to serve more people within limited budgets (IRC, 2019). Some factors to consider in assessing the comparability of outputs generated in activities include:

- Outputs should be similar (e.g. the cost to generate a black and white teacher training manual cannot be compared to the cost to procure to a set of colorful children's leveled readers).
- The duration of an output should be similar (e.g. the cost per unit of books that are designed for a single use should not be compared to textbooks designed to last for several years).

A cost-efficiency analysis generates a ratio. The mathematical expression of a cost-efficiency ratio is shown in Equation 4, where *C* is cost and *B* is the number of beneficiaries or outputs produced.

Equation 4. Cost-Efficiency Ratio

$$\textbf{Cost Efficency Ratio} = \frac{C}{B} = \textbf{Cost per Output}$$

Data and Analysis. As an example of a cost-efficiency analysis, assume that we want to compare the costs of books procured by different organizations with the objective to identify the best book procurement practices. The hypothetical research question might be, "What is the cost for each set of 10 leveled readers?" For this analysis, we would need details on procurement and delivery from each of these organizations. These details might include printing specifications such as the publisher, type of binding, book dimensions, number of pages, paper weight, colors, and the number of copies ordered. Additionally, we would separate the development costs from the production and distribution costs to allow for a more in-depth analysis. All of these data will be entered into the Expenditures and Contributions Worksheet and adjusted as needed. Only under extenuating circumstances will the cost of the books be depreciated. Generally speaking, books procured with USAID funding do not last longer than the activity years. However, in the event that the books will have useful years beyond the life of the

intervention, then depreciation would be applied and noted. The cost streams of the books would not be discounted to present value since we are evaluating one-time purchases.

The mathematical calculation for a cost-efficiency analysis is straightforward (i.e. the total cost divided by the number of books procured). The potential variation in the types of books procured may yield multiple comparable outputs (e.g. the cost per teachers' manuals procured by two different implementing partners, the cost per four-color leveled reader as compared to black and white).

Results. Cost efficiency can be used to demonstrate the difference between development and implementation. For example, the cost to develop and print a set of 10 leveled readers in Ethiopia might be $4.32 real 2018 USD, but the cost to only print the same set of books might be $0.30 real 2018 USD. This differentiation is helpful when, for example, the host government may be considering scaling the project and is not interested in the book's development costs. Cost-efficiency ratios can be a useful tool when comparing similar outputs.[52]

The goals of a cost-efficiency analysis are not to discover that the costs of books vary across time and space. That is to be expected. What is of interest is by how much the costs vary and *why*. To answer these questions, a deeper dive into the development and testing of the books and the factors that affect the production and distribution can take place. In some instances, the drivers that affect the price of books may be entrenched. However, understanding the constraints and drivers could aid in program design changes that lead to an increase in USAID's impact per dollar (IRC, 2019).

Method 3. Cost-Effectiveness Analysis

A cost-effectiveness analysis (CEA) is an evaluation method designed to help policymakers select among interventions and programs that have the largest impact for the lowest cost. To assist policymakers in these choices, the activities and interventions being analyzed should be comparable. For example, an intervention designed to measure youth employment is incomparable to one that measures secondary school dropout rates. However, interventions that seek to improve youth employment through different approaches, such as mentorships and vocational training, are comparable (Levin et al., 2018). Additional guidance on the comparability of interventions includes:

- Rigor of the impact analysis should align (e.g. an randomized control trial (RCT) should ideally be compared to another RCT, but can be compared to a quasi-experimental design if the limitations are noted).

- Intervention population sizes should be similar (e.g. an intervention with a small reach, like a pilot, should not be compared to an intervention with a large population size) unless explicit assumptions about how costs and impacts might vary with scale are added.

- Impact measures should be similar (e.g. an impact evaluation that measures reading comprehension should not be compared to one that measures mathematics).

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[52] It is important to note that cost-efficiency analysis findings are designed to be used as a tool for policymakers to select among alternatives. The average cost per output can be used as a rough proxy to estimate scale. For more precise scale estimations, analysts are referred to Method 1. Cost Economy for a discussion on scale up and estimating marginal costs.

- The measurement should have sufficient power to generate statistically significant estimates of effect, if such an effect is present.

A CEA generates an effectiveness measure and a corresponding cost. These are discussed below.

Data and Analysis. Conducting a CEA requires analysts to possess a thorough understanding of the activity being costed. Evaluating key project documents to understand the theory of change (i.e. activities, inputs, and outputs) and the effectiveness estimation model (i.e. the population served, sites, treatment and control groups, grade levels, point of randomization, sample sizes, sub-population characteristics, and outcomes measures) is a good start (Levin et al, 2018).

Before beginning a CEA, analysts should have noted the objectives of the analysis, cost questions, and intended use of the findings. These objectives and questions will dictate the type and number of calculations required. For example, while all CEAs begin with a social perspective, the host-government may be interested in the burden of an activity on a community. If so, then analysts will need to conduct a stakeholder analysis, being mindful of the community's economic burden. If the host government is interested in the costs associated with a specific sub-population of an intervention, then analysts will need to ensure that their data and calculations allow for this level of specificity. Care should be taken to ensure that cost and impact estimations carefully align.

Because a CEA estimates the total costs of the resources used to generate the corresponding impact, analysts will need detailed implementation expenditures. Additionally, any contributed resources, such as a community donating a building for monthly youth meetings, will need to be included. All of these data should be listed in the Expenditures and Contributions Worksheet and be adjusted as previously described.

Analysts should input the number of beneficiaries, relevant outputs, and the impact evaluation coefficients in the Outputs and Outcomes Worksheet.[53]

In the Findings Worksheet, the per beneficiary cost can be calculated by dividing the total cost by the number of beneficiaries. Analysts should report the cost per beneficiary and the effect per beneficiary separately. For example, the average cost per youth of a vocational training program (e.g. $380 real 2018 USD per youth) should be reported separately from the effect size (e.g. effect size of 0.32). Similarly, the average cost per youth in a mentorship program (e.g. $123 real 2018 USD) should be reported separately from the corresponding effect (e.g. effect size 0.12). Keeping costs and effects separate is critical for in-depth analysis and decision making.[54]

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[53] Analysts should note that USAID captures the intervention dosage as planned and not as implemented, unless fidelity of implementation data are included in the analysis.

[54] In the past, analysts would pair the effectiveness measure with the associated costs to generate a cost-effectiveness ratio (CER). This is problematic for three reasons. First, CERs can be difficult to interpret since they can mathematically combine two pieces of information: cost and effect (expressed as standard deviations). Second, CERs mask critical details. For example, a high cost and high impact CER may mirror a low cost and low impact CER. Finally, and perhaps most important, if the stakeholder has a limited budget, then the conversation must start with the cost per beneficiary. If the per beneficiary amount is beyond the stakeholder's budget, there is no purpose in discussing the effect size. For these reasons, USAID does not suggest generating CERs. Instead, the unit cost and unit of effectiveness should always be reported separately.

Because a CEA is a comparative evaluation, analysts will need to have at least one additional comparable intervention.

Results. Separating costs from the corresponding impact increases the transparency of the analysis and allows for a richer and more informed conversation with stakeholders (Grand Bargain Cash Working Group, 2019). Currently, it is difficult to put CEA results into context due to the lack of studies with transparent calculations. Therefore, it is difficult to say if one additionally employed youth at that cost of $380 real 2018 USD or $123 real 2018 USD per youth is justifiable. As CEAs become more prevalent and their results more available, the value of cost analyses will increase as well.[55]

Box 2. Accounting for Uncertainty—Conducting Sensitivity Analysis

Sensitivity analysis is a set of methods for dealing with uncertainty. For estimated values and quantities for which wide variation or uncertainty exists, the analysts should conduct a specific sensitivity analysis. To do so, the analyst generates a new cost model by changing one estimated value or quantity at a time to assess the impact of this singular change on the findings. Additional cost models can be generated by inputting different values or qualities or a combination of several assumptions. Analysts might also use sensitivity analysis to test costs and assumptions under different budget or enrollment constraints.

USAID recommends three methods for conducting sensitivity analysis:

- Best and Worst Case Scenarios: Places extreme bounds on the results
- Parameter Variation: The most influential variables in the model are changed
- Monte Carlo Simulation: The distribution around the average for key variables is incorporated into the model

In general, it is useful to express cost estimates in terms of a range when communicating with stakeholders. A program's true costs are more likely within a range rather a single figure. (See Boardman, Greenberg, Vining, and Weimer, 2006 for more detailed discussion of methods).

Step 6. Reporting and Documentation

Reporting and documenting the cost analysis is the last step in a USAID cost analysis. This step results in the generation of the Cost Analysis Final Report, the purpose of which is to document the findings and share the results to foster more in-depth and informed conversations with relevant stakeholders. As shown in Table 10, the cost analysis final report plan contains eight sections.

TABLE 10. Cost analysis final report

SECTION	TITLE	CONTENT
1	**Summary of Findings**	• Include the activity name, location, start and end dates, cost analysis questions, methods used, findings, and use and limitations.
2	**Activity Description**	• Describe the activity or intervention, country, start and end dates, total USAID spending, and the type and number of beneficiaries reached.

[55] It is important to note that CEA findings are designed to be used as a tool for policymakers to select among alternatives. The average cost per student generated in the analysis can be used as an estimate for scale-up projections, as long as the limitations are noted.

SECTION	TITLE	CONTENT
		• Describe the stakeholders (e.g. USAID Mission, host government, local NGOs participating in the intervention, and other donors working in the same area and their respective responsibilities). • List the key partner organizations and their financial contributions to the education activity. • Include the purpose of the activity or intervention (e.g. the goal or objective) and the primary outcome measure for the impact evaluation, if applicable.
3	**Intervention or Activity Description**	• Describe the education intervention or activity (or activities) costed. • Include a brief statement describing the intervention's theory of change and information about beneficiaries, geography, and the scale of the activity or intervention.
4	**Primary and Secondary Data**	• Detail which costs were counted and excluded within each dataset for each cost question. • List the key outputs and/or outcomes relevant to the analysis.
5	**Data Preparation**	• Documents the base year, year of analysis, method of currency exchange (if relevant), reference to the specific GDP deflator used to adjust for inflation, annualization procedures (if applicable), and the social discount rate applied to the costs.
6	**Cost Analysis Methods**	• Detail the cost analysis method used and specific calculations conducted.
7	**Findings, Assumptions, and Limitations**	• Detail the total costs inclusive of disaggregating individual cost categories and resources (i.e. expenditures and in-kind contributions), costs by year, and the average cost or the marginal cost (if applicable). • Describe contextual factors that affected the cost analysis (e.g. conflict, environmental, financial, and population). • List all the assumptions used in the analyses, to inform the reader which findings are sensitive to what conditions. • To avoid inappropriate use, clear limitations should be provided noting how the findings fall outside the scope and intent of the cost analysis. • When reporting on CEA results, report actual cost and effect sizes for each intervention.
Appendix A	**Cost Calculations**	• Include a copy of the worksheets used to conduct the calculations and document the findings

In reporting on cost analysis results and disseminating findings, it is important to balance transparency with protecting proprietary data of organizations involved. The questions of how the findings will be reported and disseminated should be addressed early in the process, in consultation with stakeholders involved.

RESOURCES AND GLOSSARY

Sourcing Prices for Contributed Resources

CONTRIBUTED RESOURCE	TYPICAL COSTS	INFORMATION REQUIRED	COST THAT NEEDS TO BE ESTIMATED	SOURCES
Volunteer and free labor	Income forgone from time donated (e.g. hours of volunteer time)	Skill level of the volunteer contribution (e.g. credentialed secondary school teacher, or manual laborer)	Cost of forgone income (e.g. average local wage rate for the contributed skill level or for trained teachers, the average salary of a credentialed teacher)	Evaluation reports of average household income, national labor market reports and studies. Occupational wages, (e.g. ILO Key Indicators of the Labor Market, WDR Occupational Wages Around the World)
Beneficiary costs	Travel and transportation costs	Travel time, and average wage to estimate forgone income; bus or car fare; or distance and transportation cost (e.g. motorbikes)	Cost of forgone income while traveling; transportation cost (e.g. bus or car fare) or cost per mile of transport (i.e. gas, time)	Beneficiary interviews, questionnaires or surveys to obtain travel time or distance Public transportation fare schedules Price of gas
	Time spent attending activities (e.g. required meetings, or trainings)	Contributed skill level, and time (e.g. average local wage rate of the targeted population or youth ages 16-24 years)	Cost of forgone income (e.g. average local wage rate for male and female youth ages 16-24 years)	Evaluation reports of average household income National labor market reports and surveys National education statistical programs
Donated goods	Learning materials (e.g. textbooks, e-readers)	Quantity and description of items used Expected shelf life or years of usage	Retail purchase price of textbooks, discounted over the number of years of expected use	Survey of retail booksellers or Education Ministry for textbook prices Retail prices for e-reader technology
Donated facilities	Classroom and office space, school facilities, government buildings used for pull-out reading instruction	Size and quality of space (e.g. number of square feet and whether heated or air-conditioned, open-air or closed) Amount of time the facility was used Rental rate per square foot	Cost per square foot per year of similar size and quality of space used, e.g. national average rental rate for school buildings Replacement value of a "standard classroom" (e.g. depreciated value of construction costs of school buildings (land, development, furnishings))	Education planning and management research reports Education Ministry's school standards, policies, code, and design documents Annual construction reports Implementing partner's accounting records

GLOSSARY

Activity: USAID ADS Chapters 200-300 define an activity as a sub-component of a project that contributes to a project purpose. Activity typically refers to as an award (such as a contract or cooperative agreement), or a component of a project.

Activity Design: In this guidance, this refers to activity cost structure, including country-level pricing for common inputs and estimates for common tasks such as start-up, close-out, and technical tasks.

Amortization: The cost of an intangible asset spread out over the course of the asset's "useful life."

Annualization: The process of spreading out the cost of an asset over that asset's "useful life." Annualization takes into account an asset's depreciation and the interest that could have been earned on the undepreciated portion of the asset (Levin et al., 2018).

Average Cost: Total cost divided by the number of participants (e.g. beneficiaries, households, classrooms, etc.)

Base Year: The start year of the education activity being analyzed (Dhaliwal et al, 2014).

Beneficiary: For USAID-funded education interventions, this can typically be children, students, parents, teachers, or education officials.

Contributions: In-kind or monetary donations by the host government or non-governmental entity valued at or more than $1,000 and essential to achieving activity objectives.

Cost: The totality of incurred monetary expenditure and in-kind contributions that produced a desired education output or outcome.

Cost-Benefit Analysis (CBA): A systematic approach to estimating the monetary value of all benefits produced by a program and comparing this monetary value to the total costs of the program.

Cost Capture: A systematic way of collecting detailed expenditure data, as well as corresponding contributions, according to predefined categories.

Cost Category: A class of costs incurred to produce a particular kind of education outcome, such as trained teachers or teaching and learning materials. *Cost Reporting Guidance for USAID-Funded Education Activities* (2018) includes the following cost categories: 1) general operations, management, and reporting; 2) assessments and evaluations; 3) higher education/pre-service teacher training; 4) in-service teacher training; 5) teaching and learning materials; 6) system strengthening; 7) private-sector engagement; 8) parents and community

engagement; 9) safe schools and infrastructure; 10) grants, scholarships, and cash transfers to individuals/families; 11) grants to organizations; and 12) other.

Cost-Economy: A systematic way of assessing components of the program and prices at which inputs were purchased for each component to establish how well the value-for-money and equity principles were adhered to during the program implementation.

Cost Effectiveness Analysis (CEA): A systematic approach to calculating the ratio of the amount of "effect" a program achieves for a given amount of cost incurred, or the amount of cost required to achieve a given impact.

Cost Effectiveness Ratio (CER): A measure of the number of dollars required to produce a given outcome for each accelerator program. CERs are interpreted as the dollar cost per unit of effectiveness produced (however the unit effectiveness is defined by the evaluator).

Cost-Efficiency: A type of economic analysis that is used to calculate the costs of producing outputs. The results are frequently expressed as unit costs for producing outputs.

Depreciation: Applies to distributing the cost of an asset over the course of its "useful life."

Dosage: The amount of intervention a beneficiary receives.

Equity: Personal or social circumstances such as gender, disability, ethnic origin, or family background are not obstacles to accessing high quality education services. The programmatic principle of equity refers to the idea that program resources must be used to compensate for existing barriers to education for marginalized groups.

Expenditure: The amount of money spent to develop and/or implement an education intervention, including all labor, materials, travel, and all other expenditures, as captured through the accounting system for the reporting period.

Fixed Cost: Program costs that do not vary with the number of participants or beneficiaries served. A fixed cost is unaffected by changes in activity level.

IGCE: Internal government cost estimate that serves as a foundation for creating a budget for a new activity.

Incremental Cost: The relative cost of the education activity added (or subtracted) in comparison to the business-as-usual or baseline cost.

In-Kind Contribution: Includes labor, materials, and resources donated by other parties and should be included as part of the overall costs.

Inflation: Changes in price levels over time.

Ingredient: A breakdown of labor, materials, rent, travel, and other elements for which the expenditure is reported into their respective units, quantities, and prices (Levin et al., 2018).

Input: Resources and activities required for an activity or intervention.

Intervention: A discrete set of tasks performed by the USAID awardee that is expected to lead to specific education-related outcomes.

Intervention Effect: Changes in outcome variables of interest that can be attributed to a particular intervention, ideally derived from an impact evaluation using an experimental or quasi-experimental methodology.

Marginal Cost: The cost of serving one additional participant.

Marginal Effect: Changes in the outcome variables attributed to the intervention holding all other explanatory variables (covariates) fixed.

Market Price: The point at which the demand of purchasers and the supplies of providers lead to transactions that clear the market (Levin et al., 2018)

Non-Governmental Entities: Includes private non-profit and for-profit organizations as well as private individuals.

Nominal Costs: Costs expressed in their values before any type of inflation adjustment has been performed.

Opportunity Cost: The value of a good or service in its best alternative use. When a good or service is used for a specific purpose, the user "gives up" the possibility of employing it in another application (Levin and McEwan, 2001).

Outcome: A measure of an activities' impact or effectiveness, for example scores on a standardized test.

Output: The quantities and qualities of goods and services that an education activity delivers to its beneficiaries.

Partner: The entity implementing the USAID-funded activity.

Price: The amount of money a seller charges a buyer to purchase something (see also Market Price and Shadow Price).

Real Costs: Costs adjusted for price changes using an index of inflation.

Resource: See Ingredients.

Sensitivity Analysis: Methods to deal with uncertainty in the costing parameters. Analysts carry out sensitivity analysis by varying uncertain parameters such as the discount rate, the cost of an ingredient, or the measure of effectiveness over a reasonable range such as "high," "middle," and "low" values. The goal is to see if there is any change in how cost-effectiveness ratios are ranked with each parameter change.

Shared Costs: Costs that support multiple tasks across the intervention. For example, the cost of renting a space where project staff work on different tasks.

Shadow Price: The price estimated for a resource when the market price is unavailable (see In-Kind Contributions).

Social Perspective: All costs should be counted, regardless of who pays for them or if they are provided in-kind, and all benefits should be included, regardless of who accrues them (Levin et al, 2018).

Stakeholder: Individuals, institutions, or organizations that have an interest in the results of an activity or intervention.

Stakeholder Analysis: Estimating the cost of an activity or intervention financed by different constituents (e.g. communities, the host-government, implementing partners, local partners, parents, etc.).

Start Year: The year in which the education activity or intervention began (Dhaliwal et al, 2014).

Sunk Cost: Costs that once committed cannot be recovered and are therefore irrelevant to the analysis under consideration.

Theory of Change: A comprehensive description and illustration of how and why an intervention will cause a desired change to occur in a particular context.

Total Cost: Total value of all the resources required for any particular intervention; opportunity cost to society of undertaking the intervention rather than using the ingredients for their most productive alternative use (Levin and McEwan, 2001).

Unit Cost: The total expenditure incurred to produce one unit of a particular product or service. Unit costs include all fixed costs, or overhead costs, and all variable costs, or direct material and labor costs.

Variable Cost: Cost that changes with the number of beneficiaries being served.

Value for Money: The optimal way to expend resources to achieve intended outcomes. Interpreted broadly, value-for-money analysis refers to a combination of cost-economy, cost-efficiency, and cost-effectiveness analyses.

Year of Analysis: The year in which the costing is expressed (Dhaliwal et al, 2014).

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